Waste Isolation Pilot Plant

Compliance Certification Application

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PHASE II FEPs

Records Package

FEP NS-7a: The Effects of Salt Water Disposal and Waterflooding on WIPP

Type Package: Model Description, Calculations and Analysis

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This Record of FEP Screening Work contains the documentation for conducting sidebar screening calculations to address hypothetical effects of salt water disposal wells on future WIPP performance. This work was planned, conducted and documented in accordance with the FEP Management Plan entitled: ***Features, Events and Processes (FEPs) Screening: Analysis Plan, Version 5.4, for Phase II FEPs.***

CONTENTS

SCREENING RECOMMENDATIONS (SUMMARY MEMO OF RECORD) 5

A. STATEMENT OF SCREENING DECISION 5
B. STATEMENT OF SCREENING ISSUE 5
C. APPROACH 5
D. RESULTS AND DISCUSSION 6

I. WORK PLAN: STATEMENT OF ISSUE/HYPOTHESIS 7

A. COMPARISON OF PRESENT DAY WIPP VERSUS VACUUM FIELD/RHODES-YATES FIELD PETROLEUM PRACTICES 8
A1. Differences between the two areas 8
A2. Description of Leaking Wellbores 10
B. HYPOTHESIS 13

II. BRAGFLO MODELS TO TEST HYPOTHESIS 13

A. RATIONALE FOR SELECTION OF MODELS USED IN CALCULATION 13
B. DESCRIPTION OF BRAGFLO MODEL 15
B.1 Comparison to 10,000 year BRAGFLO CCA models 17
B2: Description of Deeper Units 20
B3: Treatment of Leaky Boreholes in the Models 21
B4: Flow of Calculations: Grid construction, Parameterization, Initial and Boundary Conditions, Modifications to Data, and Analysis 21
C. ASSUMPTIONS NOT GIVEN IN THE WORK PLAN 24
D. PERFORMANCE MEASURES USED IN THE SCREENING EFFORT AND RATIONALE FOR USE 24
E. DOCUMENT SOFTWARE NAME AND VERSION NUMBERS 24
F. DESCRIPTION OF SCENARIOS AND KEY PARAMETERS 25
G. TREATMENT OF TIME INTERVALS 27
H. NAME OF PARTICIPANTS 27
I. DIAGRAM DESCRIBING DATA FLOW 28
J. INPUT/OUTPUT FILES 31
K. DOCUMENTATION OF CHANGES FROM WORK ANALYSIS PLAN AND RATIONALE 31

III. RESULTS AND DISCUSSIONS 32

IV. REFERENCES 41

Appendix A: Salt Water Disposal Model Results A1
Appendix B: Listing of All Parameters B1
Appendix C: GENMESH.INP File Listing C1
Appendix D: Differences between GENMESH.INP & GM_YATES01.INP (Genmesh) File Listings D1
Appendix E: MATSET_DMS_R001_GRID09.INP File Listing E1
Appendix F: ICSET_BASE01.INP File Listing F1
Appendix G: ALG_WATFLD_BASE01_R001.INP (Algebra) File Listing G1
Appendix H: ALG_WATFLD_BASE01_R002.INP (Algebra) File Listing H1
Appendix I: Differences between ALG_WATFLD_BASE01_R002.INP & ALG_WATFLD_BASE01_R003.INP (Algebra) File Listings I1
Appendix J: Differences between ALG_WATFLD_BASE01_R002.INP & ALG_WATFLD_BASE01_R004.INP (Algebra) File Listings J1
Appendix K: Differences between ALG_WATFLD_BASE01_R002.INP & ALG_WATFLD_BASE01_R005.INP (Algebra) File Listings K1
Appendix L: PREB_WATFLD_BASE01.INP (Prebrag) File Listing L1
Appendix M: PREB_WATFLD_YATES01.INP (Prebrag) File Listing M1

Appendix N: Differences between PREB_WATFLD_YATES01.INP & PREB_WATFLD_YATES02.INP (Prebrag) File Listings....N1
Appendix O: BRAGFLO_WATFLD_BASE01_R001.INP (BRAGFLO) File Listing....O1
Appendix P: BRAGFLO_WATFLD_YATES01_R002.INP (BRAGFLO) File Listing....P1
Appendix Q: Differences between BRAGFLO_WATFLD_BASE01_R001.INP & BRAGFLO_WATFLD_BASE01_R002.INP (BRAGFLO) File Listings....Q1
Appendix R: Differences between BRAGFLO_WATFLD_BASE01_R001.INP & BRAGFLO_WATFLD_BASE01_R004.INP (BRAGFLO) File Listings....R1
Appendix S: Differences between BRAGFLO_WATFLD_BASE01_R001.INP & BRAGFLO_WATFLD_BASE01_R005.INP (BRAGFLO) File Listings....S1
Appendix T: Differences between BRAGFLO_WATFLD_YATES01_R002.INP & BRAGFLO_WATFLD_YATES01_R003.INP (BRAGFLO) File Listings....T1
Appendix U: Differences between BRAGFLO_WATFLD_YATES01_R002.INP & BRAGFLO_WATFLD_YATES01_R004.INP (BRAGFLO) File Listings....U1
Appendix V: Differences between BRAGFLO_WATFLD_YATES01_R002.INP & BRAGFLO_WATFLD_YATES01_R005.INP (BRAGFLO) File Listings....V1
Appendix W: POSTALG_WF2 (Algebra) File Listing....W1
Appendix X: BASE01.INP (Summarize) File Listing....X1
Appendix Y: YATES01.INP (Summarize) File Listing....Y1

FIGURES

FIGURE 1: WIPP AREA GEOLOGY TYPICAL DISPOSAL WELL COMPLETION AND HYPOTHETICAL LEAKY PATHWAYS....11
FIGURE 2: RHODES-YATES AREA GEOLOGY EARLY WATERFLOOD INJECTION WELL AND HYPOTHETICAL LEAKY PATHWAYS....12
FIGURE 3: REPRESENTATION OF BRAGFLO FLUID INJECTION CROSS-SECTIONAL MODEL....15
FIGURE 4: REPRESENTATION OF TWO DIMENSIONAL RADIAL FLARING OUT FROM ONE WELLBORE (FLUID INJECTION MODEL)....19
FIGURE 5: PLAN VIEW OF TWO DIMENSIONAL TREATMENT OF THE WIPP EXCAVATED REGIONS (FLUID INJECTION MODEL)....19
FIGURE 6: TOTAL BRINE INJECTED FOR TWO SALT WATER DISPOSAL WELLS....32
FIGURE 7: TOTAL BRINE ENTERING ANHYDRITE BEDS TOWARD REPOSITORY FROM TWO SALT WATER DISPOSAL WELLS....33
FIGURE 8: TOTAL BRINE ENTERING REPOSITORY FROM ANHYDRITE BEDS DUE TO SALT WATER INJECTION....34
FIGURE 9: AVERAGE REPOSITORY BRINE SATURATION DURING SIMULTANEOUS SALT WATER DISPOSAL....35
FIGURE 10: AVERAGE BRINE SATURATION IN THE DRZ DURING SIMULTANEOUS SALT WATER DISPOSAL....36
FIGURE 11: AVERAGE REPOSITORY PRESSURE DURING SIMULTANEOUS SALT WATER DISPOSAL....36
FIGURE 12: AVERAGE PRESSURE IN MB 139 DURING SIMULTANEOUS SALT WATER DISPOSAL....37
FIGURE 13: PATH OF LEAKY FLUID DURING ACTIVE INJECTION FOR WIPP GEOLOGY CASE 3....38
FIGURE 14: PATH OF LEAKY FLUID DURING ACTIVE INJECTION FOR RHODES-YATES GEOLOGY CASE 4....38
FIGURE 15: TOTAL FLOW TO CULEBRA FROM DISPOSAL WELLS....39
FIGURE 16: CUMULATIVE BRINE FLOW INTO REPOSITORY FROM ALL MARKER BEDS (WIPP PA96: CCA UNDISTURBED CALCULATIONS)....40

TABLES

TABLE 1: X-DIRECTION GRIDBLOCK DIMENSIONS....16
TABLE 2: Y-DIRECTION GRIDBLOCK DIMENSIONS....17
TABLE 3: PERMEABILITY MULTIPLIERS FOR ABANDONED AND LEAKY CASING BOREHOLES....21
TABLE 4: PROPERTIES FOR EIGHT SCENARIOS USED IN STUDY....25

SCREENING RECOMMENDATIONS (Summary Memo of Record)

A. Statement of Screening Decision

FEP screening Issue NS-7a: The Effects of Salt Water Disposal and Waterflooding on WIPP need NOT be included in the Compliance Certification Application (CCA).

B. Statement of Screening Issue

The issue of injected brine from petroleum injection wells leaking into the Salado formation and saturating the WIPP repository has been raised due proven leaking wells in the Vacuum and alleged leaking wells in the Rhodes-Yates petroleum fields. These fields are relatively close to WIPP (about 40 miles away) and underlie the Salado formation, just as do the WIPP area fields. Since injection operations in the form of salt water disposal (SWD) wells and pressure maintenance (waterflooding) wells are presently taking place just outside the Land Withdrawal Boundary (LWB) surrounding WIPP, there is concern that this injection may endanger the WIPP by leaking brine into the waste panels through the Salado. This in turn may affect long term repository performance by providing an additional source of brine to dissolve and transport radionuclides away from the site. The petroleum fields of the WIPP region are significantly different than these areas, however, and it will be shown that these differences will eliminate the possibility of a nearby injection well leaking through the Salado and reaching the WIPP.

C. Approach

Because certain petroleum practices are hard to define in a probabilistic sense (for example, the quality of the cement and/or casing and its ability to withstand leaks over time), a calculational approach was adopted to test the potential consequence of injection wells leaking into the Salado, should certain barriers to leakage fail. Since comparisons have been made between the older petroleum fields located in the back-reef areas of the Delaware Basin (i.e. Rhodes-Yates and Vacuum) to the WIPP area fields, two sets of conceptual models were developed to quantify and compare the effects that these differences might have on repository performance should the site be placed in the Rhodes-Yates region of the Delaware Basin. The important differences between the two regions are summarized below:

1. The greater vertical distance from the injection interval to the WIPP horizon tends to limit flow up a potential annular casing leak. The added geology represented by the Castile formation increases the amount of "thief" zones into which injected fluid can penetrate. The Castile is not present in the Vacuum and Rhodes-Yates areas.

2. Open-hole and nitro-fractured completions such as those in the early Rhodes-Yates wells are not used in the current WIPP area wells, since cemented and perforated casing with controlled hydrofracturing is the preferred well completion method. Hence the cement integrity in the casing annulus is consistently better than in the early Rhodes-Yates wells, and large casing leaks are highly unlikely.

3. The state requirements of a continuous casing string across the Salado and Castile, and an injection gradient limit of 0.2 psi/ft (4.5 kPa/m) above hydrostatic [~0.73 psi/ft (16.42 kPa/m) total in the WIPP area] are further assurances that large leaks into the Salado from injection wells is impossible. Injection gradients of 1.0 psi/ft (22.6 kPa/m) are not uncommon for some of the wells in the Vacuum and Rhodes-Yates fields.

Two sets of BRAGFLO conceptual models were developed: One set representing the geologic cross section through of the WIPP area, and another set representing the geology of the Rhodes-Yates area, should a hypothetical WIPP-like repository exist in that area of the Delaware Basin. Various barriers to flow are systematically removed in both sets of models, i.e. casing leaks are modeled, then casing and tubing leaks together, and finally the anhydrite layers are allowed to fracture significantly to simulate a massive hydro-frac. Each of these models is described in Table 4.

D. Results and Discussion

Two performance metrics were chosen for this analysis: Each model was compared to a WIPP geology baseline run, in which all parameters were the median values from the CCA database. None of the WIPP realizations showed significant deviations in pressure, saturation, and brine flow from the baseline model. This is illustrated in Figures 7 through 12. Even the "worst case" realization for the WIPP geology showed insignificant differences in performance compared to the baseline model. The second performance metric was a comparison to the CCA undisturbed performance of brine entering the repository through the anhydrite layers. As shown in Figures 8 and 16, the amount of brine entering the repository due to salt water injection for all the WIPP geology models is well below both the mean and median curves for the undisturbed calculations in the CCA. The calculations for the Rhodes-Yates geology models, in which the geology is different and injection gradients are higher, show more brine entering the "hypothetical" repository. In summary, these calculations show that present day petroleum injection practices and geology of the WIPP area eliminate the consequences of large amounts of brine leaking to the WIPP.

I. WORK PLAN: STATEMENT OF ISSUE/HYPOTHESIS

The potential impacts of oil and gas production and simultaneous salt water injection/disposal on the WIPP site have come into focus because of documented events in two Delaware Basin oil fields - the Vacuum field, and the Rhodes-Yates field. Both of these fields have been waterflooded for forty years with possible (in the case of the Rhodes-Yates field), or confirmed (as in the Vacuum Field) leaking wells which have resulted in brine water entering the Salado and other formations above the Salado. It has been hypothesized that a similar situation may occur at the WIPP site because of current waterflooding and salt water disposal into formations below the Castile. This may in turn affect the long term performance of the repository should a significant amount of this injection brine migrate into the excavated panels through the Salado and/or marker beds. Several predictive models were developed to evaluate the potential effects of future water injection adjacent to the WIPP land withdrawal boundary. This study looks only at the potential effects of salt water disposal since there are currently several salt water disposal wells in the WIPP area. Salt water disposal is considered to be the bounding (or "worst case") scenario with respect to long-term repository performance for all liquid injection cases associated with the oil and gas activities currently being used in the WIPP area. Waterflooding, in which brine is injected into oil producing formations in order to maintain reservoir pressures and/or displace the oil toward offset producing wells, also involves brine injection. However, the potential risks to repository performance are considerably less (and therefore bounded) by the salt water disposal scenario for several reasons:

- Waterflood injection pressures and volumes are monitored much more closely (compared to disposal wells) by the oil and gas operator, since the injected brine is being used to increase recoverable oil reserves. This reduces the possibility of the injection fluid escaping "out of zone" due to casing leaks. Salt water disposal wells are not as closely monitored, so the possibility of casing leaks is much higher.

- The oil pools around WIPP are of relatively small volume, and most are operated by small independent oil companies. These companies typically do not have the money to invest in large scale waterflood projects, and it is much more economical to simply dispose of the produced brine (via salt water disposal wells) than to build and maintain waterflood facilities.

- The oil producing horizons which would be targeted for waterflooding (Brushy Canyon formation and below) are deeper than the formation (Bell Canyon) being used for salt-water disposal. Therefore a casing leak would have to travel a longer vertical distance to reach the Salado compared to a leak in the shallower disposal well. This is important because a higher pressure gradient is required to move similar fluid volumes over greater linear distances. Additionally, there would be more "thief zones", or intervening formations which could siphon off leaking brine.

- Several other injection methods can be used to enhance oil recovery. Tertiary recovery methods such as Carbon Dioxide flooding (CO_2), steamflooding, polymer flooding and oxygen rich mixtures for fire-flooding are not considered in this study due to economics for the WIPP area fields.

- Another common oil field practice for fluid injection is produced natural gas re-injection for pressure maintenance. This scenario is not considered as a possible future event at WIPP because gas re-injection costs more than waterflooding, and the operators in the area sell the produced gas.

A. Comparison of Present Day WIPP versus Vacuum Field/Rhodes-Yates Field Petroleum Practices

A detailed information packet describing the geologic differences, as well as the differences in petroleum practices between historical Rhodes-Yates and current WIPP areas, can be found in the WIPP central files: WPO# 26317 "Waterflood Records Package", authored by LJ Dotson.

A1. Differences between the two areas

The Vacuum and Rhodes-Yates petroleum fields are different from the WIPP area fields and therefore the possibility of leakage occurring into WIPP from salt water disposal and/or waterflood injection wells is highly unlikely. These differences will decrease the probability of a nearby injection well leaking through the Salado and reaching the WIPP. Because certain petroleum practices are hard to define in a probabilistic sense (for example, the quality of the cement and/or casing and its ability to withstand leaks over time), a calculational approach was adopted to test the potential consequence of injection wells leaking into the Salado, should certain barriers to leakage fail. Since comparisons have been made between the older petroleum fields located in the back-reef areas of the Delaware Basin (i.e. Rhodes-Yates and Vacuum) to the WIPP area fields, two sets of conceptual models were developed to quantify and compare the effects that these differences might have on repository performance should the site be placed in the Rhodes-Yates region of the Delaware Basin. The important differences between the two regions are summarized below:

- Geologic/lithologic differences
- Changes in oil-well completion practices from the 1940's to present day
- Improved reservoir management by operators
- Recent state regulations to reduce the possibility of petroleum wells leaking into the Salado

Geologic/Lithologic Differences

The differences in geology between WIPP and the Vacuum and Rhodes-Yates Fields are significant. WIPP is located in a fore reef area of the Capitan Reef structure, where a thick zone of anhydrite and halite (Castile Formation) exists. Oil production is from the Brushy Canyon and deeper formations at depths greater than 7,000 feet (2,134 m), which is 5,000 feet (1,524 m) below the WIPP repository. By contrast, the Castile Formation is missing at both the Vacuum and Rhodes-Yates Fields which are located in reef and back reef environments, respectively. Oil production at the Vacuum Field is from the San Andres and Grayburg Formations at depths of approximately 4,500 feet (1,372 m) and oil production at the Rhodes-Yates Field is from the Yates and Seven Rivers Formations at depths of approximately 3,000 feet (914 m). If WIPP existed adjacent to the Rhodes-Yates Field, there would be 500 feet (155 m) of vertical separation between the WIPP horizon and the waterflood injection zone. In the WIPP area, salt water disposal occurs in the Upper Bell Canyon formation which is 1900 feet (580 m) below the WIPP horizon (nearly **four times** the vertical distance as compared to the Rhodes-Yates Field). In addition, the oil pools near WIPP are characterized by heterogeneous channel sands with thin net pay zones, low permeabilities, and high irreducible water saturations. These type of formations are not conducive to large scale waterflooding because the injected water tends to "finger" through to the producing wells, by-passing large pockets of oil. In fact, the existing oil pool adjacent to WIPP currently undergoing water injection (the Cabin Lakes pool) is being waterflooded more for in-situ pressure maintenance than for oil displacement. This is an important distinction because fewer injection wells are needed for pressure maintenance than are needed for waterflood projects. It is anticipated that the life of the pools near WIPP will be less than ten years for primary production and an additional ten years for secondary production.

Changes in oil-well completion practices from the 1940's to present day

The petroleum industry has made many advances since the time when the Vacuum and Rhodes-Yates Fields were first developed. Improvements in drilling, casing, and cementing technology have greatly reduced the occurrences of leaks in oil wells. An industry-wide effort to reduce formation damage and increase production has lead to improvements in completion design and advances in stimulation. Open-hole (non-cased) production/injection wells and nitroglycerin treatments are no longer used. Acid stimulation and hydraulic fracturing techniques have improved considerably in the last ten years. Service industry support has made these technologies available to both the large and small operator.

Improved reservoir management by operators

The availability of inexpensive software has lead to improved reservoir management, including waterflood design. As a rule of thumb, fracture gradients are assumed to be one psi/ft, and operators will keep their injection pressures below this level.

Recent state regulations to reduce the possibility of petroleum wells leaking into Salado
New Mexico State regulations require a salt protection casing string for all wells drilled in the Potash Enclave, which includes the WIPP area. Injection pressures are not allowed to exceed the rock's fracture gradient at the injection horizon [or 0.2 psi/ft (4.5 kPa/m) above hydrostatic if fracture pressures are unknown] for all injection/disposal wells. Operators obey these regulations because the state has power to levy fines and/or shut wells in should they become aware of a violation. (order #R-111-P, State of New Mexico Energy, Minerals, and Natural Resources Dept., Oil Conservation Commission, Feb 18, 1988).

A2. Description of Leaking Wellbores

Figure 1a illustrates how salt water disposal wells in the vicinity of the WIPP are completed presently. Wells are completed with three casing strings with cementing requirements dictated by the State of New Mexico Oil Conservation Division. A typical completion starts with the outermost surface casing string (typically 13 3/8" OD - outer diameter) which extends to the base of the Rustler formation. During permanent placement of the casing string, cement is pumped down the interior of the casing and up through the annulus between the drilled borehole and the casing exterior. A rubber "plug" is pumped after the cement to completely displace the cement out of the casing interior. Once the cement hardens, the plug is "drilled out" to deepen the well. The state requires that cement be pumped all the way from the bottom to the surface in the annulus of the surface casing. The intermediate (also called the salt protection) casing string is typically 8 5/8" OD and extends to the base of the salt section (Castile formation). It is also cemented to the surface using the same procedure as used for the surface casing. Finally, the production casing string is typically 5 1/2" OD and is set to the total depth of the well (which is the Upper Bell Canyon formation for salt water disposal wells). This casing string is cemented such that the top of the cement in the annulus extends far enough to overlap the intermediate casing by several hundred meters. The injected brine is pumped through tubing (2 7/8" OD pipe) from the surface. This tubing is secured above the injection perforations by a packer, which has an elastomer seal to keep the injected fluid from entering the casing - tubing annulus. The arrows in Figure 1a illustrate the direction of flow of the injected brine down the tubing and out the perforated interval. The brine enters the Upper Bell Canyon formation through perforations (holes) in the casing and cement created by shaped charge explosives created immediately after the casing is set. At the surface, gages indicate the relative tubing and casing pressures. During injection, the pressure in the tubing-casing annulus is always significantly less than the injection tubing pressure.

Many salt water disposal wells are converted from previously producing oil wells from deeper formations (i.e. the Lower Bell Canyon, Cherry Canyon or Brushy Canyon formations). These former producing wells are plugged back with cement to the injection interval so there is no communication with the deeper perforations. Converted injection wells are cased and cemented under the same state guidelines.

Figure 1b illustrates the preferred pathway for a "leaky" salt water disposal well to communicate directly with a WIPP panel. An open channel would have to exist in the cement sheath between the casing and borehole to connect the perforations at the injection interval (Upper Bell Canyon) with Marker Bed 139 (MB139). In order for injection brine to reach WIPP, it would first have to travel 1900 vertical feet (580 m) through this continuous open channel. It would then have to flow an additional 10,000 horizontal feet (3048 m) through MB139. The accepted industry rule of thumb is that only 10 to 20 feet of continuous cement in the casing-borehole annulus is needed to provide sufficient vertical isolation from leaks. Any channel in the cement sheath would also be in contact with intervening formations. Some of these formations could act as "thief zones" and siphon off portions of the brine prior to its entering MB139. If a well is improperly completed such that poor cement exists throughout its entire vertical length, leaking injection brine will enter the formation with the highest permeability. In the WIPP area, this would be the Culebra formation, since it has the highest known permeability. "Behind-casing" leaks are difficult to detect since the tubing and casing surface pressures are very similar to those for non-leaking wells.

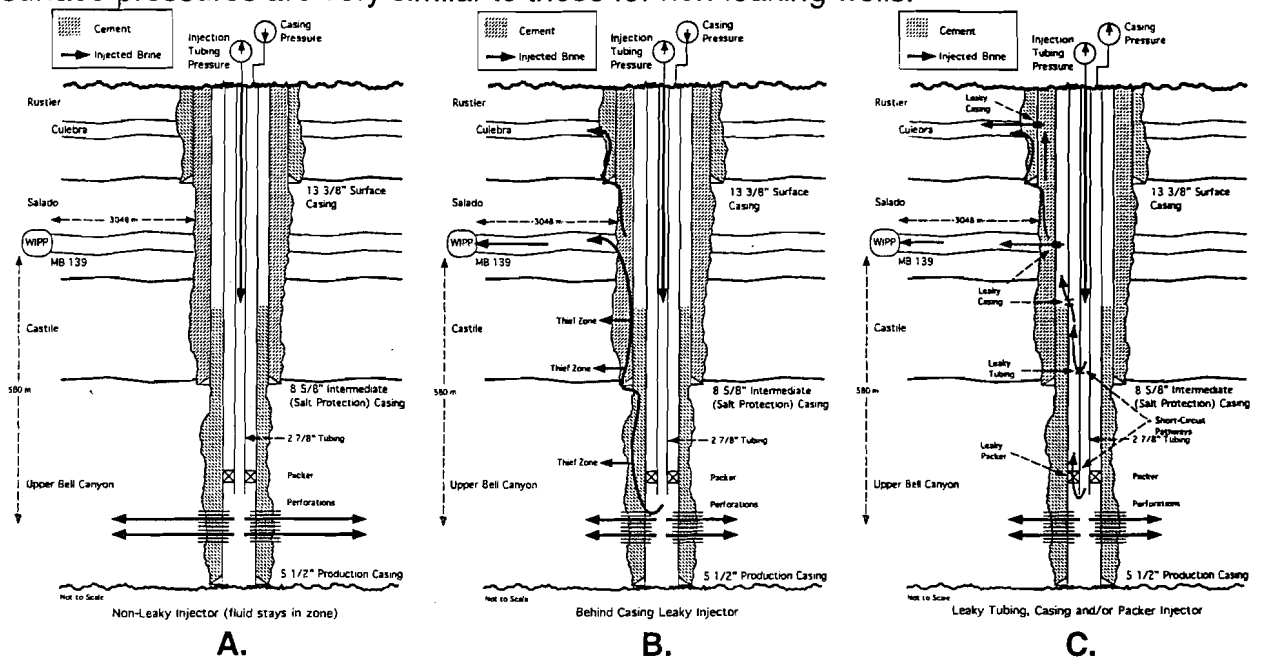


Figure 1: WIPP area geology typical Disposal Well Completion and Hypothetical Leaky Pathways

This pathway could be "short-circuited" if a leak occurred in the casing across the Salado formation. A leak would also have to occur in the tubing and/or through the packer as illustrated in Figure 1c. This is highly unlikely for two reasons:

1) A tubing or a packer leak is easy to detect via pressure response at the surface. In this situation the pressure in the tubing-casing annulus is equal to the injection tubing pressure. The state requires that all known tubing and/or packer leaks be corrected.

2) Should a tubing or packer leak exist, there would also have to be holes in both the production and intermediate casing strings as well as the cement in the annular spaces for injected brine to come in contact with the Salado. Similarly the surface casing string would also have to leak for injected brine to reach the Culebra formation.

Figure 2a illustrates the typical wellbore completion for an older (1940's and '50's vintage) Rhodes-Yates converted waterflood injector. In comparison to a present day WIPP area injector, the vertical distance from the surface to the injection interval is significantly less (500 ft or 155 m). Many of the Rhodes-Yates waterflood injectors are converted production wells. These wells were completed "open-hole" or "barefoot" in which the production casing did not extend into the producing formation. Cementing requirements were not mandated and the production casing was probably only cemented across the bottom several hundred feet (60 meters) of annular space. Notice that there is no intermediate (salt protection) casing string. Initially these production wells were "stimulated" using nitroglycerin blasting (termed "nitro-fracs"). Upon conversion to waterflood injectors, the barefoot section remained unaltered.

Figure 2b illustrates the leaky injector scenario similar to Figure 1b for the WIPP area injector. As shown, it is much more likely for a behind casing leak to occur in an early Rhodes-Yates injector since the intermediate casing string (salt protection) does not exist and because of the high probability of reduced cement volumes in the casing - borehole annulus. Because of the shorter vertical distance, fewer potential thief zones are available to siphon off the injected brine.

Figure 2c illustrates the leaky tubing, casing and/or packer scenario similar to Figure 1c. Once again there are fewer barriers to impede the injected brine's ability to come in contact with the Salado.

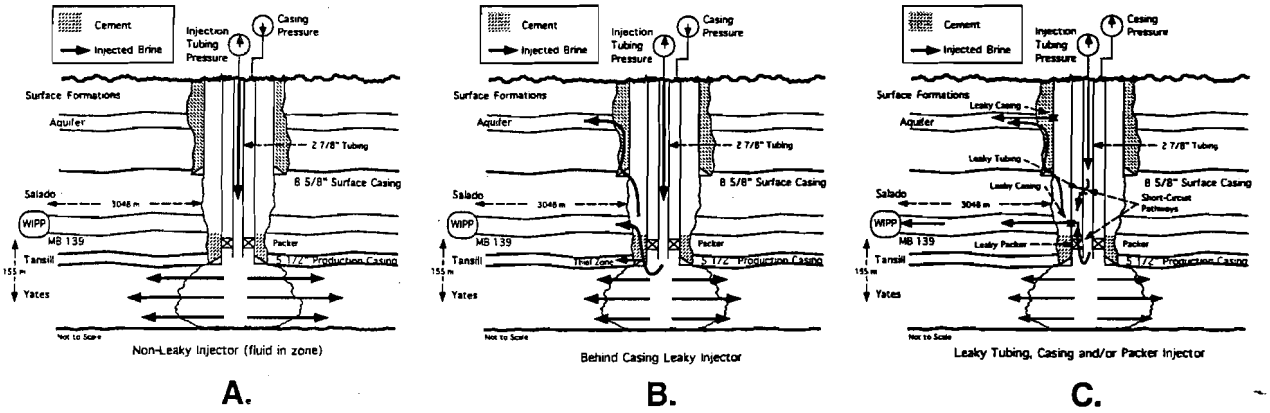


Figure 2: Rhodes-Yates area geology early waterflood injection well and Hypothetical Leaky Pathways

B. Hypothesis

Geological differences, modern petroleum development practices and government regulations will greatly reduce the potential consequences of nearby salt water disposal wells leaking to the Salado and therefore into the WIPP.

II. BRAGFLO MODELS TO TEST HYPOTHESIS

A. Rationale for Selection of Models used in Calculation

In order to test the hypothesis, two sets of conceptual models were developed, representing the different geologies at the WIPP and Rhodes-Yates areas. The models are two-dimensional vertical cross-sections incorporating the properties of the repository/shaft system within the Halite. The Salado, Castile, Marker Beds, and formations above the Salado have properties similar to those used in the CCA BRAGFLO models. The rock strata below the Castile associated with oil and gas production are also included, and differ slightly to represent the two geologic settings. The areal dimensions for all the models are the same, and extend one quarter mile (402.3 m) out from the four mile Land Withdrawal Boundary (LWB) for a 4.5 mile total extent. In order to model the various salt water disposal scenarios, two wellbores are assumed, one at each end of the mesh. The two geologic settings representing the fore and back reef areas are modeled by changing the grid dimensions in the following manner (note the total number of grid block is unchanged):

- The vertical height of the Salado formation beneath the WIPP horizon was reduced from 197.272 m for the WIPP geologic model to 116.8 m for the Rhodes-Yates geologic model. The Salado flow properties are the same for the two models.

- The vertical height of the Castile formation was reduced from 381 m for the WIPP geologic model to 38.1 m for the Tansill formation of the Rhodes-Yates geologic model. All other parameters for this layer (besides the name) remain unchanged, i.e., permeability, porosity, compressibility, etc.

- In order to make the total vertical height of the models the same for the WIPP and Rhodes-Yates geologies, the vertical height of the deepest non-pay interval of the mesh (i.e. Morrow Limestone) was changed from 205.222 m for the WIPP geologic model to 628.59 for the Rhodes-Yates geologic model.

The material properties and layering below the Castile formation (WIPP geology) or Tansill formation (Rhodes-Yates geology) were the same for both models. This part of the mesh was set up to investigate the future effects of simultaneous injection and/or production from the deeper units below the Bell Canyon formation. Because the

consequences of present-day salt water disposal operations adjacent to the LWB are the (current) highest priority oil and gas FEP to the stakeholders, and brine injection into the Bell Canyon formation is considered the near future event of the highest potential consequence, fluid injection into and/or removal from the deeper units will not be modeled at this time.

The following regulations pertain to this FEP:

- 40 CFR 194.32(c) *performance assessments shall include an analysis of the effects on the disposal system of any activities that occur in the vicinity of the disposal system prior to disposal and are expected to occur in the vicinity of the disposal system soon after disposal. Such activities shall include, but shall not be limited to, existing boreholes and the development of any existing leases that can be reasonably expected to be developed in the near future,* ***including boreholes and leases that may be used for fluid injection activities*** (emphasis added). (61 FR 5224-5245).

- 40 CFR 194.33(d) *With respect to future drilling events, performance assessments need not analyze the effects of techniques used for resource recovery subsequent to the drilling of the borehole.* (61 FR 5224-5245).

The models used for this analysis reflect these guidelines in the following ways:

- "Near future" for current oil and gas lease development is assumed (by the author) to be fifty years post-closure of the repository.
- The wellbores used in this analysis lie just outside the LWB (not within), as the time frame defined as "near future" occurs during active institutional control, and no new wells will exist within the LWB during this time.
- The wells are only "active", i.e., injecting, during the fifty year near future time period. After fifty years they go to abandoned (or "passive") state. The abandoned borehole permeabilities in this model are consistent with those used for the 10,000 year CCA BRAGFLO models.

B. *Description of BRAGFLO Model*

A cross-sectional view of the model is represented by the following diagram (Figure 3). Note that differences between Rhodes-Yates geology and WIPP geology are bolded under the Rhodes-Yates geology heading. Actual grid block dimensions are given in Tables 1 and 2.

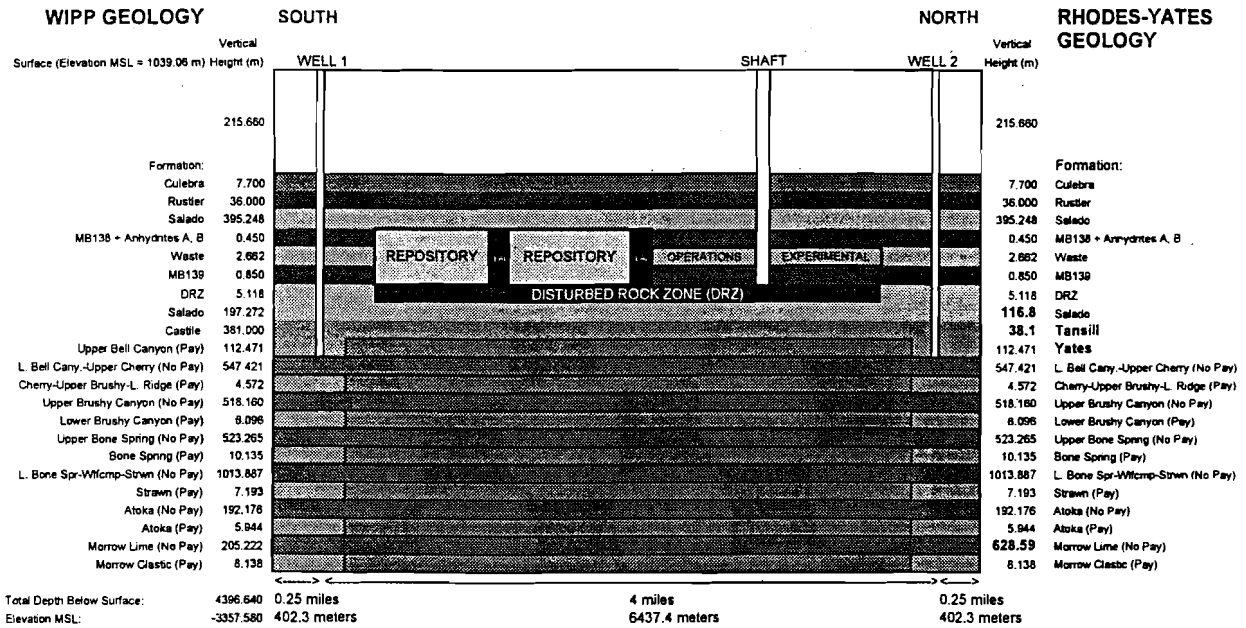


Figure 3: Representation of BRAGFLO fluid injection cross-sectional model

Table 1: X-direction Gridblock Dimensions

Description	Element Thickness (feet)	Element Thickness (Meters)	Node Number From	Node Number To	X Direction Increments Delta X (ft)	X Direction Increments Delta X (m)	Total Distance (ft)	Total Distance (m)	Total Distance (mi)
1/2 40 acr	1,320.0000	402.3360	1	2	6.600E+02	2.0117E+02	6.6000E+02	2.0117E+02	0.12500
Λ	699.0004	213.0553	2	3	4.300E+02	1.3106E+02	1.0900E+03	3.3223E+02	0.20644
Λ	219.9100	67.0286	3	4	1.800E+02	5.4864E+01	1.2700E+03	3.8710E+02	0.24053
Λ	50.2650	15.3208	4	5	3.600E+01	1.0973E+01	1.3060E+03	3.9807E+02	0.24735
Λ	14.9230	4.5485	5	6	9.000E+00	2.7432E+00	1.3150E+03	4.0081E+02	0.24905
Λ	5.4978	1.6757	6	7	3.000E+00	9.1440E-01	1.3180E+03	4.0173E+02	0.24962
Λ	1.9717	0.6010	7	8	1.490E+00	4.5403E-01	1.3195E+03	4.0218E+02	0.24990
WELL 1	0.8018	0.2444	8	9	1.021E+00	3.1117E-01	1.3205E+03	4.0249E+02	0.25010
V	1.9717	0.6010	9	10	1.490E+00	4.5403E-01	1.3220E+03	4.0295E+02	0.25038
V	5.4978	1.6757	10	11	3.000E+00	9.1440E-01	1.3250E+03	4.0386E+02	0.25095
V	14.9230	4.5485	11	12	9.000E+00	2.7432E+00	1.3340E+03	4.0660E+02	0.25265
V	50.2650	15.3208	12	13	3.600E+01	1.0973E+01	1.3700E+03	4.1758E+02	0.25947
V	219.9100	67.0286	13	14	1.800E+02	5.4864E+01	1.5500E+03	4.7244E+02	0.29356
V	699.0004	213.0553	14	15	4.300E+02	1.3106E+02	1.9800E+03	6.0350E+02	0.37500
1/3 40 acre	1,320.0000	402.3360	15	16	4.400E+02	1.3411E+02	2.4200E+03	7.3762E+02	0.45833
1/3 40 acre	1,320.0000	402.3360	16	17	4.400E+02	1.3411E+02	2.8600E+03	8.7173E+02	0.54167
1/3 40 acre	1,320.0000	402.3360	17	18	4.400E+02	1.3411E+02	3.3000E+03	1.0058E+03	0.62500
1/3 40 acre	1,320.0000	402.3360	18	19	4.400E+02	1.3411E+02	3.7400E+03	1.1400E+03	0.70833
1/3 40 acre	1,320.0000	402.3360	19	20	4.400E+02	1.3411E+02	4.1800E+03	1.2741E+03	0.79167
1/3 40 acre	1,320.0000	402.3360	20	21	4.400E+02	1.3411E+02	4.6200E+03	1.4082E+03	0.87500
1/3 40 acre	1,320.0000	402.3360	21	22	4.400E+02	1.3411E+02	5.0600E+03	1.5423E+03	0.95833
1/3 40 acre	1,320.0000	402.3360	22	23	4.400E+02	1.3411E+02	5.5000E+03	1.6764E+03	1.04167
1/3 40 acre	1,320.0000	402.3360	23	24	4.400E+02	1.3411E+02	5.9400E+03	1.8105E+03	1.12500
1/3 40 acre	1,320.0000	402.3360	24	25	4.400E+02	1.3411E+02	6.3800E+03	1.9446E+03	1.20833
1/3 40 acre	1,320.0000	402.3360	25	26	4.400E+02	1.3411E+02	6.8200E+03	2.0787E+03	1.29167
1/3 40 acre	1,320.0000	402.3360	26	27	4.400E+02	1.3411E+02	7.2600E+03	2.2128E+03	1.37500
1/3 40 acre	1,320.0000	402.3360	27	28	4.400E+02	1.3411E+02	7.7000E+03	2.3470E+03	1.45833
1/3 40 acre	1,320.0000	402.3360	28	29	4.400E+02	1.3411E+02	8.1400E+03	2.4811E+03	1.54167
1/3 40 acre	1,320.0000	402.3360	29	30	4.400E+02	1.3411E+02	8.5800E+03	2.6152E+03	1.62500
1/3 40 acre	1,320.0000	402.3360	30	31	4.400E+02	1.3411E+02	9.0200E+03	2.7493E+03	1.70833
1/3 40 acre	1,320.0000	402.3360	31	32	4.400E+02	1.3411E+02	9.4600E+03	2.8834E+03	1.79167
V	1,320.0000	402.3360	32	33	2.000E+02	6.0960E+01	9.6600E+03	2.9444E+03	1.82955
V	1,320.0000	402.3360	33	34	1.600E+02	4.8768E+01	9.8200E+03	2.9931E+03	1.85985
V	1,320.0000	402.3360	34	35	6.000E+01	1.8288E+01	9.8800E+03	3.0114E+03	1.87121
V	1,320.0000	402.3360	35	36	2.000E+01	6.0960E+00	9.9000E+03	3.0175E+03	1.87500
Waste	1,320.0000	402.3360	36	37	2.000E+01	6.0960E+00	9.9200E+03	3.0236E+03	1.87879
Waste	1,320.0000	402.3360	37	38	4.000E+01	1.2192E+01	9.9600E+03	3.0358E+03	1.88638
Waste	1,320.0000	402.3360	38	39	8.000E+01	2.4384E+01	1.0040E+04	3.0602E+03	1.90152
Waste	1,320.0000	402.3360	39	40	1.800E+02	5.4864E+01	1.0220E+04	3.1151E+03	1.93561
Waste	1,320.0000	402.3360	40	41	8.000E+01	2.4384E+01	1.0300E+04	3.1394E+03	1.95076
Waste	1,320.0000	402.3360	41	42	4.000E+01	1.2192E+01	1.0340E+04	3.1516E+03	1.95833
Waste	1,320.0000	402.3360	42	43	1.469E+01	4.4790E+00	1.0355E+04	3.1561E+03	1.96112
SEALS	1,320.0000	402.3360	43	44	6.687E+00	2.0381E+00	1.0361E+04	3.1581E+03	1.96238
Waste	1,320.0000	402.3360	44	45	1.469E+01	4.4790E+00	1.0376E+04	3.1626E+03	1.96517
Waste	1,320.0000	402.3360	45	46	4.000E+01	1.2192E+01	1.0416E+04	3.1748E+03	1.97274
Waste	1,320.0000	402.3360	46	47	8.000E+01	2.4384E+01	1.0496E+04	3.1992E+03	1.98789
Waste	1,320.0000	402.3360	47	48	1.600E+02	4.8768E+01	1.0656E+04	3.2480E+03	2.01820
Waste	1,320.0000	402.3360	48	49	1.000E+02	3.0480E+01	1.0756E+04	3.2785E+03	2.03714
Waste	1,320.0000	402.3360	49	50	4.000E+01	1.2192E+01	1.0796E+04	3.2908E+03	2.04471
Waste	1,320.0000	402.3360	50	51	2.000E+01	6.0960E+00	1.0816E+04	3.2967E+03	2.04850
SEALS	1,320.0000	402.3360	51	52	1.337E+01	4.0762E+00	1.0829E+04	3.3008E+03	2.05103
Operations	1,320.0000	402.3360	52	53	3.281E+01	1.0000E+01	1.0862E+04	3.3108E+03	2.05725
Operations	1,320.0000	402.3360	53	54	1.256E+02	3.8283E+01	1.0988E+04	3.3491E+03	2.08103
Operations	1,320.0000	402.3360	54	55	1.640E+01	5.0000E+00	1.1004E+04	3.3541E+03	2.08414
Operations	1,320.0000	402.3360	55	56	3.281E+00	9.9999E-01	1.1008E+04	3.3551E+03	2.08476
SHAFT	1,320.0000	402.3360	56	57	7.087E-01	2.1601E-01	1.1008E+04	3.3553E+03	2.08490
Experim	1,320.0000	402.3360	57	58	3.281E+00	9.9999E-01	1.1012E+04	3.3563E+03	2.08552
Experim	1,320.0000	402.3360	58	59	2.625E+01	8.0000E+00	1.1038E+04	3.3643E+03	2.09049
Experim	1,320.0000	402.3360	59	60	1.467E+02	4.4711E+01	1.1184E+04	3.4090E+03	2.11827
Makeup	1,320.0000	402.3360	60	61	3.666E+02	1.1175E+02	1.1551E+04	3.5208E+03	2.18771
Makeup	1,320.0000	402.3360	61	62	3.666E+02	1.1175E+02	1.1918E+04	3.6325E+03	2.25715
Makeup	1,320.0000	402.3360	62	63	6.474E+02	1.9733E+02	1.2565E+04	3.8299E+03	2.37976
Makeup	1,320.0000	402.3360	63	64	6.474E+02	1.9733E+02	1.3213E+04	4.0272E+03	2.50238
Makeup	1,320.0000	402.3360	64	65	6.474E+02	1.9733E+02	1.3860E+04	4.2245E+03	2.62500
1/3 40 acre	1,320.0000	402.3360	65	66	4.400E+02	1.3411E+02	1.4300E+04	4.3586E+03	2.70833
1/3 40 acre	1,320.0000	402.3360	66	67	4.400E+02	1.3411E+02	1.4740E+04	4.4927E+03	2.79166
1/3 40 acre	1,320.0000	402.3360	67	68	4.400E+02	1.3411E+02	1.5180E+04	4.6269E+03	2.87500
1/3 40 acre	1,320.0000	402.3360	68	69	4.400E+02	1.3411E+02	1.5620E+04	4.7610E+03	2.95833
1/3 40 acre	1,320.0000	402.3360	69	70	4.400E+02	1.3411E+02	1.6060E+04	4.8951E+03	3.04166
1/3 40 acre	1,320.0000	402.3360	70	71	4.400E+02	1.3411E+02	1.6500E+04	5.0292E+03	3.12500
1/3 40 acre	1,320.0000	402.3360	71	72	4.400E+02	1.3411E+02	1.6940E+04	5.1633E+03	3.20833
1/3 40 acre	1,320.0000	402.3360	72	73	4.400E+02	1.3411E+02	1.7380E+04	5.2974E+03	3.29166
1/3 40 acre	1,320.0000	402.3360	73	74	4.400E+02	1.3411E+02	1.7820E+04	5.4315E+03	3.37500
1/3 40 acre	1,320.0000	402.3360	74	75	4.400E+02	1.3411E+02	1.8260E+04	5.5656E+03	3.45833
1/3 40 acre	1,320.0000	402.3360	75	76	4.400E+02	1.3411E+02	1.8700E+04	5.6998E+03	3.54166
1/3 40 acre	1,320.0000	402.3360	76	77	4.400E+02	1.3411E+02	1.9140E+04	5.8339E+03	3.62500
1/3 40 acre	1,320.0000	402.3360	77	78	4.400E+02	1.3411E+02	1.9580E+04	5.9680E+03	3.70833
1/3 40 acre	1,320.0000	402.3360	78	79	4.400E+02	1.3411E+02	2.0020E+04	6.1021E+03	3.79166
1/3 40 acre	1,320.0000	402.3360	79	80	4.400E+02	1.3411E+02	2.0460E+04	6.2362E+03	3.87500
1/3 40 acre	1,320.0000	402.3360	80	81	4.400E+02	1.3411E+02	2.0900E+04	6.3703E+03	3.95833
1/3 40 acre	1,320.0000	402.3360	81	82	4.400E+02	1.3411E+02	2.1340E+04	6.5044E+03	4.04166
1/3 40 acre	1,320.0000	402.3360	82	83	4.400E+02	1.3411E+02	2.1780E+04	6.6385E+03	4.12500
Λ	699.0004	213.0553	83	84	4.300E+02	1.3106E+02	2.2210E+04	6.7696E+03	4.20643
Λ	219.9100	67.0286	84	85	1.800E+02	5.4864E+01	2.2390E+04	6.8245E+03	4.24053
Λ	50.2650	15.3208	85	86	3.600E+01	1.0973E+01	2.2426E+04	6.8354E+03	4.24734
Λ	14.9230	4.5485	86	87	9.000E+00	2.7432E+00	2.2435E+04	6.8382E+03	4.24905
Λ	5.4978	1.6757	87	88	3.000E+00	9.1440E-01	2.2438E+04	6.8391E+03	4.24962
Λ	1.9717	0.6010	88	89	1.490E+00	4.5403E-01	2.2439E+04	6.8395E+03	4.24990
WELL 2	0.8018	0.2444	89	90	1.021E+00	3.1117E-01	2.2440E+04	6.8399E+03	4.25009
V	1.9717	0.6010	90	91	1.490E+00	4.5403E-01	2.2442E+04	6.8403E+03	4.25037
V	5.4978	1.6757	91	92	3.000E+00	9.1440E-01	2.2445E+04	6.8412E+03	4.25094
V	14.9230	4.5485	92	93	9.000E+00	2.7432E+00	2.2454E+04	6.8440E+03	4.25265
V	50.2650	15.3208	93	94	3.600E+01	1.0973E+01	2.2490E+04	6.8549E+03	4.25946
V	219.9100	67.0286	94	95	1.800E+02	5.4864E+01	2.2670E+04	6.9098E+03	4.29356
V	699.0004	213.0553	95	96	4.300E+02	1.3106E+02	2.3100E+04	7.0409E+03	4.37500
1/2 40 acr	1,320.0000	402.3360	96	97	6.600E+02	2.0117E+02	2.3760E+04	7.2420E+03	4.50000

Table 2: Y-direction Gridblock Dimensions

		Depths hung from bottom of Salado at shaft coordinates				
Number		Y direction Increments		Mean Sea Level Elevations		
From	To	Delta Y (ft)	Delta Y (m)	(feet)	(meters)	Formation
34	35	25.26	7.700	2,676.181	815.700	Culebra
33	34	118.11	36.000	2,558.071	779.700	Rustler
32	33	820.21	250.000	1,737.861	529.700	Salado
31	32	476.54	145.248	1,261.325	384.452	Salado
30	31	1.48	0.450	1,259.849	384.002	MB 138, A&B (+waste)
29	30	4.37	1.331	1,255.482	382.671	Waste region
28	29	4.37	1.331	1,251.115	381.340	Waste region
27	28	2.79	0.850	1,248.327	380.490	MB 139 (+ waste)
26	27	16.79	5.118	1,231.537	375.372	DRZ (+Salado)
25	26	647.22	197.272	584.318	178.100	Salado
24	25	1,250.00	381.000	-665.682	-202.900	Castile
23	24	369.00	112.471	-1,034.682	-315.371	Upper Bell Canyon (Delaware Sand) Pay
22	23	796.00	242.621	-1,830.682	-557.992	Lower Bell Canyon - Upper Cherry No pay
21	22	850.00	259.080	-2,680.682	-817.072	Lower Bell Canyon - Upper Cherry No pay
20	21	150.00	45.720	-2,830.682	-862.792	Lower Bell Canyon - Upper Cherry No pay
19	20	15.00	4.572	-2,845.682	-867.364	Cherry - U. Brushy C. (L. Ridge Main Pay)
18	19	150.00	45.720	-2,995.682	-913.084	Upper Brushy Canyon (non-productive)
17	18	1,350.00	411.480	-4,345.682	-1,324.564	Upper Brushy Canyon (non-productive)
16	17	200.00	60.960	-4,545.682	-1,385.524	Upper Brushy Canyon (non-productive)
15	16	20.00	6.096	-4,565.682	-1,391.620	Lower Brushy Canyon (A,B,C,D) Pay
14	15	200.00	60.960	-4,765.682	-1,452.580	Upper Bone Spring (non-productive)
13	14	1,184.25	360.959	-5,949.932	-1,813.539	Upper Bone Spring (non-productive)
12	13	332.50	101.346	-6,282.432	-1,914.885	Upper Bone Spring (non-productive)
11	12	33.25	10.135	-6,315.682	-1,925.020	Bone Spring Pay
10	11	332.50	101.346	-6,648.182	-2,026.366	L. Bone Sp.-Wolfcamp-Strawn (non-productive)
9	10	2,757.90	840.608	-9,406.082	-2,866.974	L. Bone Sp.-Wolfcamp-Strawn (non-productive)
8	9	236.00	71.933	-9,642.082	-2,938.907	L. Bone Sp.-Wolfcamp-Strawn (non-productive)
7	8	23.60	7.193	-9,665.682	-2,946.100	Strawn Pay
6	7	350.00	106.680	-10,015.682	-3,052.780	Atoka (No Pay)
5	6	280.50	85.496	-10,296.182	-3,138.276	Atoka (No Pay)
4	5	19.50	5.944	-10,315.682	-3,144.220	Atoka Pay
3	4	300.00	91.440	-10,615.682	-3,235.660	Morrow Lime (No Pay)
2	3	373.30	113.782	-10,988.982	-3,349.442	Morrow Lime (No Pay)
1	2	26.70	8.138	-11,015.682	-3,357.580	Morrow Clastic (Pay)

B.1 Comparison to 10,000 year BRAGFLO CCA models

The models used for this fluid injection analysis are similar to the 10,000 year BRAGFLO models used in the CCA (WPO# 40514) [CCA PA Task 1] in the following ways:

- Both are two-dimensional cross sections.
- The excavated (or back-filled) volumes of the waste emplacement region, operations area, experimental area, shafts and seals are treated as composites. There is no intervening salt between these regions.
- Material properties for the repository regions, Salado, interbeds, and Rustler formations are the same (i.e. originate from the same database) for the two models.
- Treatment of the shaft seals (changes in permeability over time) is the same.
- Both include one degree formation dip through the salt section (Salado, Castile, interbeds and repository regions).

- Both include the effects of creep closure and gas generation in the waste region, and anhydrite interbed fracturing. These are described in the BRAGFLO Analysis Package (WPO# 40514).

The fluid injection models used in this analysis differ from the BRAGFLO CCA models in the following ways:

- The 10,000 year CCA models use two-dimensional radial flaring in the z direction element thickness to capture equivalent 3-dimensional volumes (360 degree flow) in the surrounding geology. The fluid injection models used in this analysis flare the z direction thicknesses out from the two wellbores near the edges of the mesh. Figure 4 shows the flaring for the South wellbore (left side of grid - Figure 3) for one layer, where the opposite wellbore is a mirror image. The flaring around the wellbore is the same for all layers in the y direction. In addition, the flared volumes of the grid blocks going outward from the wellbore grid blocks represent 90 degrees of flow in each direction, or 180 degrees of total flow in opposite directions instead of 360 degrees. This was done to limit the fluid flow and injection in the wellbores to realistic volumes, since the intervening grid blocks between the wellbores (which include the excavated region) are a constant quarter mile thickness in the z direction, and do not represent full 3-dimensional equivalent geology between the wellbores. The limited z-dimension thickness simulates long, thin reservoir "channels" which could underlie the LWB beneath WIPP. This is conservative with respect to potential releases from WIPP, since fluid movement and pressures are restricted to a quarter mile (402.3 m) "slice" through the center of the LWB. Figure 5 shows how the excavated regions of the repository are descritized. The grid blocks are equivalent in volume to the proposed excavated areas at the WIPP. The "makeup" area represents the volume of salt between the drifts and rooms which is not accounted for in the excavated regions, but needed to maintain the four mile distance between the wells.

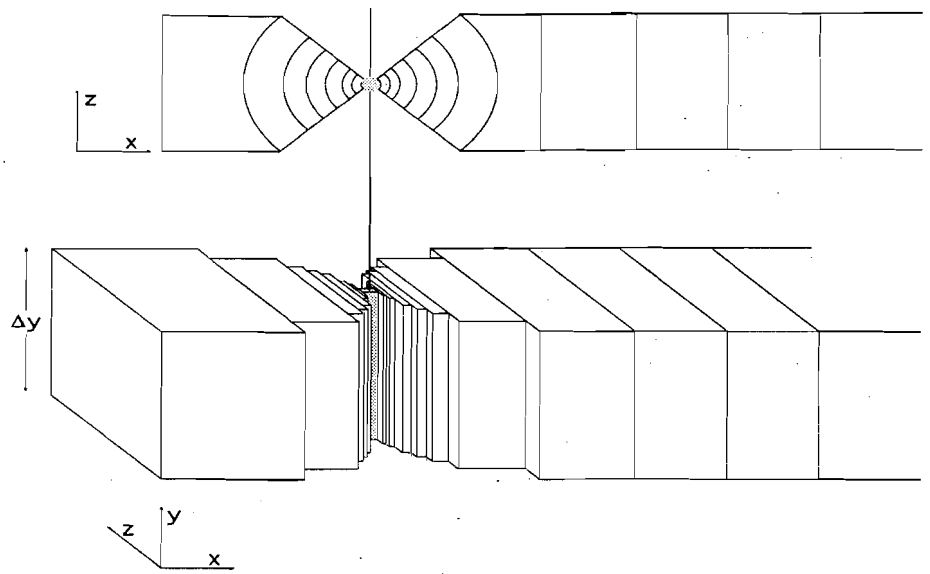
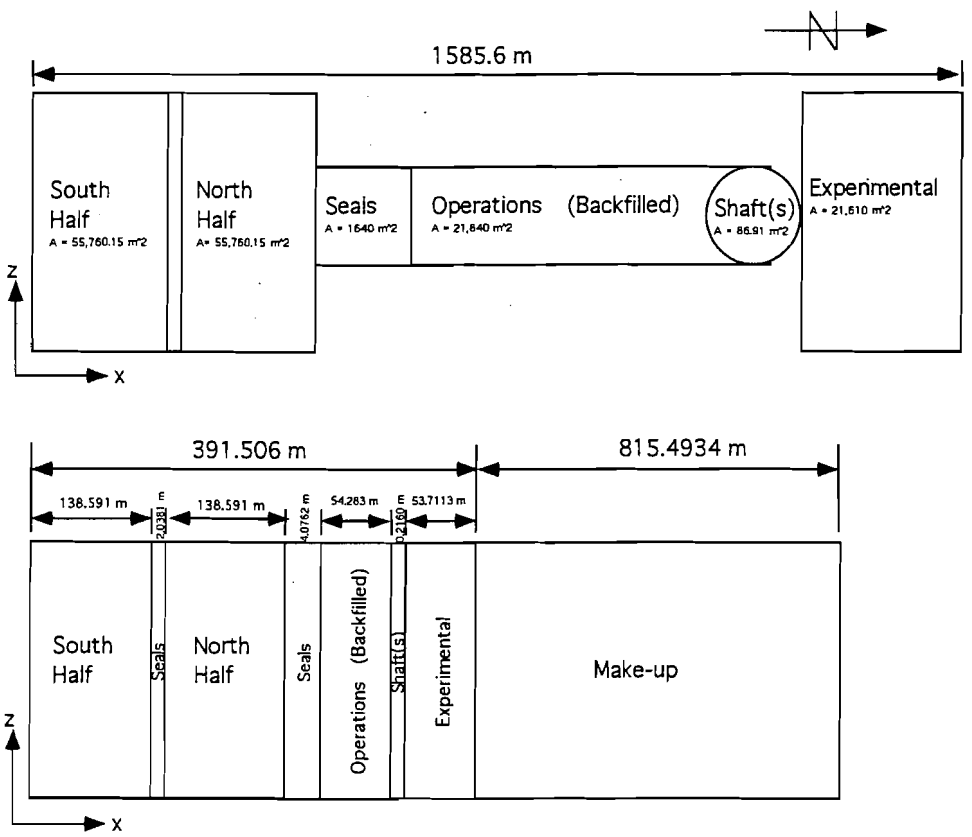


Figure 4: Representation of two dimensional radial flaring out from one wellbore (Fluid Injection Model)



NOT TO SCALE

Figure 5: Plan view of two dimensional treatment of the WIPP excavated regions (Fluid Injection Model)

- The 10,000 year BRAGFLO CCA models for human intrusion scenarios contain a single wellbore region through a waste panel in the approximate center of the mesh. The wellbore exists only in the "passive" (abandoned) state with no active injection or production. The models used for this study have two wellbore regions at the edges of the mesh, and no wellbores in the waste region. The two wells are "active" (injecting) for the first 50 years at which time leaks are allowed up the wellbore. After fifty years, they go to abandoned state.
- The mesh layering for the 10,000 year CCA models includes all formations above the Salado to the surface (Dewey Lake, Santa Rosa, etc.), but do not include the layers deeper than the Castile Formation. The fluid injection models for this analysis contain the sub-Castile formations to the Morrow (but inject into the Bell Canyon only), and do not include the surface formations above the Culebra.
- Several simplifications were made to the Salado/repository system for the fluid injection models. Marker Bed 138 and Anhydrites A&B were combined to form one layer with an equivalent combined height. This combined layer and the layer representing MB 139 were moved closer together to connect directly with the excavated regions. The disturbed rock zone (DRZ) was combined into one layer and placed beneath the excavated regions. These simplifications were made to reduce the bandwidth in the y direction.

B2: Description of Deeper Units

The deeper units (Bell Canyon through Morrow) are divided into two vertical sub-layers: Pay and No-Pay. The No-Pay zones represent non reservoir quality rock and are assigned permeabilities several orders of magnitude lower than the Pay layers. The Pay layers (reservoir quality rock) are divided further into three horizontal sections, each of which can be assigned No-Pay properties to limit the size of the reservoir(s) within each formation. This layering scheme was developed to investigate the effects of cominations of simultaneous production and injection wells at various depths and differing reservoir sizes. This capability was not fully utilized, since (as previously mentioned) the salt water disposal scenario to the Bell Canyon is considered the worst case (bounding) scenario with respect to long-term repository performance. All three sections within the Upper Bell Canyon (Pay) Formation were assigned reservoir quality rock properties for this study. Most of the rock properties were obtained from the New Mexico Bureau of Mines *Atlas of Major Rocky Mountain Gas Reservoirs* [Chapin, et. al., 1993], and are listed in Appendix B.

B3: Treatment of Leaky Boreholes in the Models

The x by z dimension grid block area for the borehole regions are equivalent to a 12.25 inch diameter bit, which is the most common bit size used in the WIPP area while drilling through the salt. During the active injection phase of the wellbores, any leaking fluid would be restricted to the annular space between the casing OD and borehole wall. Therefore, permeability multipliers are applied to the leaky borehole permeability such that the effective permeability is reduced by the ratio of the annular area over the bit diameter area. This maintains equivalent K*A (permeability times area) for the leaky flow path up the borehole without changing the physical dimensions of the borehole grid blocks. Similarly, when the boreholes go to abandoned (passive) state, permeability multipliers are applied to account for the different bit sizes used while drilling through the Rustler (17.5 inch bit), Salado - Castile (12.25 inch bit), and Bell Canyon (7.875 inch bit) formations. The multipliers used for this analysis are presented in Table 3.

Table 3: Permeability multipliers for abandoned and leaky casing boreholes

Baseline BH diameter, area =		12.2500		0.8185	Vertical perm multipliers		
Borehole	casing	Equiv. Borehole Areas		Equiv. Annular Areas		Abandon BH	leaky casing
Size (in)	Size (in)	Sq feet	Sq meters	Sq feet	Sq meters	Multiplier	multiplier
7.8750	5.500	0.3382	3.142E-02	1.7325E-01	1.610E-02	4.133E-01	2.117E-01
12.2500	9.625	0.8185	7.604E-02	3.1319E-01	2.910E-02	1.000E+00	3.827E-01
17.5000	13.375	1.6703	1.552E-01	6.9464E-01	6.453E-02	2.041E+00	8.487E-01

B4: Flow of Calculations: Grid construction, Parameterization, Initial and Boundary Conditions, Modifications to Data, and Analysis

See section I for a flowchart of the calculational process used for the SWD model simulations. The input files (with a .INP extension) provide the instruction sets needed to guide the performance assessment (PA) codes in building, modifying, running, and analyzing the SWD models. A detailed description of the operation of these PA codes can be found in the WIPP central files (see section E). Each of the input files used for this analysis are listed in the Appendices. Comment lines begin with an exclamation (!) and are ignored by all the PA codes.

Appendix C provides a listing of the mesh generator (GENMESH) instruction set used to develop the mesh for the WIPP geology models (GENMESH.INP). The grid is 96 elements (97 nodes) in the X-direction, 34 elements (35 nodes) in the Y-direction, and 1 element (2 nodes) in the Z-direction (also element thickness). Note the dimensions correlate to those in Tables 1 and 2. This code also defines the various material regions tied to the grid. The output from this code is a binary format Camdat Database (.CDB extension) file. All data associated with each model within the PA structure is contained within its CDB file, and these files are modified as they are operated on by each successive code. The Rhodes-Yates grid was constructed by GENMESH using the GM_YATES01.INP instruction set. Many of these input lines are identical to those

in the GENMESH.INP file, therefore, rather than list the entire file a DIFFERENCES command (VMS language) was performed to highlight the different sections between the WIPP geology and Rhodes-Yates geology input files. The resulting DIFFERENCES output file is listed in Appendix D. The two significant differences are in the Y-coordinate descriptions in nodal range 24 - 25, where delta = 381 meters for the WIPP geology (GENMESH.INP line 198) and delta = 38.1 meters for the Rhodes-Yates geology (GM_YATES01.INP line 210), and in nodal range 2 - 3, where delta = 113.78 meters for the WIPP geology (GENMESH.INP line 220) and delta = 537.154 meters for the Rhodes-Yates geology (GM_YATES01.INP line 234).

The assignment of initial material property parameters is handled by the MATSET code. The input file is listed in Appendix E. MATSET assigns names to each material region (block) within the GENMESH output CDB file, as well as creating property regions not directly tied to the mesh (such as the BRINESAL region, which contains the needed physical properties of Salado brine). Matset also creates property (or variable) names within each block to store values within the database. When a material region and property name exactly match similar variables on the database, the median database values are inserted into the variables. View CCA 6 from the INGRESS database was used to supply the necessary values for this analysis. MATSET can be instructed to assign property values if one wishes to over-ride database values, or if the database does not contain the defined material property. This is accomplished in the input lines subsequent to the "*SET" command (line 927, page E9). For example, all of the parameters for the deeper units are not defined in the database, and are therefore "SET" in MATSET for the SWD models. Many of the values not contained in the database and assigned in MATSET are placeholders, and will be defined in the subsequent ALGEBRA step. For this analysis, most of the placeholder variables are given a value of zero (for example, properties in material name "BH_SUR_A", lines 1433 to 1437, page E14). A complete listing of parameters is contained in Appendix B. Unmodified parameters originating from the database are described as "Database: View CCA 6" in the last column titled "source".

The next step in the construction of the models is grid initialization. This is accomplished by the codes ICSET and ALGEBRA (input files listed in Appendices F through K). Each grid block is assigned time dependent values for initial brine saturation (SATBREL), iron concentration (FECONC), and cellulosics concentration (CH2OCONC). See lines 17 and 18, page F1. ICSET also defines a starting time for the model, which is negative 5 years (-1.5778E08 seconds). Initial Brine pressures for the Salado layers (Salt, Castile, Interbeds, and Excavated Regions) are calculated in ALGEBRA based on the starting pressure of MB 139 and a hydrostatic gradient resulting from one degree formation dip. The pressures in the deeper layers (sub-Castile) are defined in ALGEBRA based on hydrostatic gradients with no dip. The Rustler formations are assigned pressures equal to the database starting pressure for the Culebra (block 40), also without formation dip. Lines 1081 through 1167 (pages G11 to G12) and lines 1123 through 1209 (pages H11 to H12) detail how this was accomplished. The ALGEBRA calculations used to determine initial brine pressure are

identical to the methods used in the 10,000 year BRAGFLO 1996 CCA models (WPO# 40514).

The ALGEBRA code is also used to modify existing parameters in order to convert them to a form usable by BRAGFLO, or create additional parameters needed by BRAGFLO. An example would be to convert log permeability to normal permeability, and convert rock compressibility to pore compressibility For example, see lines 53 to 65, page G1 for the WIPP geology baseline model. This ALGEBRA file also performs stoichiometric calculations for the reaction chemistry sub-model (lines 193 to 442, pages G2 through G5), modifies time-dependent shaft seal permeabilities (line 500 to 984, pages G5 through G10), and computes grid block elevations (lines 1169 to 1194, page G12). These particular calculations are identical to those used in the 10,000 year BRAGFLO 1996 CCA models (WPO# 40514). The parameters for the deeper units, and the borehole properties for leaky and abandoned boreholes, are modified or calculated in lines 1017 to 1078 (pages G10 and G11). Appendix H contains a listing of the ALGEBRA input used for the Rhodes-Yates geology Case 1 model, and Appendices I, J and K show the differences between this ALGEBRA file and the inputs used for the remaining models. These ALGEBRA files also contain the instructions to change the borehole permeabilities and/or maximum fracturing permeabilities for the WIPP geology cases 1, 2, and 3, and all of the Rhodes-Yates cases. For example, lines 38 through 45 (page I1) show where the section was added to the ALG_WATFLD_BASE01_R003.INP file (Rhodes-Yates geology case 2) which changes the leaky borehole permeabilities (blocks 60, 62, and 64) to 10^{-9} m^2. Similarly, lines 111 through 115 (page K2) show the lines that were added to the ALGEBRA input file that changes the maximimum log fracture permeability (KMAXLOG variable) to -3 (10^{-3} m^2), and the un-fractured permeability variable (PERM_X) to $10^{-17.1}$ m^2 for the WIPP geology case 3 and Rhodes-Yates geology case 4 (ALG_WATFLD_BASE01_R005.INP).

The CDB files output from the ALGEBRA step provide the information that PREBRAG needs to construct the BRAGFLO input file. The prebrag instruction sets (.INP's) are listed in Appendices L, M, and N. Lines 930 through 1036 (pages L9 and L10) define the boundary conditions (BC's) used in the WIPP geology models. Dirichlet (constant pressure) BC's are defined at the edge grid blocks for every Non-pay layer in the deeper units. The Salado and Culebra layers are also assigned Dirichlet BC's at the edge grid blocks. The Dirichlet pressures assigned to the edge grid blocks are equal to initial pressures, and are designed to simulate constant far-field pressures in those layers. The BC's in the wellbore region at the Culebra and edge grid blocks of the anhydrite interbeds are treated as constant pressure wells. This was done to better handle two-phase flows (brine and gas) at these locations. Lines 988 to 1034 (pages L9 and L10: note some lines are commented out) show the pressures used. The constant pressure injection wells (0 to 50 years) are defined in lines 978 to 984. Similarly, Appendices M and N define the boundary conditions for the Rhodes-Yates models. Note that brine is only allowed to enter or leave the grid at the edge grid blocks and Culebra layer, and only injects at the Upper Bell Canyon from 0 to 50 years.

All the parameters used in the BRAGFLO calculations (mesh dimensions, material properties, initial and boundary conditions, etc.) can be found in the BRAGFLO input files, which are generated by PREBRAG. These files are listed in Appendices O through V. Some of the analysis calculations were done in an ALGEBRA following POSTBRAG, and its input instruction set is listed in Appendix W. Some of the results contained in the post ALGEBRA CDB files were converted to ASCII format in SUMMARIZE, and ported to a spreadsheet application (EXCEL) for plotting.

C. Assumptions not Given in the Work Plan

No specific analysis plan was developed for the effects of salt water disposal and waterflooding on WIPP. FEPs NS7 and NS21 do not specifically address water injection issues, however, NS7 was subsequently redefined to include this concern as NS7A.

D. Performance Measures used in the Screening Effort and Rationale for Use

Because each of these models take from one to three days of CPU time to complete, a representative CCDF plot of probability and consequence could not be accomplished. Therefore comparisons are made to a "WIPP geology baseline" model, which is assumed to be representative of a most likely or "median" CCA consequence. Additionally, the results of these models are compared to the cumulative brine flow into the repository from all marker beds from the 10,000 year undisturbed BRAGFLO CCA calculations.

E. Document Software Name and Version Numbers

The following software used in this analysis was run under the VAX/VMS operating system:

- ALGEBRACDB: Version 2.35
- SUMMARIZE_PA96: Version 2.10
- BRAGFLO: Version 4.00
- PREBRAG_PA96: Version 6.00
- POSTBRAG_PA96: Version 4.00
- GM_PA96: Version 6.08 (GENMESH)
- MATSET_PA96: Version 9.00
- ICSET_PA96: Version 2.22
- BLOTCDB_PA96: Version 1.37

The following software was used for analysis and documentation using the Microsoft Windows95 and Apple Macintosh operating systems:

- CANVAS: Mac Version 3.54, Deneba Software, 7400 SW 87th Avenue, Miami, Florida 33173, (305) 596-5644
- EXCEL: Mac Version 5.0 and Win95 Version 5.0c, Microsoft Corporation, Product I.D. OEM43-F11-2200217
- WORD: Mac Version 6.0.1 and Win95 Version 6.0c, Microsoft Corporation, Product I.D. OEM43-F11-2200217
- FTP: Microsoft Corporation Windows95 System Software
- ADOBE ILLUSTRATOR: Mac Version 5.5 (used to convert Adobe 3.0 files from BLOTCDB_96 to Illustrator 1.1 files for use in CANVAS)

F. Description of Scenarios and Key Parameters

Using the two models, eight scenarios were developed to look at the consequences of salt water injection on WIPP under the following model assumptions (Table 4):

Table 4: Properties for Eight Scenarios Used in Study

MODEL:	WIPP Geology				Rhodes-Yates Geology			
SCENARIO:	Base-line	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3	Case 4
DESCRIPTION:	Median Database, Marker bed high perm. channel	Sand-filled channel behind casing, Marker bed high perm. channel	Tubing and casing leaks, Marker bed high perm. channel	Tubing and casing leaks - Marker bed open channel frac.	Sand-filled channel behind casing - Inj. gradient above frac. gradient, Marker bed high perm. channel	High perm. channel behind casing - Inj. gradient at frac. gradient, Marker bed high perm. channel	Tubing and casing leaks Marker bed high-perm channel, Marker bed high perm. channel	Tubing and casing leaks, Marker bed open channel frac.
BRAGFLO Filename:	BRAGFLO_ WATFLD_ BASE01_ R001.CDB	BRAGFLO_ WATFLD_ BASE01_ R002.CDB	BRAGFLO_ WATFLD_ BASE01_ R004.CDB	BRAGFLO_ WATFLD_ BASE01_ R005.CDB	BRAGFLO_ WATFLD_ YATES01_ R002.CDB	BRAGFLO_ WATFLD_ YATES01_ R003.CDB	BRAGFLO_ WATFLD_ YATES01_ R004.CDB	BRAGFLO_ WATFLD_ YATES01_ R005.CDB
Salado Permeability (m^2)	3.981E-24	1.778E-25	1.778E-25	1.778E-25	1.778E-25	1.778E-25	1.778E-25	1.778E-25
Anhydrite Permeability (m^2)	1.288E-19	7.943E-18	7.943E-18	7.943E-18	7.943E-18	7.943E-18	7.943E-18	7.943E-18
Effective Leaky Borehole Permeability (m^2)	3.162E-13	1.0E-11	1.0E-03	1.0E-03	1.0E-11	1.0E-09	1.0E-03	1.0E-03
Effective Abandoned Borehole Permeability (m^2)	3.162E-13	1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11
Bottomhole Inj. Press. (Pa)	22.8E06	22.8E06	22.8E06	22.8E06	22.8E06	18.53E06	18.53E06	18.53E06
Bottomhole Inj. Press. (psi)	3307	3307	3307	3307	3307	2687	2687	2687
Injection Depth (m)	1298.4	1298.4	1298.4	1298.4	819.13	819.13	819.13	819.13
Injection Depth (ft)	4260	4260	4260	4260	2687.4	2687.4	2687.4	2687.4
Injection Gradient (psi/ft)	0.78	0.78	0.78	0.78	1.23	1.00	1.00	1.00
Max. Marker Bed Perm (m^2)	1.0E-09	1.0E-09	1.0E-09	1.0E-03	1.0E-09	1.0E-09	1.0E-09	1.0E-03

All eight scenarios use the median properties from the CCA database: View CCA6.SDB. Certain properties vary by scenario in the following ways (all other properties remained unchanged):

- The WIPP geology Case 1 and Rhodes-Yates geology Case 1 scenarios use maximum database values for anhydrite and borehole (both leaky and abandoned) permeabilities, and the minimum value for Salado permeability.
- The injection gradient for WIPP Case 1 scenario (and all subsequent cases) is set to approximately 0.2 psi/ft above hydrostatic (~0.78 psi/ft) as mandated by the State of New Mexico. This is equal to 22.8 Mpa (3307 psi) injection pressure at the depth of the Bell Canyon. The Rhodes-Yates Case 1 scenario pressure gradient is set to 1.23 psi/ft, or 22.9 Mpa (3307 psi) injection pressure, which is the alleged maximum injection gradient of some of the Rhodes-Yates waterflood wells. The remaining Rhodes-Yates cases use an injection gradient of 1.0 psi/ft, or 18.53 Mpa (2687 psi) injection pressure, which is a more realistic gradient for non-WIPP area waterfloods.
- The WIPP Case 2 and Rhodes-Yates Case 3 scenarios represent "short-circuit" leak pathways in which a hole exists in both the tubing or packer, and the casing string(s) across the Salado (10^{-3} m^2 permeability).
- The WIPP Case 3 and Rhodes-Yates Case 4 scenarios are similar to the previous two cases except that an "open channel" fracture is allowed in BRAGFLO's Anhydrite Fracture Model (maximum effective Marker Bed permeability set to 10^{-3} m^2). In all previous cases the maximum effective fracture permeability is set to the database value of 10^{-9} m^2, which represents a high-permeability channel.

G. Treatment of Time Intervals

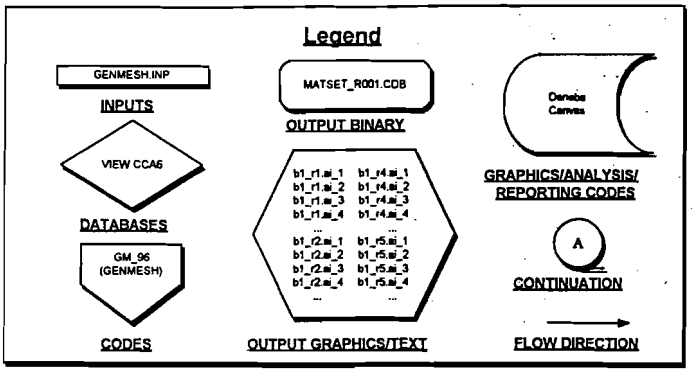
Five time periods have been established for carrying out the simulations. The characteristics of these time periods are as follows:

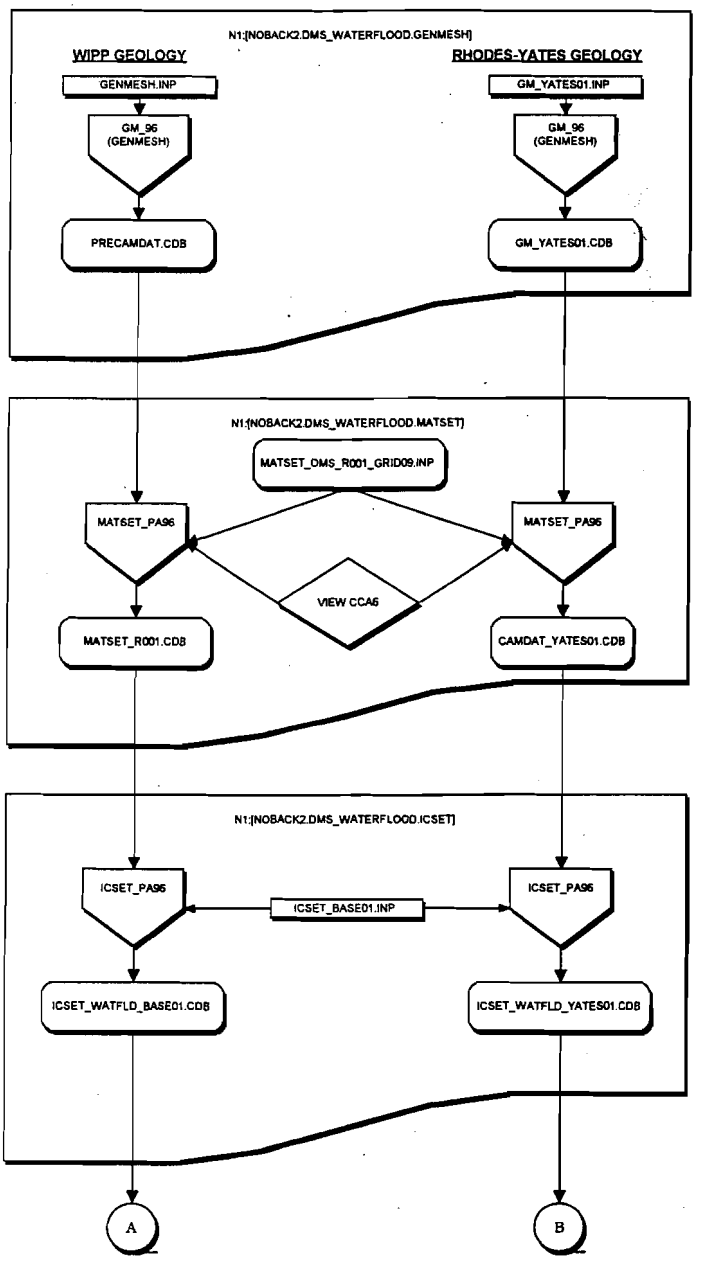
-5 to 0 years:	Mesh is allowed to equilibrate. Waste areas treated as cavities.
0 to 50 years:	Introduce waste, initiate creep closure and gas generation. Two salt water disposal wells turned on at opposite sides of 4 mile boundary. Effective "annular leak" allowed from injection interval (Bell Canyon) through Salado only (plugged at Rustler).
50 to 250 years:	Wells turned off, boreholes go to initial abandoned state with cement plugs ($5x10^{-17}$ m^2 permeability) at the injection interval and across the Rustler, with brine drilling fluid in the open hole between (10^{-9} m^2 permeability).
250 to 1250 years:	Abandoned wells go to "silty sand" state throughout.
1250 to 10000 years:	Abandoned wells in lower portion of salt have permeability reduced one order of magnitude due to salt creep.

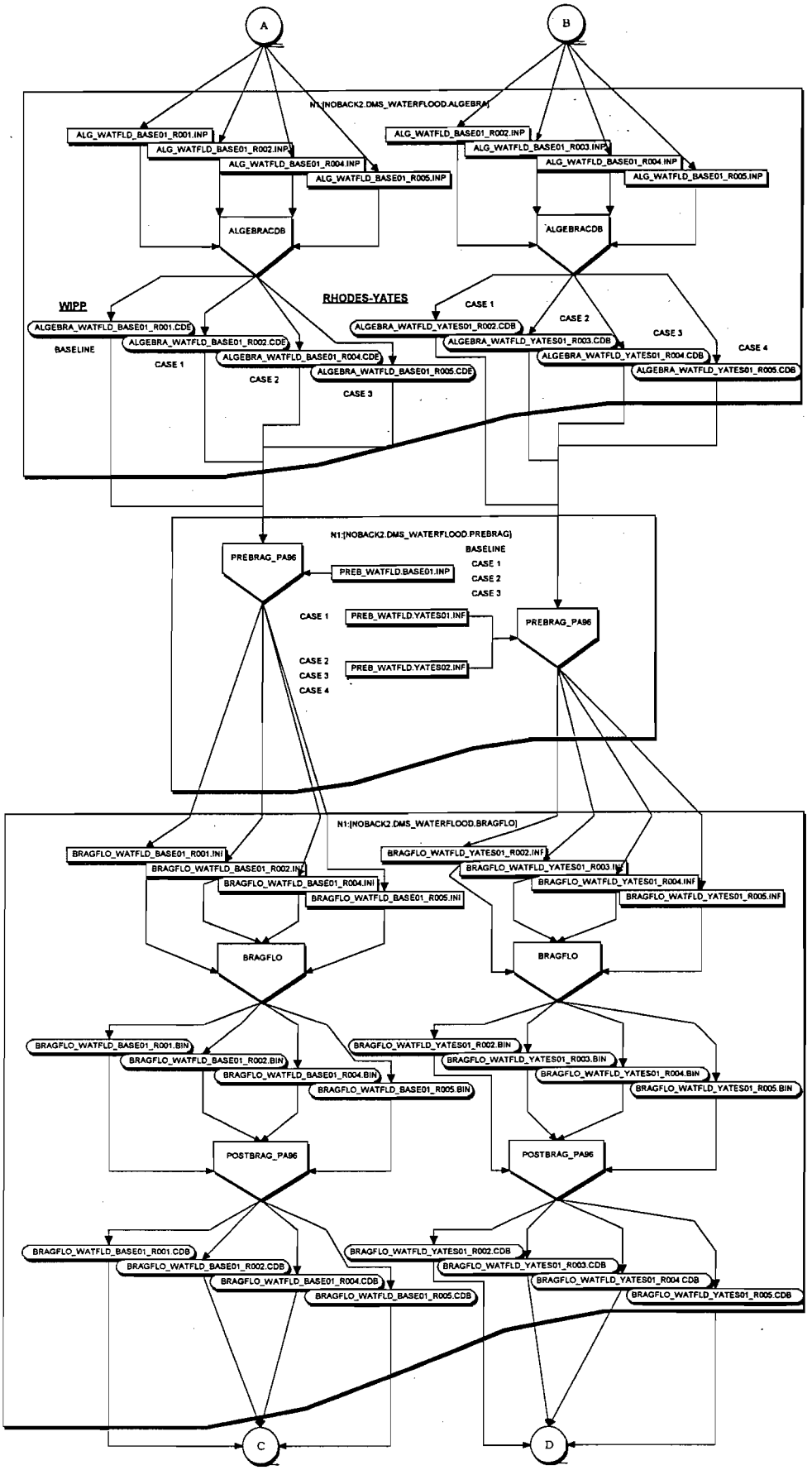
H. Name of Participants

Daniel M. Stoelzel, Senior Member Technical Staff, Sandia National Laboratories Division 6848, served as the Principal Investigator for this work, and also performed the calculations. Darien G. O'Brien, Director of Engineering, petroleum and environmental engineering consultant with Solutions Engineering (based in Lakewood, Colorado) assisted in the analyses.

I. *Diagram Describing Data Flow*



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ALGEBRACDB
WIPP
RHODES-YATES
BASELINE
CASE 1
CASE 2
CASE 3
CASE 4
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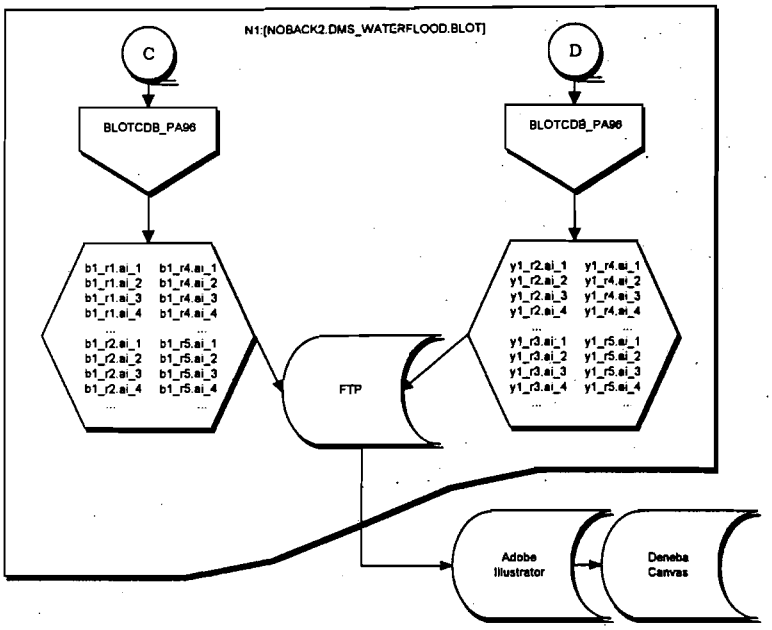
D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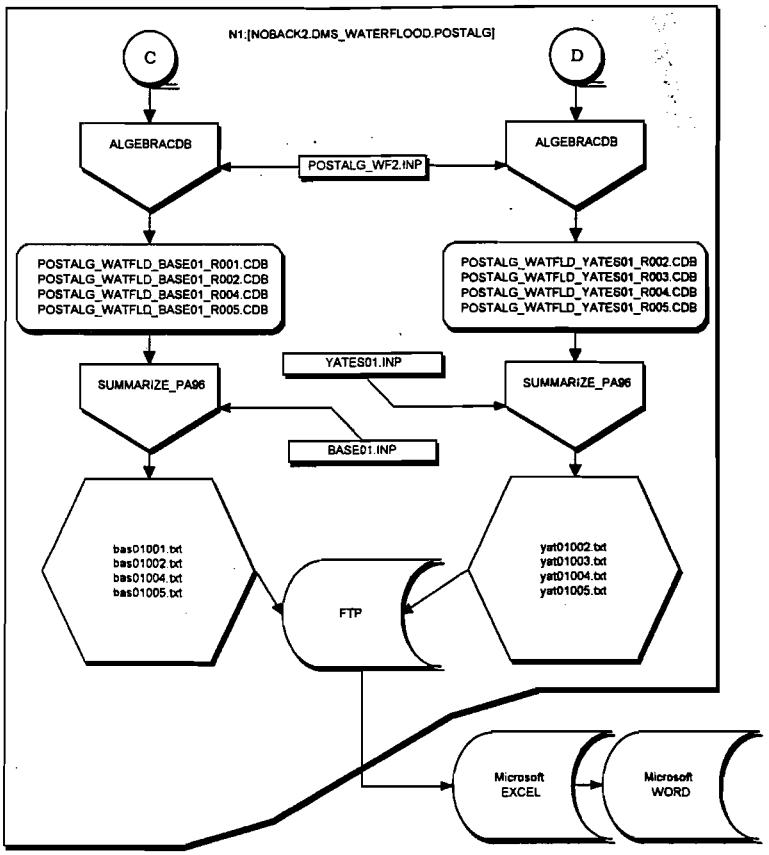
FTP
Adobe Illustrator
Deneba Canvas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POSTALG_WATFLD_BASE01_R002.CDB
POSTALG_WATFLD_BASE01_R004.CDB
POSTALG_WATFLD_BASE01_R005.CDB
POSTALG_WATFLD_YATES01_R002.CDB
POSTALG_WATFLD_YATES01_R003.CDB
POSTALG_WATFLD_YATES01_R004.CDB
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SUMMARIZE_PA96
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bas01002.txt
bas01004.txt
bas01005.txt
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yat01003.txt
yat01004.txt
yat01005.txt
FTP
Microsoft EXCEL
Microsoft WORD

J. Input/Output files

Appendix C through W includes a listing of all input files and output files which have been stored on tape backup.

K. Documentation of Changes from Work Analysis Plan and Rationale

No specific analysis plan was developed for the effects of salt water disposal and waterflooding on WIPP. FEPs NS7 and NS21 do not specifically address water injection issues, however, NS7 was subsequently redefined to include this concern as NS7A.

III. RESULTS AND DISCUSSIONS

The following plots show comparisons between the WIPP geology and Rhodes-Yates geology scenarios using the BRAGFLO model run over 10,000 years.

Figure 6 shows the cumulative brine injected in the salt water disposal wells. The plots level off early since all injection takes place in the first 50 years. The WIPP geology scenarios overly one another at ~700,000 m^3 brine injected (4.4 million oilfield barrels). This corresponds to ~88,000 barrels per year, or ~7,300 barrels per month brine injected, which is comparable to an average SWD injector in the WIPP area. Differences between the Rhodes-Yates geology Case 1 and remaining cases are caused by the 22.8E+06 Pa (1.23 psi/ft gradient) versus 18.53E+06 Pa (1.0 psi/ft gradient) bottomhole injection pressures, respectively.

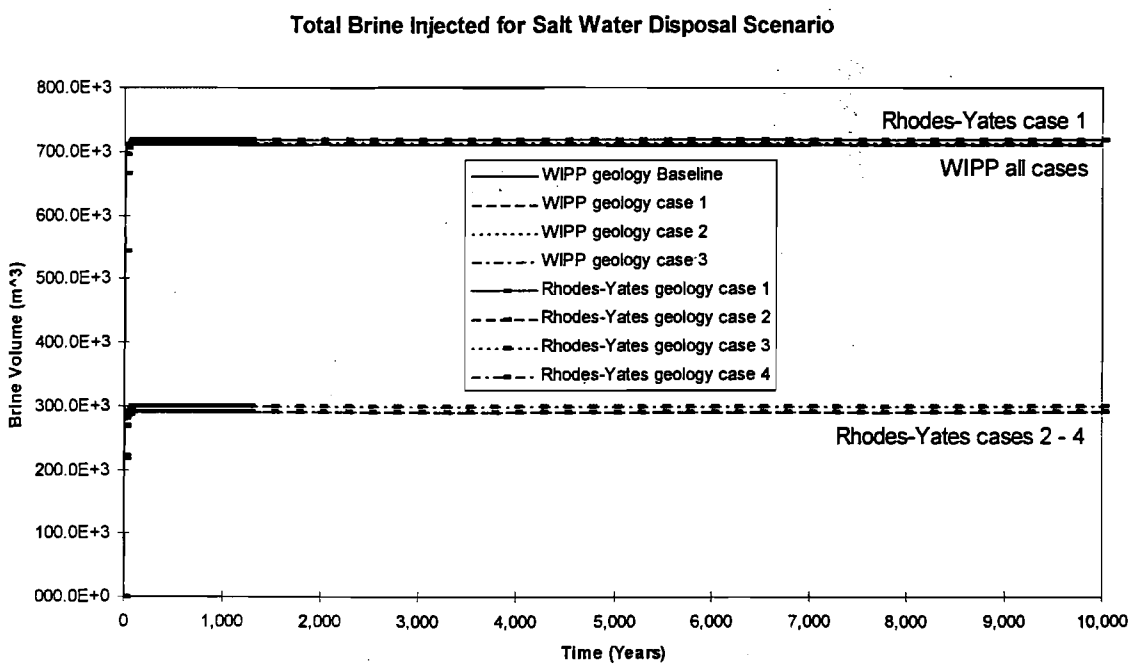

Figure 6: Total Brine Injected for Two Salt Water Disposal Wells

Figure 7 shows the cumulative brine entering the anhydrite marker beds towards the repository from the wellbores. Differences between scenarios are caused by the vertical distance of the formations above the injection interval (i.e. Castile and Salado for the WIPP geology vs. Tansill and Salado for the Rhodes-Yates geology) as well as differences in leaky casing permeabilities for each scenario. The WIPP Worst Case scenario (Case 3) allows ~2,000 m^3 to enter the marker beds from the leaky wellbores. Note that in all cases, the majority of the injected brine flowed "in zone" within the injection interval (compare with total injection volume - Figure 6).

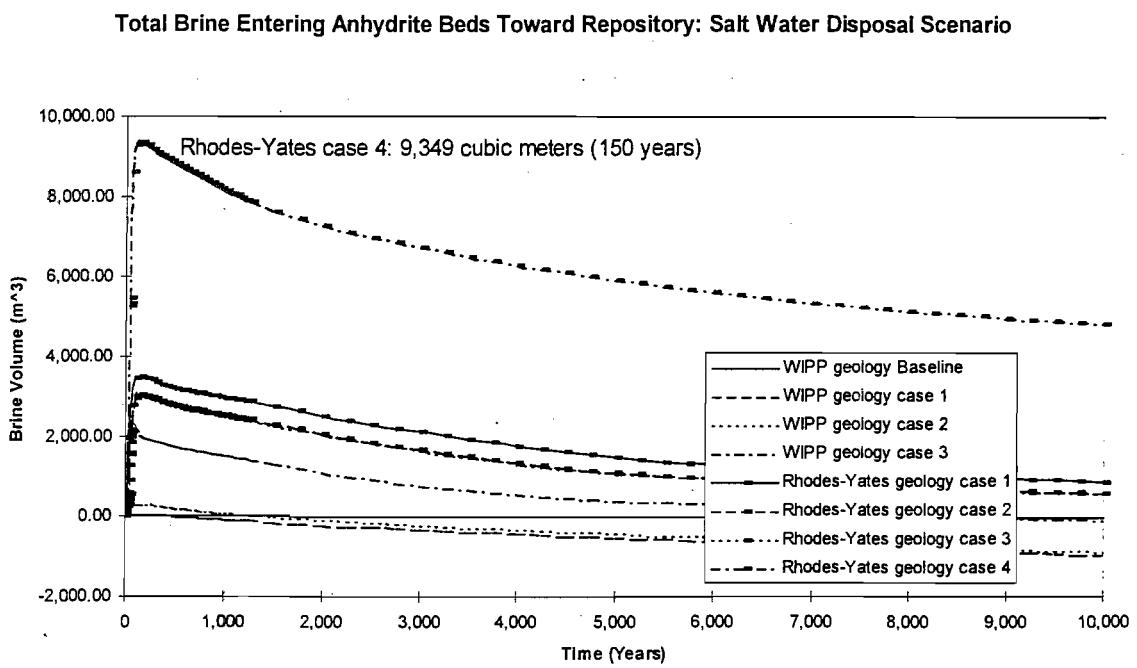

Figure 7: Total Brine Entering Anhydrite beds Toward Repository from Two Salt Water Disposal Wells

Figure 8 shows the cumulative brine entering the repository from the marker beds. Note that for the worst case scenarios (Rhode-Yates Case 4 and WIPP Case 3) about half of the brine that flowed into the interbeds (Figure 7) actually made it to the repository (5,286 of 9,349 m^3 for the Rhodes-Yates and ~1,000 of ~2,000 for the WIPP).

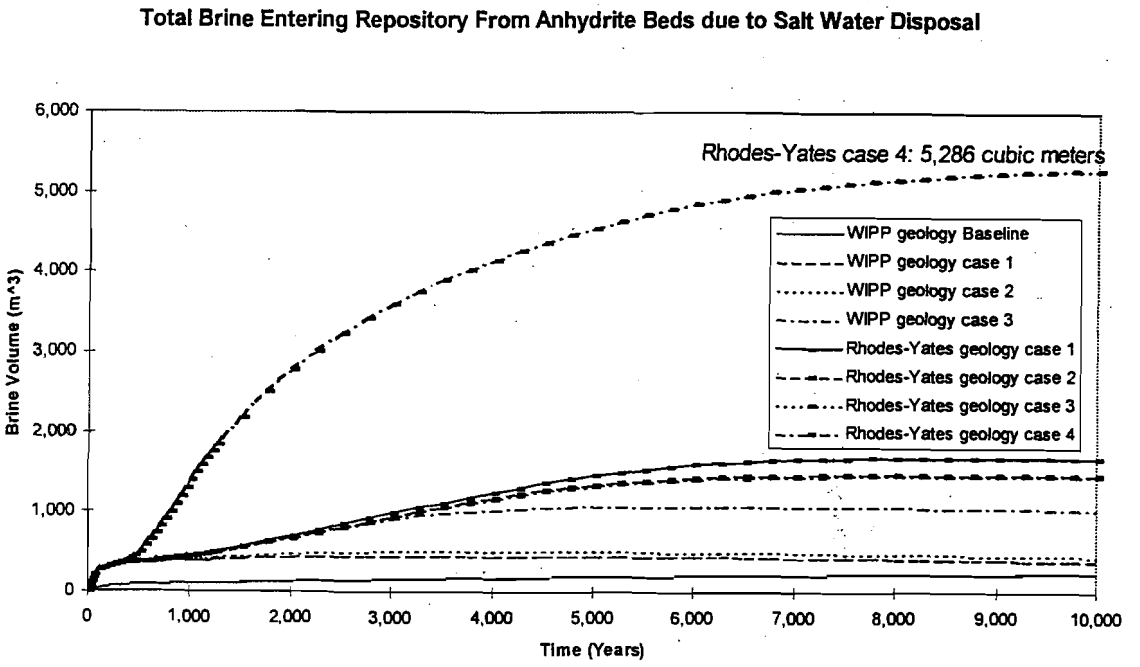

Figure 8: Total Brine Entering Repository from Anhydrite Beds due to Salt Water Injection

Figures 9, 10, and 11 show the effects that fluid injection has on the repository saturations and pressures for the two geologies. The brine flowing into the repository must first fill up the available pore space in the DRZ (Figure 10) before filling the waste regions (Figure 9). Note the only significant increase in saturation occurs in the Rhodes-Yates geology Case 4. All of the WIPP geology cases show little difference from the baseline model. Similarly, pressure response in the repository does not vary significantly from the WIPP geology baseline (Figure 11).

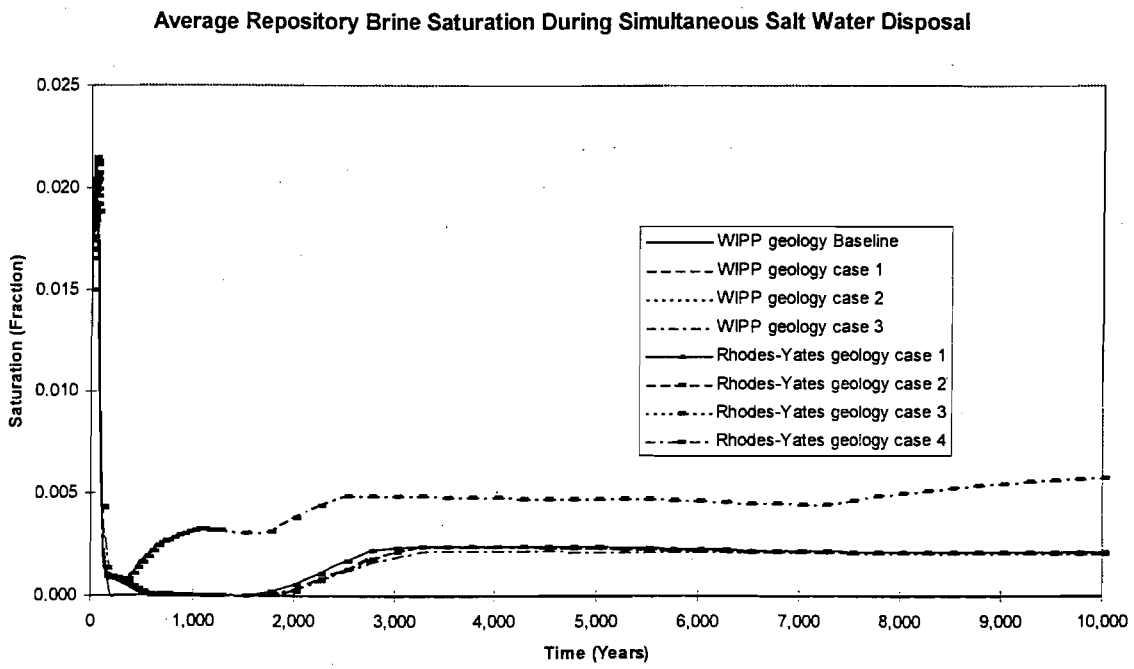

Figure 9: Average Repository Brine Saturation During Simultaneous Salt Water Disposal

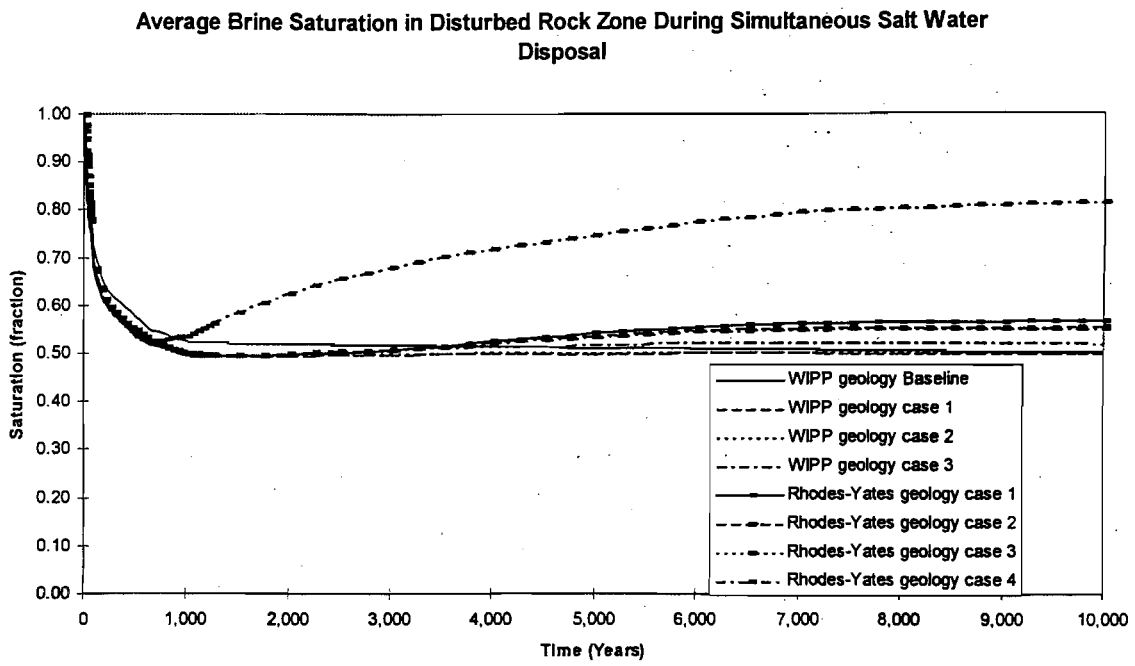

Figure 10: Average Brine Saturation in the DRZ During Simultaneous Salt Water Disposal

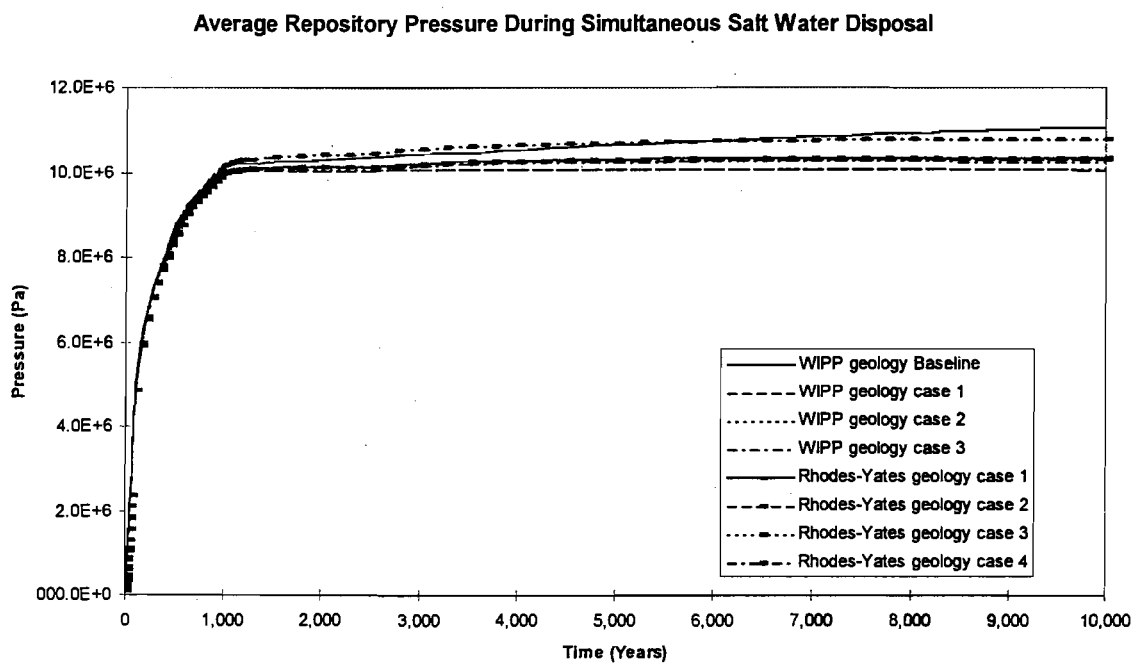

Figure 11: Average Repository Pressure During Simultaneous Salt Water Disposal

Figure 12 shows the pressure response in MB 139. MB 138 and Anhydrite A&B response is similar. Note that the pressures for the WIPP geology cases go much lower than the baseline case. This is because the brine in the interbeds preferentially wants to flow to the 10^{-11} m^2 permeability wellbore rather than towards the repository, significantly draining the interbeds.

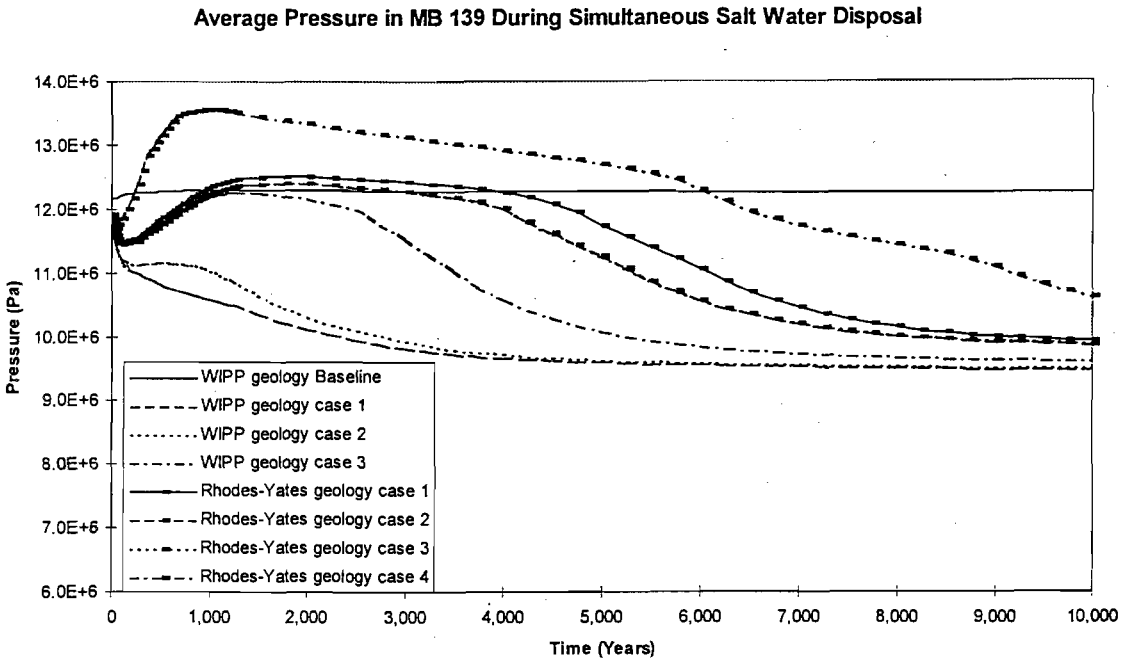

Figure 12: Average Pressure in MB 139 During Simultaneous Salt Water Disposal

Figure 13 and 14 Support the vertical distance theory of the two geologies. Note that for the Rhodes-Yates worst case scenario, nearly all of the injected brine (23% + 76% = 99%, Figure 14) flow into the interbeds. For the WIPP geology (Figure 13) only 79% of the leaking brine goes into the interbeds. The remaining 21% flows into the Castile formation, which acts as a "thief zone".

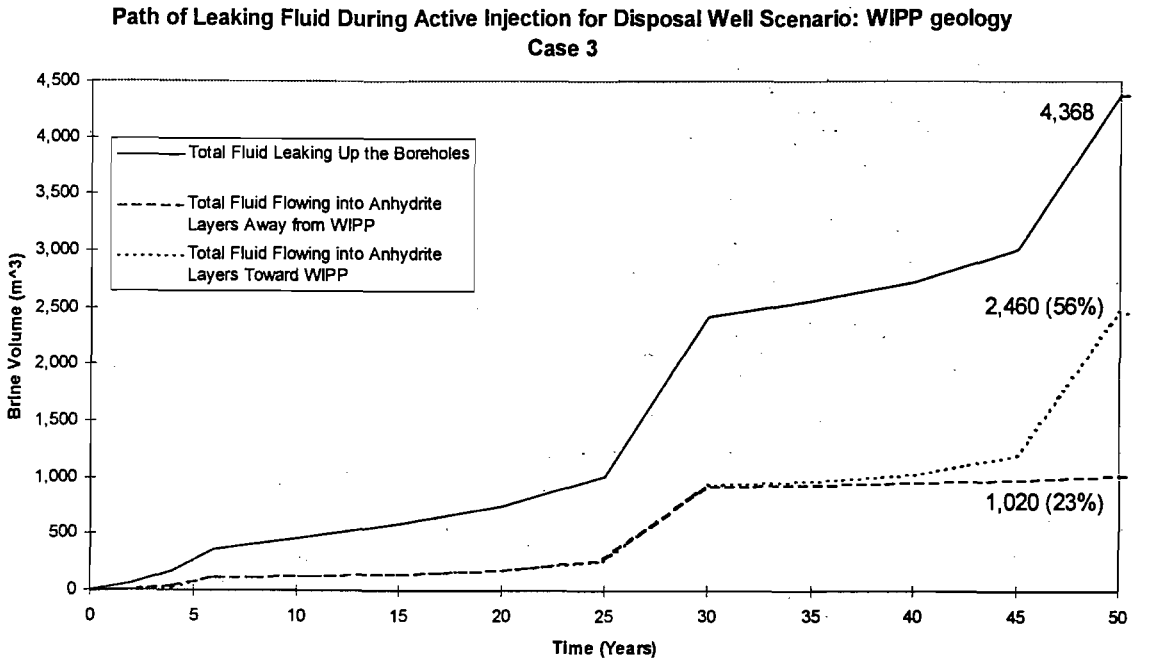

Figure 13: Path of Leaky Fluid During Active Injection for WIPP Geology Case 3

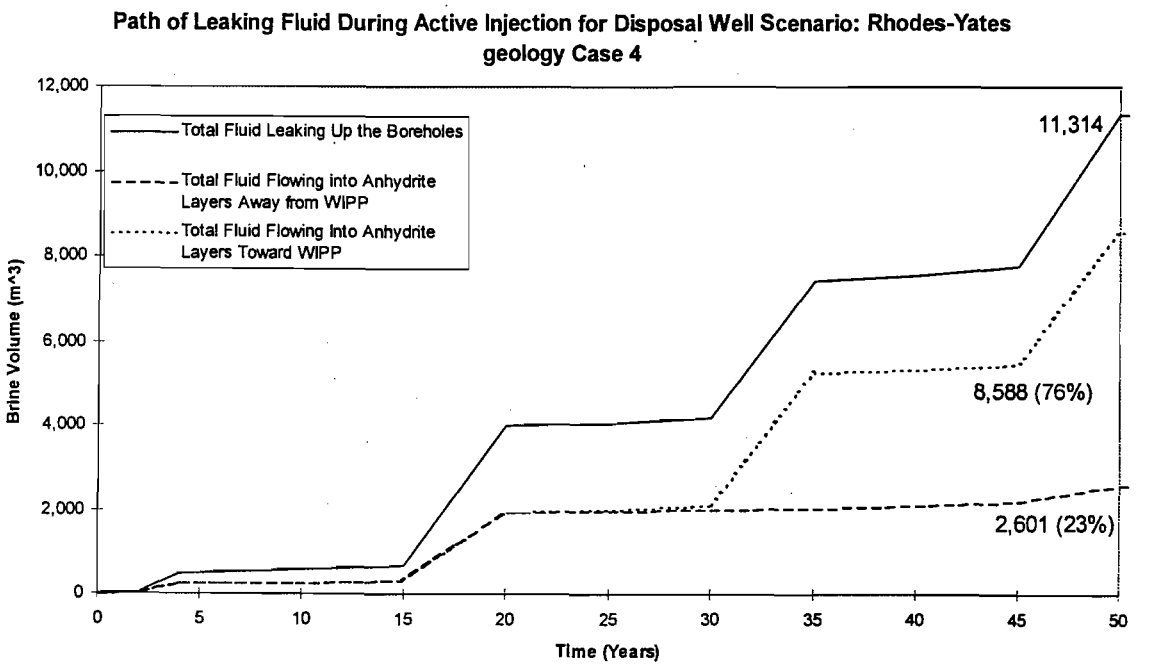

Figure 14: Path of Leaky Fluid During Active Injection for Rhodes-Yates Geology Case 4

Figure 15 shows that the majority of the injected fluid flows back into the Culebra after 10,000 years (compare to Figure 6), by-passing the intervening layers. A detailed analysis of the effects of brine flow to the Culebra from connections to deeper units can be found in FEP NS-7b (WPO# 40819).

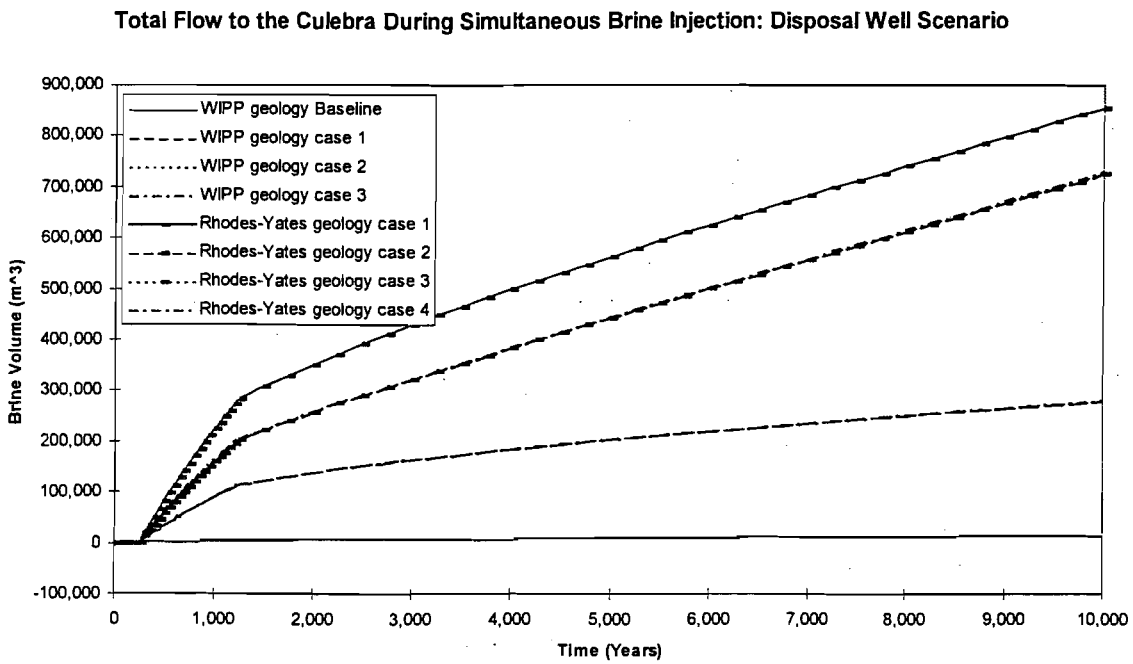

Figure 15: Total Flow to Culebra From Disposal Wells

Figure 16 is important from the perspective of potential impacts on WIPP performance. This plot shows the cumulative brine flow into the repository from all marker beds based from the 1996 CCA undisturbed results. The WIPP Worst Case cumulative releases (~1,000 m^3) from salt water disposal well model is significantly less than the mean from the three replicates for the undisturbed CCA calculations.

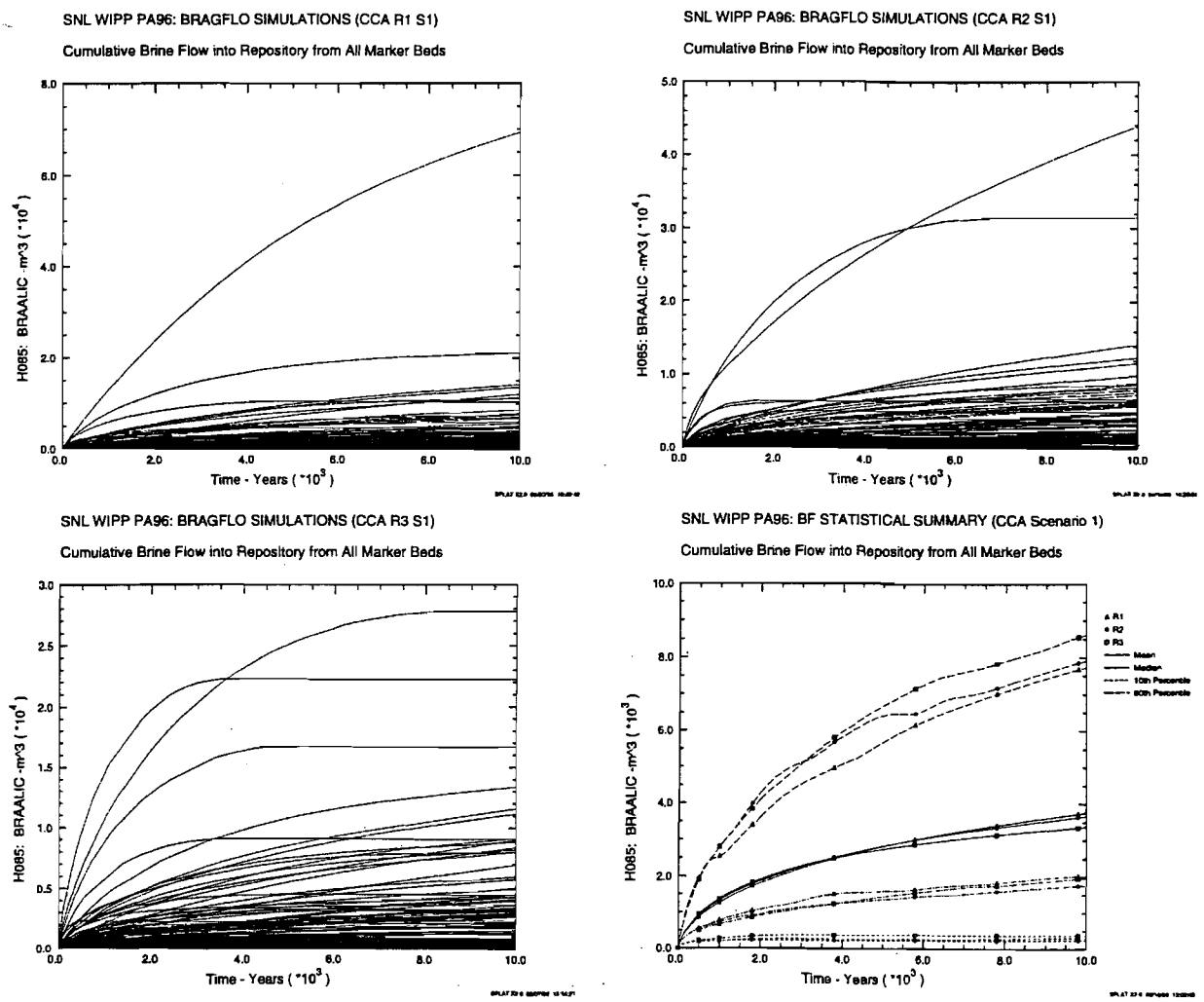

Figure 16: Cumulative Brine Flow into Repository from All Marker Beds (WIPP PA96: CCA Undisturbed Calculations)

Figures 1 through 12 in Appendix A show pressure contours and flow vectors over time for Cases 1, 2 and 3 (WIPP geology) and Cases 2, 3, and 4 (Rhodes-Yates Geology). Note that during the 50 year active injection (while the borehole "leaks"), and for several hundred years after (during the two-plug abandoned phase), pressures are high around the borehole, and flow in the interbeds is toward the repository. At later times, the boreholes act as pressure "sinks" and flow is away from the repository and toward the boreholes. Figure 3 (page A4) shows that during the 50 year injection period for the "worst case" WIPP geology model (case 3), down-dip injection gradients at the interbeds reach 1.0 psi/ft. The 15 Mpa (2,175 psi) pressure contour (labeled "G") at times 19.8 and 50.01 years is seen at the Marker Beds, which are at a depth of approximately 2,150 feet (hence 2,175/2,150 = 1.0 psi/ft). Figures 13 and 14 in Appendix A show the permeability in MB 139 due to the fracturing model at different (overlayed) times. Note that the regions of enhanced permeability extend much further out from the wellbores in the Rhodes-Yates geology cases compared to the WIPP geology cases. This is due to the higher injection gradients at Rhodes-Yates, as well as shorter vertical distance and fewer "thief zones" to siphon off the injection fluid in the Rhodes-Yates cases.

IV. REFERENCES

[CCA PA Task 1]: Analysis Package for the Salado Flow Calculations (Task 1) of the Performance Assessment Analysis Supporting the Compliance Certification Application (WPO# 40514)

[Chapin, et. al., 1993]: Chapin, C.E., Director and State Geologist, Hjellming, Carol A, Editor, *Atlas of Major Rocky Mountain Gas Reservoirs*, New Mexico Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, 1993. page 206.

SI Metric Conversion Factors

inch	X	2.54*	E+00	=	cm
ft	X	3.048*	E -01	=	m
mile	X	1.609344*	E+00	=	km
$inch^3$	X	1.6387	E+02	=	cm^3
lb/ft^3	X	1.602	E - 02	=	g/cm^3
psi	X	6.894757	E+00	=	kPa
gal	X	3.785	E+00	=	L
bbl	X	1.589873	E -01	=	m^3
md	X	9.869233	E - 16	=	m^2
bbl/MMscf	X	5.614583	E - 06	=	m^3/m^3
°F		(°F - 32)/1.8		=	°C
°C	+	2.7316	E+02	=	K

* Conversion factor is exact.

Appendix A: Salt Water Disposal Model Results

FIGURES

FIGURE 1: BRAGFLO RESULTS SHOWING PRESSURE CONTOURS: WIPP GEOLOGY CASE 1 2
FIGURE 2: BRAGFLO RESULTS SHOWING PRESSURE CONTOURS: WIPP GEOLOGY CASE 2 3
FIGURE 3: BRAGFLO RESULTS SHOWING PRESSURE CONTOURS: WIPP GEOLOGY CASE 3 4
FIGURE 4: BRAGFLO RESULTS SHOWING PRESSURE CONTOURS: RHODES-YATES GEOLOGY CASE 2 5
FIGURE 5: BRAGFLO RESULTS SHOWING PRESSURE CONTOURS: RHODES-YATES GEOLOGY CASE 3 6
FIGURE 6: BRAGFLO RESULTS SHOWING PRESSURE CONTOURS: RHODES-YATES GEOLOGY CASE 4 7
FIGURE 7: BRAGFLO RESULTS SHOWING FLOW VECTORS: WIPP GEOLOGY CASE 1 8
FIGURE 8: BRAGFLO RESULTS SHOWING FLOW VECTORS: WIPP GEOLOGY CASE 2 9
FIGURE 9: BRAGFLO RESULTS SHOWING FLOW VECTORS: WIPP GEOLOGY CASE 3 10
FIGURE 10: BRAGFLO RESULTS SHOWING FLOW VECTORS: RHODES-YATES GEOLOGY CASE 2 11
FIGURE 11: BRAGFLO RESULTS SHOWING FLOW VECTORS: RHODES-YATES GEOLOGY CASE 3 12
FIGURE 12: BRAGFLO RESULTS SHOWING FLOW VECTORS: RHODES-YATES GEOLOGY CASE 4 13
FIGURE 13: PERMEABILITY IN MB 139 IN RESPONSE TO FRACTURING MODEL: WIPP GEOLOGY CASES 1, 2 AND 3 15
FIGURE 14: PERMEABILITY IN MB 139 IN RESPONSE TO FRACTURING MODEL: RHODES-YATES GEOLOGY CASES 2, 3 AND 4 16

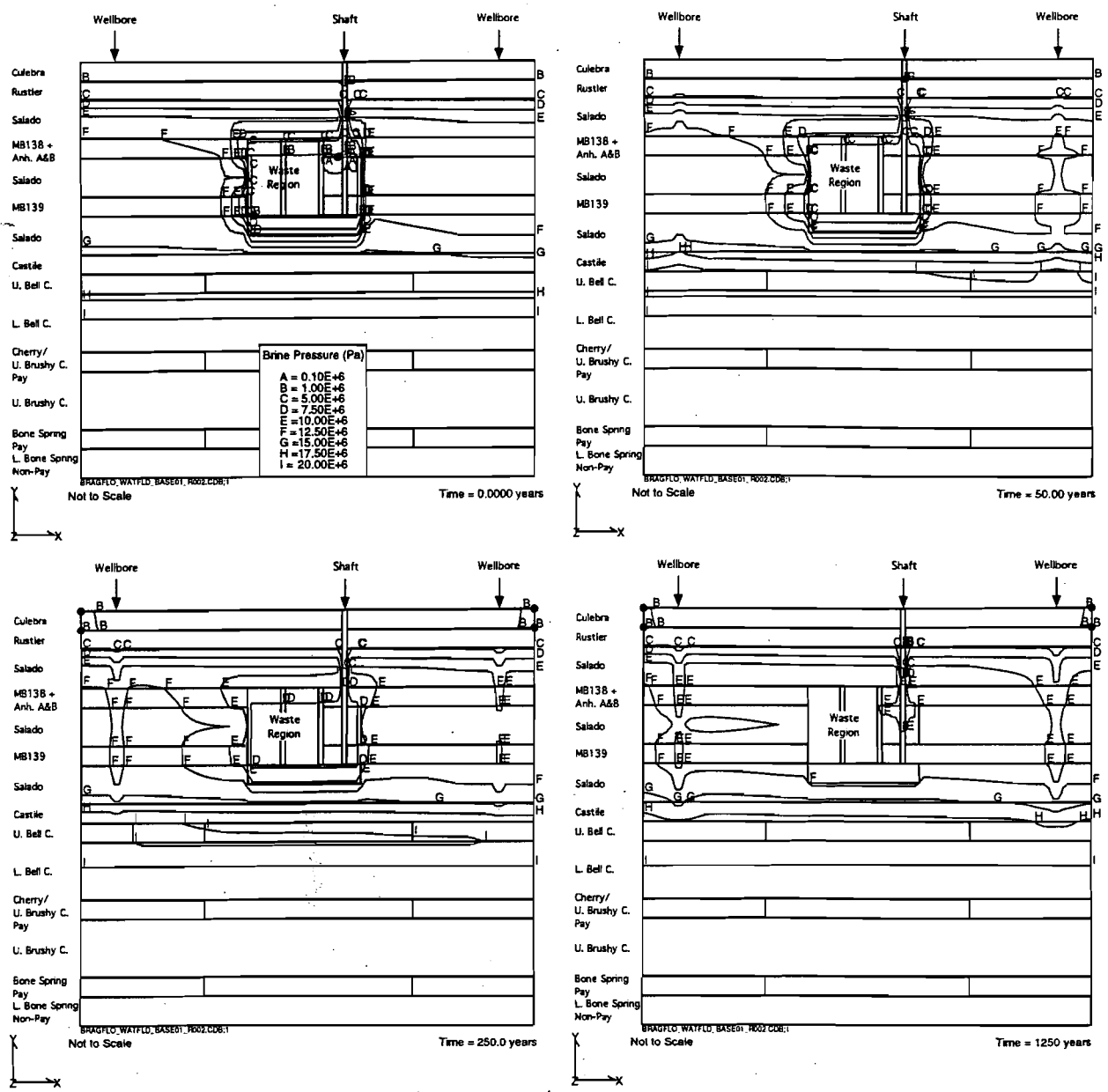

Figure 1: BRAGFLO results showing Pressure Contours: WIPP Geology Case 1

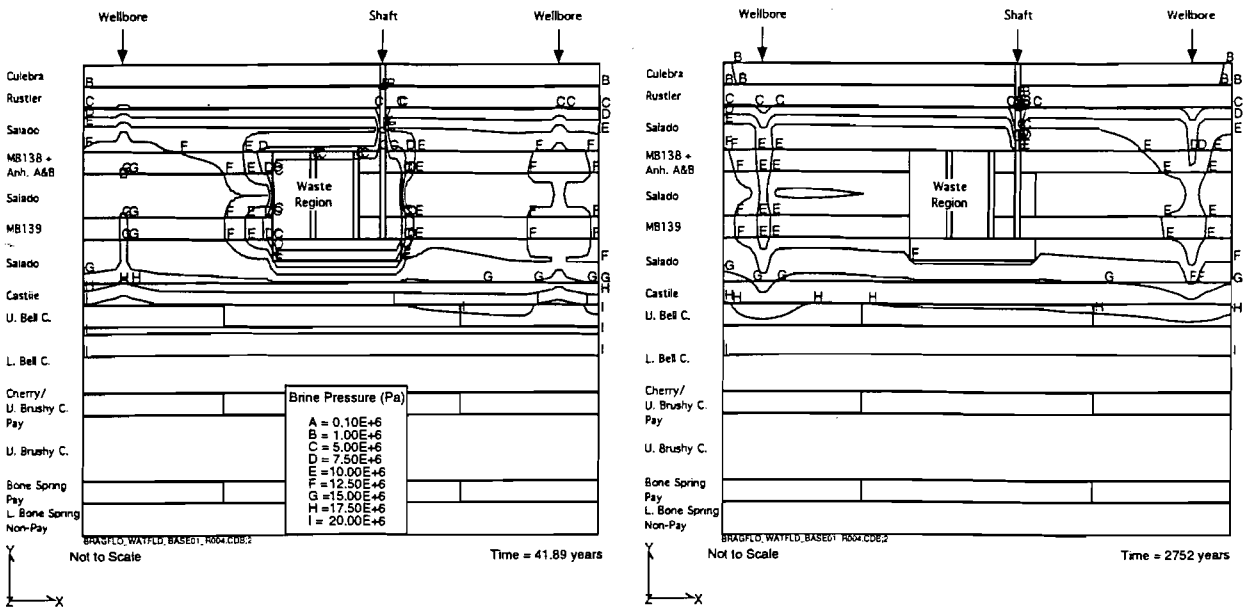

Figure 2: BRAGFLO results showing Pressure Contours: WIPP Geology Case 2

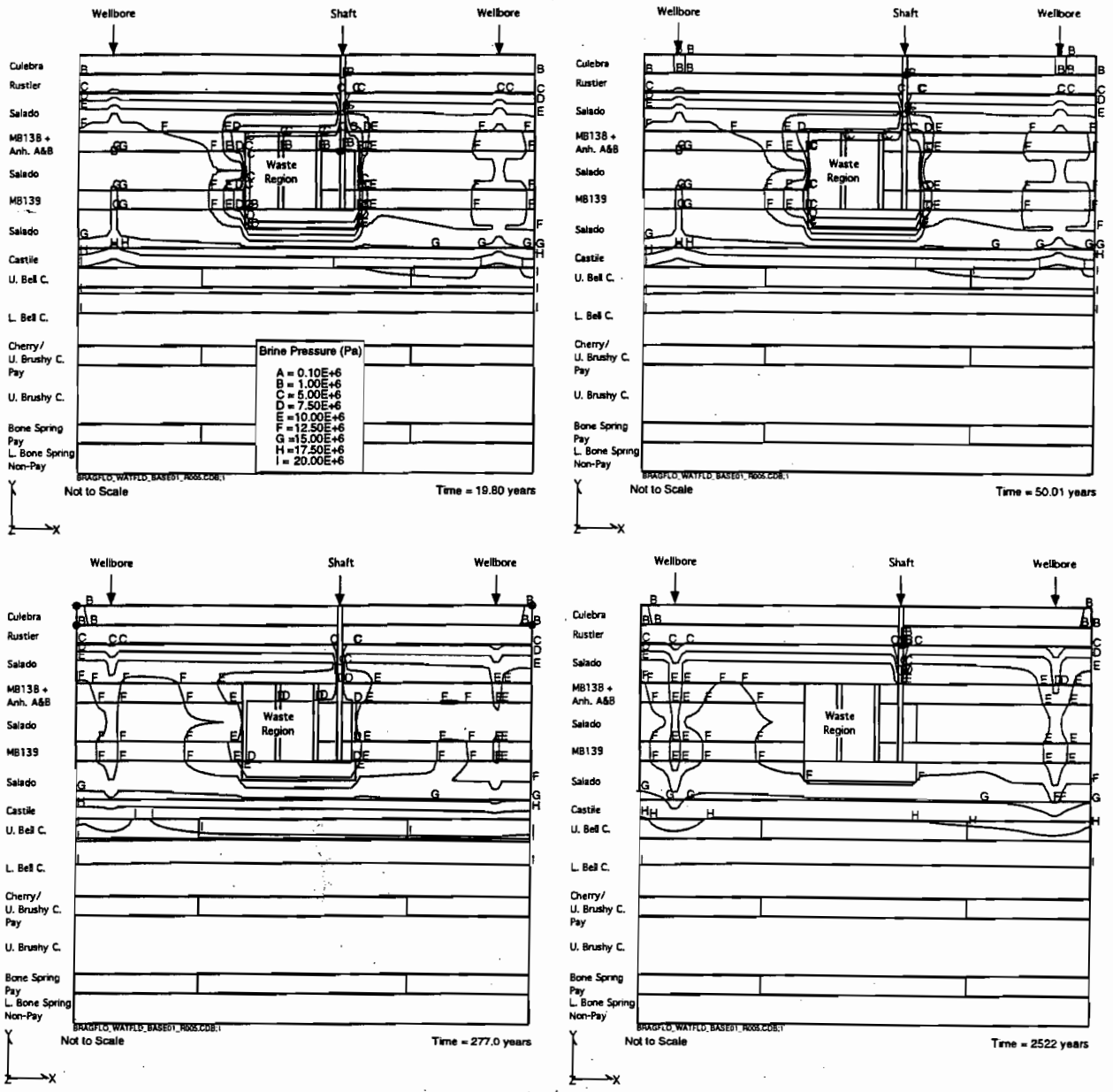

Figure 3: BRAGFLO results showing Pressure Contours: WIPP Geology Case 3

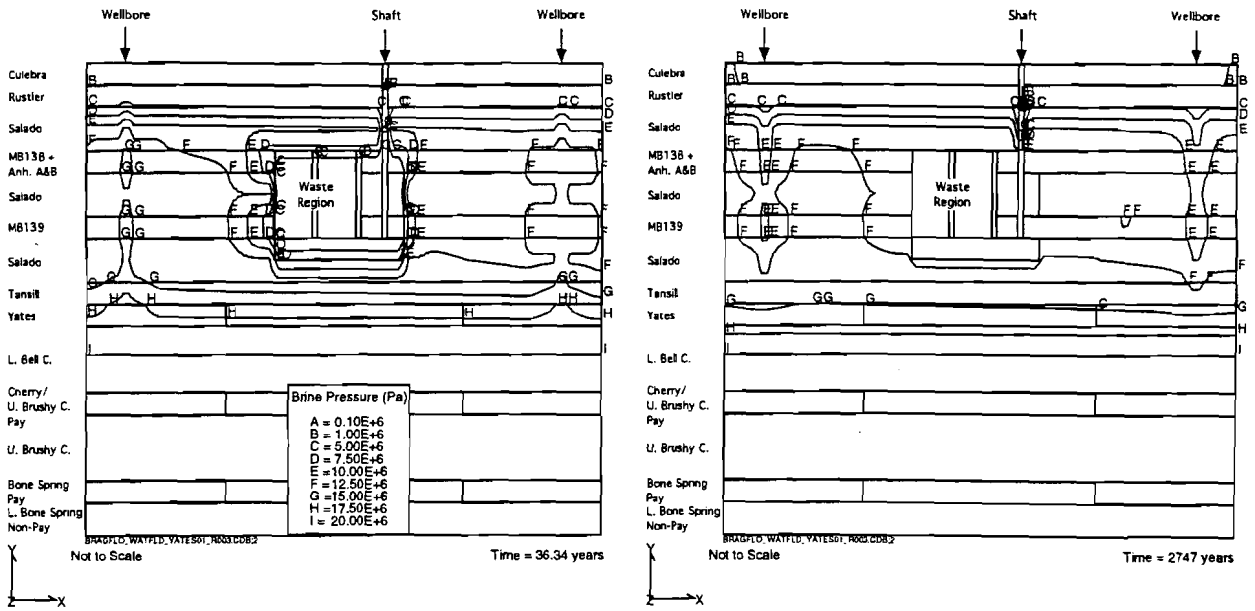

Figure 4: BRAGFLO results showing Pressure Contours: Rhodes-Yates Geology Case 2

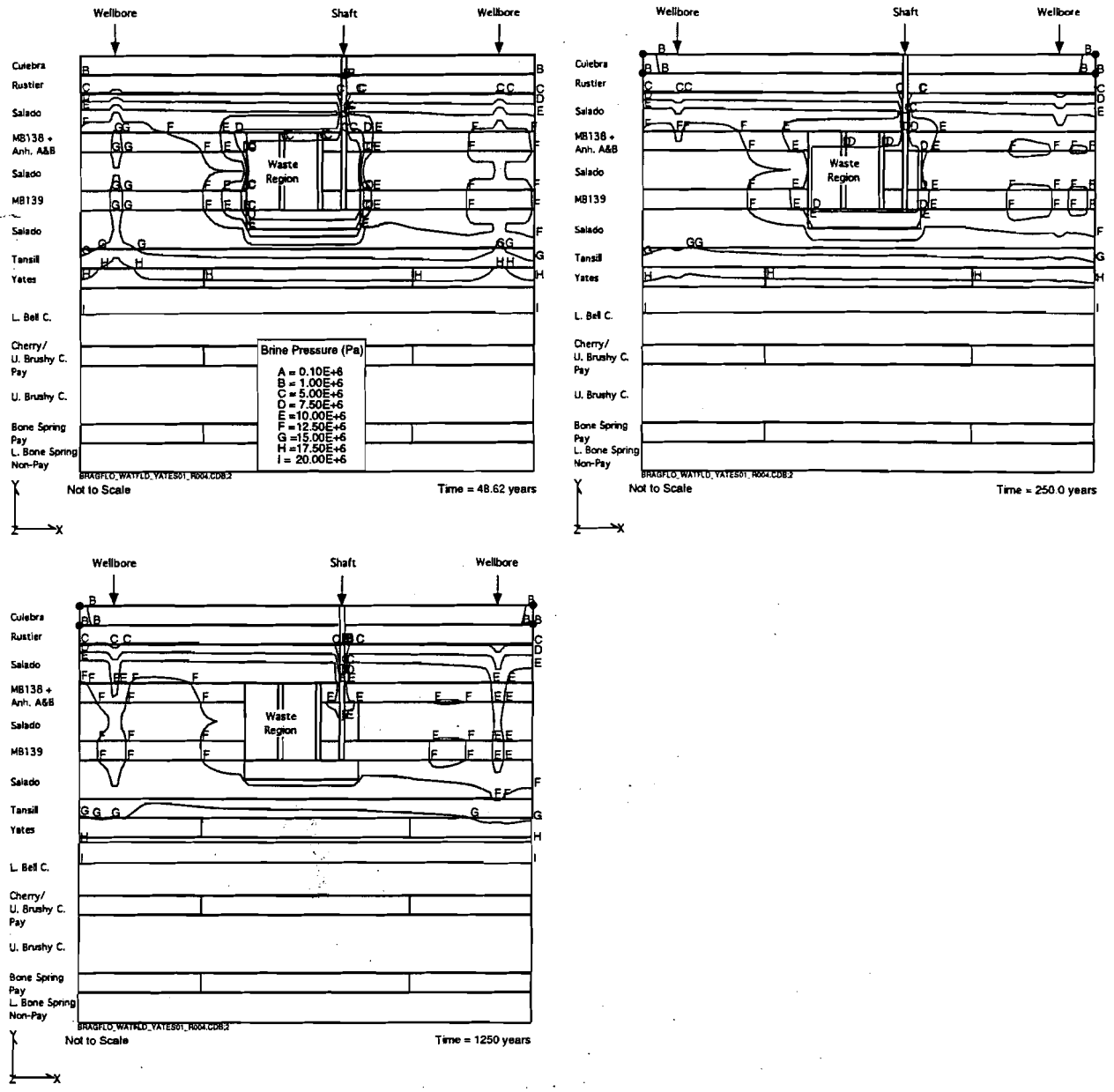

Figure 5: BRAGFLO results showing Pressure Contours: Rhodes-Yates Geology Case 3

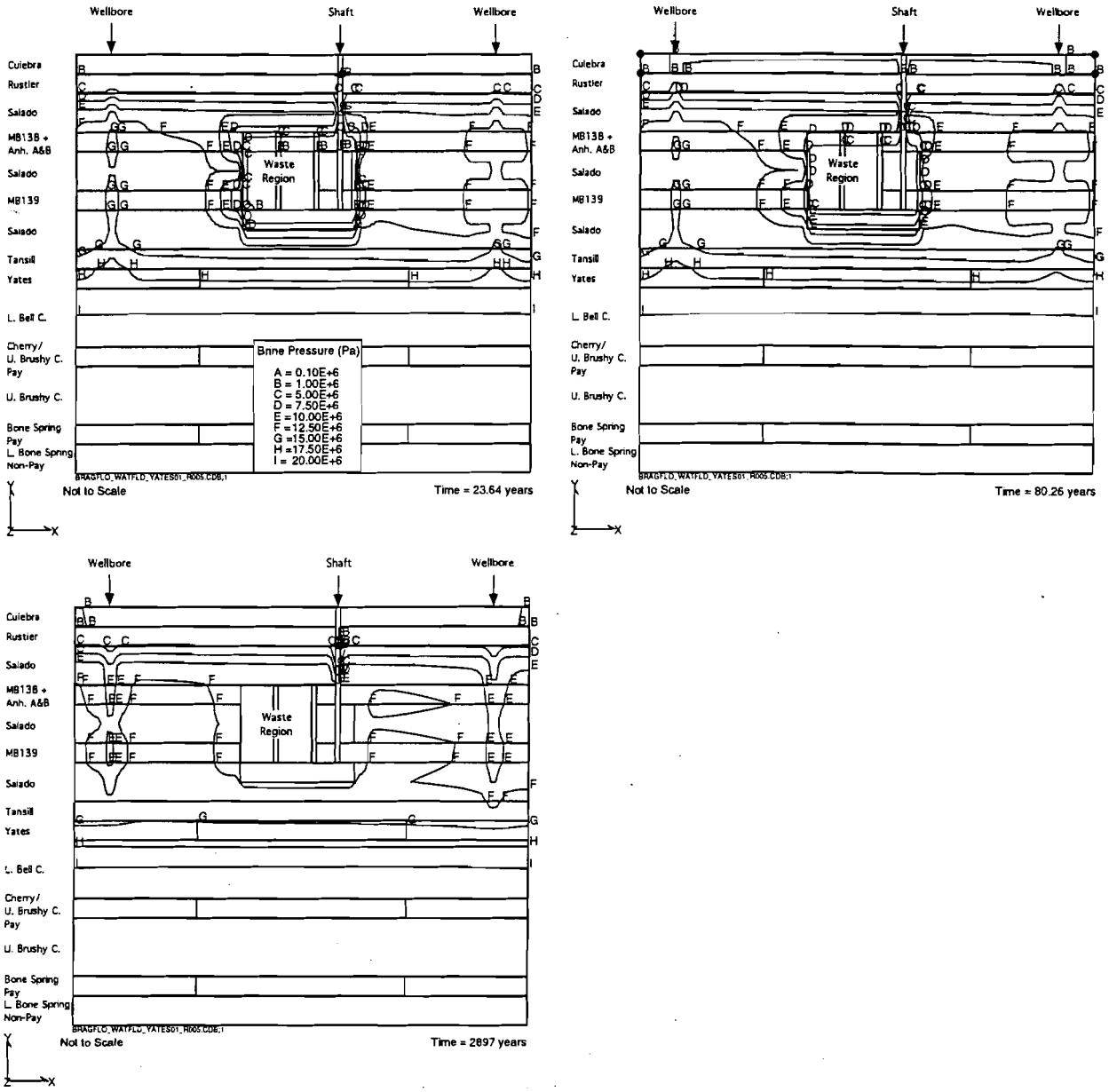

Figure 6: BRAGFLO results showing Pressure Contours: Rhodes-Yates Geology Case 4

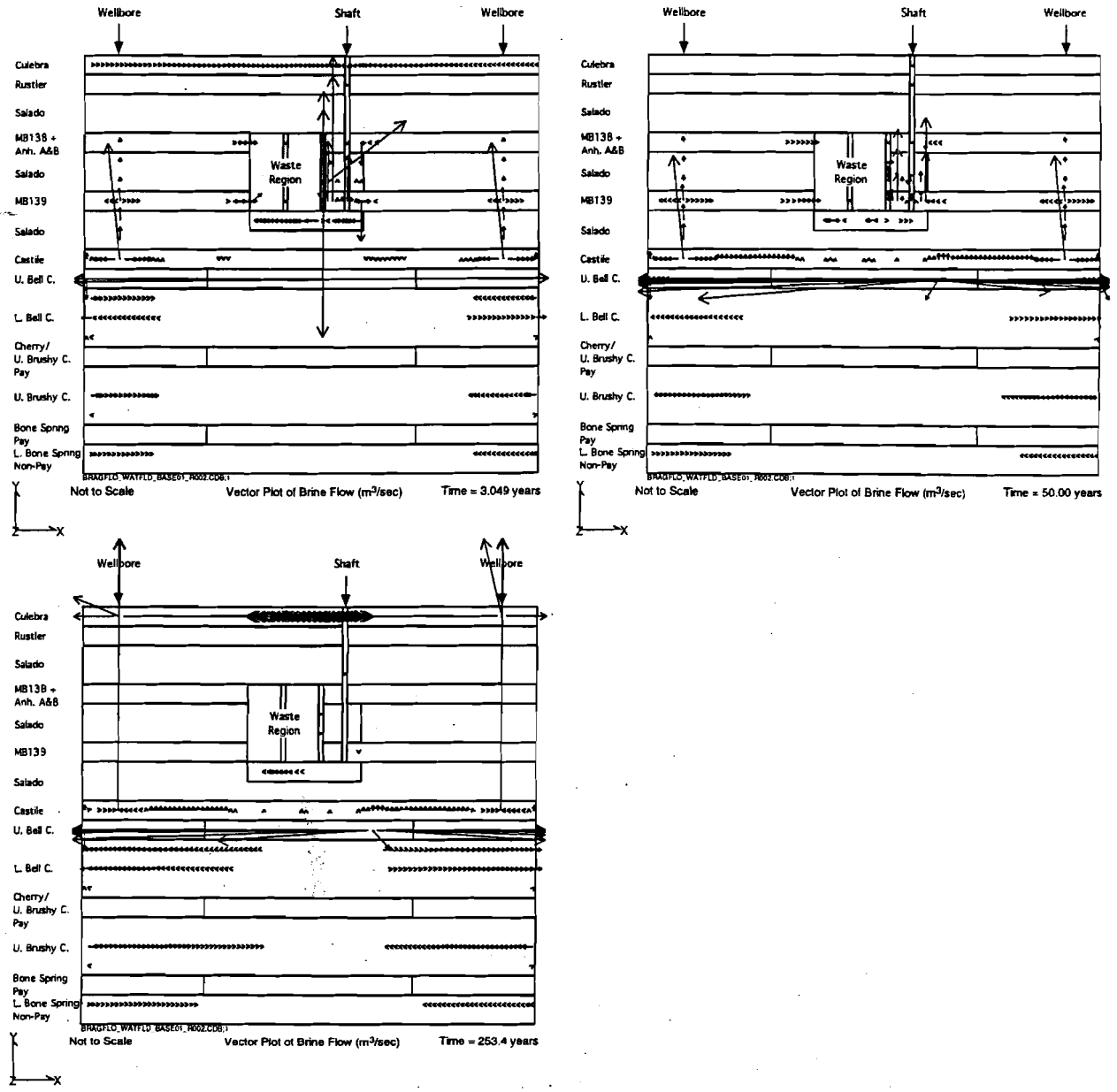

Figure 7: BRAGFLO results showing Flow Vectors: WIPP Geology Case 1

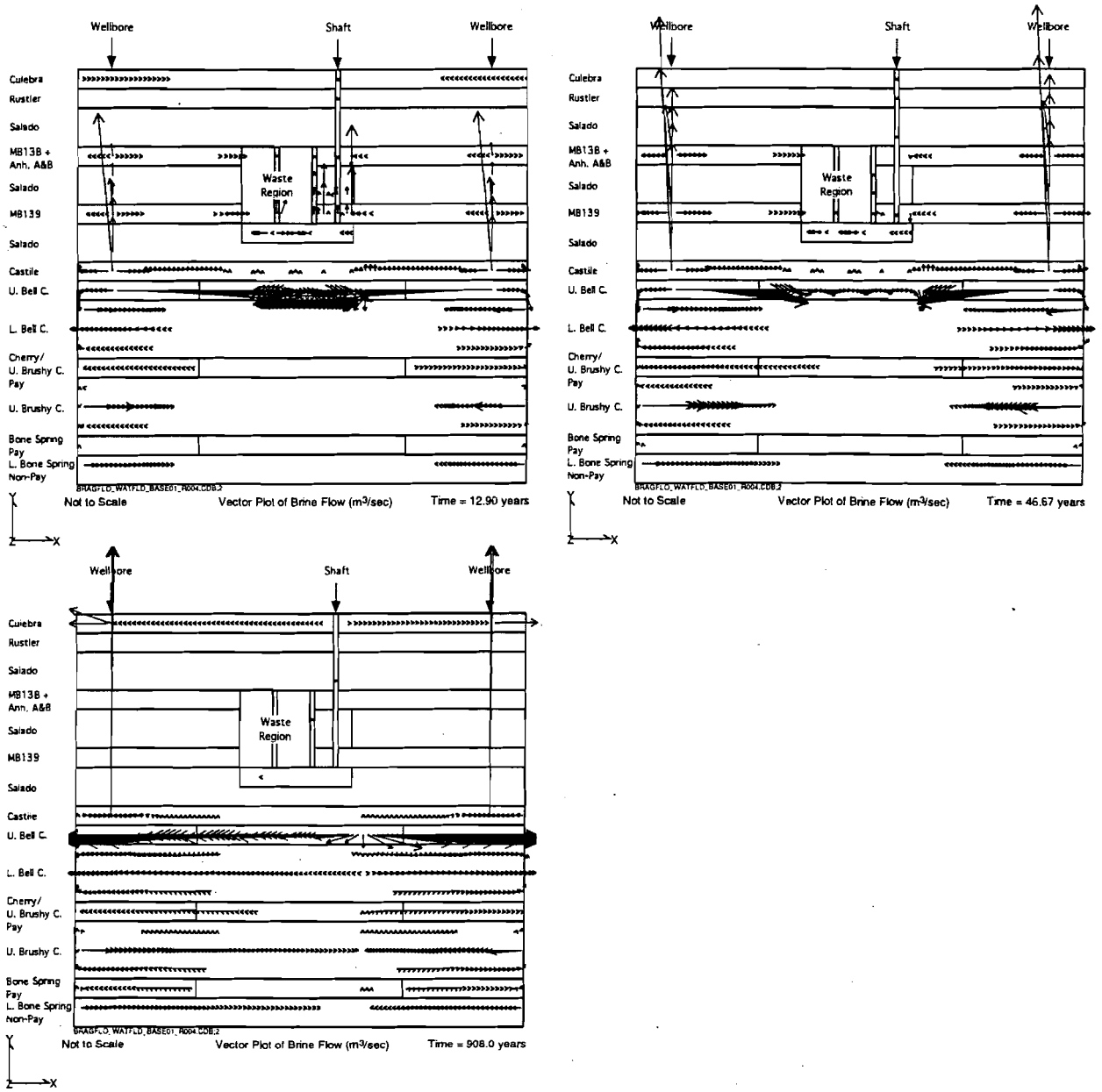

Figure 8: BRAGFLO results showing Flow Vectors: WIPP Geology Case 2

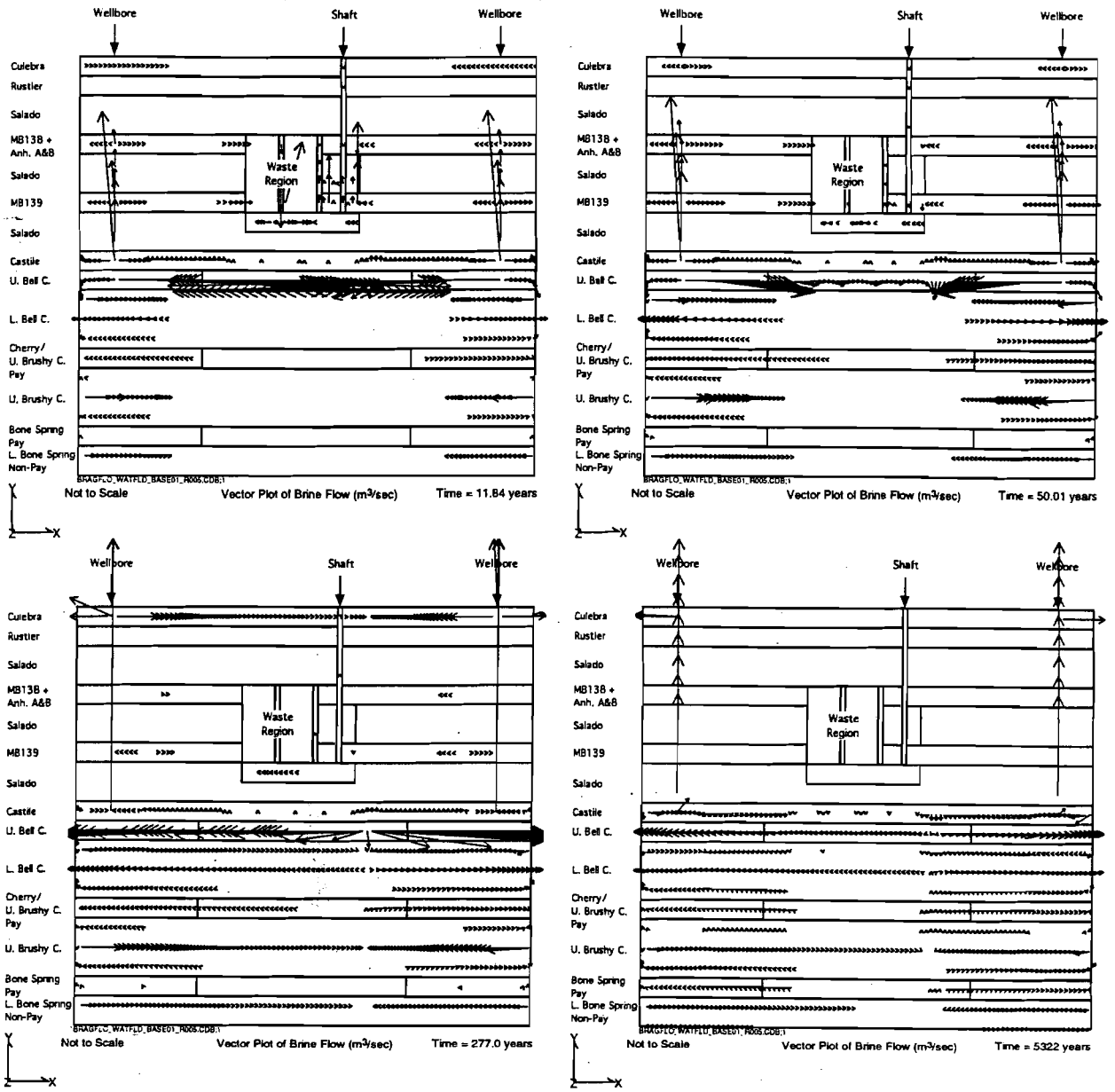

Figure 9: BRAGFLO results showing Flow Vectors: WIPP Geology Case 3

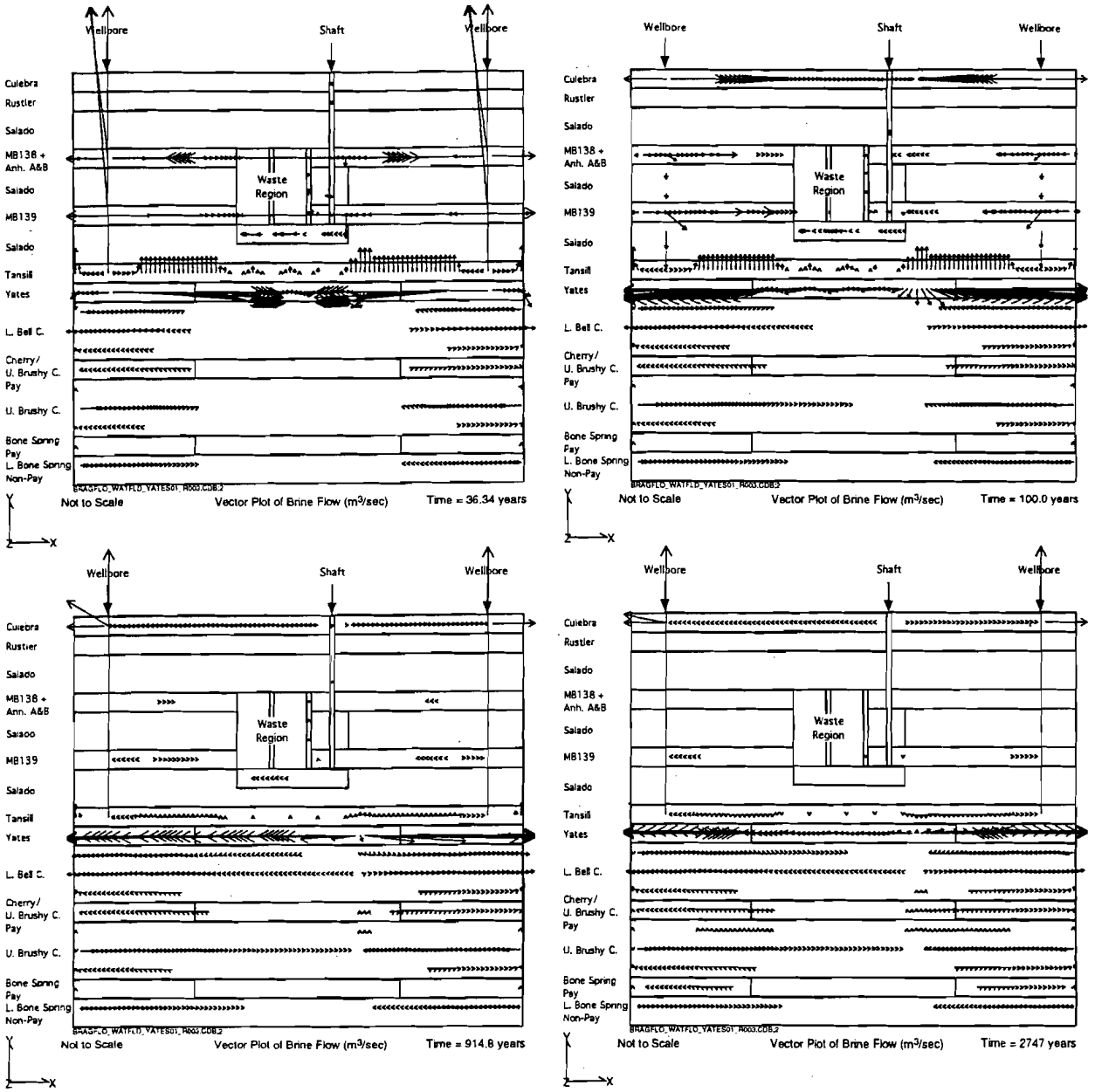

Figure 10: BRAGFLO results showing Flow Vectors: Rhodes-Yates Geology Case 2

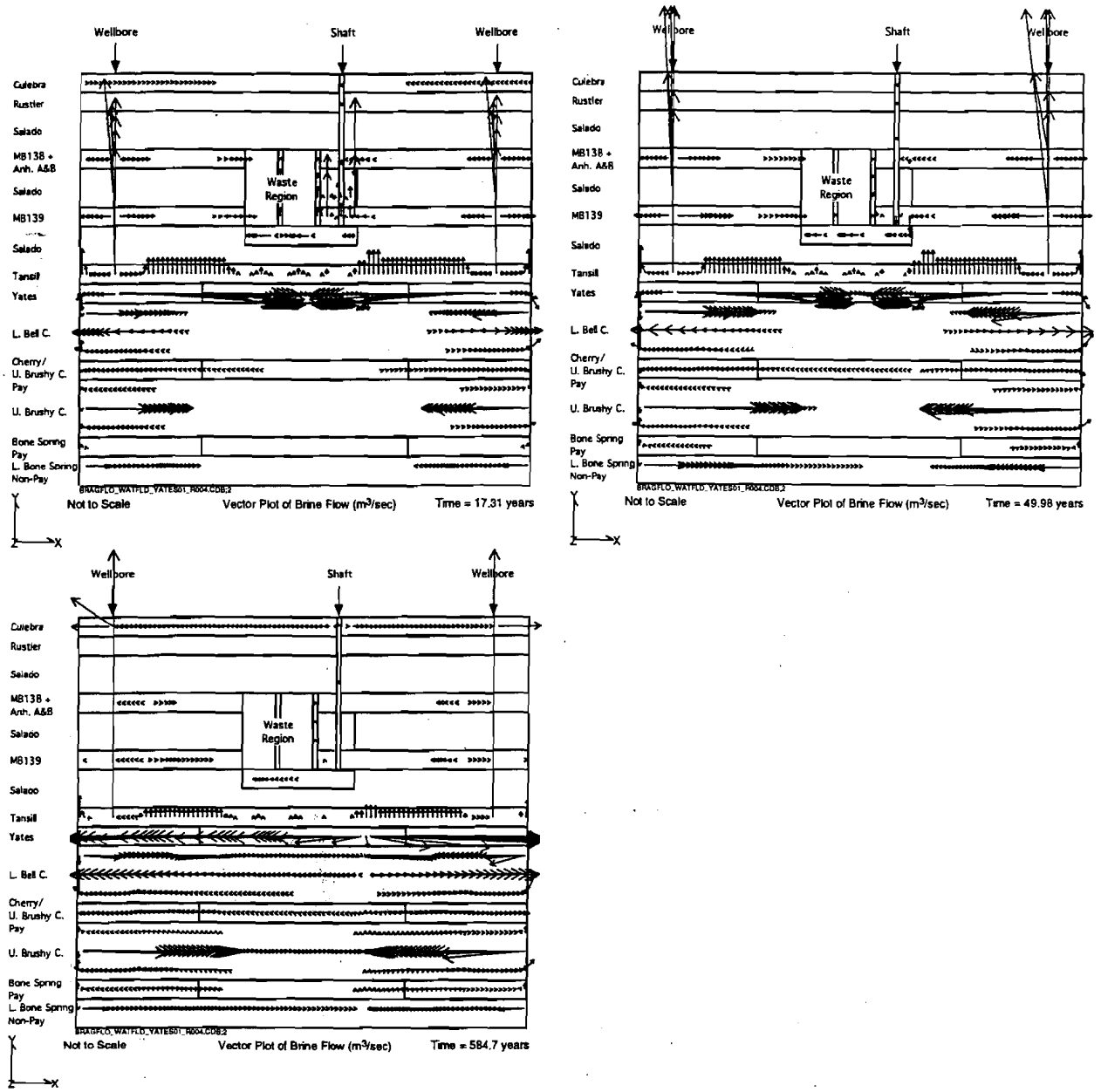

Figure 11: BRAGFLO results showing Flow Vectors: Rhodes-Yates Geology Case 3

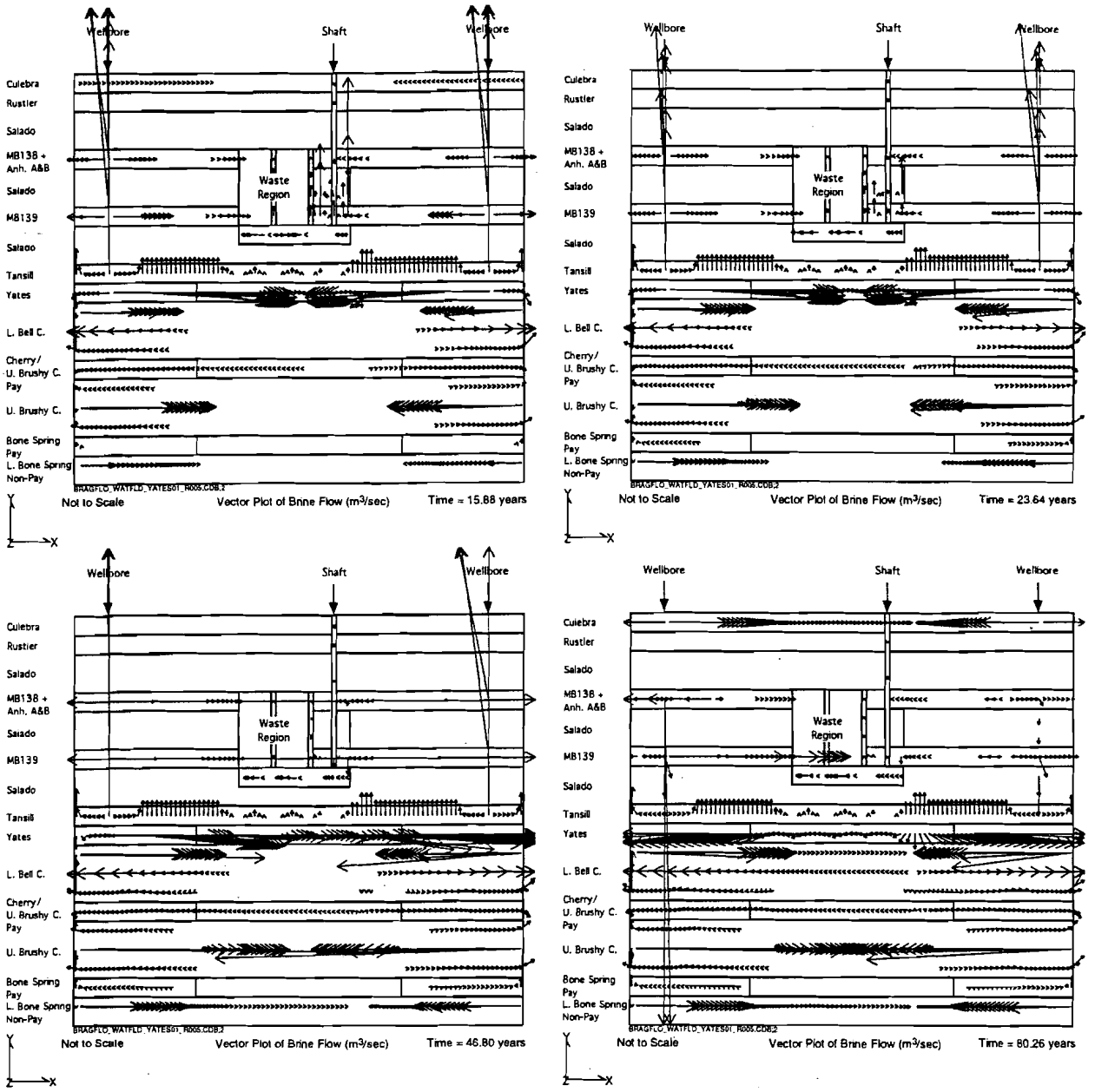

Figure 12: BRAGFLO results showing Flow Vectors: Rhodes-Yates Geology Case 4

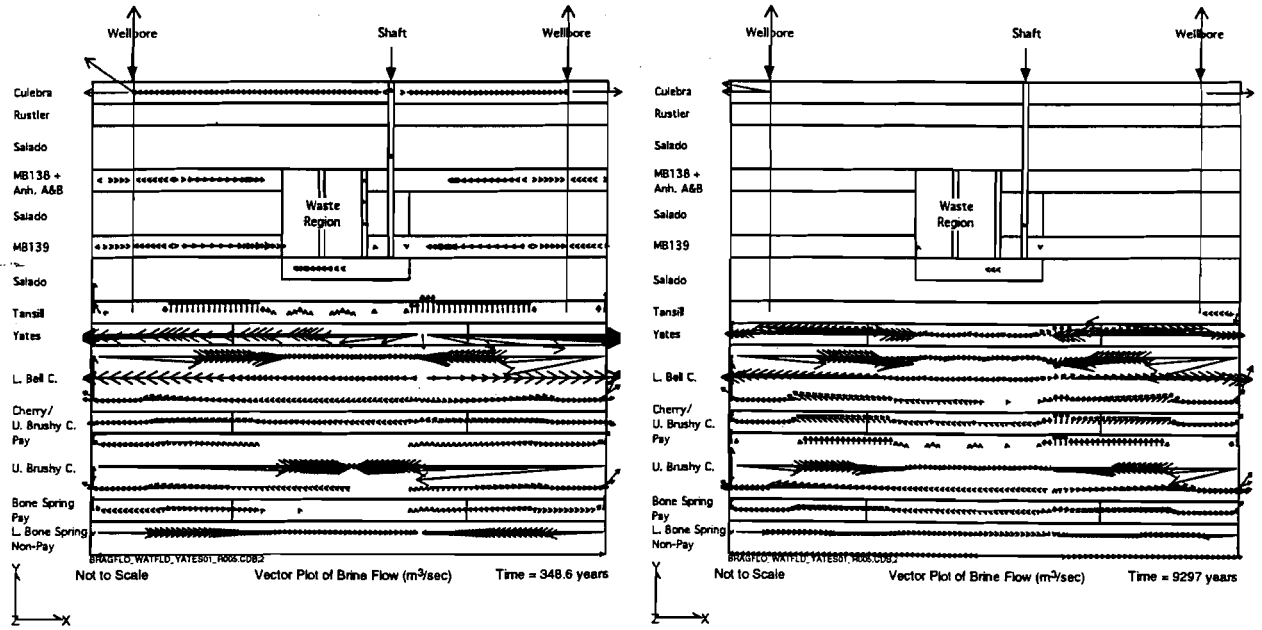

Figure 12 (cont) : BRAGFLO results showing Flow Vectors: Rhodes-Yates Geology Case 4

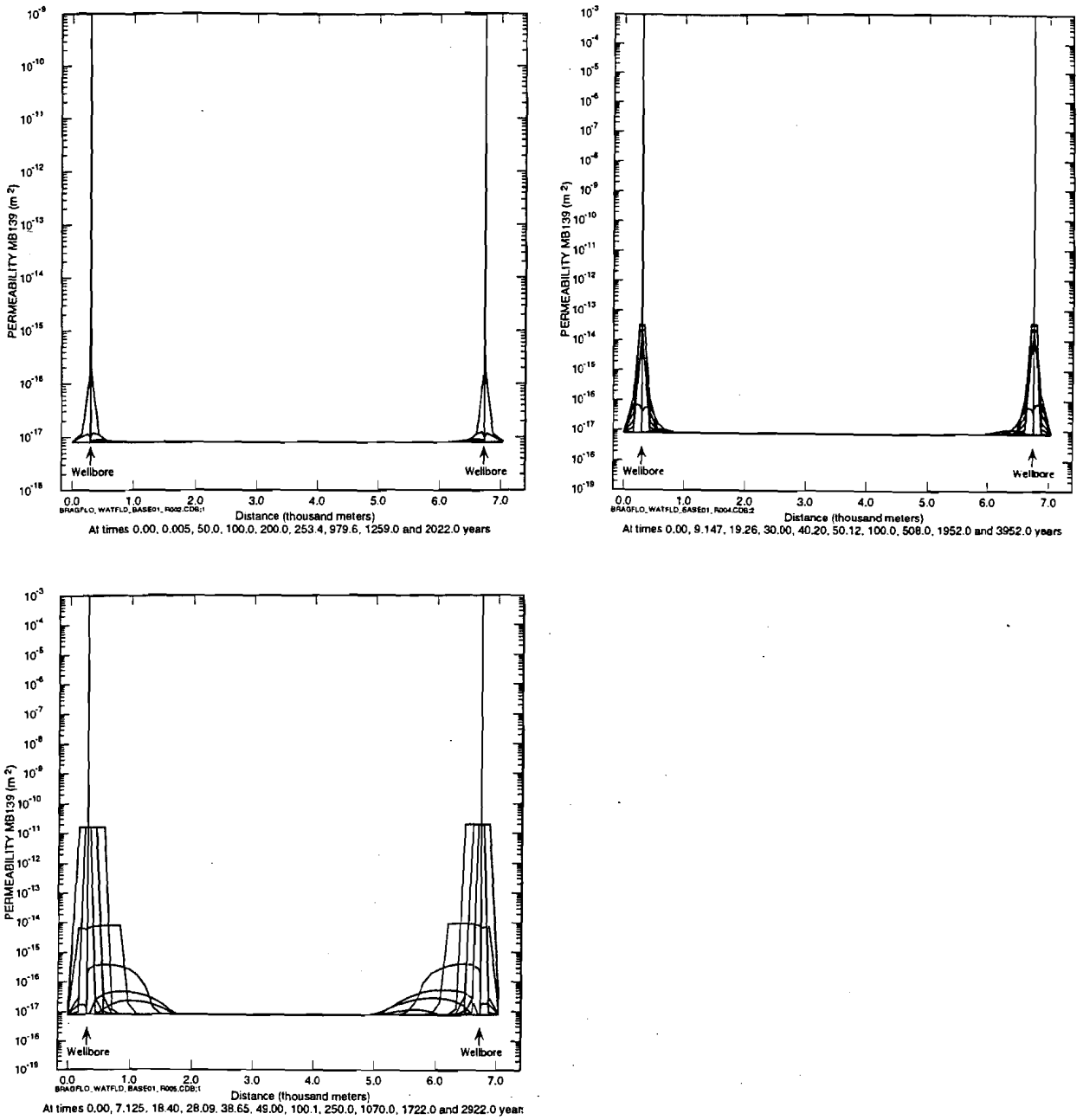

Figure 13: Permeability in MB 139 in response to Fracturing Model: WIPP geology Cases 1, 2 and 3

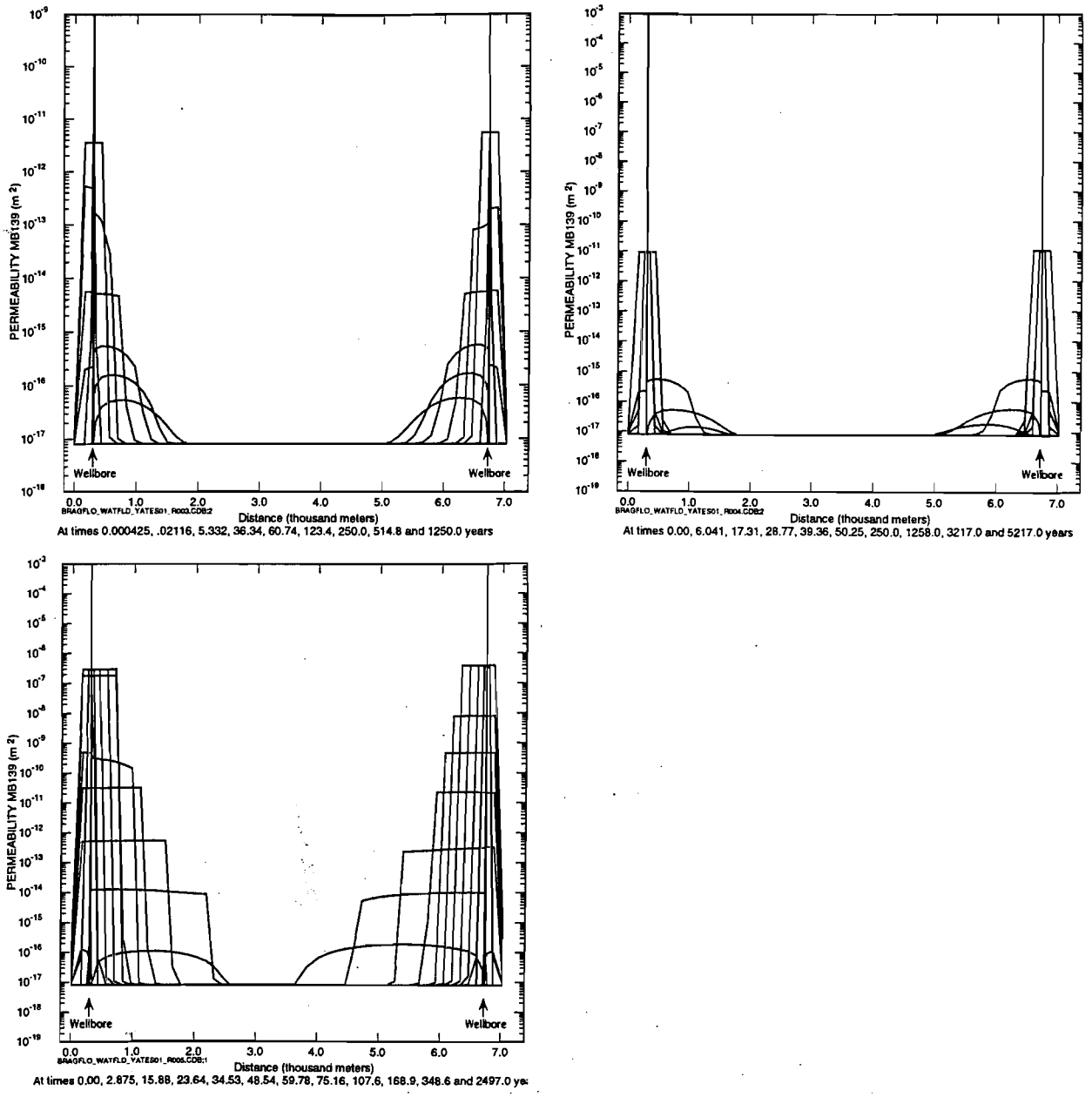

Figure 14: Permeability in MB 139 in response to Fracturing Model: Rhodes-Yates geology Cases 2, 3 and 4

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2	MORRO_P1	Morrow Formation, Pay 1	COMP_RCK	3.02E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
3	MORRO_P1	Morrow Formation, Pay 1	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
4	MORRO_P1	Morrow Formation, Pay 1	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
5	MORRO_P1	Morrow Formation, Pay 1	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
6	MORRO_P1	Morrow Formation, Pay 1	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
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9	MORRO_P1	Morrow Formation, Pay 1	POROSITY	1.10E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
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22	MORRO_P2	Morrow Formation, Pay 2	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Not used	Analyst: DM Stoelzel
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24	MORRO_P2	Morrow Formation, Pay 2	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
25	MORRO_P2	Morrow Formation, Pay 2	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
26	MORRO_P2	Morrow Formation, Pay 2	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
27	MORRO_P2	Morrow Formation, Pay 2	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
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29	MORRO_P2	Morrow Formation, Pay 2	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
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32	MORRO_P2	Morrow Formation, Pay 2	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
33	MORRO_P2	Morrow Formation, Pay 2	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
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36	MORRO_P2	Morrow Formation, Pay 2	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
37	MORRO_P2	Morrow Formation, Pay 2	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
38	MORRO_P2	Morrow Formation, Pay 2	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
39	MORRO_P2	Morrow Formation, Pay 2	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
40	MORRO_P2	Morrow Formation, Pay 2	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
41	MORRO_P2	Morrow Formation, Pay 2	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
42	MORRO_P2	Morrow Formation, Pay 2	POR_COMP	3.02E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
43	MORRO_P3	Morrow Formation, Pay 3	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
44	MORRO_P3	Morrow Formation, Pay 3	COMP_RCK	3.02E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
45	MORRO_P3	Morrow Formation, Pay 3	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
46	MORRO_P3	Morrow Formation, Pay 3	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
47	MORRO_P3	Morrow Formation, Pay 3	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
48	MORRO_P3	Morrow Formation, Pay 3	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
49	MORRO_P3	Morrow Formation, Pay 3	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
50	MORRO_P3	Morrow Formation, Pay 3	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
51	MORRO_P3	Morrow Formation, Pay 3	POROSITY	1.10E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
52	MORRO_P3	Morrow Formation, Pay 3	PRESSURE	5.29E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
53	MORRO_P3	Morrow Formation, Pay 3	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
54	MORRO_P3	Morrow Formation, Pay 3	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
55	MORRO_P3	Morrow Formation, Pay 3	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
56	MORRO_P3	Morrow Formation, Pay 3	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
57	MORRO_P3	Morrow Formation, Pay 3	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
58	MORRO_P3	Morrow Formation, Pay 3	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
59	MORRO_P3	Morrow Formation, Pay 3	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
60	MORRO_P3	Morrow Formation, Pay 3	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
61	MORRO_P3	Morrow Formation, Pay 3	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
62	MORRO_P3	Morrow Formation, Pay 3	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
63	MORRO_P3	Morrow Formation, Pay 3	POR_COMP	3.02E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
64	MORRO_NP	Morrow Formation, No pay	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
65	MORRO_NP	Morrow Formation, No pay	COMP_RCK	3.08E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
66	MORRO_NP	Morrow Formation, No pay	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
67	MORRO_NP	Morrow Formation, No pay	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
68	MORRO_NP	Morrow Formation, No pay	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
69	MORRO_NP	Morrow Formation, No pay	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
70	MORRO_NP	Morrow Formation, No pay	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
71	MORRO_NP	Morrow Formation, No pay	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
72	MORRO_NP	Morrow Formation, No pay	POROSITY	4.00E-02	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
73	MORRO_NP	Morrow Formation, No pay	PRESSURE	5.16E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
74	MORRO_NP	Morrow Formation, No pay	PRMX_LOG	-1.58E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
75	MORRO_NP	Morrow Formation, No pay	PRMY_LOG	-1.98E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
76	MORRO_NP	Morrow Formation, No pay	PRMZ_LOG	-1.58E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
77	MORRO_NP	Morrow Formation, No pay	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
78	MORRO_NP	Morrow Formation, No pay	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
79	MORRO_NP	Morrow Formation, No pay	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
80	MORRO_NP	Morrow Formation, No pay	PERM_X	1.78E-16	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
81	MORRO_NP	Morrow Formation, No pay	PERM_Y	1.78E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
82	MORRO_NP	Morrow Formation, No pay	PERM_Z	1.78E-16	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
83	MORRO_NP	Morrow Formation, No pay	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
84	MORRO_NP	Morrow Formation, No pay	POR_COMP	3.08E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
85	ATOKA_P1	Atoka Formation, Pay 1	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
86	ATOKA_P1	Atoka Formation, Pay 1	COMP_RCK	3.15E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
87	ATOKA_P1	Atoka Formation, Pay 1	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
88	ATOKA_P1	Atoka Formation, Pay 1	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
89	ATOKA_P1	Atoka Formation, Pay 1	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
90	ATOKA_P1	Atoka Formation, Pay 1	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
91	ATOKA_P1	Atoka Formation, Pay 1	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
92	ATOKA_P1	Atoka Formation, Pay 1	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
93	ATOKA_P1	Atoka Formation, Pay 1	POROSITY	9.00E-02	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
94	ATOKA_P1	Atoka Formation, Pay 1	PRESSURE	5.04E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
95	ATOKA_P1	Atoka Formation, Pay 1	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
96	ATOKA_P1	Atoka Formation, Pay 1	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
97	ATOKA_P1	Atoka Formation, Pay 1	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
98	ATOKA_P1	Atoka Formation, Pay 1	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
99	ATOKA_P1	Atoka Formation, Pay 1	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
100	ATOKA_P1	Atoka Formation, Pay 1	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
101	ATOKA_P1	Atoka Formation, Pay 1	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
102	ATOKA_P1	Atoka Formation, Pay 1	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
103	ATOKA_P1	Atoka Formation, Pay 1	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
104	ATOKA_P1	Atoka Formation, Pay 1	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
105	ATOKA_P1	Atoka Formation, Pay 1	POR_COMP	3.15E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
106	ATOKA_P2	Atoka Formation, Pay 2	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
107	ATOKA_P2	Atoka Formation, Pay 2	COMP_RCK	3.15E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
108	ATOKA_P2	Atoka Formation, Pay 2	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
109	ATOKA_P2	Atoka Formation, Pay 2	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
110	ATOKA_P2	Atoka Formation, Pay 2	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
111	ATOKA_P2	Atoka Formation, Pay 2	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
112	ATOKA_P2	Atoka Formation, Pay 2	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
113	ATOKA_P2	Atoka Formation, Pay 2	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
114	ATOKA_P2	Atoka Formation, Pay 2	POROSITY	9.00E-02	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
115	ATOKA_P2	Atoka Formation, Pay 2	PRESSURE	5.04E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
116	ATOKA_P2	Atoka Formation, Pay 2	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
117	ATOKA_P2	Atoka Formation, Pay 2	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
118	ATOKA_P2	Atoka Formation, Pay 2	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
119	ATOKA_P2	Atoka Formation, Pay 2	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
120	ATOKA_P2	Atoka Formation, Pay 2	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
121	ATOKA_P2	Atoka Formation, Pay 2	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
122	ATOKA_P2	Atoka Formation, Pay 2	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
123	ATOKA_P2	Atoka Formation, Pay 2	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
124	ATOKA_P2	Atoka Formation, Pay 2	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
125	ATOKA_P2	Atoka Formation, Pay 2	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
126	ATOKA_P2	Atoka Formation, Pay 2	POR_COMP	3.15E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
127	ATOKA_P3	Atoka Formation, Pay 3	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
128	ATOKA_P3	Atoka Formation, Pay 3	COMP_RCK	3.15E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
129	ATOKA_P3	Atoka Formation, Pay 3	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
130	ATOKA_P3	Atoka Formation, Pay 3	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
131	ATOKA_P3	Atoka Formation, Pay 3	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
132	ATOKA_P3	Atoka Formation, Pay 3	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
133	ATOKA_P3	Atoka Formation, Pay 3	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
134	ATOKA_P3	Atoka Formation, Pay 3	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
135	ATOKA_P3	Atoka Formation, Pay 3	POROSITY	9.00E-02	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
136	ATOKA_P3	Atoka Formation, Pay 3	PRESSURE	5.04E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
137	ATOKA_P3	Atoka Formation, Pay 3	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
138	ATOKA_P3	Atoka Formation, Pay 3	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
139	ATOKA_P3	Atoka Formation, Pay 3	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
140	ATOKA_P3	Atoka Formation, Pay 3	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
141	ATOKA_P3	Atoka Formation, Pay 3	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
142	ATOKA_P3	Atoka Formation, Pay 3	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
143	ATOKA_P3	Atoka Formation, Pay 3	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
144	ATOKA_P3	Atoka Formation, Pay 3	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
145	ATOKA_P3	Atoka Formation, Pay 3	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
146	ATOKA_P3	Atoka Formation, Pay 3	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
147	ATOKA_P3	Atoka Formation, Pay 3	POR_COMP	3.15E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
148	ATOKA_NP	Atoka Formation, No pay	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
149	ATOKA_NP	Atoka Formation, No pay	COMP_RCK	3.22E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
150	ATOKA_NP	Atoka Formation, No pay	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
151	ATOKA_NP	Atoka Formation, No pay	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
152	ATOKA_NP	Atoka Formation, No pay	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
153	ATOKA_NP	Atoka Formation, No pay	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
154	ATOKA_NP	Atoka Formation, No pay	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
155	ATOKA_NP	Atoka Formation, No pay	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
156	ATOKA_NP	Atoka Formation, No pay	POROSITY	1.00E-02	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
157	ATOKA_NP	Atoka Formation, No pay	PRESSURE	4.92E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
158	ATOKA_NP	Atoka Formation, No pay	PRMX_LOG	-1.58E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
159	ATOKA_NP	Atoka Formation, No pay	PRMY_LOG	-1.98E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
160	ATOKA_NP	Atoka Formation, No pay	PRMZ_LOG	-1.58E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
161	ATOKA_NP	Atoka Formation, No pay	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
162	ATOKA_NP	Atoka Formation, No pay	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
163	ATOKA_NP	Atoka Formation, No pay	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
164	ATOKA_NP	Atoka Formation, No pay	PERM_X	1.78E-16	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
165	ATOKA_NP	Atoka Formation, No pay	PERM_Y	1.78E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
166	ATOKA_NP	Atoka Formation, No pay	PERM_Z	1.78E-16	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
167	ATOKA_NP	Atoka Formation, No pay	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
168	ATOKA_NP	Atoka Formation, No pay	POR_COMP	3.22E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
169	STRWN_P1	Strawn Formation, Pay 1	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
170	STRWN_P1	Strawn Formation, Pay 1	COMP_RCK	3.29E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
171	STRWN_P1	Strawn Formation, Pay 1	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
172	STRWN_P1	Strawn Formation, Pay 1	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
173	STRWN_P1	Strawn Formation, Pay 1	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
174	STRWN_P1	Strawn Formation, Pay 1	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
175	STRWN_P1	Strawn Formation, Pay 1	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
176	STRWN_P1	Strawn Formation, Pay 1	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
177	STRWN_P1	Strawn Formation, Pay 1	POROSITY	1.00E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
178	STRWN_P1	Strawn Formation, Pay 1	PRESSURE	4.80E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
179	STRWN_P1	Strawn Formation, Pay 1	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
180	STRWN_P1	Strawn Formation, Pay 1	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
181	STRWN_P1	Strawn Formation, Pay 1	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
182	STRWN_P1	Strawn Formation, Pay 1	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
183	STRWN_P1	Strawn Formation, Pay 1	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
184	STRWN_P1	Strawn Formation, Pay 1	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
185	STRWN_P1	Strawn Formation, Pay 1	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
186	STRWN_P1	Strawn Formation, Pay 1	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
187	STRWN_P1	Strawn Formation, Pay 1	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
188	STRWN_P1	Strawn Formation, Pay 1	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
189	STRWN_P1	Strawn Formation, Pay 1	POR_COMP	3.29E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
190	STRWN_P2	Strawn Formation, Pay 2	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
191	STRWN_P2	Strawn Formation, Pay 2	COMP_RCK	3.29E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
192	STRWN_P2	Strawn Formation, Pay 2	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
193	STRWN_P2	Strawn Formation, Pay 2	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
194	STRWN_P2	Strawn Formation, Pay 2	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
195	STRWN_P2	Strawn Formation, Pay 2	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
196	STRWN_P2	Strawn Formation, Pay 2	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
197	STRWN_P2	Strawn Formation, Pay 2	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
198	STRWN_P2	Strawn Formation, Pay 2	POROSITY	1.00E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
199	STRWN_P2	Strawn Formation, Pay 2	PRESSURE	4.80E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
200	STRWN_P2	Strawn Formation, Pay 2	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
201	STRWN_P2	Strawn Formation, Pay 2	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
202	STRWN_P2	Strawn Formation, Pay 2	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
203	STRWN_P2	Strawn Formation, Pay 2	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
204	STRWN_P2	Strawn Formation, Pay 2	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
205	STRWN_P2	Strawn Formation, Pay 2	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
206	STRWN_P2	Strawn Formation, Pay 2	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
207	STRWN_P2	Strawn Formation, Pay 2	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
208	STRWN_P2	Strawn Formation, Pay 2	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
209	STRWN_P2	Strawn Formation, Pay 2	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
210	STRWN_P2	Strawn Formation, Pay 2	POR_COMP	3.29E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
211	STRWN_P3	Strawn Formation, Pay 3	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
212	STRWN_P3	Strawn Formation, Pay 3	COMP_RCK	3.29E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
213	STRWN_P3	Strawn Formation, Pay 3	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
214	STRWN_P3	Strawn Formation, Pay 3	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
215	STRWN_P3	Strawn Formation, Pay 3	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
216	STRWN_P3	Strawn Formation, Pay 3	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
217	STRWN_P3	Strawn Formation, Pay 3	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
218	STRWN_P3	Strawn Formation, Pay 3	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
219	STRWN_P3	Strawn Formation, Pay 3	POROSITY	1.00E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
220	STRWN_P3	Strawn Formation, Pay 3	PRESSURE	4.80E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
221	STRWN_P3	Strawn Formation, Pay 3	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
222	STRWN_P3	Strawn Formation, Pay 3	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
223	STRWN_P3	Strawn Formation, Pay 3	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
224	STRWN_P3	Strawn Formation, Pay 3	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
225	STRWN_P3	Strawn Formation, Pay 3	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
226	STRWN_P3	Strawn Formation, Pay 3	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
227	STRWN_P3	Strawn Formation, Pay 3	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
228	STRWN_P3	Strawn Formation, Pay 3	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
229	STRWN_P3	Strawn Formation, Pay 3	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
230	STRWN_P3	Strawn Formation, Pay 3	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
231	STRWN_P3	Strawn Formation, Pay 3	POR_COMP	3.29E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
232	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
233	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	COMP_RCK	3.70E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
234	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
235	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
236	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
237	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
238	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
239	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
240	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	POROSITY	2.00E-02	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
241	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PRESSURE	4.18E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
242	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PRMX_LOG	-1.58E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
243	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PRMY_LOG	-1.98E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
244	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PRMZ_LOG	-1.58E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
245	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
246	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
247	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
248	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PERM_X	1.78E-16	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
249	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PERM_Y	1.78E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
250	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	PERM_Z	1.78E-16	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
251	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
252	STRWN_NP	L Bone Sp-Wolfcamp-Strawn NP	POR_COMP	3.70E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
253	BONES_P1	Bone Spring Formation, Pay 1	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
254	BONES_P1	Bone Spring Formation, Pay 1	COMP_RCK	4.23E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
255	BONES_P1	Bone Spring Formation, Pay 1	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
256	BONES_P1	Bone Spring Formation, Pay 1	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
257	BONES_P1	Bone Spring Formation, Pay 1	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
258	BONES_P1	Bone Spring Formation, Pay 1	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
259	BONES_P1	Bone Spring Formation, Pay 1	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
260	BONES_P1	Bone Spring Formation, Pay 1	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
261	BONES_P1	Bone Spring Formation, Pay 1	POROSITY	1.15E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
262	BONES_P1	Bone Spring Formation, Pay 1	PRESSURE	3.56E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
263	BONES_P1	Bone Spring Formation, Pay 1	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
264	BONES_P1	Bone Spring Formation, Pay 1	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
265	BONES_P1	Bone Spring Formation, Pay 1	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
266	BONES_P1	Bone Spring Formation, Pay 1	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
267	BONES_P1	Bone Spring Formation, Pay 1	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
268	BONES_P1	Bone Spring Formation, Pay 1	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
269	BONES_P1	Bone Spring Formation, Pay 1	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
270	BONES_P1	Bone Spring Formation, Pay 1	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
271	BONES_P1	Bone Spring Formation, Pay 1	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
272	BONES_P1	Bone Spring Formation, Pay 1	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
273	BONES_P1	Bone Spring Formation, Pay 1	POR_COMP	4.23E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
274	BONES_P2	Bone Spring Formation, Pay 2	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
275	BONES_P2	Bone Spring Formation, Pay 2	COMP_RCK	4.23E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
276	BONES_P2	Bone Spring Formation, Pay 2	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
277	BONES_P2	Bone Spring Formation, Pay 2	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
278	BONES_P2	Bone Spring Formation, Pay 2	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
279	BONES_P2	Bone Spring Formation, Pay 2	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
280	BONES_P2	Bone Spring Formation, Pay 2	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
281	BONES_P2	Bone Spring Formation, Pay 2	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
282	BONES_P2	Bone Spring Formation, Pay 2	POROSITY	1.15E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
283	BONES_P2	Bone Spring Formation, Pay 2	PRESSURE	3.56E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
284	BONES_P2	Bone Spring Formation, Pay 2	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
285	BONES_P2	Bone Spring Formation, Pay 2	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel

	Material	File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
286	BONES_P2	Bone Spring Formation, Pay 2	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
287	BONES_P2	Bone Spring Formation, Pay 2	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
288	BONES_P2	Bone Spring Formation, Pay 2	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
289	BONES_P2	Bone Spring Formation, Pay 2	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
290	BONES_P2	Bone Spring Formation, Pay 2	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
291	BONES_P2	Bone Spring Formation, Pay 2	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
292	BONES_P2	Bone Spring Formation, Pay 2	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
293	BONES_P2	Bone Spring Formation, Pay 2	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
294	BONES_P2	Bone Spring Formation, Pay 2	POR_COMP	4.23E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
295	BONES_P3	Bone Spring Formation, Pay 3	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
296	BONES_P3	Bone Spring Formation, Pay 3	COMP_RCK	4.23E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
297	BONES_P3	Bone Spring Formation, Pay 3	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
298	BONES_P3	Bone Spring Formation, Pay 3	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
299	BONES_P3	Bone Spring Formation, Pay 3	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
300	BONES_P3	Bone Spring Formation, Pay 3	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
301	BONES_P3	Bone Spring Formation, Pay 3	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
302	BONES_P3	Bone Spring Formation, Pay 3	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
303	BONES_P3	Bone Spring Formation, Pay 3	POROSITY	1.15E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
304	BONES_P3	Bone Spring Formation, Pay 3	PRESSURE	3.56E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
305	BONES_P3	Bone Spring Formation, Pay 3	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
306	BONES_P3	Bone Spring Formation, Pay 3	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
307	BONES_P3	Bone Spring Formation, Pay 3	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
308	BONES_P3	Bone Spring Formation, Pay 3	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
309	BONES_P3	Bone Spring Formation, Pay 3	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
310	BONES_P3	Bone Spring Formation, Pay 3	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
311	BONES_P3	Bone Spring Formation, Pay 3	PERM_X	2.06E-14	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
312	BONES_P3	Bone Spring Formation, Pay 3	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
313	BONES_P3	Bone Spring Formation, Pay 3	PERM_Z	2.06E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
314	BONES_P3	Bone Spring Formation, Pay 3	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
315	BONES_P3	Bone Spring Formation, Pay 3	POR_COMP	4.23E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
316	BONES_NP	U. Bone Spring Form. No Pay	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
317	BONES_NP	U. Bone Spring Form. No Pay	COMP_RCK	4.58E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
318	BONES_NP	U. Bone Spring Form. No Pay	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
319	BONES_NP	U. Bone Spring Form. No Pay	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
320	BONES_NP	U. Bone Spring Form. No Pay	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
321	BONES_NP	U. Bone Spring Form. No Pay	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
322	BONES_NP	U. Bone Spring Form. No Pay	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
323	BONES_NP	U. Bone Spring Form. No Pay	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
324	BONES_NP	U. Bone Spring Form. No Pay	POROSITY	1.40E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
325	BONES_NP	U. Bone Spring Form. No Pay	PRESSURE	3.24E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
326	BONES_NP	U. Bone Spring Form. No Pay	PRMX_LOG	-1.58E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
327	BONES_NP	U. Bone Spring Form. No Pay	PRMY_LOG	-1.98E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
328	BONES_NP	U. Bone Spring Form. No Pay	PRMZ_LOG	-1.58E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
329	BONES_NP	U. Bone Spring Form. No Pay	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
330	BONES_NP	U. Bone Spring Form. No Pay	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
331	BONES_NP	U. Bone Spring Form. No Pay	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
332	BONES_NP	U. Bone Spring Form. No Pay	PERM_X	1.78E-16	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
333	BONES_NP	U. Bone Spring Form. No Pay	PERM_Y	1.78E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
334	BONES_NP	U. Bone Spring Form. No Pay	PERM_Z	1.78E-16	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
335	BONES_NP	U. Bone Spring Form. No Pay	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
336	BONES_NP	U. Bone Spring Form. No Pay	POR_COMP	4.58E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
337	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
338	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	COMP_RCK	4.98E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
339	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
340	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
341	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
342	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
343	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
344	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
345	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
346	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PRESSURE	2.92E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
347	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
348	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
349	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
350	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
351	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
352	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
353	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
354	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
355	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
356	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
357	LBRSH_P1	L. Brushy Can. (ABCD) Pay 1	POR_COMP	4.98E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
358	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
359	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	COMP_RCK	4.98E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
360	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
361	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
362	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
363	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
364	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
365	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
366	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
367	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PRESSURE	2.92E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
368	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
369	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
370	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
371	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
372	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
373	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
374	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
375	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
376	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
377	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
378	LBRSH_P2	L. Brushy Can. (ABCD) Pay 2	POR_COMP	4.98E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
379	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
380	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	COMP_RCK	4.98E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
381	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
382	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
383	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
384	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
385	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
386	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
387	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
388	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PRESSURE	2.92E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
389	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
390	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
391	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
392	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
393	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
394	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
395	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
396	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
397	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
398	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
399	LBRSH_P3	L. Brushy Can. (ABCD) Pay 3	POR_COMP	4.98E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
400	UBRSH_NP	U. Brushy Canyon -- No Pay	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
401	UBRSH_NP	U. Brushy Canyon -- No Pay	COMP_RCK	5.45E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
402	UBRSH_NP	U. Brushy Canyon -- No Pay	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
403	UBRSH_NP	U. Brushy Canyon -- No Pay	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
404	UBRSH_NP	U. Brushy Canyon -- No Pay	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
405	UBRSH_NP	U. Brushy Canyon -- No Pay	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
406	UBRSH_NP	U. Brushy Canyon -- No Pay	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
407	UBRSH_NP	U. Brushy Canyon -- No Pay	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
408	UBRSH_NP	U. Brushy Canyon -- No Pay	POROSITY	1.40E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
409	UBRSH_NP	U. Brushy Canyon -- No Pay	PRESSURE	2.61E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
410	UBRSH_NP	U. Brushy Canyon -- No Pay	PRMX_LOG	-1.60E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
411	UBRSH_NP	U. Brushy Canyon -- No Pay	PRMY_LOG	-1.90E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
412	UBRSH_NP	U. Brushy Canyon -- No Pay	PRMZ_LOG	-1.60E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
413	UBRSH_NP	U. Brushy Canyon -- No Pay	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
414	UBRSH_NP	U. Brushy Canyon -- No Pay	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
415	UBRSH_NP	U. Brushy Canyon -- No Pay	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
416	UBRSH_NP	U. Brushy Canyon -- No Pay	PERM_X	9.86E-17	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
417	UBRSH_NP	U. Brushy Canyon -- No Pay	PERM_Y	9.86E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
418	UBRSH_NP	U. Brushy Canyon -- No Pay	PERM_Z	9.86E-17	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
419	UBRSH_NP	U. Brushy Canyon -- No Pay	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
420	UBRSH_NP	U. Brushy Canyon -- No Pay	POR_COMP	5.45E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
421	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
422	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	COMP_RCK	6.02E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
423	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
424	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
425	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
426	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
427	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
428	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
429	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
430	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PRESSURE	2.29E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
431	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
432	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
433	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
434	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
435	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
436	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
437	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
438	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
439	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
440	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
441	UBRSH_P1	U. Brushy Can - Cherry C, Pay 1	POR_COMP	6.02E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
442	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
443	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	COMP_RCK	6.02E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
444	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
445	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
446	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
447	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
448	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
449	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
450	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
451	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PRESSURE	2.29E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
452	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
453	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
454	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
455	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
456	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel

	Material	File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
457	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
458	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
459	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
460	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
461	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
462	UBRSH_P2	U. Brushy Can - Cherry C, Pay 2	POR_COMP	6.02E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
463	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
464	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	COMP_RCK	6.02E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
465	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
466	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
467	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
468	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
469	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
470	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
471	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
472	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PRESSURE	2.29E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
473	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
474	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
475	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
476	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
477	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
478	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
479	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
480	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
481	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
482	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
483	UBRSH_P3	U. Brushy Can - Cherry C, Pay 3	POR_COMP	6.02E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
484	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
485	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	COMP_RCK	6.77E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
486	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
487	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
488	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
489	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
490	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
491	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
492	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	POROSITY	1.40E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
493	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PRESSURE	1.96E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
494	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PRMX_LOG	-1.60E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
495	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PRMY_LOG	-1.90E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
496	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PRMZ_LOG	-1.60E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
497	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
498	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
499	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
500	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PERM_X	9.86E-17	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
501	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PERM_Y	9.86E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
502	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	PERM_Z	9.86E-17	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
503	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
504	LBELL_NP	L. Bell Canyon-U. Cherry No Pay	POR_COMP	6.77E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
505	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
506	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	COMP_RCK	7.95E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
507	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
508	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
509	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
510	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
511	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
512	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
513	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
514	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PRESSURE	1.56E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
515	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
516	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
517	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
518	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
519	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
520	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
521	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
522	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
523	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
524	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
525	UBELL_P1	U Bell Canyon Pay 1 (SWD zone)	POR_COMP	7.95E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
526	UBELL_P2	U Bell Canyon Pay 2	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
527	UBELL_P2	U Bell Canyon Pay 2	COMP_RCK	7.95E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
528	UBELL_P2	U Bell Canyon Pay 2	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
529	UBELL_P2	U Bell Canyon Pay 2	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
530	UBELL_P2	U Bell Canyon Pay 2	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
531	UBELL_P2	U Bell Canyon Pay 2	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
532	UBELL_P2	U Bell Canyon Pay 2	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
533	UBELL_P2	U Bell Canyon Pay 2	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
534	UBELL_P2	U Bell Canyon Pay 2	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
535	UBELL_P2	U Bell Canyon Pay 2	PRESSURE	1.56E+07	Hydrostatic initial pressure (Pa)	Initialize deeper layers	Analyst: DM Stoelzel
536	UBELL_P2	U Bell Canyon Pay 2	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
537	UBELL_P2	U Bell Canyon Pay 2	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
538	UBELL_P2	U Bell Canyon Pay 2	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
539	UBELL_P2	U Bell Canyon Pay 2	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
540	UBELL_P2	U Bell Canyon Pay 2	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
541	UBELL_P2	U Bell Canyon Pay 2	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
542	UBELL_P2	U Bell Canyon Pay 2	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
543	UBELL_P2	U Bell Canyon Pay 2	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
544	UBELL_P2	U Bell Canyon Pay 2	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
545	UBELL_P2	U Bell Canyon Pay 2	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
546	UBELL_P2	U Bell Canyon Pay 2	POR_COMP	7.95E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
547	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	CAP_MOD	2.00E+00	Capillary Pressure Model Number (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
548	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	COMP_RCK	7.95E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
549	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PC_MAX	1.00E+08	Max capillary pressure (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
550	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PCT_A	2.60E-01	Capillary pressure multiplier (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
551	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PCT_EXP	-3.48E-01	Capillary pressure exponent (same as Culebra)	Required for BRAGFLO	Analyst: DM Stoelzel
552	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	KPT	0.00E+00	Not used - placeholder	Not used	Analyst: DM Stoelzel
553	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
554	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
555	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	POROSITY	2.90E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
556	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PRESSURE	1.56E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
557	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PRMX_LOG	-1.29E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
558	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PRMY_LOG	-1.99E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
559	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PRMZ_LOG	-1.29E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
560	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
561	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
562	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
563	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PERM_X	1.27E-13	X-direction permeability (m^2) from Log value (NM B of Mines)	Required for BRAGFLO	Analyst: DM Stoelzel
564	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PERM_Y	1.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
565	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	PERM_Z	1.27E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Analyst: DM Stoelzel
566	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
567	UBELL_P3	U Bell Canyon Pay 3 (SWD zone)	POR_COMP	7.95E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
568	CASTILER	Castile Formation - non reservoir	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
569	CASTILER	Castile Formation - non reservoir	COMP_RCK	-1.00E+01	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
570	CASTILER	Castile Formation - non reservoir	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
571	CASTILER	Castile Formation - non reservoir	PCT_A	5.60E-01	Capillary pressure multiplier	Required for BRAGFLO	Database: CCA view 6
572	CASTILER	Castile Formation - non reservoir	PCT_EXP	-3.46E-01	Capillary pressure exponent	Required for BRAGFLO	Database: CCA view 6
573	CASTILER	Castile Formation - non reservoir	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
574	CASTILER	Castile Formation - non reservoir	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
575	CASTILER	Castile Formation - non reservoir	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
576	CASTILER	Castile Formation - non reservoir	POROSITY	8.70E-03	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
577	CASTILER	Castile Formation - non reservoir	PRESSURE	1.27E+07	Hydrostatic initial pressure (Pa)	Not used	Database: CCA view 6
578	CASTILER	Castile Formation - non reservoir	PRMX_LOG	-1.80E+01	Log x-direction permeability	Intermediate value	Analyst: DM Stoelzel
579	CASTILER	Castile Formation - non reservoir	PRMY_LOG	-1.90E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
580	CASTILER	Castile Formation - non reservoir	PRMZ_LOG	-1.80E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
581	CASTILER	Castile Formation - non reservoir	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
582	CASTILER	Castile Formation - non reservoir	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
583	CASTILER	Castile Formation - non reservoir	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
584	CASTILER	Castile Formation - non reservoir	PERM_X	1.00E-18	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
585	CASTILER	Castile Formation - non reservoir	PERM_Y	1.00E-19	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
586	CASTILER	Castile Formation - non reservoir	PERM_Z	1.00E-18	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
587	CASTILER	Castile Formation - non reservoir	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
588	CASTILER	Castile Formation - non reservoir	POR_COMP	1.15E-08	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
589	S_HALITE	Salado Formation - impure halite	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
590	S_HALITE	Salado Formation - impure halite	COMP_RCK	9.75E-11	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
591	S_HALITE	Salado Formation - impure halite	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
592	S_HALITE	Salado Formation - impure halite	PCT_A	5.60E-01	Capillary pressure multiplier	Required for BRAGFLO	Database: CCA view 6
593	S_HALITE	Salado Formation - impure halite	PCT_EXP	-3.46E-01	Capillary pressure exponent	Required for BRAGFLO	Database: CCA view 6
594	S_HALITE	Salado Formation - impure halite	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
595	S_HALITE	Salado Formation - impure halite	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
596	S_HALITE	Salado Formation - impure halite	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
597	S_HALITE	Salado Formation - impure halite	POROSITY	1.00E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
598	S_HALITE	Salado Formation - impure halite	PRESSURE	1.25E+07	Initial pressure (Pa).	Initialize Salado grid blo	Database: CCA view 6
599	S_HALITE	Salado Formation - impure halite	PRMX_LOG	-2.25E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
600	S_HALITE	Salado Formation - impure halite	PRMY_LOG	-2.25E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
601	S_HALITE	Salado Formation - impure halite	PRMZ_LOG	-2.25E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
602	S_HALITE	Salado Formation - impure halite	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
603	S_HALITE	Salado Formation - impure halite	SAT_RBRN	3.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
604	S_HALITE	Salado Formation - impure halite	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
605	S_HALITE	Salado Formation - impure halite	PERM_X	3.16E-23	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
606	S_HALITE	Salado Formation - impure halite	PERM_Y	3.16E-23	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
607	S_HALITE	Salado Formation - impure halite	PERM_Z	3.16E-23	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
608	S_HALITE	Salado Formation - impure halite	SB_MIN	3.15E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
609	S_HALITE	Salado Formation - impure halite	POR_COMP	9.75E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
610	S_MB139	Interbed: Marker Bed 139	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
611	S_MB139	Interbed: Marker Bed 139	COMP_RCK	8.26E-11	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
612	S_MB139	Interbed: Marker Bed 139	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
613	S_MB139	Interbed: Marker Bed 139	PCT_A	2.60E-01	Capillary pressure multiplier	Required for BRAGFLO	Database: CCA view 6
614	S_MB139	Interbed: Marker Bed 139	PCT_EXP	-3.48E-01	Capillary pressure exponent	Required for BRAGFLO	Database: CCA view 6
615	S_MB139	Interbed: Marker Bed 139	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
616	S_MB139	Interbed: Marker Bed 139	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
617	S_MB139	Interbed: Marker Bed 139	PORE_DIS	6.44E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
618	S_MB139	Interbed: Marker Bed 139	POROSITY	1.10E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
619	S_MB139	Interbed: Marker Bed 139	PRMX_LOG	-1.89E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
620	S_MB139	Interbed: Marker Bed 139	PRMY_LOG	-1.89E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
621	S_MB139	Interbed: Marker Bed 139	PRMZ_LOG	-1.89E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
622	S_MB139	Interbed: Marker Bed 139	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
623	S_MB139	Interbed: Marker Bed 139	SAT_RBRN	8.36E-02	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
624	S_MB139	Interbed: Marker Bed 139	SAT_RGAS	7.71E-02	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
625	S_MB139	Interbed: Marker Bed 139	BKLINK	2.71E-01	Klinkenburg Effects multiplier	Not used	Database: CCA view 6
626	S_MB139	Interbed: Marker Bed 139	EXPKLINK	-3.41E-01	Klinkenburg exponent	Not used	Database: CCA view 6
627	S_MB139	Interbed: Marker Bed 139	DPHIMAX	3.90E-02	Maximum delta change in porosity for fracture model	Required for BRAGFLO	Database: CCA view 6

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
628	S_MB139	Interbed: Marker Bed 139	PI_DELTA	2.00E+05	Fracture initiation pressure - reference pressure (Pa)	Required for BRAGFLO	Database: CCA view 6
629	S_MB139	Interbed: Marker Bed 139	PF_DELTA	3.80E+06	Maximum final fracture pressure - reference pressure (Pa)	Required for BRAGFLO	Database: CCA view 6
630	S_MB139	Interbed: Marker Bed 139	IFRX	1.00E+00	X-direction fracturing flag (1 = true, 0 = false)	Required for BRAGFLO	Database: CCA view 6
631	S_MB139	Interbed: Marker Bed 139	IFRY	1.00E+00	Y-direction fracturing flag (1 = true, 0 = false)	Required for BRAGFLO	Database: CCA view 6
632	S_MB139	Interbed: Marker Bed 139	IFRZ	0.00E+00	Z-direction fracturing flag (1 = true, 0 = false)	Required for BRAGFLO	Database: CCA view 6
633	S_MB139	Interbed: Marker Bed 139	KMAXLOG	-9.00E+00	Log maximum allowable permeability in fracturing model log(m^2)	Used for fracturing mod	Database: CCA view 6
634	S_MB139	Interbed: Marker Bed 139	PERM_X	1.29E-19	X-direction permeablility (from PRMX_LOG) (m^2)	Required for BRAGFLO	Calculated
635	S_MB139	Interbed: Marker Bed 139	PERM_Y	1.29E-19	Y-direction permeablility (from PRMY_LOG) (m^2)	Required for BRAGFLO	Calculated
636	S_MB139	Interbed: Marker Bed 139	PERM_Z	1.29E-19	Z-direction permeablility (from PRMZ_LOG) (m^2)	Not used - 2D model	Calculated
637	S_MB139	Interbed: Marker Bed 139	SB_MIN	8.78E-02	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Calculated
638	S_MB139	Interbed: Marker Bed 139	POR_COMP	7.51E-09	Calculated; = COMP_RCK/POROSITY	Required for BRAGFLO	Calculated
639	S_MB139	Interbed: Marker Bed 139	PHIMAX	5.00E-02	Calculated: = POROSITY + DPHIMAX for fracturing model	Required for BRAGFLO	Calculated
640	S_MB139	Interbed: Marker Bed 139	TEMP	1.10E-02	Temporary variable: = POROSITY*(EXP(POR_COMP*(PI_DELTA)))	Used for fracturing mod	Calculated
641	S_MB139	Interbed: Marker Bed 139	PERM_EXP	1.51E+01	Calculated:=LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))	Required for BRAGFLO	Calculated
642	S_MB138	Interbed: Marker Bed 138 + A&B	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
643	S_MB138	Interbed: Marker Bed 138 + A&B	COMP_RCK	8.26E-11	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
644	S_MB138	Interbed: Marker Bed 138 + A&B	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
645	S_MB138	Interbed: Marker Bed 138 + A&B	PCT_A	2.60E-01	Capillary pressure multiplier	Required for BRAGFLO	Database: CCA view 6
646	S_MB138	Interbed: Marker Bed 138 + A&B	PCT_EXP	-3.48E-01	Capillary pressure exponent	Required for BRAGFLO	Database: CCA view 6
647	S_MB138	Interbed: Marker Bed 138 + A&B	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
648	S_MB138	Interbed: Marker Bed 138 + A&B	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
649	S_MB138	Interbed: Marker Bed 138 + A&B	PORE_DIS	6.44E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
650	S_MB138	Interbed: Marker Bed 138 + A&B	POROSITY	1.10E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
651	S_MB138	Interbed: Marker Bed 138 + A&B	PRMX_LOG	-1.89E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
652	S_MB138	Interbed: Marker Bed 138 + A&B	PRMY_LOG	-1.89E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
653	S_MB138	Interbed: Marker Bed 138 + A&B	PRMZ_LOG	-1.89E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
654	S_MB138	Interbed: Marker Bed 138 + A&B	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
655	S_MB138	Interbed: Marker Bed 138 + A&B	SAT_RBRN	8.36E-02	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
656	S_MB138	Interbed: Marker Bed 138 + A&B	SAT_RGAS	7.71E-02	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
657	S_MB138	Interbed: Marker Bed 138 + A&B	DPHIMAX	3.90E-02	Maximum delta change in porosity for fracture model	Required for BRAGFLO	Database: CCA view 6
658	S_MB138	Interbed: Marker Bed 138 + A&B	PI_DELTA	2.00E+05	Fracture initiation pressure - reference pressure (Pa)	Required for BRAGFLO	Database: CCA view 6
659	S_MB138	Interbed: Marker Bed 138 + A&B	PF_DELTA	3.80E+06	Maximum final fracture pressure - reference pressure (Pa)	Required for BRAGFLO	Database: CCA view 6
660	S_MB138	Interbed: Marker Bed 138 + A&B	IFRX	1.00E+00	X-direction fracturing flag (1 = true, 0 = false)	Required for BRAGFLO	Database: CCA view 6
661	S_MB138	Interbed: Marker Bed 138 + A&B	IFRY	1.00E+00	Y-direction fracturing flag (1 = true, 0 = false)	Required for BRAGFLO	Database: CCA view 6
662	S_MB138	Interbed: Marker Bed 138 + A&B	IFRZ	0.00E+00	Z-direction fracturing flag (1 = true, 0 = false)	Required for BRAGFLO	Database: CCA view 6
663	S_MB138	Interbed: Marker Bed 138 + A&B	KMAXLOG	-9.00E+00	Log maximum allowable permeability in fracturing model log(m^2)	Used for fracturing mod	Database: CCA view 6
664	S_MB138	Interbed: Marker Bed 138 + A&B	PERM_X	1.29E-19	X-direction permeablility (from PRMX_LOG) (m^2)	Required for BRAGFLO	Calculated
665	S_MB138	Interbed: Marker Bed 138 + A&B	PERM_Y	1.29E-19	Y-direction permeablility (from PRMY_LOG) (m^2)	Required for BRAGFLO	Calculated
666	S_MB138	Interbed: Marker Bed 138 + A&B	PERM_Z	1.29E-19	Z-direction permeablility (from PRMZ_LOG) (m^2)	Not used - 2D model	Calculated
667	S_MB138	Interbed: Marker Bed 138 + A&B	SB_MIN	8.78E-02	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Calculated
668	S_MB138	Interbed: Marker Bed 138 + A&B	POR_COMP	7.51E-09	Calculated: = COMP_RCK/POROSITY	Required for BRAGFLO	Calculated
669	S_MB138	Interbed: Marker Bed 138 + A&B	PHIMAX	5.00E-02	Calculated: = POROSITY + DPHIMAX for fracturing model	Required for BRAGFLO	Calculated
670	S_MB138	Interbed: Marker Bed 138 + A&B	TEMP	1.10E-02	Temporary variable: = POROSITY*(EXP(POR_COMP*(PI_DELTA)))	Used for fracturing mod	Calculated
671	S_MB138	Interbed: Marker Bed 138 + A&B	PERM_EXP	1.51E+01	Calculated:=LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))	Required for BRAGFLO	Calculated
672	UNNAMED	Un-named member of Rustler	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
673	UNNAMED	Un-named member of Rustler	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
674	UNNAMED	Un-named member of Rustler	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
675	UNNAMED	Un-named member of Rustler	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
676	UNNAMED	Un-named member of Rustler	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
677	UNNAMED	Un-named member of Rustler	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
678	UNNAMED	Un-named member of Rustler	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
679	UNNAMED	Un-named member of Rustler	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
680	UNNAMED	Un-named member of Rustler	POROSITY	1.81E-01	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
681	UNNAMED	Un-named member of Rustler	PRMX_LOG	-3.50E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
682	UNNAMED	Un-named member of Rustler	PRMY_LOG	-3.50E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
683	UNNAMED	Un-named member of Rustler	PRMZ_LOG	-3.50E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
684	UNNAMED	Un-named member of Rustler	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
685	UNNAMED	Un-named member of Rustler	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
686	UNNAMED	Un-named member of Rustler	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
687	UNNAMED	Un-named member of Rustler	PERM_X	1.00E-35	X-direction permeability (m^2) from Log value (impermeable)	Required for BRAGFLO	Calculated
688	UNNAMED	Un-named member of Rustler	PERM_Y	1.00E-35	Y-direction permeability (m^2) from Log value (impermeable)	Required for BRAGFLO	Calculated
689	UNNAMED	Un-named member of Rustler	PERM_Z	1.00E-35	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
690	UNNAMED	Un-named member of Rustler	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
691	UNNAMED	Un-named member of Rustler	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
692	IMPERM_Z	Becomes Culebra @ time 0	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
693	IMPERM_Z	Becomes Culebra @ time 0	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
694	IMPERM_Z	Becomes Culebra @ time 0	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
695	IMPERM_Z	Becomes Culebra @ time 0	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
696	IMPERM_Z	Becomes Culebra @ time 0	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
697	IMPERM_Z	Becomes Culebra @ time 0	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
698	IMPERM_Z	Becomes Culebra @ time 0	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
699	IMPERM_Z	Becomes Culebra @ time 0	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
700	IMPERM_Z	Becomes Culebra @ time 0	POROSITY	5.00E-03	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
701	IMPERM_Z	Becomes Culebra @ time 0	PRMX_LOG	-3.50E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
702	IMPERM_Z	Becomes Culebra @ time 0	PRMY_LOG	-3.50E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
703	IMPERM_Z	Becomes Culebra @ time 0	PRMZ_LOG	-3.50E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
704	IMPERM_Z	Becomes Culebra @ time 0	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
705	IMPERM_Z	Becomes Culebra @ time 0	SAT_RBRN	0.00E+00	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
706	IMPERM_Z	Becomes Culebra @ time 0	SAT_RGAS	0.00E+00	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
707	IMPERM_Z	Becomes Culebra @ time 0	PERM_X	1.00E-35	X-direction permeability (m^2) from Log value (impermeable)	Required for BRAGFLO	Calculated
708	IMPERM_Z	Becomes Culebra @ time 0	PERM_Y	1.00E-35	Y-direction permeability (m^2) from Log value (impermeable)	Required for BRAGFLO	Calculated
709	IMPERM_Z	Becomes Culebra @ time 0	PERM_Z	1.00E-35	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
710	IMPERM_Z	Becomes Culebra @ time 0	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
711	IMPERM_Z	Becomes Culebra @ time 0	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
712	CAVITY_2	Becomes Waste area @ time 0	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
713	CAVITY_2	Becomes Waste area @ time 0	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
714	CAVITY_2	Becomes Waste area @ time 0	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
715	CAVITY_2	Becomes Waste area @ time 0	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
716	CAVITY_2	Becomes Waste area @ time 0	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
717	CAVITY_2	Becomes Waste area @ time 0	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
718	CAVITY_2	Becomes Waste area @ time 0	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
719	CAVITY_2	Becomes Waste area @ time 0	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
720	CAVITY_2	Becomes Waste area @ time 0	POROSITY	1.00E+00	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
721	CAVITY_2	Becomes Waste area @ time 0	PRESSURE	1.01E+05	Initial brine pressure (Pa)	Used in ICSET	Database: CCA view 6
722	CAVITY_2	Becomes Waste area @ time 0	PRMX_LOG	-1.00E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
723	CAVITY_2	Becomes Waste area @ time 0	PRMY_LOG	-1.00E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
724	CAVITY_2	Becomes Waste area @ time 0	PRMZ_LOG	-1.00E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
725	CAVITY_2	Becomes Waste area @ time 0	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
726	CAVITY_2	Becomes Waste area @ time 0	SAT_RBRN	0.00E+00	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
727	CAVITY_2	Becomes Waste area @ time 0	SAT_RGAS	0.00E+00	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
728	CAVITY_2	Becomes Waste area @ time 0	SAT_IBRN	0.00E+00	Initial brine saturation @ t = -5 years	Used in ICSET	Database: CCA view 6
729	CAVITY_2	Becomes Waste area @ time 0	PERM_X	1.00E-10	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
730	CAVITY_2	Becomes Waste area @ time 0	PERM_Y	1.00E-10	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
731	CAVITY_2	Becomes Waste area @ time 0	PERM_Z	1.00E-10	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
732	CAVITY_2	Becomes Waste area @ time 0	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
733	CAVITY_2	Becomes Waste area @ time 0	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
734	CAVITY_3	Becomes Exp. & Oper. areas t=0	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
735	CAVITY_3	Becomes Exp. & Oper. areas t=0	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
736	CAVITY_3	Becomes Exp. & Oper. areas t=0	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
737	CAVITY_3	Becomes Exp. & Oper. areas t=0	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
738	CAVITY_3	Becomes Exp. & Oper. areas t=0	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
739	CAVITY_3	Becomes Exp. & Oper. areas t=0	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
740	CAVITY_3	Becomes Exp. & Oper. areas t=0	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
741	CAVITY_3	Becomes Exp. & Oper. areas t=0	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
742	CAVITY_3	Becomes Exp. & Oper. areas t=0	POROSITY	1.00E+00	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
743	CAVITY_3	Becomes Exp. & Oper. areas t=0	PRESSURE	1.01E+05	Initial brine pressure (Pa)	Used in ICSET	Database: CCA view 6
744	CAVITY_3	Becomes Exp. & Oper. areas t=0	PRMX_LOG	-1.00E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
745	CAVITY_3	Becomes Exp. & Oper. areas t=0	PRMY_LOG	-1.00E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
746	CAVITY_3	Becomes Exp. & Oper. areas t=0	PRMZ_LOG	-1.00E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
747	CAVITY_3	Becomes Exp. & Oper. areas t=0	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
748	CAVITY_3	Becomes Exp. & Oper. areas t=0	SAT_RBRN	0.00E+00	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
749	CAVITY_3	Becomes Exp. & Oper. areas t=0	SAT_RGAS	0.00E+00	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
750	CAVITY_3	Becomes Exp. & Oper. areas t=0	SAT_IBRN	0.00E+00	Initial brine saturation @ t = -5 years	Used in ICSET	Database: CCA view 6
751	CAVITY_3	Becomes Exp. & Oper. areas t=0	PERM_X	1.00E-10	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
752	CAVITY_3	Becomes Exp. & Oper. areas t=0	PERM_Y	1.00E-10	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
753	CAVITY_3	Becomes Exp. & Oper. areas t=0	PERM_Z	1.00E-10	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
754	CAVITY_3	Becomes Exp. & Oper. areas t=0	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
755	CAVITY_3	Becomes Exp. & Oper. areas t=0	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
756	CAVITY_4	Becomes shaft & seals @ t=0	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
757	CAVITY_4	Becomes shaft & seals @ t=0	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
758	CAVITY_4	Becomes shaft & seals @ t=0	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
759	CAVITY_4	Becomes shaft & seals @ t=0	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
760	CAVITY_4	Becomes shaft & seals @ t=0	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
761	CAVITY_4	Becomes shaft & seals @ t=0	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
762	CAVITY_4	Becomes shaft & seals @ t=0	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
763	CAVITY_4	Becomes shaft & seals @ t=0	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
764	CAVITY_4	Becomes shaft & seals @ t=0	POROSITY	1.00E+00	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
765	CAVITY_4	Becomes shaft & seals @ t=0	PRESSURE	1.01E+05	Initial brine pressure (Pa)	Used in ICSET	Database: CCA view 6
766	CAVITY_4	Becomes shaft & seals @ t=0	PRMX_LOG	-1.00E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
767	CAVITY_4	Becomes shaft & seals @ t=0	PRMY_LOG	-1.00E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
768	CAVITY_4	Becomes shaft & seals @ t=0	PRMZ_LOG	-1.00E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
769	CAVITY_4	Becomes shaft & seals @ t=0	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
770	CAVITY_4	Becomes shaft & seals @ t=0	SAT_RBRN	0.00E+00	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
771	CAVITY_4	Becomes shaft & seals @ t=0	SAT_RGAS	0.00E+00	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
772	CAVITY_4	Becomes shaft & seals @ t=0	PERM_X	1.00E-10	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
773	CAVITY_4	Becomes shaft & seals @ t=0	PERM_Y	1.00E-10	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
774	CAVITY_4	Becomes shaft & seals @ t=0	PERM_Z	1.00E-10	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
775	CAVITY_4	Becomes shaft & seals @ t=0	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
776	CAVITY_4	Becomes shaft & seals @ t=0	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
777	DRZ_0	DRZ @ -5 to 0 years	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
778	DRZ_0	DRZ @ -5 to 0 years	COMP_RCK	7.41E-10	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
779	DRZ_0	DRZ @ -5 to 0 years	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
780	DRZ_0	DRZ @ -5 to 0 years	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
781	DRZ_0	DRZ @ -5 to 0 years	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
782	DRZ_0	DRZ @ -5 to 0 years	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
783	DRZ_0	DRZ @ -5 to 0 years	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
784	DRZ_0	DRZ @ -5 to 0 years	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
785	DRZ_0	DRZ @ -5 to 0 years	POROSITY	1.29E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
786	DRZ_0	DRZ @ -5 to 0 years	PRMX_LOG	-1.70E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
787	DRZ_0	DRZ @ -5 to 0 years	PRMY_LOG	-1.70E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
788	DRZ_0	DRZ @ -5 to 0 years	PRMZ_LOG	-1.70E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
789	DRZ_0	DRZ @ -5 to 0 years	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
790	DRZ_0	DRZ @ -5 to 0 years	SAT_RBRN	0.00E+00	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
791	DRZ_0	DRZ @ -5 to 0 years	SAT_RGAS	0.00E+00	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
792	DRZ_0	DRZ @ -5 to 0 years	PERM_X	1.00E-17	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
793	DRZ_0	DRZ @ -5 to 0 years	PERM_Y	1.00E-17	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
794	DRZ_0	DRZ @ -5 to 0 years	PERM_Z	1.00E-17	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
795	DRZ_0	DRZ @ -5 to 0 years	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
796	DRZ_0	DRZ @ -5 to 0 years	POR_COMP	5.74E-08	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
797	BOREHOLE	Borehole- not used for SWD mod	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Not used	Database: CCA view 6
798	BOREHOLE	Borehole- not used for SWD mod	COMP_RCK	2.64E-09	Rock compressibility (1/Pa)	Not used	Database: CCA view 6

	Material	File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
799	BOREHOLE	Borehole- not used for SWD mod	PC_MAX	1.00E+08	Max capillary pressure	Not used	Database: CCA view 6
800	BOREHOLE	Borehole- not used for SWD mod	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
801	BOREHOLE	Borehole- not used for SWD mod	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
802	BOREHOLE	Borehole- not used for SWD mod	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
803	BOREHOLE	Borehole- not used for SWD mod	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Not used	Database: CCA view 6
804	BOREHOLE	Borehole- not used for SWD mod	PORE_DIS	9.40E-01	Pore distribution (fraction)	Not used	Database: CCA view 6
805	BOREHOLE	Borehole- not used for SWD mod	POROSITY	5.00E-02	Porosity (fraction)	Not used	Database: CCA view 6
806	BOREHOLE	Borehole- not used for SWD mod	PRMX_LOG	-1.25E+01	Log x-direction permeability	Not used	Database: CCA view 6
807	BOREHOLE	Borehole- not used for SWD mod	PRMY_LOG	-1.25E+01	Log y-direction permeability	Not used	Database: CCA view 6
808	BOREHOLE	Borehole- not used for SWD mod	PRMZ_LOG	-1.25E+01	Log z-direction permeability (BRAGFLO required input)	Not used	Database: CCA view 6
809	BOREHOLE	Borehole- not used for SWD mod	RELP_MOD	4.00E+00	Relative permeability model number	Not used	Database: CCA view 6
810	BOREHOLE	Borehole- not used for SWD mod	SAT_RBRN	2.00E-01	Residual Brine saturation	Not used	Database: CCA view 6
811	BOREHOLE	Borehole- not used for SWD mod	SAT_RGAS	2.00E-01	Residual Gas saturation	Not used	Database: CCA view 6
812	BOREHOLE	Borehole- not used for SWD mod	PERM_X	3.16E-13	X-direction permeability (m^2) from Log value	Not used	Calculated
813	BOREHOLE	Borehole- not used for SWD mod	PERM_Y	3.16E-13	Y-direction permeability (m^2) from Log value	Not used	Calculated
814	BOREHOLE	Borehole- not used for SWD mod	PERM_Z	3.16E-13	Z-direction permeability (m^2) Not used in 2D	Not used	Calculated
815	BOREHOLE	Borehole- not used for SWD mod	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Not used	Database: CCA view 6
816	BOREHOLE	Borehole- not used for SWD mod	POR_COMP	2.64E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Not used	Database: CCA view 6
817	DRZ_1	DRZ @ time = 0	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
818	DRZ_1	DRZ @ time = 0	COMP_RCK	7.41E-10	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
819	DRZ_1	DRZ @ time = 0	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
820	DRZ_1	DRZ @ time = 0	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
821	DRZ_1	DRZ @ time = 0	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
822	DRZ_1	DRZ @ time = 0	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
823	DRZ_1	DRZ @ time = 0	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
824	DRZ_1	DRZ @ time = 0	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
825	DRZ_1	DRZ @ time = 0	POROSITY	1.29E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
826	DRZ_1	DRZ @ time = 0	PRMX_LOG	-1.50E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
827	DRZ_1	DRZ @ time = 0	PRMY_LOG	-1.50E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
828	DRZ_1	DRZ @ time = 0	PRMZ_LOG	-1.50E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
829	DRZ_1	DRZ @ time = 0	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
830	DRZ_1	DRZ @ time = 0	SAT_RBRN	0.00E+00	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
831	DRZ_1	DRZ @ time = 0	SAT_RGAS	0.00E+00	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
832	DRZ_1	DRZ @ time = 0	PERM_X	1.00E-15	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
833	DRZ_1	DRZ @ time = 0	PERM_Y	1.00E-15	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
834	DRZ_1	DRZ @ time = 0	PERM_Z	1.00E-15	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
835	DRZ_1	DRZ @ time = 0	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
836	DRZ_1	DRZ @ time = 0	POR_COMP	5.74E-08	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
837	CULEBRA	Replaces IMPERM_Z @ t=0	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
838	CULEBRA	Replaces IMPERM_Z @ t=0	COMP_RCK	1.00E-10	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
839	CULEBRA	Replaces IMPERM_Z @ t=0	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
840	CULEBRA	Replaces IMPERM_Z @ t=0	PCT_A	2.60E-01	Capillary pressure multiplier	Required for BRAGFLO	Database: CCA view 6
841	CULEBRA	Replaces IMPERM_Z @ t=0	PCT_EXP	-3.48E-01	Capillary pressure exponent	Required for BRAGFLO	Database: CCA view 6
842	CULEBRA	Replaces IMPERM_Z @ t=0	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
843	CULEBRA	Replaces IMPERM_Z @ t=0	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
844	CULEBRA	Replaces IMPERM_Z @ t=0	PORE_DIS	6.44E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
845	CULEBRA	Replaces IMPERM_Z @ t=0	POROSITY	1.51E-01	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
846	CULEBRA	Replaces IMPERM_Z @ t=0	PRESSURE	8.22E+05	Initial pressure for Culebra, Unnamed formations (Pa)	In ALGEBRA step	Database: CCA view 6
847	CULEBRA	Replaces IMPERM_Z @ t=0	PRMX_LOG	-1.37E+01	Log x-direction permeability	Intermediate value	Analyst: DM Stoelzel
848	CULEBRA	Replaces IMPERM_Z @ t=0	PRMY_LOG	-1.37E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
849	CULEBRA	Replaces IMPERM_Z @ t=0	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
850	CULEBRA	Replaces IMPERM_Z @ t=0	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
851	CULEBRA	Replaces IMPERM_Z @ t=0	SAT_RBRN	8.36E-02	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
852	CULEBRA	Replaces IMPERM_Z @ t=0	SAT_RGAS	7.71E-02	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
853	CULEBRA	Replaces IMPERM_Z @ t=0	PERM_X	2.10E-14	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
854	CULEBRA	Replaces IMPERM_Z @ t=0	PERM_Y	2.10E-14	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
855	CULEBRA	Replaces IMPERM_Z @ t=0	PERM_Z	2.10E-14	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
856	CULEBRA	Replaces IMPERM_Z @ t=0	SB_MIN	8.78E-02	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
857	CULEBRA	Replaces IMPERM_Z @ t=0	POR_COMP	6.62E-10	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
858	WAS_AREA	Replaces CAVITY_2 @ t=0	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
859	WAS_AREA	Replaces CAVITY_2 @ t=0	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
860	WAS_AREA	Replaces CAVITY_2 @ t=0	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
861	WAS_AREA	Replaces CAVITY_2 @ t=0	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
862	WAS_AREA	Replaces CAVITY_2 @ t=0	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
863	WAS_AREA	Replaces CAVITY_2 @ t=0	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
864	WAS_AREA	Replaces CAVITY_2 @ t=0	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
865	WAS_AREA	Replaces CAVITY_2 @ t=0	PORE_DIS	2.89E+00	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
866	WAS_AREA	Replaces CAVITY_2 @ t=0	POROSITY	8.48E-01	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
867	WAS_AREA	Replaces CAVITY_2 @ t=0	PRMX_LOG	-1.28E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
868	WAS_AREA	Replaces CAVITY_2 @ t=0	PRMY_LOG	-1.28E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
869	WAS_AREA	Replaces CAVITY_2 @ t=0	PRMZ_LOG	-1.28E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
870	WAS_AREA	Replaces CAVITY_2 @ t=0	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
871	WAS_AREA	Replaces CAVITY_2 @ t=0	SAT_RBRN	2.76E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
872	WAS_AREA	Replaces CAVITY_2 @ t=0	SAT_RGAS	7.50E-02	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
873	WAS_AREA	Replaces CAVITY_2 @ t=0	SAT_IBRN	1.50E-02	Initial brine saturation @ t = -5 years	Used in ICSET	Database: CCA view 6
874	WAS_AREA	Replaces CAVITY_2 @ t=0	GRATMICI	3.71E-09	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
875	WAS_AREA	Replaces CAVITY_2 @ t=0	GRATMICH	1.29E-01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
876	WAS_AREA	Replaces CAVITY_2 @ t=0	DCELLCHW	5.40E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
877	WAS_AREA	Replaces CAVITY_2 @ t=0	DCELLRHW	1.70E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
878	WAS_AREA	Replaces CAVITY_2 @ t=0	DIRONCHW	1.70E+02	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
879	WAS_AREA	Replaces CAVITY_2 @ t=0	DIRONRHW	1.00E+02	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
880	WAS_AREA	Replaces CAVITY_2 @ t=0	DPLASCHW	3.40E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
881	WAS_AREA	Replaces CAVITY_2 @ t=0	DPLASRHW	1.50E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
882	WAS_AREA	Replaces CAVITY_2 @ t=0	DRUBBCHW	1.00E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
883	WAS_AREA	Replaces CAVITY_2 @ t=0	DRUBBRHW	3.30E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
884	WAS_AREA	Replaces CAVITY_2 @ t=0	DIRNCCHW	1.39E+02	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
885	WAS_AREA	Replaces CAVITY_2 @ t=0	DIRNCRHW	2.59E+03	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
886	WAS_AREA	Replaces CAVITY_2 @ t=0	DPLSCCHW	2.60E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
887	WAS_AREA	Replaces CAVITY_2 @ t=0	DPLSCRHW	3.10E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
888	WAS_AREA	Replaces CAVITY_2 @ t=0	VOLCHW	1.69E+05	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
889	WAS_AREA	Replaces CAVITY_2 @ t=0	VOLRHW	7.08E+03	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
890	WAS_AREA	Replaces CAVITY_2 @ t=0	SAT_WICK	5.00E-01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
891	WAS_AREA	Replaces CAVITY_2 @ t=0	PROBDEG	2.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Gas generation sub-mod	Database: CCA view 6
892	WAS_AREA	Replaces CAVITY_2 @ t=0	PERM_X	1.70E-13	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
893	WAS_AREA	Replaces CAVITY_2 @ t=0	PERM_Y	1.70E-13	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
894	WAS_AREA	Replaces CAVITY_2 @ t=0	PERM_Z	1.70E-13	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
895	WAS_AREA	Replaces CAVITY_2 @ t=0	SB_MIN	2.90E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
896	WAS_AREA	Replaces CAVITY_2 @ t=0	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
897	WAS_AREA	Replaces CAVITY_2 @ t=0	STOICOR	1.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
898	WAS_AREA	Replaces CAVITY_2 @ t=0	SCOR_H2	1.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
899	WAS_AREA	Replaces CAVITY_2 @ t=0	SCOR_H2O	2.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
900	WAS_AREA	Replaces CAVITY_2 @ t=0	SCOR_FE	1.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
901	WAS_AREA	Replaces CAVITY_2 @ t=0	DRH_METL	2.69E+03	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
902	WAS_AREA	Replaces CAVITY_2 @ t=0	DRH_RUPL	3.41E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
903	WAS_AREA	Replaces CAVITY_2 @ t=0	DRH_BIO	5.11E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
904	WAS_AREA	Replaces CAVITY_2 @ t=0	DCH_METL	3.09E+02	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
905	WAS_AREA	Replaces CAVITY_2 @ t=0	DCH_RUPL	1.12E+02	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
906	WAS_AREA	Replaces CAVITY_2 @ t=0	DCH_BIO	1.66E+02	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
907	WAS_AREA	Replaces CAVITY_2 @ t=0	WTFETOT	7.13E+07	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
908	WAS_AREA	Replaces CAVITY_2 @ t=0	WTCELTOT	9.25E+06	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
909	WAS_AREA	Replaces CAVITY_2 @ t=0	WTRPLTOT	1.92E+07	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
910	WAS_AREA	Replaces CAVITY_2 @ t=0	PLASIDX	1.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
911	WAS_AREA	Replaces CAVITY_2 @ t=0	BIOIDX	1.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
912	WAS_AREA	Replaces CAVITY_2 @ t=0	WTBIOTOT	2.84E+07	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
913	WAS_AREA	Replaces CAVITY_2 @ t=0	CONCFE	1.63E+02	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
914	WAS_AREA	Replaces CAVITY_2 @ t=0	CONCBIO	6.52E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
915	WAS_AREA	Replaces CAVITY_2 @ t=0	CH2OCONC	2.12E+01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
916	WAS_AREA	Replaces CAVITY_2 @ t=0	DRUMVOL	1.87E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
917	WAS_AREA	Replaces CAVITY_2 @ t=0	DRUMTOT	8.14E+05	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
918	WAS_AREA	Replaces CAVITY_2 @ t=0	DRPANEL	8.61E+04	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
919	WAS_AREA	Replaces CAVITY_2 @ t=0	A1	1.05E+09	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
920	WAS_AREA	Replaces CAVITY_2 @ t=0	A2	4.41E+10	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
921	WAS_AREA	Replaces CAVITY_2 @ t=0	MAX_CELL	1.05E+09	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
922	WAS_AREA	Replaces CAVITY_2 @ t=0	B1	1.27E+09	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
923	WAS_AREA	Replaces CAVITY_2 @ t=0	B2	2.24E+10	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
924	WAS_AREA	Replaces CAVITY_2 @ t=0	MAX_FE	1.27E+09	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
925	WAS_AREA	Replaces CAVITY_2 @ t=0	NUM1	4.57E+07	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
926	WAS_AREA	Replaces CAVITY_2 @ t=0	NUM2	1.98E+07	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
927	WAS_AREA	Replaces CAVITY_2 @ t=0	NUM3	1.01E+09	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
928	WAS_AREA	Replaces CAVITY_2 @ t=0	YMAX	1.02E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
929	WAS_AREA	Replaces CAVITY_2 @ t=0	C1	5.56E+08	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
930	WAS_AREA	Replaces CAVITY_2 @ t=0	C2	1.27E+09	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
931	WAS_AREA	Replaces CAVITY_2 @ t=0	G	5.56E+08	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
932	WAS_AREA	Replaces CAVITY_2 @ t=0	YMIN	4.91E-01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
933	WAS_AREA	Replaces CAVITY_2 @ t=0	STOIMIC	7.55E-01	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
934	WAS_AREA	Replaces CAVITY_2 @ t=0	KCGSI	1.63E-07	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
935	WAS_AREA	Replaces CAVITY_2 @ t=0	KCGSH	0.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
936	WAS_AREA	Replaces CAVITY_2 @ t=0	GRATCORI	1.45E-08	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
937	WAS_AREA	Replaces CAVITY_2 @ t=0	GRATCORH	0.00E+00	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
938	WAS_AREA	Replaces CAVITY_2 @ t=0	KBGSI	3.20E-07	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
939	WAS_AREA	Replaces CAVITY_2 @ t=0	KBGSH	4.13E-08	Variable for gas generation stoichiometry (see Task 1, WPO# 40514)	Reaction chemistry mod	Calculated in ALGEBRA
940	OPS_AREA	Resets Oper area of CAVITITY_3	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
941	OPS_AREA	Resets Oper area of CAVITITY_3	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
942	OPS_AREA	Resets Oper area of CAVITITY_3	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
943	OPS_AREA	Resets Oper area of CAVITITY_3	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
944	OPS_AREA	Resets Oper area of CAVITITY_3	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
945	OPS_AREA	Resets Oper area of CAVITITY_3	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
946	OPS_AREA	Resets Oper area of CAVITITY_3	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
947	OPS_AREA	Resets Oper area of CAVITITY_3	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
948	OPS_AREA	Resets Oper area of CAVITITY_3	POROSITY	1.80E-01	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
949	OPS_AREA	Resets Oper area of CAVITITY_3	PRMX_LOG	-1.10E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
950	OPS_AREA	Resets Oper area of CAVITITY_3	PRMY_LOG	-1.10E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
951	OPS_AREA	Resets Oper area of CAVITITY_3	PRMZ_LOG	-1.10E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
952	OPS_AREA	Resets Oper area of CAVITITY_3	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
953	OPS_AREA	Resets Oper area of CAVITITY_3	SAT_RBRN	0.00E+00	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
954	OPS_AREA	Resets Oper area of CAVITITY_3	SAT_RGAS	0.00E+00	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
955	OPS_AREA	Resets Oper area of CAVITITY_3	PERM_X	1.00E-11	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
956	OPS_AREA	Resets Oper area of CAVITITY_3	PERM_Y	1.00E-11	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
957	OPS_AREA	Resets Oper area of CAVITITY_3	PERM_Z	1.00E-11	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
958	OPS_AREA	Resets Oper area of CAVITITY_3	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
959	OPS_AREA	Resets Oper area of CAVITITY_3	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
960	EXP_AREA	Resets Exp area of CAVITITY_3	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
961	EXP_AREA	Resets Exp area of CAVITITY_3	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
962	EXP_AREA	Resets Exp area of CAVITITY_3	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
963	EXP_AREA	Resets Exp area of CAVITITY_3	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
964	EXP_AREA	Resets Exp area of CAVITITY_3	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
965	EXP_AREA	Resets Exp area of CAVITITY_3	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
966	EXP_AREA	Resets Exp area of CAVITITY_3	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
967	EXP_AREA	Resets Exp area of CAVITITY_3	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
968	EXP_AREA	Resets Exp area of CAVITITY_3	POROSITY	1.80E-01	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
969	EXP_AREA	Resets Exp area of CAVITITY_3	PRMX_LOG	-1.10E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
970	EXP_AREA	Resets Exp area of CAVITITY_3	PRMY_LOG	-1.10E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
971	EXP_AREA	Resets Exp area of CAVITITY_3	PRMZ_LOG	-1.10E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
972	EXP_AREA	Resets Exp area of CAVITITY_3	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
973	EXP_AREA	Resets Exp area of CAVITITY_3	SAT_RBRN	0.00E+00	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
974	EXP_AREA	Resets Exp area of CAVITITY_3	SAT_RGAS	0.00E+00	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
975	EXP_AREA	Resets Exp area of CAVITITY_3	PERM_X	1.00E-11	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
976	EXP_AREA	Resets Exp area of CAVITITY_3	PERM_Y	1.00E-11	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
977	EXP_AREA	Resets Exp area of CAVITITY_3	PERM_Z	1.00E-11	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
978	EXP_AREA	Resets Exp area of CAVITITY_3	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
979	EXP_AREA	Resets Exp area of CAVITITY_3	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
980	PAN_SEAL	Resets Panel seals @ t=0	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
981	PAN_SEAL	Resets Panel seals @ t=0	COMP_RCK	2.64E-09	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
982	PAN_SEAL	Resets Panel seals @ t=0	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
983	PAN_SEAL	Resets Panel seals @ t=0	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
984	PAN_SEAL	Resets Panel seals @ t=0	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
985	PAN_SEAL	Resets Panel seals @ t=0	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
986	PAN_SEAL	Resets Panel seals @ t=0	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
987	PAN_SEAL	Resets Panel seals @ t=0	PORE_DIS	9.40E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
988	PAN_SEAL	Resets Panel seals @ t=0	POROSITY	7.50E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
989	PAN_SEAL	Resets Panel seals @ t=0	PRMX_LOG	-1.50E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
990	PAN_SEAL	Resets Panel seals @ t=0	PRMY_LOG	-1.50E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
991	PAN_SEAL	Resets Panel seals @ t=0	PRMZ_LOG	-1.50E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
992	PAN_SEAL	Resets Panel seals @ t=0	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
993	PAN_SEAL	Resets Panel seals @ t=0	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
994	PAN_SEAL	Resets Panel seals @ t=0	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
995	PAN_SEAL	Resets Panel seals @ t=0	SAT_IBRN	1.00E+00	Initial brine saturation @ t = -5 years	Used in ICSET	Database: CCA view 6
996	PAN_SEAL	Resets Panel seals @ t=0	PERM_X	1.00E-15	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
997	PAN_SEAL	Resets Panel seals @ t=0	PERM_Y	1.00E-15	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
998	PAN_SEAL	Resets Panel seals @ t=0	PERM_Z	1.00E-15	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
999	PAN_SEAL	Resets Panel seals @ t=0	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
1,000	PAN_SEAL	Resets Panel seals @ t=0	POR_COMP	2.64E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
1,001	CLAY_RUS	Clay seal in shaft across Rustler	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
1,002	CLAY_RUS	Clay seal in shaft across Rustler	COMP_RCK	1.96E-09	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
1,003	CLAY_RUS	Clay seal in shaft across Rustler	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
1,004	CLAY_RUS	Clay seal in shaft across Rustler	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
1,005	CLAY_RUS	Clay seal in shaft across Rustler	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
1,006	CLAY_RUS	Clay seal in shaft across Rustler	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
1,007	CLAY_RUS	Clay seal in shaft across Rustler	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
1,008	CLAY_RUS	Clay seal in shaft across Rustler	PORE_DIS	9.40E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
1,009	CLAY_RUS	Clay seal in shaft across Rustler	POROSITY	2.40E-01	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
1,010	CLAY_RUS	Clay seal in shaft across Rustler	PRMX_LOG	-1.83E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
1,011	CLAY_RUS	Clay seal in shaft across Rustler	PRMY_LOG	-1.83E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
1,012	CLAY_RUS	Clay seal in shaft across Rustler	PRMZ_LOG	-1.83E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
1,013	CLAY_RUS	Clay seal in shaft across Rustler	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
1,014	CLAY_RUS	Clay seal in shaft across Rustler	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
1,015	CLAY_RUS	Clay seal in shaft across Rustler	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
1,016	CLAY_RUS	Clay seal in shaft across Rustler	SAT_IBRN	7.90E-01	Initial brine saturation @ t = -5 years	Used in ICSET	Database: CCA view 6
1,017	CLAY_RUS	Clay seal in shaft across Rustler	PERM_X	5.00E-19	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,018	CLAY_RUS	Clay seal in shaft across Rustler	PERM_Y	5.00E-19	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,019	CLAY_RUS	Clay seal in shaft across Rustler	PERM_Z	5.00E-19	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
1,020	CLAY_RUS	Clay seal in shaft across Rustler	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
1,021	CLAY_RUS	Clay seal in shaft across Rustler	POR_COMP	1.96E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
1,022	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
1,023	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	COMP_RCK	1.59E-09	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
1,024	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
1,025	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
1,026	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
1,027	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
1,028	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
1,029	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PORE_DIS	9.40E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
1,030	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	POROSITY	2.40E-01	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
1,031	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PRMX_LOG	-1.83E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
1,032	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PRMY_LOG	-1.83E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
1,033	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PRMZ_LOG	-1.83E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
1,034	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
1,035	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
1,036	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
1,037	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	SAT_IBRN	7.90E-01	Initial brine saturation @ t = -5 years	Used in ICSET	Database: CCA view 6
1,038	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	RSH_AIR	3.09E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,039	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	RSH_SAL	1.80E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,040	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	RSH_WAS	3.50E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,041	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	RSH_EXH	2.30E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,042	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	RADN_DRZ	1.86E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,043	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PERM_X	5.97E-19	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,044	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PERM_Y	5.97E-19	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,045	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PERM_Z	5.97E-19	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
1,046	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
1,047	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	POR_COMP	1.59E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
1,048	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	PX_SALT	3.16E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,049	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AKIS1	5.00E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,050	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AAS1	3.00E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,051	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ASS2	1.02E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,052	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AWS3	3.85E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,053	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AES4	1.66E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,054	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AST	9.53E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,055	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	RDF	2.45E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,056	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AAD1	7.36E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,057	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ASD2	2.50E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,058	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AWD3	9.44E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,059	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AED4	4.08E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,060	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ADR	2.65E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,061	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ANUM1	-5.82E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,062	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	DEN	9.35E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,063	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ATRM1	-1.97E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,064	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ANUM2	-3.25E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,065	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ATRM2	-1.74E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,066	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	AKDRZ	3.94E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,067	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	SDR	1.54E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,068	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	SNUM1	-3.39E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,069	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	STRM1	-1.15E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,070	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	SNUM2	-1.89E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,071	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	STRM2	-1.01E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,072	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	SKDRZ	3.94E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,073	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	WDR	3.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,074	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	WNUM1	-6.59E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,075	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	WTRM1	-2.23E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,076	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	WNUM2	-3.68E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,077	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	WTRM2	-1.97E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,078	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	WKDRZ	3.94E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,079	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	EDR	1.97E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,080	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ENUM1	-4.33E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,081	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ETRM1	-1.46E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,082	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ENUM2	-2.42E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,083	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	ETRM2	-1.30E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
1,084	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	EKDRZ	3.94E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,085	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	KDAD	9.21E-18	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,086	CL_L_T1	Clay seal in shaft: L Sal (0-50 yrs)	KMOD	5.97E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,087	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
1,088	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	COMP_RCK	1.59E-09	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
1,089	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
1,090	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
1,091	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
1,092	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
1,093	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
1,094	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PORE_DIS	9.40E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
1,095	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	POROSITY	2.40E-01	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
1,096	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PRMX_LOG	-1.83E+01	Log x-direction permeability	Intermediate value	Database: CCA view 6
1,097	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PRMY_LOG	-1.83E+01	Log y-direction permeability	Intermediate value	Database: CCA view 6
1,098	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PRMZ_LOG	-1.83E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Database: CCA view 6
1,099	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
1,100	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
1,101	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
1,102	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	RSH_AIR	3.09E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,103	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	RSH_SAL	1.80E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,104	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	RSH_WAS	3.50E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,105	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	RSH_EXH	2.30E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,106	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	RADN_DRZ	1.00E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,107	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PERM_X	5.00E-19	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,108	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PERM_Y	5.00E-19	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,109	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PERM_Z	5.00E-19	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
1,110	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
1,111	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	POR_COMP	1.59E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
1,112	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	PX_SALT	3.16E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,113	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AKIS1	5.00E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,114	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AAS1	3.00E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,115	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	ASS2	1.02E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,116	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AWS3	3.85E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,117	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AES4	1.66E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,118	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AST	9.53E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,119	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	RDF	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,120	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AAD1	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,121	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	ASD2	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,122	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AWD3	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,123	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AED4	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,124	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	ADR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,125	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	ANUM1	-2.99E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,126	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	DEN	9.35E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,127	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	ATRM1	-1.01E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,128	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	ANUM2	-2.99E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,129	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	ATRM2	-1.60E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,130	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	AKDRZ	5.17E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,131	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	SDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,132	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	SNUM1	-1.74E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,133	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	STRM1	-5.89E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,134	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	SNUM2	-1.74E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,135	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	STRM2	-9.31E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,136	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	SKDRZ	5.17E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,137	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	WDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,138	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	WNUM1	-3.38E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,139	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	WTRM1	-1.14E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,140	CL_L_T4	CI seal in shaft: L Sal (50-10k yrs)	WNUM2	-3.38E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
1,141	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	WTRM2	-1.81E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,142	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	WKDRZ	5.17E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,143	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	EDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,144	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	ENUM1	-2.22E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,145	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	ETRM1	-7.52E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,146	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	ENUM2	-2.22E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,147	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	ETRM2	-1.19E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,148	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	EKDRZ	5.17E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,149	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	KDAD	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,150	CL_L_T4	Cl seal in shaft: L Sal (50-10k yrs)	KMOD	5.00E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,151	SALT_T1	Salt seal in shaft (0-50 yrs)	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
1,152	SALT_T1	Salt seal in shaft (0-50 yrs)	COMP_RCK	1.60E-09	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
1,153	SALT_T1	Salt seal in shaft (0-50 yrs)	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
1,154	SALT_T1	Salt seal in shaft (0-50 yrs)	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
1,155	SALT_T1	Salt seal in shaft (0-50 yrs)	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
1,156	SALT_T1	Salt seal in shaft (0-50 yrs)	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
1,157	SALT_T1	Salt seal in shaft (0-50 yrs)	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
1,158	SALT_T1	Salt seal in shaft (0-50 yrs)	PORE_DIS	9.40E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
1,159	SALT_T1	Salt seal in shaft (0-50 yrs)	POROSITY	5.00E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
1,160	SALT_T1	Salt seal in shaft (0-50 yrs)	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
1,161	SALT_T1	Salt seal in shaft (0-50 yrs)	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
1,162	SALT_T1	Salt seal in shaft (0-50 yrs)	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
1,163	SALT_T1	Salt seal in shaft (0-50 yrs)	SAT_IBRN	3.20E-01	Initial brine saturation @ t = -5 years	Used in ICSET	Database: CCA view 6
1,164	SALT_T1	Salt seal in shaft (0-50 yrs)	RSH_AIR	3.09E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,165	SALT_T1	Salt seal in shaft (0-50 yrs)	RSH_SAL	1.80E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,166	SALT_T1	Salt seal in shaft (0-50 yrs)	RSH_WAS	3.50E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,167	SALT_T1	Salt seal in shaft (0-50 yrs)	RSH_EXH	2.30E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,168	SALT_T1	Salt seal in shaft (0-50 yrs)	RADN_DRZ	1.81E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,169	SALT_T1	Salt seal in shaft (0-50 yrs)	PMLT_MD	-1.48E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,170	SALT_T1	Salt seal in shaft (0-50 yrs)	PMLT_LO	-1.73E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,171	SALT_T1	Salt seal in shaft (0-50 yrs)	PMLT_HI	-1.23E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,172	SALT_T1	Salt seal in shaft (0-50 yrs)	CUMPROB	5.00E-01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,173	SALT_T1	Salt seal in shaft (0-50 yrs)	PERM_X	1.81E-15	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,174	SALT_T1	Salt seal in shaft (0-50 yrs)	PERM_Y	1.81E-15	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,175	SALT_T1	Salt seal in shaft (0-50 yrs)	PERM_Z	1.81E-15	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
1,176	SALT_T1	Salt seal in shaft (0-50 yrs)	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
1,177	SALT_T1	Salt seal in shaft (0-50 yrs)	POR_COMP	1.60E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
1,178	SALT_T1	Salt seal in shaft (0-50 yrs)	PX_SALT	3.16E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,179	SALT_T1	Salt seal in shaft (0-50 yrs)	AKIS1	1.65E-15	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,180	SALT_T1	Salt seal in shaft (0-50 yrs)	AAS1	3.00E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,181	SALT_T1	Salt seal in shaft (0-50 yrs)	ASS2	1.02E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,182	SALT_T1	Salt seal in shaft (0-50 yrs)	AWS3	3.85E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,183	SALT_T1	Salt seal in shaft (0-50 yrs)	AES4	1.66E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,184	SALT_T1	Salt seal in shaft (0-50 yrs)	AST	9.53E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,185	SALT_T1	Salt seal in shaft (0-50 yrs)	RDF	2.29E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,186	SALT_T1	Salt seal in shaft (0-50 yrs)	AAD1	6.87E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,187	SALT_T1	Salt seal in shaft (0-50 yrs)	ASD2	2.33E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,188	SALT_T1	Salt seal in shaft (0-50 yrs)	AWD3	8.82E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,189	SALT_T1	Salt seal in shaft (0-50 yrs)	AED4	3.81E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,190	SALT_T1	Salt seal in shaft (0-50 yrs)	ADR	2.52E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,191	SALT_T1	Salt seal in shaft (0-50 yrs)	ANUM1	-1.02E+02	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,192	SALT_T1	Salt seal in shaft (0-50 yrs)	DEN	3.16E+02	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,193	SALT_T1	Salt seal in shaft (0-50 yrs)	ATRM1	-1.02E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,194	SALT_T1	Salt seal in shaft (0-50 yrs)	ANUM2	-5.74E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,195	SALT_T1	Salt seal in shaft (0-50 yrs)	ATRM2	-3.00E-16	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,196	SALT_T1	Salt seal in shaft (0-50 yrs)	AKDRZ	6.90E-17	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,197	SALT_T1	Salt seal in shaft (0-50 yrs)	SDR	1.47E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
1,198	SALT_T1	Salt seal in shaft (0-50 yrs)	SNUM1	-5.95E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,199	SALT_T1	Salt seal in shaft (0-50 yrs)	STRM1	-5.96E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,200	SALT_T1	Salt seal in shaft (0-50 yrs)	SNUM2	-3.35E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,201	SALT_T1	Salt seal in shaft (0-50 yrs)	STRM2	-1.75E-16	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,202	SALT_T1	Salt seal in shaft (0-50 yrs)	SKDRZ	6.90E-17	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,203	SALT_T1	Salt seal in shaft (0-50 yrs)	WDR	2.85E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,204	SALT_T1	Salt seal in shaft (0-50 yrs)	WNUM1	-1.16E+02	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,205	SALT_T1	Salt seal in shaft (0-50 yrs)	WTRM1	-1.16E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,206	SALT_T1	Salt seal in shaft (0-50 yrs)	WNUM2	-6.50E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,207	SALT_T1	Salt seal in shaft (0-50 yrs)	WTRM2	-3.40E-16	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,208	SALT_T1	Salt seal in shaft (0-50 yrs)	WKDRZ	6.90E-17	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,209	SALT_T1	Salt seal in shaft (0-50 yrs)	EDR	1.87E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,210	SALT_T1	Salt seal in shaft (0-50 yrs)	ENUM1	-7.60E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,211	SALT_T1	Salt seal in shaft (0-50 yrs)	ETRM1	-7.61E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,212	SALT_T1	Salt seal in shaft (0-50 yrs)	ENUM2	-4.27E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,213	SALT_T1	Salt seal in shaft (0-50 yrs)	ETRM2	-2.23E-16	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,214	SALT_T1	Salt seal in shaft (0-50 yrs)	EKDRZ	6.90E-17	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,215	SALT_T1	Salt seal in shaft (0-50 yrs)	KDAD	1.51E-14	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,216	SALT_T1	Salt seal in shaft (0-50 yrs)	KMOD	1.81E-15	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,217	SALT_T1	Salt seal in shaft (0-50 yrs)	A	-1.73E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,218	SALT_T1	Salt seal in shaft (0-50 yrs)	B	-1.48E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,219	SALT_T1	Salt seal in shaft (0-50 yrs)	C	-1.23E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,220	SALT_T4	Salt seal in shaft (50-100 yrs)	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
1,221	SALT_T4	Salt seal in shaft (50-100 yrs)	COMP_RCK	1.60E-09	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
1,222	SALT_T4	Salt seal in shaft (50-100 yrs)	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
1,223	SALT_T4	Salt seal in shaft (50-100 yrs)	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
1,224	SALT_T4	Salt seal in shaft (50-100 yrs)	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
1,225	SALT_T4	Salt seal in shaft (50-100 yrs)	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
1,226	SALT_T4	Salt seal in shaft (50-100 yrs)	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
1,227	SALT_T4	Salt seal in shaft (50-100 yrs)	PORE_DIS	9.40E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
1,228	SALT_T4	Salt seal in shaft (50-100 yrs)	POROSITY	5.00E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
1,229	SALT_T4	Salt seal in shaft (50-100 yrs)	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
1,230	SALT_T4	Salt seal in shaft (50-100 yrs)	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
1,231	SALT_T4	Salt seal in shaft (50-100 yrs)	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
1,232	SALT_T4	Salt seal in shaft (50-100 yrs)	RSH_AIR	3.09E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,233	SALT_T4	Salt seal in shaft (50-100 yrs)	RSH_SAL	1.80E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,234	SALT_T4	Salt seal in shaft (50-100 yrs)	RSH_WAS	3.50E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,235	SALT_T4	Salt seal in shaft (50-100 yrs)	RSH_EXH	2.30E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,236	SALT_T4	Salt seal in shaft (50-100 yrs)	RADN_DRZ	1.00E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,237	SALT_T4	Salt seal in shaft (50-100 yrs)	PMLT_MD	-1.72E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,238	SALT_T4	Salt seal in shaft (50-100 yrs)	PMLT_LO	-2.29E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,239	SALT_T4	Salt seal in shaft (50-100 yrs)	PMLT_HI	-1.40E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,240	SALT_T4	Salt seal in shaft (50-100 yrs)	PERM_X	6.83E-18	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,241	SALT_T4	Salt seal in shaft (50-100 yrs)	PERM_Y	6.83E-18	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,242	SALT_T4	Salt seal in shaft (50-100 yrs)	PERM_Z	6.83E-18	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
1,243	SALT_T4	Salt seal in shaft (50-100 yrs)	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
1,244	SALT_T4	Salt seal in shaft (50-100 yrs)	POR_COMP	1.60E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
1,245	SALT_T4	Salt seal in shaft (50-100 yrs)	PX_SALT	3.16E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,246	SALT_T4	Salt seal in shaft (50-100 yrs)	AKIS1	6.83E-18	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,247	SALT_T4	Salt seal in shaft (50-100 yrs)	AAS1	3.00E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,248	SALT_T4	Salt seal in shaft (50-100 yrs)	ASS2	1.02E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,249	SALT_T4	Salt seal in shaft (50-100 yrs)	AWS3	3.85E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,250	SALT_T4	Salt seal in shaft (50-100 yrs)	AES4	1.66E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,251	SALT_T4	Salt seal in shaft (50-100 yrs)	AST	9.53E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,252	SALT_T4	Salt seal in shaft (50-100 yrs)	RDF	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,253	SALT_T4	Salt seal in shaft (50-100 yrs)	AAD1	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,254	SALT_T4	Salt seal in shaft (50-100 yrs)	ASD2	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
1,255	SALT_T4	Salt seal in shaft (50-100 yrs)	AWD3	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,256	SALT_T4	Salt seal in shaft (50-100 yrs)	AED4	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,257	SALT_T4	Salt seal in shaft (50-100 yrs)	ADR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,258	SALT_T4	Salt seal in shaft (50-100 yrs)	ANUM1	-3.80E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,259	SALT_T4	Salt seal in shaft (50-100 yrs)	DEN	1.51E+02	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,260	SALT_T4	Salt seal in shaft (50-100 yrs)	ATRM1	-7.96E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,261	SALT_T4	Salt seal in shaft (50-100 yrs)	ANUM2	-3.80E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,262	SALT_T4	Salt seal in shaft (50-100 yrs)	ATRM2	-1.72E-18	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,263	SALT_T4	Salt seal in shaft (50-100 yrs)	AKDRZ	5.56E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,264	SALT_T4	Salt seal in shaft (50-100 yrs)	SDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,265	SALT_T4	Salt seal in shaft (50-100 yrs)	SNUM1	-2.21E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,266	SALT_T4	Salt seal in shaft (50-100 yrs)	STRM1	-4.63E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,267	SALT_T4	Salt seal in shaft (50-100 yrs)	SNUM2	-2.21E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,268	SALT_T4	Salt seal in shaft (50-100 yrs)	STRM2	-1.00E-18	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,269	SALT_T4	Salt seal in shaft (50-100 yrs)	SKDRZ	5.56E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,270	SALT_T4	Salt seal in shaft (50-100 yrs)	WDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,271	SALT_T4	Salt seal in shaft (50-100 yrs)	WNUM1	-4.30E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,272	SALT_T4	Salt seal in shaft (50-100 yrs)	WTRM1	-9.01E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,273	SALT_T4	Salt seal in shaft (50-100 yrs)	WNUM2	-4.30E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,274	SALT_T4	Salt seal in shaft (50-100 yrs)	WTRM2	-1.95E-18	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,275	SALT_T4	Salt seal in shaft (50-100 yrs)	WKDRZ	5.56E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,276	SALT_T4	Salt seal in shaft (50-100 yrs)	EDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,277	SALT_T4	Salt seal in shaft (50-100 yrs)	ENUM1	-2.83E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,278	SALT_T4	Salt seal in shaft (50-100 yrs)	ETRM1	-5.92E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,279	SALT_T4	Salt seal in shaft (50-100 yrs)	ENUM2	-2.83E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,280	SALT_T4	Salt seal in shaft (50-100 yrs)	ETRM2	-1.28E-18	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,281	SALT_T4	Salt seal in shaft (50-100 yrs)	EKDRZ	5.56E-19	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,282	SALT_T4	Salt seal in shaft (50-100 yrs)	KDAD	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,283	SALT_T4	Salt seal in shaft (50-100 yrs)	KMOD	6.83E-18	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,284	SALT_T4	Salt seal in shaft (50-100 yrs)	A	-2.29E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,285	SALT_T4	Salt seal in shaft (50-100 yrs)	B	-1.72E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,286	SALT_T4	Salt seal in shaft (50-100 yrs)	C	-1.40E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,287	SALT_T5	Salt seal in shaft (100-200 yrs)	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
1,288	SALT_T5	Salt seal in shaft (100-200 yrs)	COMP_RCK	1.60E-09	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
1,289	SALT_T5	Salt seal in shaft (100-200 yrs)	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
1,290	SALT_T5	Salt seal in shaft (100-200 yrs)	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
1,291	SALT_T5	Salt seal in shaft (100-200 yrs)	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
1,292	SALT_T5	Salt seal in shaft (100-200 yrs)	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
1,293	SALT_T5	Salt seal in shaft (100-200 yrs)	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
1,294	SALT_T5	Salt seal in shaft (100-200 yrs)	PORE_DIS	9.40E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
1,295	SALT_T5	Salt seal in shaft (100-200 yrs)	POROSITY	5.00E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
1,296	SALT_T5	Salt seal in shaft (100-200 yrs)	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
1,297	SALT_T5	Salt seal in shaft (100-200 yrs)	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
1,298	SALT_T5	Salt seal in shaft (100-200 yrs)	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
1,299	SALT_T5	Salt seal in shaft (100-200 yrs)	RSH_AIR	3.09E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,300	SALT_T5	Salt seal in shaft (100-200 yrs)	RSH_SAL	1.80E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,301	SALT_T5	Salt seal in shaft (100-200 yrs)	RSH_WAS	3.50E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,302	SALT_T5	Salt seal in shaft (100-200 yrs)	RSH_EXH	2.30E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,303	SALT_T5	Salt seal in shaft (100-200 yrs)	RADN_DRZ	1.00E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,304	SALT_T5	Salt seal in shaft (100-200 yrs)	PMLT_MD	-1.93E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,305	SALT_T5	Salt seal in shaft (100-200 yrs)	PMLT_LO	-2.29E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,306	SALT_T5	Salt seal in shaft (100-200 yrs)	PMLT_HI	-1.54E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,307	SALT_T5	Salt seal in shaft (100-200 yrs)	PERM_X	5.27E-20	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,308	SALT_T5	Salt seal in shaft (100-200 yrs)	PERM_Y	5.27E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,309	SALT_T5	Salt seal in shaft (100-200 yrs)	PERM_Z	5.27E-20	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
1,310	SALT_T5	Salt seal in shaft (100-200 yrs)	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
1,311	SALT_T5	Salt seal in shaft (100-200 yrs)	POR_COMP	1.60E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
			File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
1,312	SALT_T5	Salt seal in shaft (100-200 yrs)	PX_SALT	3.16E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,313	SALT_T5	Salt seal in shaft (100-200 yrs)	AKIS1	5.27E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,314	SALT_T5	Salt seal in shaft (100-200 yrs)	AAS1	3.00E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,315	SALT_T5	Salt seal in shaft (100-200 yrs)	ASS2	1.02E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,316	SALT_T5	Salt seal in shaft (100-200 yrs)	AWS3	3.85E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,317	SALT_T5	Salt seal in shaft (100-200 yrs)	AES4	1.66E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,318	SALT_T5	Salt seal in shaft (100-200 yrs)	AST	9.53E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,319	SALT_T5	Salt seal in shaft (100-200 yrs)	RDF	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,320	SALT_T5	Salt seal in shaft (100-200 yrs)	AAD1	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,321	SALT_T5	Salt seal in shaft (100-200 yrs)	ASD2	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,322	SALT_T5	Salt seal in shaft (100-200 yrs)	AWD3	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,323	SALT_T5	Salt seal in shaft (100-200 yrs)	AED4	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,324	SALT_T5	Salt seal in shaft (100-200 yrs)	ADR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,325	SALT_T5	Salt seal in shaft (100-200 yrs)	ANUM1	-2.29E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,326	SALT_T5	Salt seal in shaft (100-200 yrs)	DEN	5.50E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,327	SALT_T5	Salt seal in shaft (100-200 yrs)	ATRM1	-1.32E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,328	SALT_T5	Salt seal in shaft (100-200 yrs)	ANUM2	-2.29E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,329	SALT_T5	Salt seal in shaft (100-200 yrs)	ATRM2	-2.20E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,330	SALT_T5	Salt seal in shaft (100-200 yrs)	AKDRZ	7.10E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,331	SALT_T5	Salt seal in shaft (100-200 yrs)	SDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,332	SALT_T5	Salt seal in shaft (100-200 yrs)	SNUM1	-1.34E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,333	SALT_T5	Salt seal in shaft (100-200 yrs)	STRM1	-7.67E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,334	SALT_T5	Salt seal in shaft (100-200 yrs)	SNUM2	-1.34E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,335	SALT_T5	Salt seal in shaft (100-200 yrs)	STRM2	-1.28E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,336	SALT_T5	Salt seal in shaft (100-200 yrs)	SKDRZ	7.10E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,337	SALT_T5	Salt seal in shaft (100-200 yrs)	WDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,338	SALT_T5	Salt seal in shaft (100-200 yrs)	WNUM1	-2.60E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,339	SALT_T5	Salt seal in shaft (100-200 yrs)	WTRM1	-1.49E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,340	SALT_T5	Salt seal in shaft (100-200 yrs)	WNUM2	-2.60E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,341	SALT_T5	Salt seal in shaft (100-200 yrs)	WTRM2	-2.49E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,342	SALT_T5	Salt seal in shaft (100-200 yrs)	WKDRZ	7.10E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,343	SALT_T5	Salt seal in shaft (100-200 yrs)	EDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,344	SALT_T5	Salt seal in shaft (100-200 yrs)	ENUM1	-1.71E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,345	SALT_T5	Salt seal in shaft (100-200 yrs)	ETRM1	-9.80E-24	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,346	SALT_T5	Salt seal in shaft (100-200 yrs)	ENUM2	-1.71E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,347	SALT_T5	Salt seal in shaft (100-200 yrs)	ETRM2	-1.63E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,348	SALT_T5	Salt seal in shaft (100-200 yrs)	EKDRZ	7.10E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,349	SALT_T5	Salt seal in shaft (100-200 yrs)	KDAD	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,350	SALT_T5	Salt seal in shaft (100-200 yrs)	KMOD	5.27E-20	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,351	SALT_T5	Salt seal in shaft (100-200 yrs)	A	-2.29E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,352	SALT_T5	Salt seal in shaft (100-200 yrs)	B	-1.93E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,353	SALT_T5	Salt seal in shaft (100-200 yrs)	C	-1.54E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,354	SALT_T6	Salt seal in shaft (200-10,000 yrs)	CAP_MOD	2.00E+00	Capillary Pressure Model Number	Required for BRAGFLO	Database: CCA view 6
1,355	SALT_T6	Salt seal in shaft (200-10,000 yrs)	COMP_RCK	1.60E-09	Rock compressibility (1/Pa)	Intermediate value	Database: CCA view 6
1,356	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PC_MAX	1.00E+08	Max capillary pressure	Required for BRAGFLO	Database: CCA view 6
1,357	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PCT_A	5.60E-01	Capillary pressure multiplier (placeholder)	Not used	Database: CCA view 6
1,358	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PCT_EXP	-3.46E-01	Capillary pressure exponent (placeholder)	Not used	Database: CCA view 6
1,359	SALT_T6	Salt seal in shaft (200-10,000 yrs)	KPT	0.00E+00	Not used - placeholder	Not used	Database: CCA view 6
1,360	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Database: CCA view 6
1,361	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PORE_DIS	9.40E-01	Pore distribution (fraction)	Required for BRAGFLO	Database: CCA view 6
1,362	SALT_T6	Salt seal in shaft (200-10,000 yrs)	POROSITY	5.00E-02	Porosity (fraction)	Required for BRAGFLO	Database: CCA view 6
1,363	SALT_T6	Salt seal in shaft (200-10,000 yrs)	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Database: CCA view 6
1,364	SALT_T6	Salt seal in shaft (200-10,000 yrs)	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Database: CCA view 6
1,365	SALT_T6	Salt seal in shaft (200-10,000 yrs)	SAT_RGAS	2.00E-01	Residual Gas saturation	Required for BRAGFLO	Database: CCA view 6
1,366	SALT_T6	Salt seal in shaft (200-10,000 yrs)	RSH_AIR	3.09E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,367	SALT_T6	Salt seal in shaft (200-10,000 yrs)	RSH_SAL	1.80E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,368	SALT_T6	Salt seal in shaft (200-10,000 yrs)	RSH_WAS	3.50E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
1,369	SALT_T6	Salt seal in shaft (200-10,000 yrs)	RSH_EXH	2.30E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,370	SALT_T6	Salt seal in shaft (200-10,000 yrs)	RADN_DRZ	1.00E+00	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,371	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PMLT_MD	-2.03E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,372	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PMLT_LO	-2.29E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,373	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PMLT_HI	-1.77E+01	Permeability modifiers for shaft: see Task 1 (WPO# 40514)	Used in ALGEBRA	Database: CCA view 6
1,374	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PERM_X	5.35E-21	X-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,375	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PERM_Y	5.35E-21	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Calculated
1,376	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PERM_Z	5.35E-21	Z-direction permeability (m^2) Not used in 2D	Required for BRAGFLO	Calculated
1,377	SALT_T6	Salt seal in shaft (200-10,000 yrs)	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Database: CCA view 6
1,378	SALT_T6	Salt seal in shaft (200-10,000 yrs)	POR_COMP	1.60E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Required for BRAGFLO	Database: CCA view 6
1,379	SALT_T6	Salt seal in shaft (200-10,000 yrs)	PX_SALT	3.16E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,380	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AKIS1	5.35E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,381	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AAS1	3.00E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,382	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ASS2	1.02E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,383	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AWS3	3.85E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,384	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AES4	1.66E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,385	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AST	9.53E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,386	SALT_T6	Salt seal in shaft (200-10,000 yrs)	RDF	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,387	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AAD1	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,388	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ASD2	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,389	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AWD3	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,390	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AED4	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,391	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ADR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,392	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ANUM1	-1.59E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,393	SALT_T6	Salt seal in shaft (200-10,000 yrs)	DEN	2.63E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,394	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ATRM1	-1.90E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,395	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ANUM2	-1.59E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,396	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ATRM2	-3.22E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,397	SALT_T6	Salt seal in shaft (200-10,000 yrs)	AKDRZ	1.04E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,398	SALT_T6	Salt seal in shaft (200-10,000 yrs)	SDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,399	SALT_T6	Salt seal in shaft (200-10,000 yrs)	SNUM1	-9.24E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,400	SALT_T6	Salt seal in shaft (200-10,000 yrs)	STRM1	-1.11E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,401	SALT_T6	Salt seal in shaft (200-10,000 yrs)	SNUM2	-9.24E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,402	SALT_T6	Salt seal in shaft (200-10,000 yrs)	STRM2	-1.88E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,403	SALT_T6	Salt seal in shaft (200-10,000 yrs)	SKDRZ	1.04E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,404	SALT_T6	Salt seal in shaft (200-10,000 yrs)	WDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,405	SALT_T6	Salt seal in shaft (200-10,000 yrs)	WNUM1	-1.80E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,406	SALT_T6	Salt seal in shaft (200-10,000 yrs)	WTRM1	-2.16E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,407	SALT_T6	Salt seal in shaft (200-10,000 yrs)	WNUM2	-1.80E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,408	SALT_T6	Salt seal in shaft (200-10,000 yrs)	WTRM2	-3.65E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,409	SALT_T6	Salt seal in shaft (200-10,000 yrs)	WKDRZ	1.04E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,410	SALT_T6	Salt seal in shaft (200-10,000 yrs)	EDR	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,411	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ENUM1	-1.18E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,412	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ETRM1	-1.42E-23	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,413	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ENUM2	-1.18E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,414	SALT_T6	Salt seal in shaft (200-10,000 yrs)	ETRM2	-2.40E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,415	SALT_T6	Salt seal in shaft (200-10,000 yrs)	EKDRZ	1.04E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,416	SALT_T6	Salt seal in shaft (200-10,000 yrs)	KDAD	0.00E+00	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,417	SALT_T6	Salt seal in shaft (200-10,000 yrs)	KMOD	5.35E-21	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,418	SALT_T6	Salt seal in shaft (200-10,000 yrs)	A	-2.29E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,419	SALT_T6	Salt seal in shaft (200-10,000 yrs)	B	-2.03E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,420	SALT_T6	Salt seal in shaft (200-10,000 yrs)	C	-1.77E+01	Temporary variable to modify shaft properties (Task 1 WPO# 40514)	Used in ALGEBRA	Calculated
1,421	BRINESAL	Salado Brine	DNSFLUID	1.22E+03	Density (kg/m^3)	BRAGFLO input	Database: CCA view 6
1,422	BRINESAL	Salado Brine	WTF	3.24E-01	Salinity	BRAGFLO input	Database: CCA view 6
1,423	BRINESAL	Salado Brine	COMPRES	3.10E-10	Fluid compressibility (1/Pa)	BRAGFLO input	Database: CCA view 6
1,424	BRINESAL	Salado Brine	VISCO	2.10E-03	Brine viscosity (Pa-s)	BRAGFLO input	Database: CCA view 6
1,425	BRINESAL	Salado Brine	REF_TEMP	3.00E+02	Brine reference temperature (deg Kelvin)	BRAGFLO input	Database: CCA view 6

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
1,426	BRINESAL	Salado Brine	REF_PRES	1.01E+05	Brine reference pressure (Pa)	BRAGFLO input	Database: CCA view 6
1,427	BRINESAL	Salado Brine	COMP	3.10E-10	Set equal to compressibility: COMP = COMPRES (1/Pa)	BRAGFLO key word	Calculated
1,428	H2	Hydrogen gas	VISCO	8.93E-06	Gas viscosity (Pa-s)	BRAGFLO key word	Database: CCA view 6
1,429	SULFATE	Sulfate	QINIT	6.59E+06	Initial Moles of Sulfate for reaction chemistry model	Used in ALGEBRA	Database: CCA view 6
1,430	NITRATE	Nitrate	QINIT	2.61E+07	Initial Moles of Sulfate for reaction chemistry model	Used in ALGEBRA	Database: CCA view 6
1,431	STEEL	Steel properties	CORRMCO2	7.94E-15	INUNDATED STEEL CORROSION RATE [M/SEC] WITHOUT microb	ALGEBRA: Chem mod	Database: CCA view 6
1,432	STEEL	Steel properties	CORRWCO2	1.03E-13	INUNDATED STEEL CORROSION RATE [M/SEC] WITH microbes	ALGEBRA: Chem mod	Database: CCA view 6
1,433	STEEL	Steel properties	HUMCORR	0.00E+00	HUMID STEEL CORROSION RATE	ALGEBRA: Chem mod	Database: CCA view 6
1,434	STEEL	Steel properties	STOIFX	1.00E+00	IRON-CORROSION STOCHIOMETRIC FACTOR (Y.WANG MEMO)	ALGEBRA: Chem mod	Database: CCA view 6
1,435	CELLULS	Cellulosics property	FBETA	5.00E-01	Stoichiometry factor used in Reaction Chemistry model	ALGEBRA: Chem mod	Database: CCA view 6
1,436	REFCON	Reference props or conversions	GRAVACC	9.81E+00	Acceleration due to gravity	ALGEBRA: Chem mod	Database: CCA view 6
1,437	REFCON	Reference props or conversions	PI	3.14E+00	constant PI	ALGEBRA: Chem mod	Database: CCA view 6
1,438	REFCON	Reference props or conversions	VPANLEX	4.61E+04	Conversion used in gas generation rates (see task 1 WPO# 40514)	ALGEBRA: Chem mod	Database: CCA view 6
1,439	REFCON	Reference props or conversions	VROOM	3.64E+03	Conversion used in gas generation rates (see task 1 WPO# 40514)	ALGEBRA: Chem mod	Database: CCA view 6
1,440	REFCON	Reference props or conversions	VREPOS	4.36E+05	Conversion used in gas generation rates (see task 1 WPO# 40514)	ALGEBRA: Chem mod	Database: CCA view 6
1,441	REFCON	Reference props or conversions	DRROOM	6.80E+03	Conversion used in gas generation rates (see task 1 WPO# 40514)	ALGEBRA: Chem mod	Database: CCA view 6
1,442	REFCON	Reference props or conversions	YRSEC	3.16E+07	Years to seconds conversion	ALGEBRA: Chem mod	Database: CCA view 6
1,443	REFCON	Reference props or conversions	SECYR	3.17E-08	Seconds to year conversion	ALGEBRA: Chem mod	Database: CCA view 6
1,444	REFCON	Reference props or conversions	ASDRUM	6.00E+00	Conversion used in gas generation rates (see task 1 WPO# 40514)	ALGEBRA: Chem mod	Database: CCA view 6
1,445	REFCON	Reference props or conversions	ATMPA	1.01E+05	Atmospheric pressure (Pa)	ALGEBRA: Chem mod	Database: CCA view 6
1,446	BH_SUR_A	Abandoned Borehole @ surface	CAP_MOD	1.00E+00	Capillary Pressure Model Number (same as BH_SAND)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,447	BH_SUR_A	Abandoned Borehole @ surface	COMP_RCK	0.00E+00	Rock compressibility (1/Pa) (same as BH_SAND)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,448	BH_SUR_A	Abandoned Borehole @ surface	PC_MAX	1.00E+08	Max capillary pressure (same as BH_SAND)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,449	BH_SUR_A	Abandoned Borehole @ surface	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not Used	Analyst: DM Stoelzel
1,450	BH_SUR_A	Abandoned Borehole @ surface	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not Used	Analyst: DM Stoelzel
1,451	BH_SUR_A	Abandoned Borehole @ surface	KPT	0.00E+00	Not used - placeholder	Not Used	Analyst: DM Stoelzel
1,452	BH_SUR_A	Abandoned Borehole @ surface	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,453	BH_SUR_A	Abandoned Borehole @ surface	PORE_DIS	9.40E-01	Pore distribution (fraction) (same as BH_SAND)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,454	BH_SUR_A	Abandoned Borehole @ surface	POROSITY	3.20E-01	Porosity (fraction) (same as BH_SAND)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,455	BH_SUR_A	Abandoned Borehole @ surface	RELP_MOD	4.00E+00	Relative permeability model number (same as BH_SAND)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,456	BH_SUR_A	Abandoned Borehole @ surface	SAT_RBRN	0.00E+00	Residual Brine saturation (same as BH_SAND)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,457	BH_SUR_A	Abandoned Borehole @ surface	SAT_RGAS	0.00E+00	Residual Gas saturation (same as BH_SAND)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,458	BH_SUR_A	Abandoned Borehole @ surface	PRMY_MUL	2.04E+00	Y direction permeability multiplier	Borehole props @ Rustler	Analyst: DM Stoelzel
1,459	BH_SUR_A	Abandoned Borehole @ surface	PERM_X	3.16E-13	X-direction permeability (m^2)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,460	BH_SUR_A	Abandoned Borehole @ surface	PERM_Y	6.45E-13	Y-direction permeability (m^2)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,461	BH_SUR_A	Abandoned Borehole @ surface	PERM_Z	3.16E-13	Z-direction permeability (m^2) Not used in 2D	Borehole props @ Rustler	Analyst: DM Stoelzel
1,462	BH_SUR_A	Abandoned Borehole @ surface	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,463	BH_SUR_A	Abandoned Borehole @ surface	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,464	BH_SUR_L	Leaky Borehole @ surface	CAP_MOD	1.00E+00	Capillary Pressure Model Number (same as BH_OPEN)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,465	BH_SUR_L	Leaky Borehole @ surface	COMP_RCK	0.00E+00	Rock compressibility (1/Pa) (same as BH_OPEN)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,466	BH_SUR_L	Leaky Borehole @ surface	PC_MAX	1.00E+08	Max capillary pressure (same as BH_OPEN)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,467	BH_SUR_L	Leaky Borehole @ surface	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not Used	Analyst: DM Stoelzel
1,468	BH_SUR_L	Leaky Borehole @ surface	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not Used	Analyst: DM Stoelzel
1,469	BH_SUR_L	Leaky Borehole @ surface	KPT	0.00E+00	Not used - placeholder	Not Used	Analyst: DM Stoelzel
1,470	BH_SUR_L	Leaky Borehole @ surface	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,471	BH_SUR_L	Leaky Borehole @ surface	PORE_DIS	9.40E-01	Pore distribution (fraction) (same as BH_OPEN)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,472	BH_SUR_L	Leaky Borehole @ surface	POROSITY	3.20E-01	Porosity (fraction) (same as BH_OPEN)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,473	BH_SUR_L	Leaky Borehole @ surface	RELP_MOD	4.00E+00	Relative permeability model number (same as BH_OPEN)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,474	BH_SUR_L	Leaky Borehole @ surface	SAT_RBRN	0.00E+00	Residual Brine saturation (same as BH_OPEN)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,475	BH_SUR_L	Leaky Borehole @ surface	SAT_RGAS	0.00E+00	Residual Gas saturation (same as BH_OPEN)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,476	BH_SUR_L	Leaky Borehole @ surface	PRMY_MUL	8.49E-01	Y direction permeability multiplier	Borehole props @ Rustler	Analyst: DM Stoelzel
1,477	BH_SUR_L	Leaky Borehole @ surface	PERM_X	3.16E-13	X-direction permeability (m^2)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,478	BH_SUR_L	Leaky Borehole @ surface	PERM_Y	2.68E-13	Y-direction permeability (m^2)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,479	BH_SUR_L	Leaky Borehole @ surface	PERM_Z	3.16E-13	Z-direction permeability (m^2) Not used in 2D	Borehole props @ Rustler	Analyst: DM Stoelzel
1,480	BH_SUR_L	Leaky Borehole @ surface	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,481	BH_SUR_L	Leaky Borehole @ surface	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Borehole props @ Rustler	Analyst: DM Stoelzel
1,482	BH_SLT_A	Abandoned Borehole @ salt	CAP_MOD	1.00E+00	Capillary Pressure Model Number (same as BH_SAND)	Borehole props @ salt	Analyst: DM Stoelzel

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
			File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
1,483	BH_SLT_A	Abandoned Borehole @ salt	COMP_RCK	0.00E+00	Rock compressibility (1/Pa) (same as BH_SAND)	Borehole props @ salt	Analyst: DM Stoelzel
1,484	BH_SLT_A	Abandoned Borehole @ salt	PC_MAX	1.00E+08	Max capillary pressure (same as BH_SAND)	Borehole props @ salt	Analyst: DM Stoelzel
1,485	BH_SLT_A	Abandoned Borehole @ salt	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not Used	Analyst: DM Stoelzel
1,486	BH_SLT_A	Abandoned Borehole @ salt	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not Used	Analyst: DM Stoelzel
1,487	BH_SLT_A	Abandoned Borehole @ salt	KPT	0.00E+00	Not used - placeholder	Not Used	Analyst: DM Stoelzel
1,488	BH_SLT_A	Abandoned Borehole @ salt	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Borehole props @ salt	Analyst: DM Stoelzel
1,489	BH_SLT_A	Abandoned Borehole @ salt	PORE_DIS	9.40E-01	Pore distribution (fraction) (same as BH_SAND)	Borehole props @ salt	Analyst: DM Stoelzel
1,490	BH_SLT_A	Abandoned Borehole @ salt	POROSITY	3.20E-01	Porosity (fraction) (same as BH_SAND)	Borehole props @ salt	Analyst: DM Stoelzel
1,491	BH_SLT_A	Abandoned Borehole @ salt	RELP_MOD	4.00E+00	Relative permeability model number (same as BH_SAND)	Borehole props @ salt	Analyst: DM Stoelzel
1,492	BH_SLT_A	Abandoned Borehole @ salt	SAT_RBRN	0.00E+00	Residual Brine saturation (same as BH_SAND)	Borehole props @ salt	Analyst: DM Stoelzel
1,493	BH_SLT_A	Abandoned Borehole @ salt	SAT_RGAS	0.00E+00	Residual Gas saturation (same as BH_SAND)	Borehole props @ salt	Analyst: DM Stoelzel
1,494	BH_SLT_A	Abandoned Borehole @ salt	PRMY_MUL	1.00E+00	Y direction permeability multiplier	Borehole props @ salt	Analyst: DM Stoelzel
1,495	BH_SLT_A	Abandoned Borehole @ salt	PERM_X	3.16E-13	X-direction permeability (m^2)	Borehole props @ salt	Analyst: DM Stoelzel
1,496	BH_SLT_A	Abandoned Borehole @ salt	PERM_Y	3.16E-13	Y-direction permeability (m^2)	Borehole props @ salt	Analyst: DM Stoelzel
1,497	BH_SLT_A	Abandoned Borehole @ salt	PERM_Z	3.16E-13	Z-direction permeability (m^2) Not used in 2D	Borehole props @ salt	Analyst: DM Stoelzel
1,498	BH_SLT_A	Abandoned Borehole @ salt	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Borehole props @ salt	Analyst: DM Stoelzel
1,499	BH_SLT_A	Abandoned Borehole @ salt	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Borehole props @ salt	Analyst: DM Stoelzel
1,500	BH_SLT_L	Leaky Borehole @ salt	CAP_MOD	1.00E+00	Capillary Pressure Model Number (same as BH_OPEN)	Borehole props @ salt	Analyst: DM Stoelzel
1,501	BH_SLT_L	Leaky Borehole @ salt	COMP_RCK	0.00E+00	Rock compressibility (1/Pa) (same as BH_OPEN)	Borehole props @ salt	Analyst: DM Stoelzel
1,502	BH_SLT_L	Leaky Borehole @ salt	PC_MAX	1.00E+08	Max capillary pressure (same as BH_OPEN)	Borehole props @ salt	Analyst: DM Stoelzel
1,503	BH_SLT_L	Leaky Borehole @ salt	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not Used	Analyst: DM Stoelzel
1,504	BH_SLT_L	Leaky Borehole @ salt	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not Used	Analyst: DM Stoelzel
1,505	BH_SLT_L	Leaky Borehole @ salt	KPT	0.00E+00	Not used - placeholder	Not Used	Analyst: DM Stoelzel
1,506	BH_SLT_L	Leaky Borehole @ salt	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Borehole props @ salt	Analyst: DM Stoelzel
1,507	BH_SLT_L	Leaky Borehole @ salt	PORE_DIS	9.40E-01	Pore distribution (fraction) (same as BH_OPEN)	Borehole props @ salt	Analyst: DM Stoelzel
1,508	BH_SLT_L	Leaky Borehole @ salt	POROSITY	3.20E-01	Porosity (fraction) (same as BH_OPEN)	Borehole props @ salt	Analyst: DM Stoelzel
1,509	BH_SLT_L	Leaky Borehole @ salt	RELP_MOD	4.00E+00	Relative permeability model number (same as BH_OPEN)	Borehole props @ salt	Analyst: DM Stoelzel
1,510	BH_SLT_L	Leaky Borehole @ salt	SAT_RBRN	0.00E+00	Residual Brine saturation (same as BH_OPEN)	Borehole props @ salt	Analyst: DM Stoelzel
1,511	BH_SLT_L	Leaky Borehole @ salt	SAT_RGAS	0.00E+00	Residual Gas saturation (same as BH_OPEN)	Borehole props @ salt	Analyst: DM Stoelzel
1,512	BH_SLT_L	Leaky Borehole @ salt	PRMY_MUL	3.83E-01	Y direction permeability multiplier	Borehole props @ salt	Analyst: DM Stoelzel
1,513	BH_SLT_L	Leaky Borehole @ salt	PERM_X	3.16E-13	X-direction permeability (m^2)	Borehole props @ salt	Analyst: DM Stoelzel
1,514	BH_SLT_L	Leaky Borehole @ salt	PERM_Y	1.21E-13	Y-direction permeability (m^2)	Borehole props @ salt	Analyst: DM Stoelzel
1,515	BH_SLT_L	Leaky Borehole @ salt	PERM_Z	3.16E-13	Z-direction permeability (m^2) Not used in 2D	Borehole props @ salt	Analyst: DM Stoelzel
1,516	BH_SLT_L	Leaky Borehole @ salt	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Borehole props @ salt	Analyst: DM Stoelzel
1,517	BH_SLT_L	Leaky Borehole @ salt	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Borehole props @ salt	Analyst: DM Stoelzel
1,518	BH_LOW_A	Abandoned Borehole @ U Bell C	CAP_MOD	1.00E+00	Capillary Pressure Model Number (same as BH_SAND)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,519	BH_LOW_A	Abandoned Borehole @ U Bell C	COMP_RCK	0.00E+00	Rock compressibility (1/Pa) (same as BH_SAND)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,520	BH_LOW_A	Abandoned Borehole @ U Bell C	PC_MAX	1.00E+08	Max capillary pressure (same as BH_SAND)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,521	BH_LOW_A	Abandoned Borehole @ U Bell C	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not Used	Analyst: DM Stoelzel
1,522	BH_LOW_A	Abandoned Borehole @ U Bell C	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not Used	Analyst: DM Stoelzel
1,523	BH_LOW_A	Abandoned Borehole @ U Bell C	KPT	0.00E+00	Not used - placeholder	Not Used	Analyst: DM Stoelzel
1,524	BH_LOW_A	Abandoned Borehole @ U Bell C	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,525	BH_LOW_A	Abandoned Borehole @ U Bell C	PORE_DIS	9.40E-01	Pore distribution (fraction) (same as BH_SAND)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,526	BH_LOW_A	Abandoned Borehole @ U Bell C	POROSITY	3.20E-01	Porosity (fraction) (same as BH_SAND)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,527	BH_LOW_A	Abandoned Borehole @ U Bell C	RELP_MOD	4.00E+00	Relative permeability model number (same as BH_SAND)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,528	BH_LOW_A	Abandoned Borehole @ U Bell C	SAT_RBRN	0.00E+00	Residual Brine saturation (same as BH_SAND)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,529	BH_LOW_A	Abandoned Borehole @ U Bell C	SAT_RGAS	0.00E+00	Residual Gas saturation (same as BH_SAND)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,530	BH_LOW_A	Abandoned Borehole @ U Bell C	PRMY_MUL	2.40E-01	Y direction permeability multiplier	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,531	BH_LOW_A	Abandoned Borehole @ U Bell C	PERM_X	3.16E-13	X-direction permeability (m^2)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,532	BH_LOW_A	Abandoned Borehole @ U Bell C	PERM_Y	7.59E-14	Y-direction permeability (m^2)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,533	BH_LOW_A	Abandoned Borehole @ U Bell C	PERM_Z	3.16E-13	Z-direction permeability (m^2) Not used in 2D	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,534	BH_LOW_A	Abandoned Borehole @ U Bell C	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,535	BH_LOW_A	Abandoned Borehole @ U Bell C	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,536	BH_LOW_L	Leaky Borehole @ U Bell C	CAP_MOD	1.00E+00	Capillary Pressure Model Number (same as BH_OPEN)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,537	BH_LOW_L	Leaky Borehole @ U Bell C	COMP_RCK	0.00E+00	Rock compressibility (1/Pa) (same as BH_OPEN)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,538	BH_LOW_L	Leaky Borehole @ U Bell C	PC_MAX	1.00E+08	Max capillary pressure (same as BH_OPEN)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,539	BH_LOW_L	Leaky Borehole @ U Bell C	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Not Used	Analyst: DM Stoelzel

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
1,540	BH_LOW_L	Leaky Borehole @ U Bell C	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Not Used	Analyst: DM Stoelzel
1,541	BH_LOW_L	Leaky Borehole @ U Bell C	KPT	0.00E+00	Not used - placeholder	Not Used	Analyst: DM Stoelzel
1,542	BH_LOW_L	Leaky Borehole @ U Bell C	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,543	BH_LOW_L	Leaky Borehole @ U Bell C	PORE_DIS	9.40E-01	Pore distribution (fraction) (same as BH_OPEN)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,544	BH_LOW_L	Leaky Borehole @ U Bell C	POROSITY	3.20E-01	Porosity (fraction) (same as BH_OPEN)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,545	BH_LOW_L	Leaky Borehole @ U Bell C	RELP_MOD	4.00E+00	Relative permeability model number (same as BH_OPEN)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,546	BH_LOW_L	Leaky Borehole @ U Bell C	SAT_RBRN	0.00E+00	Residual Brine saturation (same as BH_OPEN)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,547	BH_LOW_L	Leaky Borehole @ U Bell C	SAT_RGAS	0.00E+00	Residual Gas saturation (same as BH_OPEN)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,548	BH_LOW_L	Leaky Borehole @ U Bell C	PRMY_MUL	1.05E-01	Y direction permeability multiplier	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,549	BH_LOW_L	Leaky Borehole @ U Bell C	PERM_X	3.16E-13	X-direction permeability (m^2)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,550	BH_LOW_L	Leaky Borehole @ U Bell C	PERM_Y	3.32E-14	Y-direction permeability (m^2)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,551	BH_LOW_L	Leaky Borehole @ U Bell C	PERM_Z	3.16E-13	Z-direction permeability (m^2) Not used in 2D	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,552	BH_LOW_L	Leaky Borehole @ U Bell C	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,553	BH_LOW_L	Leaky Borehole @ U Bell C	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Borehole props @ U Bell C	Analyst: DM Stoelzel
1,554	CONC_PLG	Concrete Plug	CAP_MOD	1.00E+00	Capillary Pressure Model Number	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,555	CONC_PLG	Concrete Plug	COMP_RCK	1.20E-09	Rock compressibility (1/Pa)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,556	CONC_PLG	Concrete Plug	PC_MAX	1.00E+08	Max capillary pressure	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,557	CONC_PLG	Concrete Plug	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,558	CONC_PLG	Concrete Plug	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,559	CONC_PLG	Concrete Plug	KPT	0.00E+00	Not used - placeholder	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,560	CONC_PLG	Concrete Plug	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,561	CONC_PLG	Concrete Plug	PORE_DIS	9.40E-01	Pore distribution (fraction)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,562	CONC_PLG	Concrete Plug	POROSITY	3.20E-01	Porosity (fraction)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,563	CONC_PLG	Concrete Plug	PRMX_LOG	-1.63E+01	Log x-direction permeability	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,564	CONC_PLG	Concrete Plug	PRMY_LOG	-1.63E+01	Log y-direction permeability	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,565	CONC_PLG	Concrete Plug	PRMZ_LOG	-1.63E+01	Log z-direction permeability (BRAGFLO required input)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,566	CONC_PLG	Concrete Plug	RELP_MOD	4.00E+00	Relative permeability model number	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,567	CONC_PLG	Concrete Plug	SAT_RBRN	0.00E+00	Residual Brine saturation	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,568	CONC_PLG	Concrete Plug	SAT_RGAS	0.00E+00	Residual Gas saturation	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,569	CONC_PLG	Concrete Plug	PERM_X	5.00E-17	X-direction permeability (m^2) from Log value	U Bell & Rustler: 50-250 yrs	Calculated
1,570	CONC_PLG	Concrete Plug	PERM_Y	5.00E-17	Y-direction permeability (m^2) from Log value	U Bell & Rustler: 50-250 yrs	Calculated
1,571	CONC_PLG	Concrete Plug	PERM_Z	5.00E-17	Z-direction permeability (m^2) Not used in 2D	U Bell & Rustler: 50-250 yrs	Calculated
1,572	CONC_PLG	Concrete Plug	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,573	CONC_PLG	Concrete Plug	POR_COMP	1.20E-09	Pore compressibility COMP_RCK/POROSITY (1/Pa)	U Bell & Rustler: 50-250 yrs	Database: CCA view 6
1,574	BH_OPEN	Open or channel borehole props	CAP_MOD	1.00E+00	Capillary Pressure Model Number	For leaky boreholes	Database: CCA view 6
1,575	BH_OPEN	Open or channel borehole props	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	For leaky boreholes	Database: CCA view 6
1,576	BH_OPEN	Open or channel borehole props	PC_MAX	1.00E+08	Max capillary pressure	For leaky boreholes	Database: CCA view 6
1,577	BH_OPEN	Open or channel borehole props	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	For leaky boreholes	Database: CCA view 6
1,578	BH_OPEN	Open or channel borehole props	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	For leaky boreholes	Database: CCA view 6
1,579	BH_OPEN	Open or channel borehole props	KPT	0.00E+00	Not used - placeholder	For leaky boreholes	Database: CCA view 6
1,580	BH_OPEN	Open or channel borehole props	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	For leaky boreholes	Database: CCA view 6
1,581	BH_OPEN	Open or channel borehole props	PORE_DIS	7.00E-01	Pore distribution (fraction)	For leaky boreholes	Database: CCA view 6
1,582	BH_OPEN	Open or channel borehole props	POROSITY	3.20E-01	Porosity (fraction)	For leaky boreholes	Database: CCA view 6
1,583	BH_OPEN	Open or channel borehole props	PRMX_LOG	-9.00E+00	Log x-direction permeability	For leaky boreholes	Database: CCA view 6
1,584	BH_OPEN	Open or channel borehole props	PRMY_LOG	-9.00E+00	Log y-direction permeability	For leaky boreholes	Database: CCA view 6
1,585	BH_OPEN	Open or channel borehole props	PRMZ_LOG	-9.00E+00	Log z-direction permeability (BRAGFLO required input)	For leaky boreholes	Database: CCA view 6
1,586	BH_OPEN	Open or channel borehole props	RELP_MOD	5.00E+00	Relative permeability model number	For leaky boreholes	Database: CCA view 6
1,587	BH_OPEN	Open or channel borehole props	SAT_RBRN	0.00E+00	Residual Brine saturation	For leaky boreholes	Database: CCA view 6
1,588	BH_OPEN	Open or channel borehole props	SAT_RGAS	0.00E+00	Residual Gas saturation	For leaky boreholes	Database: CCA view 6
1,589	BH_OPEN	Open or channel borehole props	PERM_X	1.00E-09	X-direction permeability (m^2) from Log value	For leaky boreholes	Calculated
1,590	BH_OPEN	Open or channel borehole props	PERM_Y	1.00E-09	Y-direction permeability (m^2) from Log value	For leaky boreholes	Calculated
1,591	BH_OPEN	Open or channel borehole props	PERM_Z	1.00E-09	Z-direction permeability (m^2) Not used in 2D	For leaky boreholes	Calculated
1,592	BH_OPEN	Open or channel borehole props	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	For leaky boreholes	Database: CCA view 6
1,593	BH_OPEN	Open or channel borehole props	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	For leaky boreholes	Database: CCA view 6
1,594	BH_SAND	Sand-filled Borehole properties	CAP_MOD	1.00E+00	Capillary Pressure Model Number	For abandoned boreholes	Database: CCA view 6
1,595	BH_SAND	Sand-filled Borehole properties	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	For abandoned boreholes	Database: CCA view 6
1,596	BH_SAND	Sand-filled Borehole properties	PC_MAX	1.00E+08	Max capillary pressure	For abandoned boreholes	Database: CCA view 6

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
1,597	BH_SAND	Sand-filled Borehole properties	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	For abandoned boreholes	Database: CCA view 6
1,598	BH_SAND	Sand-filled Borehole properties	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	For abandoned boreholes	Database: CCA view 6
1,599	BH_SAND	Sand-filled Borehole properties	KPT	0.00E+00	Not used - placeholder	For abandoned boreholes	Database: CCA view 6
1,600	BH_SAND	Sand-filled Borehole properties	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	For abandoned boreholes	Database: CCA view 6
1,601	BH_SAND	Sand-filled Borehole properties	PORE_DIS	9.40E-01	Pore distribution (fraction)	For abandoned boreholes	Database: CCA view 6
1,602	BH_SAND	Sand-filled Borehole properties	POROSITY	3.20E-01	Porosity (fraction)	For abandoned boreholes	Database: CCA view 6
1,603	BH_SAND	Sand-filled Borehole properties	PRMX_LOG	-1.25E+01	Log x-direction permeability	For abandoned boreholes	Database: CCA view 6
1,604	BH_SAND	Sand-filled Borehole properties	PRMY_LOG	-1.25E+01	Log y-direction permeability	For abandoned boreholes	Database: CCA view 6
1,605	BH_SAND	Sand-filled Borehole properties	PRMZ_LOG	-1.25E+01	Log z-direction permeability (BRAGFLO required input)	For abandoned boreholes	Database: CCA view 6
1,606	BH_SAND	Sand-filled Borehole properties	RELP_MOD	4.00E+00	Relative permeability model number	For abandoned boreholes	Database: CCA view 6
1,607	BH_SAND	Sand-filled Borehole properties	SAT_RBRN	0.00E+00	Residual Brine saturation	For abandoned boreholes	Database: CCA view 6
1,608	BH_SAND	Sand-filled Borehole properties	SAT_RGAS	0.00E+00	Residual Gas saturation	For abandoned boreholes	Database: CCA view 6
1,609	BH_SAND	Sand-filled Borehole properties	PERM_X	3.16E-13	X-direction permeability (m^2) from Log value	For abandoned boreholes	Calculated
1,610	BH_SAND	Sand-filled Borehole properties	PERM_Y	3.16E-13	Y-direction permeability (m^2) from Log value	For abandoned boreholes	Calculated
1,611	BH_SAND	Sand-filled Borehole properties	PERM_Z	3.16E-13	Z-direction permeability (m^2) Not used in 2D	For abandoned boreholes	Calculated
1,612	BH_SAND	Sand-filled Borehole properties	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	For abandoned boreholes	Database: CCA view 6
1,613	BH_SAND	Sand-filled Borehole properties	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	For abandoned boreholes	Database: CCA view 6
1,614	BH_CREEP	BH props for lower part after 1k yrs	CAP_MOD	1.00E+00	Capillary Pressure Model Number	Salt creep portion of BH	Database: CCA view 6
1,615	BH_CREEP	BH props for lower part after 1k yrs	COMP_RCK	0.00E+00	Rock compressibility (1/Pa)	Salt creep portion of BH	Database: CCA view 6
1,616	BH_CREEP	BH props for lower part after 1k yrs	PC_MAX	1.00E+08	Max capillary pressure	Salt creep portion of BH	Database: CCA view 6
1,617	BH_CREEP	BH props for lower part after 1k yrs	PCT_A	0.00E+00	Capillary pressure multiplier (placeholder)	Salt creep portion of BH	Database: CCA view 6
1,618	BH_CREEP	BH props for lower part after 1k yrs	PCT_EXP	0.00E+00	Capillary pressure exponent (placeholder)	Salt creep portion of BH	Database: CCA view 6
1,619	BH_CREEP	BH props for lower part after 1k yrs	KPT	0.00E+00	Not used - placeholder	Salt creep portion of BH	Database: CCA view 6
1,620	BH_CREEP	BH props for lower part after 1k yrs	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Salt creep portion of BH	Database: CCA view 6
1,621	BH_CREEP	BH props for lower part after 1k yrs	PORE_DIS	9.40E-01	Pore distribution (fraction)	Salt creep portion of BH	Database: CCA view 6
1,622	BH_CREEP	BH props for lower part after 1k yrs	POROSITY	3.20E-01	Porosity (fraction)	Salt creep portion of BH	Database: CCA view 6
1,623	BH_CREEP	BH props for lower part after 1k yrs	PRMX_LOG	-1.35E+01	Log x-direction permeability	Salt creep portion of BH	Database: CCA view 6
1,624	BH_CREEP	BH props for lower part after 1k yrs	PRMY_LOG	-1.35E+01	Log y-direction permeability	Salt creep portion of BH	Database: CCA view 6
1,625	BH_CREEP	BH props for lower part after 1k yrs	PRMZ_LOG	-1.35E+01	Log z-direction permeability (BRAGFLO required input)	Salt creep portion of BH	Database: CCA view 6
1,626	BH_CREEP	BH props for lower part after 1k yrs	RELP_MOD	4.00E+00	Relative permeability model number	Salt creep portion of BH	Database: CCA view 6
1,627	BH_CREEP	BH props for lower part after 1k yrs	SAT_RBRN	0.00E+00	Residual Brine saturation	Salt creep portion of BH	Database: CCA view 6
1,628	BH_CREEP	BH props for lower part after 1k yrs	SAT_RGAS	0.00E+00	Residual Gas saturation	Salt creep portion of BH	Database: CCA view 6
1,629	BH_CREEP	BH props for lower part after 1k yrs	PERM_X	3.16E-14	X-direction permeability (m^2) from Log value	Salt creep portion of BH	Calculated
1,630	BH_CREEP	BH props for lower part after 1k yrs	PERM_Y	3.16E-14	Y-direction permeability (m^2) from Log value	Salt creep portion of BH	Calculated
1,631	BH_CREEP	BH props for lower part after 1k yrs	PERM_Z	3.16E-14	Z-direction permeability (m^2) Not used in 2D	Salt creep portion of BH	Calculated
1,632	BH_CREEP	BH props for lower part after 1k yrs	SB_MIN	0.00E+00	Minimum saturation (SAT_RBRN * 1.05)	Salt creep portion of BH	Database: CCA view 6
1,633	BH_CREEP	BH props for lower part after 1k yrs	POR_COMP	0.00E+00	Pore compressibility COMP_RCK/POROSITY (1/Pa)	Salt creep portion of BH	Database: CCA view 6

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1 !==========================================================================
2 !
3 ! TITLE:    GENMESH Input. Cross - sectional model for FEP analysis
4 ! ANALYST:  Daniel M. Stoelzel
5 ! NOTES:    This cross - sectional model will be used to analyse the effects
6 !           of oil and gas development on the WIPP site. It will specifically
7 !           address FEPs NS - 7: Leakage from wells from brine pockets,
8 !           injection, fluids from drilling; NS - 21: connections to units
9 !           beneath the repository, and S - 9: Near - miss boreholes.
10 !          Because current well spacing is at 40 acre intervals (1/4 mile
11 !          square), the thickness dimension is set at a constant 1320 feet
12 !          throughout (402.334 meters). There are 5 discrete well regions
13 !          corresponding to an equivalent area of an 7-7/8 inch wellbore.
14 !          Boreholes will be treated in several ways: intact, in which no
15 !          vertical communication is allowed, leaky casing, in which vertical
16 !          permeability multipliers are used to represent equivalent K*A of
17 !          the annular space between casing and open - hole (the multiplier
18 !          changes according to the casing design & bit size used), and plug-
19 !          ged and abandoned (P&A), in which the vert. perm multipliers
20 !          represent the bit - size equivalent (sand - filled hole) for long
21 !          term (to 10,000 years) leakage
22 !
23 ! CREATED:  June 22, 1995
24 !
25 ! REVISED:  August 2, 1995
26 !          Revised repository area to reflect excavated volume only, added
27 !          backfill area (operations and experimental regions), and shaft.
28 !          This increased mesh to 95 x 25 (2375 elements) from 90 x 25
29 !          (2250 elements) for 125 elem increase
30 !
31 !          August 7, 1995
32 !          Changed grid to add seals and DRZ. Mesh now at 106 by 25 nodes.
33 !
34 !          August 9, 1995
35 !          added an additional region to the shaft to represent the shaft
36 !          seals.
37 !
38 !          AUG 25, 1995
39 !          TOOK OUT THE WELLS AS DISCRETE REGIONS.  MESH REMAINS THE SAME,
40 !          (105 BY 24 ELEMENTS) BUT WELLS WILL BE "TURNED ON" IN THE PREBRAG/
41 !          BRAGFLO STEPS.  THIS WILL ALLOW THE LAYER PROPERTIES TO BE
42 !          CONTINUOUS IF THE WELLS DO NOT EXIST.
43 !
44 !          Aug 29, 1995
45 !          NEW MESH!!! BRAGFLO struggling with small grid blocks.  Changing
46 !          mesh to add more cells around wellbore regions, also taking out
47 !          upper Rustler and Dewey Lake regions, stopping mesh at Culebra.
48 !          Also added one more layer in waste region.  Grid now at 131 x 23
49 !          blocks.
50 !
51 !          Sep 1, 1995
52 !          NEW MESH!!! BRAGFLO still having problems. Changing del X to 155
53 !          from 131.  Del Y remains the same.
54 !
55 !          Sep 26, 1995
56 !          BRAGFLO appears to be time-step limited due to the extremely
57 !          small pore volume represented by the well grid blocks. Changing
58 !          the grid to increase the wellbore del-x's to 0.78 meters.  The
59 !          perms will be reduced to maintain equiv. KA's, and the rock
60 !          compress for well regions will be 1e-99 to minimize storage
61 !          effects.  New mesh is 124 by 34 elements.
62 !
63 !          Feb 26, 1996
64 !          New model to reflect new 40CFR 194 regulations, which do not
65 !          require active phase for future BH intrusions.  Therefore have
66 !                removed wells 2, 3, and 4, and re-named well 5 as well 2.  The two
67 !          wells are located opposite each other at the LWB, and radially
68 !                flared outward from an equivalent BH area of a 12-1/4 inch bit.
69 !          Only half the flow area out the borehole will be considered, and
70 !          the radial flaring will reflect 1/4 flow volume toward the WIPP,
71 !                and 1/4 flow volume away.  The production/injection at the
72 !                productive zones in the wellbore will reflect 1/2 average
73 !                production (or injection) for a Delaware Basin Well.  The
74 !                excavated volume will remain "undisturbed" (no future intrusions).
75 !          The latest assumptions used in PA will be incoorporated into the
76 !                model; gas generation, salt creep, fracture parameters, abandoned
77 !                borehole perms, etc.
78 !                Mesh is now 96 by 34 elements.
79 !
80 !                Feb 27, 1996
81 !          Eliminated CAVITY_1 region, (Panel) since this model only models
82 !                entire repository.
83 !==========================================================================
84 !
85 *SETUP
86  DIM=    3
87  ORIGIN= 0., -3357.58, 0.
88  IJKMAX= 97, 35, 2
89 !
90 *GRID
91   DEL, COORD = X, DEL = 2.0117E+02,INRANGE = 1,2,FACTOR = 1
92   DEL, COORD = X, DEL = 1.3106E+02,INRANGE = 2,3,FACTOR = 1
93   DEL, COORD = X, DEL = 5.4864E+01,INRANGE = 3,4,FACTOR = 1
94   DEL, COORD = X, DEL = 1.0973E+01,INRANGE = 4,5,FACTOR = 1
95   DEL, COORD = X, DEL = 2.7432E+00,INRANGE = 5,6,FACTOR = 1
96   DEL, COORD = X, DEL = 9.1440E-01,INRANGE = 6,7,FACTOR = 1
97   DEL, COORD = X, DEL = 4.5403E-01,INRANGE = 7,8,FACTOR = 1
98   DEL, COORD = X, DEL = 3.1117E-01,INRANGE = 8,9,FACTOR = 1
99   DEL, COORD = X, DEL = 4.5403E-01,INRANGE = 9,10,FACTOR = 1
100  DEL, COORD = X, DEL = 9.1440E-01,INRANGE = 10,11,FACTOR = 1
101  DEL, COORD = X, DEL = 2.7432E+00,INRANGE = 11,12,FACTOR = 1
102  DEL, COORD = X, DEL = 1.0973E+01,INRANGE = 12,13,FACTOR = 1
103  DEL, COORD = X, DEL = 5.4864E+01,INRANGE = 13,14,FACTOR = 1
104  DEL, COORD = X, DEL = 1.3106E+02,INRANGE = 14,15,FACTOR = 1
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DEL, COORD = Y, DEL = 9.1440E+01,INRANGE = 3,4,FACTOR = 1
DEL, COORD = Y, DEL = 1.1378E+02,INRANGE = 2,3,FACTOR = 1
DEL, COORD = Y, DEL = 8.1382E+00,INRANGE = 1,2,FACTOR = 1
!
*ELEVATION_ELEMENT, ADJUST_Z_COORD
LOCATION, THICK=402.336, ELEVAT=-3357.58,IRANGE=1, 2,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=213.0553,ELEVAT=-3357.58,IRANGE=2, 3,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=67.0286, ELEVAT=-3357.58,IRANGE=3, 4,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=15.3208, ELEVAT=-3357.58,IRANGE=4, 5,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=4.5485 , ELEVAT=-3357.58,IRANGE=5, 6,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=1.6757 , ELEVAT=-3357.58,IRANGE=6, 7,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=0.6010 , ELEVAT=-3357.58,IRANGE=7, 8,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=0.2444 , ELEVAT=-3357.58,IRANGE=8, 9,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=0.6010 , ELEVAT=-3357.58,IRANGE=9,10,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=1.6757 , ELEVAT=-3357.58,IRANGE=10,11,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=4.5485 , ELEVAT=-3357.58,IRANGE=11,12,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=15.3208, ELEVAT=-3357.58,IRANGE=12,13,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=67.0286, ELEVAT=-3357.58,IRANGE=13,14,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=213.0553,ELEVAT=-3357.58,IRANGE=14,15,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=402.336, ELEVAT=-3357.58,IRANGE=15,83,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=213.0553,ELEVAT=-3357.58,IRANGE=83,84,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=67.0286, ELEVAT=-3357.58,IRANGE=84,85,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=15.3208, ELEVAT=-3357.58,IRANGE=85,86,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=4.5485 , ELEVAT=-3357.58,IRANGE=86,87,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=1.6757 , ELEVAT=-3357.58,IRANGE=87,88,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=0.6010 , ELEVAT=-3357.58,IRANGE=88,89,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=0.2444 , ELEVAT=-3357.58,IRANGE=89,90,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=0.6010 , ELEVAT=-3357.58,IRANGE=90,91,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=1.6757 , ELEVAT=-3357.58,IRANGE=91,92,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=4.5485 , ELEVAT=-3357.58,IRANGE=92,93,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=15.3208, ELEVAT=-3357.58,IRANGE=93,94,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=67.0286, ELEVAT=-3357.58,IRANGE=94,95,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=213.0553,ELEVAT=-3357.58,IRANGE=95,96,JRANGE=1,35,KRANGE=1,2
LOCATION, THICK=402.336, ELEVAT=-3357.58,IRANGE=96,97,JRANGE=1,35,KRANGE=1,2
!
*REGIONS
! Bottom - up stratigraphy
!
! -- Morrow_pay, zone 1
REGION=1, IRANGE= 1,27, JRANGE= 1, 2, KRANGE=1,2
! -- Morrow_pay, zone 2
REGION=2, IRANGE= 27,71, JRANGE= 1, 2, KRANGE=1,2
! -- Morrow Pay, zone 3
REGION=3, IRANGE= 71,97, JRANGE= 1, 2, KRANGE=1,2
!
!
! -- Morrow_lime no pay
!
!
REGION=4, IRANGE= 1,97, JRANGE= 2, 4, KRANGE=1,2
!
! -- Atoka_pay, zone 1
!
REGION=5, IRANGE= 1,27, JRANGE= 4, 5, KRANGE=1,2
! -- Atoka_pay, zone 2
REGION=6, IRANGE= 27,71, JRANGE= 4, 5, KRANGE=1,2
! -- Atoka Pay, zone 3
REGION=7, IRANGE= 71,97, JRANGE= 4, 5, KRANGE=1,2
!
!
! -- Atoka no pay
!
!
REGION=8, IRANGE= 1,97, JRANGE= 5, 7, KRANGE=1,2
!
! -- Strawn_pay, zone 1
!
REGION=9, IRANGE= 1,27, JRANGE= 7, 8, KRANGE=1,2
! -- Strawn_pay, zone 2
REGION=10, IRANGE= 27,71, JRANGE= 7, 8, KRANGE=1,2
! -- Strawn Pay, zone 3
REGION=11, IRANGE= 71,97, JRANGE= 7, 8, KRANGE=1,2
!
!
! -- Strawn no pay
!
!
REGION=12, IRANGE= 1,97, JRANGE= 8,11, KRANGE=1,2
!
! -- Bone Spring_pay, zone 1
!
REGION=13, IRANGE= 1,27, JRANGE= 11,12, KRANGE=1,2
! -- Bone Spring_pay, zone 2
REGION=14, IRANGE= 27,71, JRANGE= 11,12, KRANGE=1,2
! -- Bone Spring Pay, zone 3
REGION=15, IRANGE= 71,97, JRANGE= 11,12, KRANGE=1,2
!
!
! -- Upper Bone Spring no pay
!
!
REGION=16, IRANGE= 1,97, JRANGE= 12,15, KRANGE=1,2
!
! -- Lower Brushy Canyon_pay, zone 1
```

```
!
REGION=17, IRANGE= 1,27, JRANGE= 15,16, KRANGE=1,2
! -- Lower Brushy Canyon_pay, zone 2
REGION=18, IRANGE= 27,71, JRANGE= 15,16, KRANGE=1,2
! -- Lower Brushy Canyon Pay, zone 3
REGION=19, IRANGE= 71,97, JRANGE= 15,16, KRANGE=1,2
!
!
! -- Upper Brushy Canyon no pay
!
!
REGION=20, IRANGE= 1,97, JRANGE= 16,19, KRANGE=1,2
!
! -- Upper Brushy Canyon (Livingston Ridge Main pay), zone 1
!
REGION=21, IRANGE= 1,27, JRANGE= 19,20, KRANGE=1,2
! -- Upper Brushy Canyon (Livingston Ridge Main pay), zone 2
REGION=22, IRANGE= 27,71, JRANGE= 19,20, KRANGE=1,2
! -- Upper Brushy Canyon (Livingston Ridge Main pay), zone 3
REGION=23, IRANGE= 71,97, JRANGE= 19,20, KRANGE=1,2
!
!
! -- Lower Bell Canyon - Upper Cherry Canyon no pay
!
!
REGION=24, IRANGE= 1,97, JRANGE= 20,23, KRANGE=1,2
!
! -- Upper Bell Canyon (Delaware Sandstone pay), zone 1
!
REGION=25, IRANGE= 1,27, JRANGE= 23,24, KRANGE=1,2
! -- Upper Bell Canyon (Delaware Sandstone pay), zone 2
REGION=26, IRANGE= 27,71, JRANGE= 23,24, KRANGE=1,2
! -- Upper Bell Canyon (Delaware Sandstone pay), zone 3
REGION=27, IRANGE= 71,97, JRANGE= 23,24, KRANGE=1,2
!
!
! -- Castile
!
!
REGION=28, IRANGE= 1,97, JRANGE= 24,25, KRANGE=1,2
!
!
! -- Salado
!
!
REGION=29, IRANGE= 1,97, JRANGE= 25,26, KRANGE=1,2
!
REGION=29, IRANGE= 1,36, JRANGE= 26,27, KRANGE=1,2
REGION=29, IRANGE= 60,97, JRANGE= 26,27, KRANGE=1,2
!
REGION=29, IRANGE= 1,36, JRANGE= 28,30, KRANGE=1,2
REGION=29, IRANGE= 60,97, JRANGE= 28,30, KRANGE=1,2
!
REGION=29, IRANGE= 1,56, JRANGE= 31,33, KRANGE=1,2
REGION=29, IRANGE= 57,97,JRANGE= 31,33, KRANGE=1,2
!
! -- MB 139
!
REGION=30, IRANGE= 1,36, JRANGE= 27,28, KRANGE=1,2
REGION=30, IRANGE= 52,56, JRANGE= 27,28, KRANGE=1,2
REGION=30, IRANGE= 57,97, JRANGE= 27,28, KRANGE=1,2
!
! -- MB 138, plus anhy. A&B
!
REGION=31, IRANGE= 1,36, JRANGE= 30,31, KRANGE=1,2
REGION=31, IRANGE= 52,56, JRANGE= 30,31, KRANGE=1,2
REGION=31, IRANGE= 57,97, JRANGE= 30,31, KRANGE=1,2
!
!
! -- Rustler
!
!
REGION=32, IRANGE= 1,56, JRANGE= 33,34, KRANGE=1,2
REGION=32, IRANGE= 57,97, JRANGE= 33,34, KRANGE=1,2
!
!
! -- Culebra
!
!
REGION=33, IRANGE= 1,56, JRANGE= 34,35, KRANGE=1,2
REGION=33, IRANGE= 57,97, JRANGE= 34,35, KRANGE=1,2
!
!
! --CAVITY REGION == CLOSURE WILL BE ALLOWED
! -- CAVITY: will be WASTE REGION after 100 years
! --------- CAVITY_2 ------------
REGION=34, IRANGE= 36,43, JRANGE= 27,31, KRANGE=1,2
REGION=34, IRANGE= 44,51, JRANGE= 27,31, KRANGE=1,2
!
!
! -- Operations (backfill) AND EXP_AREA TOGETHER area --
! ------- CAVITY_3 -------
REGION=35, IRANGE= 52,56, JRANGE= 28,30, KRANGE=1,2
!
REGION=35, IRANGE= 57,60, JRANGE= 28,30, KRANGE=1,2
!
!
! ----------------- Shaft(s), & PANEL SEALS -----
!
! -------------- CAVITY_4 -------------
! -- Seals --------
!
REGION=36, IRANGE= 43,44, JRANGE= 27,31, KRANGE=1,2
REGION=36, IRANGE= 51,52, JRANGE= 27,31, KRANGE=1,2
```

```
!
! ---------------- SHAFT(S) ----------
!
 REGION=36, IRANGE= 56,57, JRANGE= 27,35, KRANGE=1,2
!
! -- DRZ ---------
!
 REGION=37, IRANGE= 36,60, JRANGE= 26,27, KRANGE=1,2
*END
```

```
1 ************
2 File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.INP;9
3   85  *SETUP
4 ******
5 File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GM_YATES01.INP;2
6   85
7   86
8   87
9   88
10  89
11  90
12  91
13  92  *SETUP
14 ************
15 ************
16 File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.INP;9
17  197    DEL, COORD = Y, DEL =  1.9727E+02,INRANGE =  25,26,FACTOR = 1
18  198    DEL, COORD = Y, DEL =  3.8100E+02,INRANGE =  24,25,FACTOR = 1
19  199    DEL, COORD = Y, DEL =  1.1247E+02,INRANGE =  23,24,FACTOR = 1
20 ******
21 File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GM_YATES01.INP;2
22  204
23  205
24  206
25  207
26  208
27  209    DEL, COORD = Y, DEL =  1.1680E+02,INRANGE =  25,26,FACTOR = 1
28  210    DEL, COORD = Y, DEL =  3.8100E+01,INRANGE =  24,25,FACTOR = 1
29  211
30  212    DEL, COORD = Y, DEL =  1.1247E+02,INRANGE =  23,24,FACTOR = 1
31 ************
32 ************
33 File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.INP;9
34  220    DEL, COORD = Y, DEL =  1.1378E+02,INRANGE =  2,3,FACTOR = 1
35  221    DEL, COORD = Y, DEL =  8.1382E+00,INRANGE =  1,2,FACTOR = 1
36 ******
37 File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GM_YATES01.INP;2
38  233
39  234    DEL, COORD = Y, DEL =  5.37154+02,INRANGE =  2,3,FACTOR = 1
40  235
41  236    DEL, COORD = Y, DEL =  8.1382E+00,INRANGE =  1,2,FACTOR = 1
42 ************
43
44 Number of difference sections found: 3
45 Number of difference records found: 18
46
47 DIFFERENCES
48 /IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[
49 NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.DIFF;1-
50    N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.INP;9-
51    N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GM_YATES01.INP;2
```

```
1 !=================================================================
2 !
3 !TITLE:   BRAGFLO CROSS-SECTIONAL MODEL FOR FEP SCREENING CALCULATIONS
4 !ANALYST:  Daniel M. Stoelzel ,SNL
5 !CREATED:  June 29, 1995
6 !PURPOSE:  Define material and property names and selected values that
7 !       are not in the PROPERTY.SDB
8 !Modified: Aug 8, 1995
9 !       Redefined block assignments to reflect 3rd grid revision
10 !
11 !       AUG 15, 1995
12 !       ADDED PAN_S_2 REGION, CHANGED SOME PROPERTIES TO BE READ FROM
13 !       DATABASE
14 !
15 !       Aug 16, 1995
16 !       Reduced vertical perms one order of magnitude for all lower zones
17 !       (Bell Canyon through Morrow) to contain any potential gas
18 !       saturations in-zone.
19 !       Added PTHRESH property for S_HALITE (needed in algebra)
20 !
21 !       Aug 21, 1995
22 !       Added CAVITY_3 & CAVITY_4 Regions to define backfill and exp_area
23 !       initial conditions (-5 tto 0 years)
24 !
25 !       Aug 22, 1995
26 !       Changed well PRMY_MUL's to reflect scenario no 1: wells 1 & 5
27 !       to disposal (present-day development), well 2 to disposal (future
28 !       development), well 4 to future abandoned to bonespring (never
29 !       produced).
30 !
31 !       Eliminated one IMPERM_Z block.  Only Culebra is impermeable.
32 !
33 !       AUG 23, 1995
34 !       CHANGED CASTILLE PERM TO 1E-18H, E-19V (WAS 1E-11). CHANGED WELLBORE
35 !       VERT PERM MULT FOR MIDDLE AND LOWER SECTIONS TO 1E-5 TO ALLOW
36 !       EASIER EQUILIBRATION.
37 !
38 !       AUG 25, 1995
39 !       RE-DO MATSET TO REFLECT NEW GRID REGIONS.  DISCRETE WELL REGIONS
40 !       HAVE BEEN REMOVED FROM GENMESH.  WELLS WILL NOW BE DEFINED IN
41 !       PREBRAG/BRAGFLO.  THIS WILL ALLOW UNIFORM PROPERTIES FOR EACH LAYER
42 !       AT TIMES WHEN WELLS DO NOT EXIST
43 !
44 !       AUG 26, 1995
45 !       CHANGED MARKER BED LOG PERMEABILITIES TO -15, WHICH IS MAX ON DATA-
46 !       BASE.
47 !
48 !       Aug 28, 1995
49 !       Fixed fracture params. Changed pay zone cap models to zero cap
50 !       pressure.  Also lowered pay zone vert perm 3 orders of magnitude
51 !
52 !       AUG 29, 1995
53 !       NEW MESH!! INCREASED DEL-X TO REFINE GRID AROUND WELLBORES. STOP AT
54 !       CULEBRA
55 !
56 !               Feb. 27,1996
57 !               New grid reflecting the new 194 requirements.  No wells will be
58 !               included inside the LWB, since no future active phase is required.
59 !       Will therefore have only three time periods: -5 to 0 years, 0 to 50
60 !               years (active well phase with possible casing leaks), and 50 to
61 !               10,000 years (abandoned well phase).  Will also attempt to read as
62 !               many variables as possible off the database for the upper units
63 !               (Castile and above) instead of hard-wiring.  Database should be
64 !               QA'ed.
65 !
66 !       FEB 29, 1996
67 !               ADDED REGIONS 59 TO 64 TO REPRESENT THE BOREHOLE PERMS FOR
68 !               SURFACE, SALT, AND DEEP SECTIONS OF BOREHOLE (USING A VERTICAL PERM
69 !               MULTIPLIER: PERMY_MUL)
70 !
71 !               JUNE 14, 1996
72 !               ADDED CONC_PLUG, BH_OPEN, BH_SAND, BH_CREED.  LATEST MATERIAL
73 !               PROPERTIES FOR BOREHOLE PERMEABILITY (cca CALCS)
74 !=================================================================
75 *PRINT_ASSIGNED_VALUES
76 !
77 *HEADING
78  TITLE, BRAGFLO: 1996 FEPs: OIL DEVEL. X-SECTIONAL MODEL WITH 2 WELLS
79  SCALE, LOCAL
80  SCENARIO, UNDIST
81 !
82 *UNITS=SI
83 !
84 *CREATE_BLOCKS
85 !...Create additional blocks for FLUID, WELL, and other properties
86 !  for modeling corrosion and biodegradation reactions
87  BLOCK_IDS=38
88  BLOCK_IDS=39
89  BLOCK_IDS=40
90  BLOCK_IDS=41
91  BLOCK_IDS=42
92  BLOCK_IDS=43
93  BLOCK_IDS=44
94  BLOCK_IDS=45
95  BLOCK_IDS=46
96  BLOCK_IDS=47
97  BLOCK_IDS=48
98  BLOCK_IDS=49
99  BLOCK_IDS=50
100 BLOCK_IDS=51
101 BLOCK_IDS=52
102 BLOCK_IDS=53
103 BLOCK_IDS=54
104 BLOCK_IDS=55
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```
BLOCK_IDS=56
BLOCK_IDS=57
BLOCK_IDS=58
BLOCK_IDS=59
BLOCK_IDS=60
BLOCK_IDS=61
BLOCK_IDS=62
BLOCK_IDS=63
BLOCK_IDS=64
BLOCK_IDS=65
BLOCK_IDS=66
BLOCK_IDS=67
BLOCK_IDS=68
!
*RETRIEVE
COORD, DIM=3, NAMES= X,Y,Z
!
!...Define region names
MATERIAL, 1=MORRO_P1,   2=MORRO_P2,   3=MORRO_P3,   4=MORRO_NP,&
        5=ATOKA_P1,   6=ATOKA_P2,   7=ATOKA_P3,   8=ATOKA_NP,&
        9=STRWN_P1,   10=STRWN_P2,   11=STRWN_P3,   12=STRWN_NP,&
        13=BONES_P1,   14=BONES_P2,   15=BONES_P3,   16=BONES_NP,&
        17=LBRSH_P1,   18=LBRSH_P2,   19=LBRSH_P3,   20=UBRSH_NP,&
        21=UBRSH_P1,   22=UBRSH_P2,   23=UBRSH_P3,   24=LBELL_NP,&
        25=UBELL_P1,   26=UBELL_P2,   27=UBELL_P3,   28=CASTILER, &
        29=S_HALITE,   30=S_MB139,   31=S_MB138,   32=UNNAMED,&
        33=IMPERM_Z,   34=CAVITY_2,   35=CAVITY_3,   36=CAVITY_4,&
        37=DRZ_0,   38=BOREHOLE,   39=DRZ_1,   40=CULEBRA,&
        41=WAS_AREA,   42=OPS_AREA,   43=EXP_AREA,   44=PAN_SEAL,&
        45=CLAY_RUS,   46=CL_L_T1,   47=CL_L_T4,   48=SALT_T1,&
        49=SALT_T4,   50=SALT_T5,   51=SALT_T6,&
        52=BRINESAL,   53=H2,   54=SULFATE,   55=NITRATE,&
        56=STEEL,   57=CELLULS,   58=REFCON,   59=BH_SUR_A,&
        60=BH_SUR_L,   61=BH_SLT_A,   62=BH_SLT_L,   63=BH_LOW_A,&
        64=BH_LOW_L,   65=CONC_PLG,   66=BH_OPEN,   67=BH_SAND,&
        68=BH_CREEP
!
!1 ...Define Morrow Zone 1 property names,
PROPERTY,MAT=MORRO_P1,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!2 ...Define Morrow Zone 2 property names,
PROPERTY,MAT=MORRO_P2,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!3 ...Define Morrow Zone 3 property names,
PROPERTY,MAT=MORRO_P3,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!4 ...Define Morrow Zone NO PAY property names,
PROPERTY,MAT=MORRO_NP,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
```

```
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!5 ...Define ATOKA Zone 1 property names,
PROPERTY,MAT=ATOKA_P1,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!6 ...Define ATOKA Zone 2 property names,
PROPERTY,MAT=ATOKA_P2,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!7 ...Define ATOKA Zone 3 property names,
PROPERTY,MAT=ATOKA_P3,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!8 ...Define ATOKA NO PAY property names,
PROPERTY,MAT=ATOKA_NP,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!9 ...Define STRWN Zone 1 property names,
PROPERTY,MAT=STRWN_P1,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!10 ...Define STRAWN Zone 2 property names,
PROPERTY,MAT=STRWN_P2,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
```

```
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!11 ...Define STRAWN Zone 3 property names,
PROPERTY,MAT=STRWN_P3,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!12 ...Define STRAWN NO PAY property names,
PROPERTY,MAT=STRWN_NP,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!13 ...Define BONE SPRING Zone 1 property names,
PROPERTY,MAT=BONES_P1,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!14 ...Define BONE SPRING Zone 2 property names,
PROPERTY,MAT=BONES_P2,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!15 ...Define BONE SPRING Zone 3 property names,
PROPERTY,MAT=BONES_P3,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!16 ...Define BONE SPRING NO PAYproperty names,
PROPERTY,MAT=BONES_NP,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
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PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!17 ...Define LOWER BRUSHY CANYON Zone 1 property names,
PROPERTY,MAT=LBRSH_P1,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!18 ...Define LOWER BRUSHY CANYON Zone 2 property names,
PROPERTY,MAT=LBRSH_P2,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!19 ...Define LOWER BRUSHY CANYON Zone 3 property names,
PROPERTY,MAT=LBRSH_P3,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!20 ...Define UPPER BRUSHY CANYON NO PAY property names,
PROPERTY,MAT=UBRSH_NP,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!21 ...Define UPPER BRUSHY CANYON Zone 1 property names,
PROPERTY,MAT=UBRSH_P1,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!22 ...Define UPPER BRUSHY CANYON Zone 2 property names,
```

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PROPERTY,MAT=UBRSH_P2,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!23 ...Define UPPER BRUSHY CANYON Zone 3 property names,
PROPERTY,MAT=UBRSH_P3,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!24 ...Define LOWER BELL CANYON NO PAY property names,
PROPERTY,MAT=LBELL_NP,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!25 ...Define UPPER BELL CANYON Zone 1 property names,
PROPERTY,MAT=UBELL_P1,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!26 ...Define UPPER BELL CANYON Zone 2 property names,
PROPERTY,MAT=UBELL_P2,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!27 ...Define UPPER BELL CANYON Zone 3 property names,
PROPERTY,MAT=UBELL_P3,NAMES = &
CAP_MOD,&
COMP_RCK,&
PC_MAX,&
PCT_A,&
PCT_EXP,&
KPT,&
PO_MIN,&
PORE_DIS,&
POROSITY,&
PRESSURE,&
PRMX_LOG,&
PRMY_LOG,&
PRMZ_LOG,&
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RELP_MOD,&
SAT_RBRN,&
SAT_RGAS
!28 ...Define castiler property names,
PROPERTY, MAT=CASTILER, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT,&
                    PRESSURE
!29 ...Define SALADO HALITE property names,
PROPERTY, MAT=S_HALITE, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT,&
                    PRESSURE
!30 ...Define MB 139 property names,
PROPERTY, MAT=S_MB139, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT,&
                    BKLINK,     EXPKLINK
!30b...Define MARKER BED 139 fracture model parameters
PROPERTY, MAT=S_MB139, NAMES=   DPHIMAX,   PI_DELTA,  PF_DELTA,&
                    IFRX,       IFRY,     IFRZ,&
                    KMAXLOG
!31 ...Define S_MB138 + S_ANH_AB property names
PROPERTY, MAT=S_MB138, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT
!31b...Define MARKER BED 138 fracture model parameters
PROPERTY, MAT=S_MB138, NAMES=   DPHIMAX,   PI_DELTA,  PF_DELTA,&
                    IFRX,       IFRY,     IFRZ,&
                    KMAXLOG
!32 ...Define UNNAMED property names,
PROPERTY, MAT=UNNAMED, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT
!33...Define impermeable zone (Rustler including Culebra (for time period
!  -5 to 0 yrs) property names
PROPERTY, MAT=IMPERM_Z, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT
!34...Define empty CAVITY (ENTIRE repository)
!  property names
PROPERTY, MAT=CAVITY_2, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT,&
                    PRESSURE,   SAT_IBRN
!35...Define empty CAVITY (experimental room, backfill)
!  property names
PROPERTY, MAT=CAVITY_3, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT,&
                    PRESSURE,   SAT_IBRN
!36...Define empty CAVITY (shaft and seals including drift and panel seals)
!  property names
PROPERTY, MAT=CAVITY_4, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT,&
                    PRESSURE
!37...Define INITIAL DRZ property names
PROPERTY, MAT=DRZ_0, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT
!38...Define INTRUSION BOREHOLE FOR 2 WELLS OUTSIDE LWB.  PERM WILL BE ADDED
!  IN ALGEBRA (PERM MULTIPLIERS FOR LEAKY CASING, ETC)
! property names
PROPERTY, MAT=BOREHOLE, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT
!39...Define DRZ (Time period 2 : 0-10000 yrs)
! property names
PROPERTY, MAT=DRZ_1,   NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT
!40 ...Define CULEBRA property names,
PROPERTY, MAT=CULEBRA, NAMES=   PRMX_LOG,   PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,   PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,   COMP_RCK,  CAP_MOD,&
                    RELP_MOD,   PC_MAX,   PO_MIN,&
                    PCT_A,      PCT_EXP,  KPT,&
                    PRESSURE
!41a...Define WASTE property names
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PROPERTY, MAT=WAS_AREA, NAMES=    PRMX_LOG,    PRMY_LOG,   PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT,&
                    SAT_IBRN
!41b..Define the waste properties that will control gas generation by
!    corrosion reaction and biodegradation
PROPERTY, MAT=WAS_AREA, NAMES=    GRATMICI,    GRATMICH,&
                    DCELLCHW,    DCELLRHW,  DIRONCHW,&
                    DIRONRHW,    DPLASCHW,  DPLASRHW,&
                    DRUBBCHW,    DRUBBRHW,  DIRNCCHW,&
                    DIRNCRHW,    DPLSCCHW,  DPLSCRHW,&
                    VOLCHW,      VOLRHW,    SAT_WICK,&
                    PROBDEG
!42...Define OPERATIONS AREA property names
PROPERTY, MAT=OPS_AREA, NAMES=    PRMX_LOG,    PRMY_LOG,   PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!43...Define Experimental Area property names
PROPERTY, MAT=EXP_AREA, NAMES=    PRMX_LOG,    PRMY_LOG,   PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!44...Define Panel Seal (Time period 1 : 0-10000 yrs) property names
PROPERTY, MAT=PAN_SEAL, NAMES=    PRMX_LOG,    PRMY_LOG,   PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT,&
                    SAT_IBRN
!45...Define upper shaft fill Rustler Clay w/o DRZ (0-10000 yrs) property names
PROPERTY, MAT=CLAY_RUS, NAMES=    PRMX_LOG,    PRMY_LOG,   PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT,&
                    SAT_IBRN
!46a..Define Lower clay seal w/ DRZ (Time period 1 : 0-10 yrs) property names
PROPERTY, MAT=CL_L_T1, NAMES=     PRMX_LOG,    PRMY_LOG,   PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT,&
                    SAT_IBRN
!46b..Define Lower clay seal w/ DRZ (Time period 1 : 0-10 yrs) drz dimensions
PROPERTY, MAT=CL_L_T1, NAMES=     RSH_AIR,     RSH_SAL,    RSH_WAS,&
                    RSH_EXH,     RADN_DRZ
!47a..Define Lower clay seal w/ DRZ (Time period 4 : 50-10000 yrs) property names
PROPERTY, MAT=CL_L_T4, NAMES=     PRMX_LOG,    PRMY_LOG,   PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!47b..Define Lower clay seal w/ DRZ (Time period 4 : 50-10000 yrs) drz dimensions
PROPERTY, MAT=CL_L_T4, NAMES=     RSH_AIR,     RSH_SAL,    RSH_WAS,&
                    RSH_EXH,     RADN_DRZ
!48a..Define Salt column seal w/ DRZ (Time period 1 : 0-10 yrs) property names
PROPERTY, MAT=SALT_T1, NAMES=     POROSITY,    PORE_DIS,   SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT,&
                    SAT_IBRN
!48b..Define Salt column seal w/ DRZ (Time period 1 : 0-10 yrs) drz dimensions
PROPERTY, MAT=SALT_T1, NAMES=     RSH_AIR,     RSH_SAL,    RSH_WAS,&
                    RSH_EXH,     RADN_DRZ,  PMLT_MD,&
                    PMLT_LO,     PMLT_HI,   CUMPROB
!49a..Define Salt column seal w/ DRZ (Time period 4 : 50-100 yrs)
! property names
PROPERTY, MAT=SALT_T4, NAMES=     POROSITY,    PORE_DIS,   SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!49b..Define Salt column seal w/ DRZ (Time period 4 : 50-100 yrs)
! drz dimensions
PROPERTY, MAT=SALT_T4, NAMES=     RSH_AIR,     RSH_SAL,    RSH_WAS,&
                    RSH_EXH,     RADN_DRZ,  PMLT_MD,&
                    PMLT_LO,     PMLT_HI
!50a..Define Salt column seal w/ DRZ (Time period 5 : 100-200 yrs)
! property names
PROPERTY, MAT=SALT_T5, NAMES=     POROSITY,    PORE_DIS,   SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!50b..Define Salt column seal w/ DRZ (Time period 5 : 100-200 yrs)
! drz dimensions
PROPERTY, MAT=SALT_T5, NAMES=     RSH_AIR,     RSH_SAL,    RSH_WAS,&
                    RSH_EXH,     RADN_DRZ,  PMLT_MD,&
                    PMLT_LO,     PMLT_HI
!51a..Define Salt column seal w/ DRZ (Time period 6 : 200-10000 yrs)
! property names
PROPERTY, MAT=SALT_T6, NAMES=     POROSITY,    PORE_DIS,   SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!51b..Define Salt column seal w/ DRZ (Time period 6 : 200-10000 yrs)
! drz dimensions
PROPERTY, MAT=SALT_T6, NAMES=     RSH_AIR,     RSH_SAL,    RSH_WAS,&
                    RSH_EXH,     RADN_DRZ,  PMLT_MD,&
                    PMLT_LO,     PMLT_HI
!
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!52..Define BRINE property names
PROPERTY, MAT=BRINESAL, NAMES=    DNSFLUID,    WTF,      COMPRES,&
                    VISCO,      REF_TEMP,  REF_PRES
!53..Define GAS (H2) property names
PROPERTY, MAT=H2,     NAMES=    VISCO
!54..Define SULFATE property names
PROPERTY, MAT=SULFATE,  NAMES=    QINIT
!55..Define NITRATE property names
PROPERTY, MAT=NITRATE,  NAMES=    QINIT
!56..Define STEEL property names
PROPERTY, MAT=STEEL,   NAMES=    CORRMCO2,    CORRWCO2,  HUMCORR,&
                    STOIFX
!57..Define CELLULS property names
PROPERTY, MAT=CELLULS,  NAMES=    FBETA
!58..Define REFCON property names
PROPERTY, MAT=REFCON,  NAMES=    GRAVACC,    PI,       VPANLEX,&
                    VROOM,      VREPOS,    DRROOM,&
                    YRSEC,      SECYR,     ASDRUM,&
                    ATMPA,
!
!59 SURFACE BOREHOLE, ABANDONED PERMEABILITY
! property names
PROPERTY, MAT=BH_SUR_A, NAMES=    PRMY_MUL,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!60 SURFACE BOREHOLE, LEAKING PERMEABILITY
! property names
PROPERTY, MAT=BH_SUR_L, NAMES=    PRMY_MUL,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!
!61 BOREHOLE THRU SALT, ABANDONED PERMEABILITY
! property names
PROPERTY, MAT=BH_SLT_A, NAMES=    PRMY_MUL,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!62 BOREHOLE THRU SALT, LEAKING PERMEABILITY
! property names
PROPERTY, MAT=BH_SLT_L, NAMES=    PRMY_MUL,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!
!63 DEEP UNITS BOREHOLE, ABANDONED PERMEABILITY
! property names
PROPERTY, MAT=BH_LOW_A, NAMES=    PRMY_MUL,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!64 DEEP UNITS BOREHOLE, LEAKING PERMEABILITY
! property names
PROPERTY, MAT=BH_LOW_L, NAMES=    PRMY_MUL,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!65...Define INTRUSION BOREHOLE: CONCRETE PLUG SECTION
! property names
PROPERTY, MAT=CONC_PLG, NAMES=    PRMX_LOG,    PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!66...Define INTRUSION BOREHOLE: OPEN BOREHOLE SECTION
! property names
PROPERTY, MAT=BH_OPEN, NAMES=    PRMX_LOG,    PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!67...Define INTRUSION BOREHOLE: SILTY-SAND BOREHOLE SECTION
! property names
PROPERTY, MAT=BH_SAND, NAMES=    PRMX_LOG,    PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!68...Define INTRUSION BOREHOLE: CREEP CLOSURE SILTY SAND SECTION
! property names
PROPERTY, MAT=BH_CREEP, NAMES=    PRMX_LOG,    PRMY_LOG,  PRMZ_LOG,&
                    POROSITY,    PORE_DIS,  SAT_RGAS,&
                    SAT_RBRN,    COMP_RCK,  CAP_MOD,&
                    RELP_MOD,    PC_MAX,    PO_MIN,&
                    PCT_A,       PCT_EXP,   KPT
!=================================================================
=
*SET
!
!...Specify property values for those not currently obtainable from the
!  PROPERTY.SDB.  Also those that may be equal to a sampled value in ALGERBA
!  (many will be redefined in the ALGEBRA step)
!
!
!I ...Set values Morrow Zone 1 properties not in database,
PROPERTY,MAT=MORRO_P1,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
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COMP_RCK=3.0154E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.1000E-001,&
PRESSURE=5.2920E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!2 ...Set values Morrow Zone 2 properties not in database,,
PROPERTY,MAT=MORRO_P2,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.0154E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.1000E-001,&
PRESSURE=5.2920E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!3 ...Set values Morrow Zone 3 properties not in database,,
PROPERTY,MAT=MORRO_P3,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.0154E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.1000E-001,&
PRESSURE=5.2920E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!4 ...Set values Morrow Zone NO PAY properties not in database,,
PROPERTY,MAT=MORRO_NP,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.0813E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=4.0000E-002,&
PRESSURE=5.1634E+007,&
PRMX_LOG=-1.5750E+001,&
PRMY_LOG=-1.9750E+001,&
PRMZ_LOG=-1.5750E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!5 ...Set values ATOKA Zone 1 properties not in database,,
PROPERTY,MAT=ATOKA_P1,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.1494E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=9.0000E-002,&
PRESSURE=5.0362E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!6 ...Set values ATOKA Zone 2 properties not in database,,
PROPERTY,MAT=ATOKA_P2,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.1494E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=9.0000E-002,&
PRESSURE=5.0362E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
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SAT_RGAS=1.0000E-002
!7 ...Set values ATOKA Zone 3 properties not in database,,
PROPERTY,MAT=ATOKA_P3,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.1494E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=9.0000E-002,&
PRESSURE=5.0362E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!8 ...Set values ATOKA NO PAY properties not in database,,
PROPERTY,MAT=ATOKA_NP,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.2162E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.0000E-002,&
PRESSURE=4.9169E+007,&
PRMX_LOG=-1.5750E+001,&
PRMY_LOG=-1.9750E+001,&
PRMZ_LOG=-1.5750E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!9 ...Set values STRWN Zone 1 properties not in database,,
PROPERTY,MAT=STRWN_P1,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.2863E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.0000E-001,&
PRESSURE=4.7968E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!10 ...Set values STRAWN Zone 2 properties not in database,,
PROPERTY,MAT=STRWN_P2,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.2863E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.0000E-001,&
PRESSURE=4.7968E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!11 ...Set values STRAWN Zone 3 properties not in database,,
PROPERTY,MAT=STRWN_P3,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.2863E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.0000E-001,&
PRESSURE=4.7968E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!12 ...Set values STRAWN NO PAY properties not in database,,
PROPERTY,MAT=STRWN_NP,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=3.6990E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.0000E-002,&
PRESSURE=4.1817E+007,&
PRMX_LOG=-1.5750E+001,&
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PRMY_LOG=-1.9750E+001,&
PRMZ_LOG=-1.5750E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!13 ...Set values BONE SPRING Zone 1 properties not in database,,
PROPERTY,MAT=BONES_P1,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=4.2321E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.1500E-001,&
PRESSURE=3.5649E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!14 ...Set values BONE SPRING Zone 2 properties not in database,,
PROPERTY,MAT=BONES_P2,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=4.2321E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.1500E-001,&
PRESSURE=3.5649E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!15 ...Set values BONE SPRING Zone 3 properties not in database,,
PROPERTY,MAT=BONES_P3,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=4.2321E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.1500E-001,&
PRESSURE=3.5649E+007,&
PRMX_LOG=-1.3686E+001,&
PRMY_LOG=-1.9686E+001,&
PRMZ_LOG=-1.3686E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!16 ...Set values BONE SPRING NO PAYproperties not in database,,
PROPERTY,MAT=BONES_NP,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=4.5756E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.4000E-001,&
PRESSURE=3.2436E+007,&
PRMX_LOG=-1.5750E+001,&
PRMY_LOG=-1.9750E+001,&
PRMZ_LOG=-1.5750E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!17 ...Set values LOWER BRUSHY CANYON Zone 1 properties not in database,,
PROPERTY,MAT=LBRSH_P1,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=4.9765E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=2.9247E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!18 ...Set values LOWER BRUSHY CANYON Zone 2 properties not in database,,
PROPERTY,MAT=LBRSH_P2,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=4.9765E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
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PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=2.9247E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!19 ...Set values LOWER BRUSHY CANYON Zone 3 properties not in database,,
PROPERTY,MAT=LBRSH_P3,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=4.9765E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=2.9247E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!20 ...Set values UPPER BRUSHY CANYON NO PAY properties not in database,,
PROPERTY,MAT=UBRSH_NP,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=5.4493E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.4000E-001,&
PRESSURE=2.6089E+007,&
PRMX_LOG=-1.6006E+001,&
PRMY_LOG=-1.9006E+001,&
PRMZ_LOG=-1.6006E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!21 ...Set values UPPER BRUSHY CANYON Zone 1 properties not in database,,
PROPERTY,MAT=UBRSH_P1,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=6.0195E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=2.2940E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!22 ...Set values UPPER BRUSHY CANYON Zone 2 properties not in database,,
PROPERTY,MAT=UBRSH_P2,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=6.0195E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=2.2940E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!23 ...Set values UPPER BRUSHY CANYON Zone 3 properties not in database,,
PROPERTY,MAT=UBRSH_P3,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=6.0195E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=2.2940E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!24 ...Set values LOWER BELL CANYON NO PAY properties not in database,,
PROPERTY,MAT=LBELL_NP,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=6.7673E-010,&
PC_MAX=1.0000E+008,&
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PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=1.4000E-001,&
PRESSURE=1.9615E+007,&
PRMX_LOG=-1.6006E+001,&
PRMY_LOG=-1.9006E+001,&
PRMZ_LOG=-1.6006E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!25 ...Set values UPPER BELL CANYON Zone 1 properties not in database,,
PROPERTY,MAT=UBELL_P1,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=7.9476E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=1.5640E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!26 ...Set values UPPER BELL CANYON Zone 2 properties not in database,,
PROPERTY,MAT=UBELL_P2,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=7.9476E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=1.5640E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!27 ...Set values UPPER BELL CANYON Zone 3 properties not in database,,
PROPERTY,MAT=UBELL_P3,NAME*VALUE: &
CAP_MOD=1.0000E+000,&
COMP_RCK=7.9476E-010,&
PC_MAX=1.0000E+008,&
PCT_A=0.0000E+000,&
PCT_EXP=0.0000E+000,&
KPT=0.0000E+000,&
PO_MIN=1.0132E+005,&
PORE_DIS=7.0000E-001,&
POROSITY=2.9000E-001,&
PRESSURE=1.5640E+007,&
PRMX_LOG=-1.2897E+001,&
PRMY_LOG=-1.9897E+001,&
PRMZ_LOG=-1.2897E+001,&
RELP_MOD=4.0000E+000,&
SAT_RBRN=2.0000E-001,&
SAT_RGAS=1.0000E-002
!28 ...Set values castiler properties not in database
! PERMEABILITIES FOR CASTILE NOT BRINE POCKET
PROPERTY,MAT=CASTILER,NAME*VALUE: &
PRMX_LOG=-1.8000E+001,&
PRMY_LOG=-1.9000E+001,&
PRMZ_LOG=-1.8000E+001,&
!
PROPERTY, MAT=CLAY_RUS, NAMES*VALUE: PO_MIN= 101325.0
PROPERTY, MAT=REFCON,   NAMES*VALUE: ASDRUM= 6.0
PROPERTY, MAT=REFCON,   NAMES*VALUE: DRROOM= 6804.0
!
!59 SURFACE BOREHOLE, ABANDONED PERMEABILITY
! property names
PROPERTY, MAT=BH_SUR_A, NAMES*VALUE: PRMY_MUL=2.041,&
                POROSITY=0,  PORE_DIS=0, SAT_RGAS=0,&
                SAT_RBRN=0,  COMP_RCK=0, CAP_MOD=0,&
                RELP_MOD=0,  PC_MAX=0,  PO_MIN=0,&
                PCT_A=0,     PCT_EXP=0,  KPT=0
!60 SURFACE BOREHOLE, LEAKING PERMEABILITY
! property names
PROPERTY, MAT=BH_SUR_L, NAMES*VALUE: PRMY_MUL=8.487E-01,&
                POROSITY=0,  PORE_DIS=0, SAT_RGAS=0,&
                SAT_RBRN=0,  COMP_RCK=0, CAP_MOD=0,&
                RELP_MOD=0,  PC_MAX=0,  PO_MIN=0,&
                PCT_A=0,     PCT_EXP=0,  KPT=0
!
!61 BOREHOLE THRU SALT, ABANDONED PERMEABILITY
! property names
PROPERTY, MAT=BH_SLT_A, NAMES*VALUE: PRMY_MUL=1.0,&
                POROSITY=0,  PORE_DIS=0, SAT_RGAS=0,&
                SAT_RBRN=0,  COMP_RCK=0, CAP_MOD=0,&
                RELP_MOD=0,  PC_MAX=0,  PO_MIN=0,&
                PCT_A=0,     PCT_EXP=0,  KPT=0
!62 BOREHOLE THRU SALT, LEAKING PERMEABILITY
! property names
PROPERTY, MAT=BH_SLT_L, NAMES*VALUE: PRMY_MUL=3.827E-01,&
                POROSITY=0,  PORE_DIS=0, SAT_RGAS=0,&
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                    SAT_RBRN=0,  COMP_RCK=0, CAP_MOD=0,&
                    RELP_MOD=0,  PC_MAX=0,  PO_MIN=0,&
                    PCT_A=0,     PCT_EXP=0, KPT=0
!
!63 DEEP UNITS BOREHOLE, ABANDONED PERMEABILITY
! property names
PROPERTY, MAT=BH_LOW_A, NAMES*VALUE: PRMY_MUL=2.399E-01,&
                    POROSITY=0,  PORE_DIS=0, SAT_RGAS=0,&
                    SAT_RBRN=0,  COMP_RCK=0, CAP_MOD=0,&
                    RELP_MOD=0,  PC_MAX=0,  PO_MIN=0,&
                    PCT_A=0,     PCT_EXP=0, KPT=0
!64 DEEP UNITS BOREHOLE, LEAKING PERMEABILITY
! property names
PROPERTY, MAT=BH_LOW_L, NAMES*VALUE: PRMY_MUL=1.050E-01,&
                    POROSITY=0,  PORE_DIS=0, SAT_RGAS=0,&
                    SAT_RBRN=0,  COMP_RCK=0, CAP_MOD=0,&
                    RELP_MOD=0,  PC_MAX=0,  PO_MIN=0,&
                    PCT_A=0,     PCT_EXP=0, KPT=0
!=================================================================
!
*END
```

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!==========================================================
!
! TITLE:  INITIAL CONDITIONS FOR BRAGFLO 1995 SIDEBAR CALCS - WATERFLOOD MODEL
! ANALYST: D. M. STOELZEL, SNL
! DATE:   AUG 15, 1995
!
!       AUG 23, 1995
!       CHANGED INITIAL BRINE SATURATIONS IN DEWEY LAKE FROM 0.20 TO 0.90
!       (SANTA ROSA INCLUDED IN THIS LAYER)
!
!       FEB 29.1996
!       NEW WATERFLOOD MESH (96X34 ELEMENTS). BASE01.INP FOR ALL DEEPER
!       UNITS SET TO 100% BRINE FOR INITIAL CONDITIONS
!==========================================================
!
*SET_NAMES
 INITIAL_NAMES TYPE=ELEMENT, NUM=4, NAMES=SATBREL, PRESEL, FECONC,&
                        CH2OCONC
!
*SET_VALUES
!Define start time = -5 years
 INITIAL_VALUE, TYPE=TIME, VALUE=-1.57785e8
!
!Define initial brine saturations: some regions will be changed below
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL,  IRANGE=1,97, JRANGE=1,35,&
          KRANGE=1,2,   VALUE=1.0
!
!Define initial Fe concentrations
 INITIAL_VALUE, TYPE=ELEMENT, NAME=FECONC,   IRANGE=1,97, JRANGE=1,35,&
          KRANGE=1,2,   VALUE=0.0
!
!Define initial CH2O concentrations
 INITIAL_VALUE, TYPE=ELEMENT, NAME=CH2OCONC, IRANGE=1,97, JRANGE=1,35,&
          KRANGE=1,2,   VALUE=0.0
!
!==========================================================
!Set initial brine saturations
!==========================================================
!
!Define initial waste brine saturation
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, MATERIAL=CAVITY_2,&
          VALUE=CAVITY_2:SAT_IBRN
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, MATERIAL=CAVITY_3,&
          VALUE=CAVITY_3:SAT_IBRN
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, MATERIAL=CAVITY_4,&
          VALUE=CAVITY_3:SAT_IBRN
!Define initial saturation in panel seal
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, IRANGE=43,44, JRANGE=27,31,&
          KRANGE=1,2,   VALUE=PAN_SEAL:SAT_IBRN
!Define initial saturation in Drift seal
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, IRANGE=51,52, JRANGE=27,31,&
          KRANGE=1,2,   VALUE=PAN_SEAL:SAT_IBRN
!Define initial saturation in shaft
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, IRANGE=56,57, JRANGE=29,32,&
          KRANGE=1,2,   VALUE=CL_L_T1:SAT_IBRN
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, IRANGE=56,57, JRANGE=32,33,&
          KRANGE=1,2,   VALUE=SALT_T1:SAT_IBRN
 INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, IRANGE=56,57, JRANGE=33,35,&
          KRANGE=1,2,   VALUE=CLAY_RUS:SAT_IBRN
!Define initial saturation in Morrow Pay regions 1,2,3. 90% gas sat assumed
! INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, IRANGE=1,97,  JRANGE=1,2,&
!          KRANGE=1,2,   VALUE=0.10
!Define initial saturation in Atoka Pay regions 1,2,3. 90% gas sat assumed
! INITIAL_VALUE, TYPE=ELEMENT, NAME=SATBREL, IRANGE=1,97,  JRANGE=3,4,&
!          KRANGE=1,2,   VALUE=0.10
!
*END
```

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1 !==========================================================================
2 !
3 !TITLE:  ALGEBRACDB INPUT FILE FOR....
4 !      BRAGFLO 1996 NMVP calculations
5 !
6 !ANAYLST: James E. Bean,  New Mexico Engineering Research Institute (NMERI)
7 !      Robert J. Mackinnon, Ecodynamics Research Associates Inc (ERAI)
8 !      David McArthur,  Sandia National Laboratory, Albuquerque
9 !
10 !CREATED: February 8-??,1996
11 !
12 !PURPOSE: ALGEBRA file computes properties that can not be obtained
13 !      from CAMDAT and/or assigns properties to element blocks.
14 !
15 !NOTE:   This input file is for the waste panel located down-dip or
16 !      south of the rest of the repository. Only the Salado formation
17 !      is dipping.
18 !
19 !      Different gas generation and salt seal treatment from the one
20 !      to be used in the CCA calculations.
21 !
22 !      FEB 29, 1996
23 !      THIS ALGEBRA FILE WAS ORIGIONALLY JEBEAN'S .INP FOR THE 1996 NMVP
24 !      CALCULATION.  CHANGES SPECIFIC TO THE WATERFLOOD MODEL, BASE01
25 !      WERE ADDED BY DM STOELZEL.  BASE01 REPRESENTS MEDIAN VALUES FOR UPPER
26 !      UNITS, AND MEDIAN GAS GEN PARAMS (NO CO2 SORPTION)
27 !
28 !            JUNE 14, 1996
29 !            CHANGES TO REFLECT NEW BHOLE PERMS
30 !==========================================================================
31 !**************************************************************************
32 !CHAPTER 0:  DEFINE NEW VARIABLE NAMES AND SOME NEEDED CONSTANTS
33 !**************************************************************************
34 !==========================================================================
35 !
36 ! ***VARIABLE DEFINITION
37 !   DIP1 ( IN DEGREES) =  ANGLE OF DIP FOR SALADO FORMATION
38 !   DIP2 ( IN DEGREES) =  ANGLE OF DIP FOR NON-SALADO FORMATIONS =
39 !   THETA1 AND THETA2 ARE IN RADIANS
40 !==========================================================================
41 ==
42 DIP1    = 1.0
43 DIP2    = 0.0
44 THETA1  = DIP1*2.0*PI[B:58]/360.0
45 THETA2  = DIP2*2.0*PI[B:58]/360.0
46 !==========================================================================
47 !**************************************************************************
48 !CHAPTER 1:  DEFINE AND COMPUTE HYDROLOGIC MATERIAL PROPERTIES
49 !**************************************************************************
50 !==========================================================================
51 !
52 !**************************************************************************
53 !BLOCK 29 = S_HALITE = SALADO HALITE
54 !**************************************************************************
55 !***COMMENTS: SAMPLED PARAMETERS ARE:
56 ! PRMX_LOG,  POROSITY,  SAT_RBRN,  SAT_RGAS,  RELP_MOD,  PORE_DIS
57 ! COMP_RCK
58 !**************************************************************************
59 LIMIT BLOCK 29
60 !SINCE PRMX_LOG IS SAMPLED ASSIGN PERM_Y AND PERM_Z
61 PERM_X  = 10**PRMX_LOG
62 PERM_Y  = 10**PRMX_LOG
63 PERM_Z  = 10**PRMX_LOG
64 SB_MIN  = 1.05*SAT_RBRN
65 POR_COMP = COMP_RCK/POROSITY
66 !
67 !**************************************************************************
68 !BLOCK 37 = DRZ_0 = DRZ FROM -5 YRS TO 0 YRS
69 !**************************************************************************
70 !***COMMENTS: SAMPLED PARAMETERS: NONE
71 !1)CORRELATE DRZ_0 POROSITY TO SAMPLED S_HALITE BY ADDING 0.0029
72 !**************************************************************************
73 LIMIT BLOCK 37
74 PERM_X  = 10**PRMX_LOG
75 PERM_Y  = 10**PRMY_LOG
76 PERM_Z  = 10**PRMZ_LOG
77 POROSITY = POROSITY[B:29] + 0.0029
78 PORE_DIS = PORE_DIS
79 RELP_MOD = RELP_MOD
80 SB_MIN  = 1.05*SAT_RBRN
81 POR_COMP = COMP_RCK/POROSITY
82 !
83 !**************************************************************************
84 !BLOCK 30 = S_MB139  = SALADO MARKER BED 139
85 !**************************************************************************
86 !***COMMENTS: SAMPLED PARAMETERS: SAT_RBRN, SAT_RGAS, PORE_DIS, AND
87 RELP_MOD
88 !**************************************************************************
89 LIMIT BLOCK 30
90 PERM_X  = 10**PRMX_LOG
91 PERM_Y  = 10**PRMY_LOG
92 PERM_Z  = 10**PRMZ_LOG
93 SB_MIN  = 1.05*SAT_RBRN
94 POR_COMP = COMP_RCK/POROSITY
95 PHIMAX  = POROSITY + DPHIMAX
96 !TEMP   = POROSITY AT FRACTURE INITIATION PRESSURE
97 !PI_DELTA = FRACTURE INITIATION PRESSURE - REFERENCE PRESSURE
98 TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
99 PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
100 !
101 !**************************************************************************
102 !BLOCK 31 = S_ANH_AB = SALADO ANHYDRITE LAYERS A + B
103 !        PLUS S_MB138  = SALADO MARKER BED 138
104 !**************************************************************************
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105!***COMMENTS: SAMPLED PARAMETERS: NONE
106!1) USE S_MB139 SAMPLED VALUES FOR:SAT_RBRN, SAT_RGAS, PORE_DIS, AND RELP_MOD
107!*********************************************************************
108!
109LIMIT BLOCK 31
110PERM_X  = 10**PRMX_LOG
111PERM_Y  = 10**PRMY_LOG
112PERM_Z  = 10**PRMZ_LOG
113RELP_MOD = RELP_MOD[B:30]
114PORE_DIS = PORE_DIS[B:30]
115SAT_RBRN = SAT_RBRN[B:30]
116SAT_RGAS = SAT_RGAS[B:30]
117SB_MIN  = 1.05*SAT_RBRN
118POR_COMP = COMP_RCK/POROSITY
119PHIMAX  = POROSITY + DPHIMAX
120!TEMP   = POROSITY AT FRACTURE INITIATION PRESSURE
121!PI_DELTA = FRACTURE INITIATION PRESSURE - REFERENCE PRESSURE
122TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
123PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
124!
125!*********************************************************************
126!BLOCK 34=CAVITY_2 = REST OF REPOSITORY WHERE WASTE WILL BE PLACED AT T= 0
127YEARS
128!BLOCK 35  = CAVITY_3 = EXPERIMENTAL REGION AND BACKFILLED REGION
129!BLOCK 36  = CAVITY_4 = SHAFT AND PANEL SEALS
130!*********************************************************************
131!***COMMENTS:
132!*****************
133LIMIT BLOCK 34 35 36
134PERM_X  = 10**PRMX_LOG
135PERM_Y  = 10**PRMY_LOG
136PERM_Z  = 10**PRMZ_LOG
137SB_MIN  = 1.05*SAT_RBRN
138POR_COMP = COMP_RCK/POROSITY
139!
140!*********************************************************************
141!BLOCK 33 = IMPERM_Z
142!*********************************************************************
143!***COMMENTS:
144!  INCLUDES THE RUSTLER, SANTA ROSA, DEWEY LAKE, AND CASTILE.
145!  USED TO CONTROL DRAINAGE OF FORMATIONS ABOVE THE SALADO INTO THE
146!  SHAFT PRIOR TO T=0 YEARS.  IT IS ALSO USED TO PREVENT BRINE POCKET
147!  FROM BECOMING DE-PRESSURIZED PRIOR TO DRILLING INTRUSION.
148!*********************************************************************
149LIMIT BLOCK 33
150PERM_X  = 10**PRMX_LOG
151PERM_Y  = 10**PRMY_LOG
152PERM_Z  = 10**PRMZ_LOG
153SB_MIN  = 1.05*SAT_RBRN
154POR_COMP = COMP_RCK/POROSITY
155!
156!*********************************************************************
157!BLOCK 28 = CASTILER = NO BRINE POCKET: PERMEABILITIES HAVE BEEN DECREASED
158!        IN MATSET
159!*********************************************************************
160!***COMMENTS:
161!*********************************************************************
162LIMIT BLOCK 28
163PERM_X  = 10**PRMX_LOG
164PERM_Y  = 10**PRMY_LOG
165PERM_Z  = 10**PRMZ_LOG
166SB_MIN  = 1.05*SAT_RBRN
167!THE COMPRESSIBILITY COMP_RCK IS LOG10(BULK COMPRESSIBILITY) (G. FREEZE)
168POR_COMP = (10**COMP_RCK)/POROSITY
169!ACOMPPRM = LOG(COMP_RCK*PERM_X)
170!COMP_RCK = (10**(ACOMPPRM))/PERM_X  *NOTE: HARDWIRE MEDIAN BRINE POCKET
171PERM
172!COMP_RCK = (10**(ACOMPPRM))/1.584892E-12
173!POR_COMP = COMP_RCK/POROSITY
174!
175!*********************************************************************
176!BLOCK 41 = WAS_AREA = WASTE MATERIAL
177!*********************************************************************
178!***COMMENTS: SAMPLED PARAMETERS ARE:
179!1) SAT_RBRN, SAT_RGAS, SAT_WICK
180!2) THE FOLLOWING GAS GENERATION PARAMETERS ARE PRESENTED IN TABLE 1.
181!  IN THE MEMO DATED 01/02/1996, FROM Y.WANG AND L BRUSH TO M. TIERNEY,
182!  SUBJECT: ESTIMATES OF GAS GENERATION PARAMETERS FOR THE LONG-TERM
183!  WIPP PERFORMANCE ASSESSMENT
184!
185!*********************************************************************
186LIMIT BLOCK 41
187!HYDROLOGIC PARAMETERS
188PERM_X  = 10**PRMX_LOG
189PERM_Y  = 10**PRMY_LOG
190PERM_Z  = 10**PRMZ_LOG
191SB_MIN  = 1.05*SAT_RBRN
192POR_COMP = COMP_RCK/POROSITY
193!*********************************************************************
194! GAS GENERATION DEFINITIONS
195! SAMPLED PARAMETERS:          GRATMICI, GRATMICII, PROBDEG,
196! ASSOCIATED SAMPLED PARAMETERS: CORRMCO2[B:56], CORRWCO2[B:56], FBETA[B:57]
197!
198! CORRMCO2[B:56]  =  INUNDATED STEEL CORROSION RATE [M/SEC] WITHOUT
199!              MICROBIAL GAS GENERATION
200! CORRWCO2[B:56]  =  INUNDATED STEEL CORROSION RATE [M/SEC] WITH
201!              MICROBIAL GAS GENERATION
202! GRATMICII[B:41]  =  RATE OF HUMID CELLULOSICS BIODEGRADATION [MOLE C/KG/SEC]
203! GRATMICI[B:41]  =  RATE OF INUNDATED CELLULOSICS BIODEGRADATION
204!              [MOLE C/KG/SEC]
205! FBETA[B:57]     =  SCALING FACTOR FOR THE AVERAGE STOICIOMETRIC FACTOR Y IN
206!              THE MICROBIAL REACTION
207! PROBDEG         =  FLAG TO INDICATE IF BIODEGRADATION IS ACTIVATED
208!              (0=NO,1=YES)
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!            PROBDEG = 0 => NO BIODEGRADATION
!            PROBDEG = 1 => BIODEGRADATION BUT NO PLASTICS AND RUBBERS
!            PROBDEG = 2 => BIODEGRADATION WITH PLASTICS AND RUBBERS
!                   INCLUDED
!            PROBDEG IS A SAMPLED PARAMETER DEFINED SUCH THAT
!            IT'S VALUE IS  0  50% OF THE TIME,
!                           1  25% OF THE TIME,
!                           2  25% OF THE TIME.
!*********************************************************************
!*********************************************************************
! STOICOR = IRON-CORROSION STOCHIOMETRIC FACTOR (Y.WANG MEMO)
 STOICOR = MAKEPROP(STOIFX[B:56])
!
! CORROSION STOCHIOMETRIC FACTOR FOR H2 PRODUCTION=SCOR_H2=S(1,1)
! SELL LINE 9.8 IN THE BRAGFLO INPUT MANUAL
 SCOR_H2 =  MAKEPROP((4 - STOICOR)/3)
!
! CORROSION STOCHIOMETRIC FACTOR FOR H2O CONSUMPTION=SCOR_H2O=S(1,2)
 SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
!
! CORROSION STOCHIOMETRIC FACTOR FOR FE CONSUMPTION=SCOR_FE=S(1,3)
 SCOR_FE = MAKEPROP(1.0)
!
! HUMID STEEL CORROSION RATES (KCGSH) ARE ZERO
! HUMCORR = HUMID STEEL CORROSION RATE
!
!*********************************************************************
! THE FOLLOWING INVENTORY PARAMETERS ARE OBTAINED FROM THE DATA BASE
! **REMOTE HANDLED WASTE
! DIRONRHW =    100  KG/M**3
! DIRNCRHW =   2591  KG/M**3
! DCELLRHW =    17   KG/M**3
! DRUBBRHW =    3.3  KG/M**3
! DPLASRHW =    15   KG/M**3
! DPLSCRHW =    3.1  KG/M**3
! VOLRHW   =   7080 M**3
!
! **CONTACT HANDLED WASTE
! DIRONCHW =    170  KG/M**3
! DIRNCCHW =    139  KG/M**3
! DCELLCHW =    54   KG/M**3
! DRUBBCHW =    10   KG/M**3
! DPLASCHW =    34   KG/M**3
! DPLSCCHW =    26   KG/M**3
! VOLCHW   =   1.69E5 M**3
!
!*****************************************************************
! COMPUTE AVERAGE DENSITIES
!
! DRH_METL =    AVERAGE DENSITY OF RH METALS
! DRH_BIO  =    AVERAGE DENSITY OF RH BIO
! DCELLRHW =    AVERAGE DENSITY OF RH CELL
! DCH_METL =    AVERAGE DENSITY OF CH METALS
! DCH_BIO  =    AVERAGE DENSITY OF CH BIO
! DCELLCHW =    AVERAGE DENSITY OF CH CELLULOSE
! DRH_RUPL =    AVERAGE DENSITY OF RH RUBBERS AND PLASTICS
! DCH_RUPL =    AVERAGE DENSITY OF CH RUBBERS AND PLASTICS
!
 DRH_METL =    DIRONRHW + DIRNCRHW
 DRH_RUPL =    DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
 DRH_BIO  =    DCELLRHW + DRH_RUPL
 DCH_METL =    DIRONCHW + DIRNCCHW
 DCH_RUPL =    DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
 DCH_BIO  =    DCELLCHW + DCH_RUPL
!
!*********************************************************************
!
! VPANLEX =    VOLUME OF EXCAVATED PANEL    = 46097.65 M**3
! VROOM   =    VOLUME OF EXCAVATED ROOM     = 3644.4 M**3
! VREPOS  =    VOLUME OF WASTE STORAGE AREA  = 436023 M**3
! DRROOM  =    NUMBER OF DRUMS PER ROOM     = 6804
!
!*********************************************************************
!
! BIOIDX  = 1 ===> MICROBIAL GAS GENERATION = YES
!         = 0 ===> MICROBIAL GAS GENERATION = NO
! IF BIOIDX = 1, THEN
!   PLASIDX = 1 ===> DEGRADATION OF RUBBERS, PLASTICS, AND CELLULOSICS
!           = 0 ===> DEGRADATION OF CELLULOSE ONLY
!*********************************************************************
!
! TOTAL MASS OF CORRODIBLE METAL
 WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
!
! TOTAL MASS OF CELLULOSICS ONLY
 WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
!
! TOTAL MASS OF RUBBER AND PLASTICS
 WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
!
! TOTAL MASS OF BIODEGRADABLE MATERIAL
! IF PROBDEG > 0,  NOZERO BIODEGRADATION REACTION RATES (BIOIDX = 1)
! IF PROBDEG = 2,  ADD IN PLASTICS AND RUBBERS (PLASIDX = 1)
 PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
 BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
!
!ALTERNATE FORM FOR SETTING PLASIDX AND BIOIDX IF DISTRIBUTION IS DIFFERENT
! BIOIDX  = MAKEPROP(0)
! PLASIDX = MAKEPROP(0)
! BIOIDX  = IFGT0(PROBDEG - 0.50, 1,BIOIDX)
! PLASIDX = IFGT0(PROBDEG - 0.50, 1,PLASIDX)
! PLASIDX = IFGT0(PROBDEG - 0.75, 2,PLASIDX)
!
```

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13  WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
14!
15! INITIAL FE CONCENTRATION = CONCFE
16! (APPEARS IN THE BRAGFLO INPUT INITIAL CONDITIONS (SEE LINE 5.6
17! IN THE BRAGFLO INPUT MANUAL))
18!
19  CONCFE  =  WTFETOT/VREPOS[B:58]
20!
21! INITIAL BIODEGRADABLE MATERIAL CONCENTRATION = CONCBIO
22! (APPEARS IN THE BRAGFLO INPUT INITIAL CONDITIONS (SEE LINE 5.8
23! IN THE BRAGFLO INPUT MANUAL))
24!
25  CONCBIO  =  WTBIOTOT/VREPOS[B:58]
26!
27! INITIAL CELLULOSICS CONCENTRATION = CONCCEL
28!
29  CH20CONC   =  WTCELTOT/VREPOS[B:58]
30!
31!*************************************************************************
32!*************************************************************************
33! THE FOLLOWING CALCULATIONS DETERMINE THE AVERAGE STOCHIOMETRIC
34! COEFFICIENT IN THE BIODEGRADATION REACTION
35!
36! DRUMVOL  =  NO OF DRUMS PER UNIT VOL OF WASTE STORAGE
37! DRPANEL  =  NO OF DRUMS PER PANEL
38! DRUMTOT  =  NUMBER OF DRUMS IN REPOSITORY
39
40  DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
41  DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
42  DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
43!
44! CALCULATE THE MAXIMUM QUANTITIES (IN MOLES) OF CELLULOSICS AND STEEL
45! THAT WILL BE POTENTIALLY CONSUMED IN 10000 YEARS
46! (SEE EQUATIONS 12 AND 13 IN THE Y. WANG MEMO)
47! CONVERT FROM DATABASE UNITS OF MOLES C/(KG-SEC) TO MOLES C/(KG-YR)
48!*************************************************************************
49! 6       = 6 MOLES OF C/MOLE OF CELLULOSE C6-H10-O5
50! 1000    = 1000 GRAMS/KG
51! WTBIOTOT  = KG
52! 162     = MW OF CELLULOSE C6-H10-O5
53  A1      =  6*1000*WTBIOTOT/162
54! 10000   = YEARS
55! GRATMIC1  = MOLES C/KG-SEC
56! YRSEC    = 3.15569E7 SEC/YR
57  A2      =  10000*GRATMIC1*YRSEC[B:58]*WTBIOTOT
58  MAX_CELL  =  MIN(A1,A2)
59!*************************************************************************
60! 10000   = GRAMS/KG
61! WTFETOT  =  KG
62! 56      =  MW OF FE
63  B1      =  1000*WTFETOT/56
64!*************************************************************************
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365! 1410    = 10000 YRS* 0.141MOLES/MICROMETER/M**2
366! CORRWCO2 =  M/SEC
367! 1000000  =  MICROMETERS/M
368! YRSEC    =  3.15569E7 YEARS/SEC
369! ASDRUM   =  M**2 STEEL/DRUM
370! DRUMTOT  =  DRUMS/REPOSITORY
371! B2      =  MOLES
372  B2      =  1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
373  MAX_FE  =  MIN(B1,B2)
374!*************************************************************************
375!
376! CALCULATE THE MAXIMUM VALUE OF THE AVERAGE STOCHIOMETRIC COEFFICIENT
377! Y IN THE BIODEGRADATION REACTION (SEE EQUATION 15 IN THE y. WANG MEMO)
378  MOL_NO3  = QINIT[B:55]
379  MOL_SO4  = QINIT[B:54]
380! EQUATION 15 IS NEXT
381  NUM1 = MAKEPROP(8.4*MOL_NO3/4.8)
382  NUM2 = MAKEPROP(9*MOL_SO4/3)
383  NUM3 = MAX_CELL - 6*MOL_NO3/4.8 - 6*MOL_SO4/3
384  YMAX = (NUM1+NUM2+NUM3)/MAX_CELL
385!
386! CALCULATE THE MINIMUM VALUE OF Y (SEE EQUATIONS 16 AND 17)
387  C1    =  6*MOL_NO3/4.8 + NUM2 + 0.5*NUM3
388  C2    =  MAX_FE
389  G     =  MIN(C1,C2)
390  YMIN  =  YMAX - G/MAX_CELL
391!
392! THE VALUE OF Y (STOIMIC) IS (EQUATION 18)
393  STOIMIC  =  YMIN + FBETA[B:57]*(YMAX - YMIN)
394!
395! SBIO_H2 = S(2,1), SEE LINE 9.10 IN BRAGFLO INPUT MANUAL
396! SBIO_H2 = STOIMIC
397!
398! BIODEGRADATION STOICHIOMETRIC FACTOR FOR H20 CONSUMPTION
399! SBIO_H2O = S(2,2) = 0
400!
401! BIODEGRADATION STOICHIOMETRIC FACTOR FOR CELLULOSIC CONSUMPTION
402! SBIO_CH2O = S(2,3) = 1
403!
404! DETERMINE THE INUNDATED STEEL CORROSION RATE
405  KCGSI =  CORRWCO2[B:56]*BIOIDX + CORRMCO2[B:56]*(1 - BIOIDX)
406!
407! CONVERT REACTION RATES TO GAS GENERATION RATES REQUIRED BY PREBRAG
408!
409! CONVERT THE UNITS OF KCGSI FROM M/SEC TO MOLE-FE/M3-S
410! KCGSI  =  KCGSI(M/SEC)*0.141 (MOLE-FE/MICRON-M2)*6(M2/DRUM)
411!        *100000 MICRONS/M* (6804 DRUMS/3644.4 M3)
412  KCGSI  =  MAKEPROP(KCGSI*0.141*1000000*ASDRUM[B:58]* &
413          DRROOM[B:58]/VROOM[B:58])
414!
415! CONVERT THE UNITS OF HUMCORR (= KCGSII) FROM M/SEC TO MOLE-FE/M3-S
416  KCGSII  =  MAKEPROP(HUMCORR[B:56]*0.141*1000000*ASDRUM[B:58]* &
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417        DRROOM[B:58]/VROOM[B:58])
418!
419! COMPUTE THE INUNDATED GAS (H2) PRODUCTION RATE FROM THE REACTION RATE
420  GRATCORI  = MAKEPROP(KCGSI*VPANLEX[B:58]*SCOR_H2/ASDRUM[B:58]/DRPANEL)
421!
422! COMPUTE THE HUMID GAS (H2) PRODUCTION RATE FROM THE REACTION RATE
423  GRATCORH  = MAKEPROP(KCGSH*VPANLEX[B:58]*SCOR_H2/ASDRUM[B:58]/DRPANEL)
424!
425! CONVERT THE UNITS OF THE INUNDATED BIODEGRADATION RATE GRATMICI
426! GRATMICI  = GRATMICI(MOLE-C/KG/SEC)*(KG-CELL/M3)
427  KBGSI    = GRATMICI*CONCBIO
428!
429! COMPUTE THE INUNDATED GAS (CO2) PRODUCTION RATE FROM THE REACTION RATE
430  GRATMICI  = KBGSI*STOIMIC/CONCBIO
431!
432! CONVERT THE UNITS OF THE HUMID BIODEGRADATION RATE GRATMICH
433! GRATMICH  = GRATMICH(MOLE-C/KG/SEC)
434  KBGSH    = GRATMICH*CONCBIO
435!
436! NOW CONVERT KBGSH TO THE GAS GENERATION RATE REQUIRED BY PREBRAG
437  GRATMICH  = KBGSH*STOIMIC/CONCBIO
438!
439! COMPUTE RATIO OF HUMID TO INUNDATED (STORE IN HUMID)
440! FOR INPUT TO PREBRAG
441  GRATMICH  = GRATMICH/GRATMICI
442  GRATCORH  = GRATCORH/GRATCORI
443!
444!*********************************************************************
445!BLOCK 32  UNNAMED MEMBER OF RUSTLER
446!*********************************************************************
447!***COMMENTS:
448!*********************************************************************
449LIMIT BLOCK 32
450PERM_X  = 10**PRMX_LOG
451PERM_Y  = 10**PRMY_LOG
452PERM_Z  = 10**PRMZ_LOG
453SB_MIN  = 1.05*SAT_RBRN
454POR_COMP = COMP_RCK/POROSITY
455!
456!*********************************************************************
457!BLOCK 40  CULEBRA MEMBER OF RUSTLER
458!*********************************************************************
459!***COMMENTS:
460!*********************************************************************
461LIMIT BLOCK 40
462PERM_X  = 10**PRMX_LOG
463PERM_Y  = 10**PRMY_LOG
464PERM_Z  = 10**PRMZ_LOG
465SB_MIN  = 1.05*SAT_RBRN
466POR_COMP = COMP_RCK/POROSITY
467!
468!*********************************************************************
469!
470!*********************************************************************
471!BLOCK 42  OPERATIONS REGION
472!BLOCK 43  EXPERIMENTAL REGION
473!*********************************************************************
474!***COMMENTS:
475!  Operations and experimental region have same properties
476!*********************************************************************
477LIMIT BLOCK 42 43
478PERM_X  = 10**PRMX_LOG
479PERM_Y  = 10**PRMY_LOG
480PERM_Z  = 10**PRMZ_LOG
481SB_MIN  = 1.05*SAT_RBRN
482POR_COMP = COMP_RCK/POROSITY
483!
484!*********************************************************************
485!BLOCK 45 CLAY_RUS
486!*********************************************************************
487!***COMMENTS:
488!  Clay shaft fill used in the Rustler formation:
489!  Constant properties from 0 to 10000 years
490!*********************************************************************
491LIMIT BLOCK 45
492!*************************************
493PERM_X  = 10**PRMX_LOG
494PERM_Y  = 10**PRMY_LOG
495PERM_Z  = 10**PRMZ_LOG
496SB_MIN  = 1.05*SAT_RBRN
497!POR_COMP = COMP_RCK/POROSITY
498POR_COMP = COMP_RCK
499!
500!*********************************************************************
501!BLOCK 46  CL_L_T1
502!*********************************************************************
503!***COMMENTS:
504!  Clay shaft material
505!  Time period 1: 0 to 10 years
506!*********************************************************************
507LIMIT BLOCK 46
508PX_SALT  = MAKEPROP(PERM_X[B:29])
509AKIS1    = 10**PRMX_LOG
510!*************************************************************************
511! CALCULATE AREA OF THE FOUR SHAFTS:
512AAS1   = PI[B:58]*RSH_AIR**2
513ASS2   = PI[B:58]*RSH_SAL**2
514AWS3   = PI[B:58]*RSH_WAS**2
515AES4   = PI[B:58]*RSH_EXH**2
516AST    = AAS1 + ASS2 + AWS3 + AES4
517!*************************************
518! CALCULATE DRZ AREAS FOR EACH SHAFT:
519RDF    = RADN_DRZ**2 - 1.0
520AAD1   = PI[B:58]*RDF*RSH_AIR**2
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521 ASD2  = PI[B:58]*RDF*RSH_SAL**2
522 AWD3  = PI[B:58]*RDF*RSH_WAS**2
523 AED4  = PI[B:58]*RDF*RSH_EXH**2
524 !*************************************
525 ! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
526 !
527 ADR   = (RADN_DRZ - 1)*RSH_AIR
528 ANUM1  = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
529 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
530 ATRM1   = ANUM1/DEN*PX_SALT
531 ANUM2  = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
532 ATRM2   = ANUM2/DEN*AKIS1
533 AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
534 !*************************************
535 ! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
536 !
537 SDR   = (RADN_DRZ - 1)*RSH_SAL
538 SNUM1  = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
539 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
540 STRM1   = SNUM1/DEN*PX_SALT
541 SNUM2  = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
542 STRM2   = SNUM2/DEN*AKIS1
543 SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
544 !*************************************
545 ! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
546 !
547 WDR   = (RADN_DRZ - 1)*RSH_WAS
548 WNUM1  = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
549 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
550 WTRM1   = WNUM1/DEN*PX_SALT
551 WNUM2  = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
552 WTRM2   = WNUM2/DEN*AKIS1
553 WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
554 !*************************************
555 ! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
556 !
557 EDR   = (RADN_DRZ - 1)*RSH_EXH
558 ENUM1  = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
559 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
560 ETRM1   = ENUM1/DEN*PX_SALT
561 ENUM2  = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
562 ETRM2   = ENUM2/DEN*AKIS1
563 EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
564 !*************************************
565 ! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
566 KDAD   = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
567 ! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
568 !  PERMEABILITY (EQ. 3):
569 KMOD   = (AKIS1*AST + KDAD)/AST
570 !*************************************************************************
571 PERM_Y  = KMOD
572 PERM_X  = PERM_Y
573 PERM_Z  = PERM_Y
574 SB_MIN  = 1.05*SAT_RBRN
575 !POR_COMP = COMP_RCK/POROSITY
576 POR_COMP = COMP_RCK
577 !
578 !*************************************************************************
579 !BLOCK 47  CL_L_T4
580 !*************************************************************************
581 !***COMMENTS:
582 !  Clay shaft material
583 !  Time period 4: 50 to 10000 years
584 !*************************************************************************
585 LIMIT BLOCK 47
586 PX_SALT  = MAKEPROP(PERM_X[B:29])
587 AKIS1   = 10**PRMX_LOG
588 !*************************************************************************
589 ! CALCULATE AREA OF THE FOUR SHAFTS:
590 AAS1   = PI[B:58]*RSH_AIR**2
591 ASS2   = PI[B:58]*RSH_SAL**2
592 AWS3   = PI[B:58]*RSH_WAS**2
593 AES4   = PI[B:58]*RSH_EXH**2
594 AST   = AAS1 + ASS2 + AWS3 + AES4
595 !*************************************
596 ! CALCULATE DRZ AREAS FOR EACH SHAFT:
597 RDF   = RADN_DRZ**2 - 1.0
598 AAD1   = PI[B:58]*RDF*RSH_AIR**2
599 ASD2   = PI[B:58]*RDF*RSH_SAL**2
600 AWD3   = PI[B:58]*RDF*RSH_WAS**2
601 AED4   = PI[B:58]*RDF*RSH_EXH**2
602 !*************************************
603 ! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
604 !
605 ADR   = (RADN_DRZ - 1)*RSH_AIR
606 ANUM1  = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
607 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
608 ATRM1   = ANUM1/DEN*PX_SALT
609 ANUM2  = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
610 ATRM2   = ANUM2/DEN*AKIS1
611 AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
612 !*************************************
613 ! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
614 !
615 SDR   = (RADN_DRZ - 1)*RSH_SAL
616 SNUM1  = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
617 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
618 STRM1   = SNUM1/DEN*PX_SALT
619 SNUM2  = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
620 STRM2   = SNUM2/DEN*AKIS1
621 SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
622 !*************************************
623 ! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
624 !
```

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625 WDR   = (RADN_DRZ - 1)*RSH_WAS
626 WNUM1   = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
627 DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
628 WTRM1    = WNUM1/DEN*PX_SALT
629 WNUM2   = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
630 WTRM2    = WNUM2/DEN*AKIS1
631 WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
632 !*************************************
633 ! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
634 !
635 EDR   = (RADN_DRZ - 1)*RSH_EXH
636 ENUM1   = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
637 DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
638 ETRM1    = ENUM1/DEN*PX_SALT
639 ENUM2   = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
640 ETRM2    = ENUM2/DEN*AKIS1
641 EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
642 !*************************************
643 ! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
644 KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
645 ! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
646 !  PERMEABILITY (EQ. 3):
647 KMOD    = (AKIS1*AST + KDAD)/AST
648 !*****************************************************************************
649 PERM_Y = KMOD
650 PERM_X = PERM_Y
651 PERM_Z = PERM_Y
652 SB_MIN   = 1.05*SAT_RBRN
653 !POR_COMP = COMP_RCK/POROSITY
654 POR_COMP = COMP_RCK
655 !
656 !*****************************************************************************
657 !BLOCK 48  SALT_T1
658 !*****************************************************************************
659 !***COMMENTS:
660 !  Crushed salt shaft material
661 !  Time period 1: 0 to 10 years
662 !*****************************************************************************
663 LIMIT BLOCK 48
664 PX_SALT = MAKEPROP(PERM_X[B:29])
665 !*****************************************************************************
666 ! CALCULATE AREA OF THE FOUR SHAFTS:
667 AAS1   = PI[B:58]*RSH_AIR**2
668 ASS2   = PI[B:58]*RSH_SAL**2
669 AWS3   = PI[B:58]*RSH_WAS**2
670 AES4   = PI[B:58]*RSH_EXH**2
671 AST    = AAS1 + ASS2 + AWS3 + AES4
672 !*************************************
673 ! CALCULATE DRZ AREAS FOR EACH SHAFT:
674 RDF    = RADN_DRZ**2 - 1.0
675 AAD1   = PI[B:58]*RDF*RSH_AIR**2
676 ASD2   = PI[B:58]*RDF*RSH_SAL**2
677 AWD3   = PI[B:58]*RDF*RSH_WAS**2
678 AED4   = PI[B:58]*RDF*RSH_EXH**2
679 !*************************************
680 !*************************************
681 ! AKIS1   = MODE OF DISTRIBUTION
682 A      = PMLT_LO
683 B      = PMLT_MD
684 C      = PMLT_HI
685 AKIS1   = 10**B
686 !*************************************
687 ! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
688 !
689 ADR    = (RADN_DRZ - 1)*RSH_AIR
690 ANUM1   = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
691 DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
692 ATRM1    = ANUM1/DEN*PX_SALT
693 ANUM2   = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
694 ATRM2    = ANUM2/DEN*AKIS1
695 AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
696 !*************************************
697 ! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
698 !
699 SDR    = (RADN_DRZ - 1)*RSH_SAL
700 SNUM1   = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
701 DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
702 STRM1    = SNUM1/DEN*PX_SALT
703 SNUM2   = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
704 STRM2    = SNUM2/DEN*AKIS1
705 SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
706 !*************************************
707 ! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
708 !
709 WDR    = (RADN_DRZ - 1)*RSH_WAS
710 WNUM1   = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
711 DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
712 WTRM1    = WNUM1/DEN*PX_SALT
713 WNUM2   = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
714 WTRM2    = WNUM2/DEN*AKIS1
715 WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
716 !*************************************
717 ! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
718 !
719 EDR    = (RADN_DRZ - 1)*RSH_EXH
720 ENUM1   = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
721 DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
722 ETRM1    = ENUM1/DEN*PX_SALT
723 ENUM2   = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
724 ETRM2    = ENUM2/DEN*AKIS1
725 EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
726 !*************************************
727 ! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
728 KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
```

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! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
!  PERMEABILITY (EQ. 3):
KMOD    = (AKIS1*AST + KDAD)/AST
!*****************************************************************************
PERM_Y = KMOD
PERM_X = PERM_Y
PERM_Z = PERM_Y
SB_MIN  = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!*****************************************************************************
!BLOCK 49  SALT_T4
!*****************************************************************************
!***COMMENTS:
!  Crushed salt shaft material
!  Time period 4: 50 to 100 years
!*****************************************************************************
LIMIT BLOCK 49
PX_SALT  = MAKEPROP(PERM_X[B:29])
! CALCULATE AREA OF THE FOUR SHAFTS:
AAS1   = PI[B:58]*RSH_AIR**2
ASS2   = PI[B:58]*RSH_SAL**2
AWS3   = PI[B:58]*RSH_WAS**2
AES4   = PI[B:58]*RSH_EXH**2
AST    = AAS1 + ASS2 + AWS3 + AES4
!****************************************
! CALCULATE DRZ AREAS FOR EACH SHAFT:
RDF    = RADN_DRZ**2 - 1.0
AAD1   = PI[B:58]*RDF*RSH_AIR**2
ASD2   = PI[B:58]*RDF*RSH_SAL**2
AWD3   = PI[B:58]*RDF*RSH_WAS**2
AED4   = PI[B:58]*RDF*RSH_EXH**2
!****************************************
!****************************************
! AKIS1   = MODE OF THE DISTRIBUTION
A       = PMLT_LO
B       = PMLT_MD
C       = PMLT_HI
AKIS1   = 10**B
!****************************************
! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
!
ADR    = (RADN_DRZ - 1)*RSH_AIR
ANUM1   = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
ATRM1    = ANUM1/DEN*PX_SALT
ANUM2   = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
ATRM2    = ANUM2/DEN*AKIS1
AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
!****************************************
! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
!
SDR    = (RADN_DRZ - 1)*RSH_SAL
SNUM1   = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
STRM1    = SNUM1/DEN*PX_SALT
SNUM2   = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
STRM2    = SNUM2/DEN*AKIS1
SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
!****************************************
! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
!
WDR    = (RADN_DRZ - 1)*RSH_WAS
WNUM1   = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
WTRM1    = WNUM1/DEN*PX_SALT
WNUM2   = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
WTRM2    = WNUM2/DEN*AKIS1
WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
!****************************************
! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
!
EDR    = (RADN_DRZ - 1)*RSH_EXH
ENUM1   = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
ETRM1    = ENUM1/DEN*PX_SALT
ENUM2   = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
ETRM2    = ENUM2/DEN*AKIS1
EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
!****************************************
! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
!  PERMEABILITY (EQ. 3):
KMOD    = (AKIS1*AST + KDAD)/AST
!*****************************************************************************
PERM_Y = KMOD
PERM_X = PERM_Y
PERM_Z = PERM_Y
SB_MIN  = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!*****************************************************************************
!BLOCK 50  SALT_T5
!*****************************************************************************
!***COMMENTS:
!  Crushed salt shaft material
!  Time period 5: 100 to 200 years
!*****************************************************************************
LIMIT BLOCK 50
PX_SALT  = MAKEPROP(PERM_X[B:29])
! CALCULATE AREA OF THE FOUR SHAFTS:
```

```
833 AAS1   = PI[B:58]*RSH_AIR**2
834 ASS2   = PI[B:58]*RSH_SAL**2
835 AWS3   = PI[B:58]*RSH_WAS**2
836 AES4   = PI[B:58]*RSH_EXH**2
837 AST    = AAS1 + ASS2 + AWS3 + AES4
838 !*************************************
839 ! CALCULATE DRZ AREAS FOR EACH SHAFT:
840 RDF    = RADN_DRZ**2 - 1.0
841 AAD1   = PI[B:58]*RDF*RSH_AIR**2
842 ASD2   = PI[B:58]*RDF*RSH_SAL**2
843 AWD3   = PI[B:58]*RDF*RSH_WAS**2
844 AED4   = PI[B:58]*RDF*RSH_EXH**2
845 !*************************************
846 !*************************************
847 ! AKIS1   = MODE OF THE DISTRIBUTION
848 A      = PMLT_LO
849 B      = PMLT_MD
850 C      = PMLT_HI
851 AKIS1   = 10**B
852 !*************************************
853 ! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
854 !
855 ADR    = (RADN_DRZ - 1)*RSH_AIR
856 ANUM1   = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
857 DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
858 ATRM1    = ANUM1/DEN*PX_SALT
859 ANUM2   = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
860 ATRM2    = ANUM2/DEN*AKIS1
861 AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
862 !*************************************
863 ! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
864 !
865 SDR    = (RADN_DRZ - 1)*RSH_SAL
866 SNUM1   = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
867 DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
868 STRM1    = SNUM1/DEN*PX_SALT
869 SNUM2   = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
870 STRM2    = SNUM2/DEN*AKIS1
871 SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
872 !*************************************
873 ! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
874 !
875 WDR    = (RADN_DRZ - 1)*RSH_WAS
876 WNUM1   = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
877 DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
878 WTRM1    = WNUM1/DEN*PX_SALT
879 WNUM2   = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
880 WTRM2    = WNUM2/DEN*AKIS1
881 WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
882 !*************************************
883 ! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
884 !
885 EDR    = (RADN_DRZ - 1)*RSH_EXH
886 ENUM1   = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
887 DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
888 ETRM1    = ENUM1/DEN*PX_SALT
889 ENUM2   = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
890 ETRM2    = ENUM2/DEN*AKIS1
891 EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
892 !*************************************
893 ! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
894 KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
895 ! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
896 !  PERMEABILITY (EQ. 3):
897 KMOD    = (AKIS1*AST + KDAD)/AST
898 !*****************************************************************************
899 PERM_Y  = KMOD
900 PERM_X  = PERM_Y
901 PERM_Z  = PERM_Y
902 SB_MIN  = 1.05*SAT_RBRN
903 !POR_COMP = COMP_RCK/POROSITY
904 POR_COMP = COMP_RCK
905 !
906 !*****************************************************************************
907 !BLOCK 51  SALT_T6
908 !*****************************************************************************
909 !***COMMENTS:
910 !  Crushed salt shaft material
911 !  Time period 6: 200 to 10000 years
912 !*****************************************************************************
913 LIMIT BLOCK 51
914 PX_SALT  = MAKEPROP(PERM_X[B:29])
915 ! CALCULATE AREA OF THE FOUR SHAFTS:
916 AAS1   = PI[B:58]*RSH_AIR**2
917 ASS2   = PI[B:58]*RSH_SAL**2
918 AWS3   = PI[B:58]*RSH_WAS**2
919 AES4   = PI[B:58]*RSH_EXH**2
920 AST    = AAS1 + ASS2 + AWS3 + AES4
921 !*************************************
922 ! CALCULATE DRZ AREAS FOR EACH SHAFT:
923 RDF    = RADN_DRZ**2 - 1.0
924 AAD1   = PI[B:58]*RDF*RSH_AIR**2
925 ASD2   = PI[B:58]*RDF*RSH_SAL**2
926 AWD3   = PI[B:58]*RDF*RSH_WAS**2
927 AED4   = PI[B:58]*RDF*RSH_EXH**2
928 !*************************************
929 !*************************************
930 ! AKIS1   = MODE OF THE DISTRIBUTION
931 A      = PMLT_LO
932 B      = PMLT_MD
933 C      = PMLT_HI
934 AKIS1   = 10**B
935 !*************************************
936 ! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
```

```
!
ADR   = (RADN_DRZ - 1)*RSH_AIR
ANUM1  = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
ATRM1    = ANUM1/DEN*PX_SALT
ANUM2  = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
ATRM2    = ANUM2/DEN*AKIS1
AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
!
SDR   = (RADN_DRZ - 1)*RSH_SAL
SNUM1  = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
STRM1    = SNUM1/DEN*PX_SALT
SNUM2  = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
STRM2    = SNUM2/DEN*AKIS1
SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
!
WDR   = (RADN_DRZ - 1)*RSH_WAS
WNUM1  = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
WTRM1    = WNUM1/DEN*PX_SALT
WNUM2  = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
WTRM2    = WNUM2/DEN*AKIS1
WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
!
EDR   = (RADN_DRZ - 1)*RSH_EXH
ENUM1  = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
ETRM1    = ENUM1/DEN*PX_SALT
ENUM2  = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
ETRM2    = ENUM2/DEN*AKIS1
EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
!*************************************
! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
!  PERMEABILITY (EQ. 3):
KMOD    = (AKIS1*AST + KDAD)/AST
!*************************************************************************
PERM_Y  = KMOD
PERM_X  = PERM_Y
PERM_Z  = PERM_Y
SB_MIN  = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!
!*************************************************************************
!BLOCK 44  PAN_SEAL  = PANEL and DRIFT Seals
!*************************************************************************
!***COMMENTS:
!*************************************************************************
LIMIT BLOCK 44
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
SB_MIN  = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!*************************************************************************
!BLOCK 39  DRZ_I  = DRZ
!*************************************************************************
!***COMMENTS:
!  Time period 2 (0 - 10000 years)
!*************************************************************************
LIMIT BLOCK 39
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
POROSITY = POROSITY[B:29] + 0.0029
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!*************************************************************************
!  DEFINE PROPERTIES FOR DEEPER UNITS (BELL CAN. TO MORROW)
!********************
!***COMMENTS: COMP_RCK IS ALREADY PORE COMPRESSIBILITY. USE SAME CAP
!          PRESSURE - REL PERM PARAMETERS AS CULEBRA. PERM_Y IS 100X
!          SMALLER THAN PERM_X TO KEEP FLUIDS IN-ZONE. (FOR NON-PAY REGIONS)
!*************************************************************************
LIMIT BLOCK 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 &
        24 25 26 27
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = PERM_X
CAP_MOD  = CAP_MOD[ID:40]
PCT_EXP  = PCT_EXP[ID:40]
PCT_A    = PCT_A[ID:40]
KPT      = KPT[ID:40]
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK
!*************************************************************************
!BLOCK 38,65,66,67,68  BOREHOLE, CONC_PLG, BH_OPEN, BH_SAND, BH_CREEP
!*************************************************************************
!***COMMENTS: VALUES READ IN FROM DATABASE
!*************************************************************************
LIMIT BLOCK 38 65 66 67 68
```

```
1041! BL 38 (BOREHOLE) PROPERTIES WILL NO LONGER BE USED (BH_SAND INSTEAD),
1042! BUT WILL BE KEPT IN TO MINIMIZE CHANGES TO MATSET 6/14/96
1043PERM_X  = 10**PRMX_LOG
1044PERM_Y  = 10**PRMY_LOG
1045PERM_Z  = 10**PRMZ_LOG
1046SB_MIN  = 1.05*SAT_RBRN
1047!POR_COMP = COMP_RCK/POROSITY
1048POR_COMP = COMP_RCK
1049!
1050!*********************************************************************
1051! CALCULATE VERTICAL PERMEABILITIES FOR BH's AT LWB AT DIFFERENT DEPTHS,
1052!BASED ON PEMRY MULTIPLIER AND BOREHOLE PROPERTIES FROM DBASE (BL67:BH_SAND)
1053LIMIT BLOCK 59 60 61 62 63 64
1054PERM_X = PERM_X[ID:67]
1055PERM_Y = PERM_Y[ID:67]*PRMY_MUL
1056PERM_Z = PERM_Z[ID:67]
1057CAP_MOD = CAP_MOD[ID:67]
1058PCT_EXP = PCT_EXP[ID:67]
1059PC_MAX  = PC_MAX[ID:67]
1060PCT_A   = PCT_A[ID:67]
1061KPT    = KPT[ID:67]
1062PO_MIN  = PO_MIN[ID:67]
1063PORE_DIS = PORE_DIS[ID:67]
1064POROSITY = POROSITY[ID:67]
1065RELP_MOD = RELP_MOD[ID:67]
1066SAT_RBRN = SAT_RBRN[ID:67]
1067SAT_RGAS = SAT_RGAS[ID:67]
1068SB_MIN  = SB_MIN[ID:67]
1069COMP_RCK = COMP_RCK[ID:67]
1070POR_COMP = POR_COMP[ID:67]
1071!*********************************************************************
1072! now modify bh_creep by vertical perm multiplier (6/14/96)
1073limit block 68
1074PERM_Y = PERM_Y*PRMY_MUL[ID:61]
1075!*********************************************************************
1076!BLOCK 52 = BRINESAL
1077LIMIT BLOCK 52
1078COMP   = COMPRES
1079!
1080!=====================================================================
1081!*********************************************************************
1082!CHAPTER 2.  COMPUTE BRINE PRESSURE INITIAL CONDITIONS
1083!         ACCOUNTING FOR DIP IN SPECIFIED FORMATIONS
1084!         (THIS FORMULATION ACCOUNTS FOR COMPRESSIBILITY OF LIQUID)
1085!*********************************************************************
1086!=====================================================================
1087! 1)  P0 IS THE INITIAL FAR FIELD PRESSURE IN SALADO
1088!     AND IS USED FOR DEFINING THE PRESSURE IN ALL OTHER BLOCKS
1089!     IN THE SALADO
1090! 2)  DEN0 IS THE FLUID DENSITY AT PRESSURE P0
1091! 3)  XPT AND YPT ARE CENTER COORDINATES OF SHAFT AT LEVEL OF MB139
1092!     I.E. THE REFERENCE POINT
1093! 4)  PHIREF IS THE TOTAL POTENTIAL RELATIVE TO XPT AND YPT
1094! 5)  DENND IS THE DENSITY CALCULATED AT THE GRID CELL CORNERS (NODES)
1095! 6)  PRESND IS THE LIQUID PRESSURE CALCULATED AT THE GRID CELL CORNERS
1096! 7)  DENEL IS THE DENSITY AVERAGED FROM THE CELL CORNERS
1097! 8)  PRESEL IS THE LIQUID PRESSURE AVERAGED FROM THE CELL CORNERS
1098!
1099P0    = PRESSURE[B:29]
1100DEN0  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(P0 - REF_PRES[B:52]))
1101PHIREF = (1.0/DNSFLUID[B:52] - 1.0/DEN0)/(GRAVACC[B:58]*COMPRES[B:52])
1102!
1103!*********************************************************************
1104!DEFINE PRESSURES IN SALADO
1105!*********************************************************************
1106!STEP 1) CALCULATE PRESSURES AT NODES WITH COORDINATES X AND Y
1107!STEP 2) CONVERT FROM NODAL VALUES TO CELL VALUES
1108LIMIT ELEMENTS OFF
1109YPT  = ( Y[N:2578] + Y[N:2675])/2.0
1110XPT  = ( X[N:2578] + X[N:2579])/2.0
1111LIMIT BLOCK 28 29 30 31 37
1112DENND  = MAKENODE(-1.0/((GRAVACC[B:58]*COMPRES[B:52])* &
1113            (PHIREF - (COS(THETA1)*(Y-YPT) + SIN(THETA1)*(X-XPT)) - &
1114             1.0/(GRAVACC[B:58]*DNSFLUID[B:52]*COMPRES[B:52]))))
1115PRESND  = (1.0/COMPRES[B:52])*LOG(DENND/DNSFLUID[B:52]) + REF_PRES[B:52]
1116!NOW COMPUTE THE PRESSURE AT THE ELEMENT CENTER
1117DENEL   = NOD2ELE(DENND)
1118PRESEL  = NOD2ELE(PRESND)
1119!*********************************************************************
1120! DEFINE THE PRESSURES IN THE CULEBRA, UNNAMED
1121!*********************************************************************
1122LIMIT BLOCK 32 33
1123DENEL   = DEN0*EXP(COMPRES[B:52]*(PRESSURE[B:40] - REF_PRES[B:52]))
1124PRESEL  = PRESSURE[B:40]
1125!*********************************************************************
1126!DEFINE PRESSURES IN CAVITIES (WASTE AREAS, NORTH END EXCAVATIONS AND SHAFTS)
1127!*********************************************************************
1128!CAVITY 2
1129LIMIT BLOCK 34
1130DENEL  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(PRESSURE[B:34] - REF_PRES[B:52]))
1131PRESEL = PRESSURE[B:34]
1132!CAVITY 3
1133LIMIT BLOCK 35
1134DENEL  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(PRESSURE[B:34] - REF_PRES[B:52]))
1135PRESEL = PRESSURE[B:35]
1136!CAVITY 4
1137LIMIT BLOCK 36
1138DENEL  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(PRESSURE[B:36] - REF_PRES[B:52]))
1139PRESEL = PRESSURE[B:36]
1140!*********************************************************************
1141! NOW CALCULATE PRESSURE FOR DEEPER UNITS WITH NO DIP
1142! PRESSURES ARE CALCULATED AT HYDROSTATIC WITH REFERENCE POINT AT SHAFT
1143! COORDINATES AT BELL CANYON ELEVATION
1144LIMIT ELEMENTS OFF
```

```
1145 P0    = PRESSURE[B:26]
1146 DEN0  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(P0 - REF_PRES[B:52]))
1147 PHIREF = (1.0/DNSFLUID[B:52] - 1.0/DEN0)/(GRAVACC[B:58]*COMPRES[B:52])
1148 !
1149 YPT   = ( Y[N:2190] + Y[N:2287])/2.0
1150 XPT   = ( X[N:2190] + X[N:2191])/2.0
1151 LIMIT BLOCK 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 &
1152          24 25 26 27
1153 DENND  = MAKENODE(-1.0/((GRAVACC[B:58]*COMPRES[B:52])* &
1154              (PHIREF - (COS(THETA2)*(Y-YPT) + SIN(THETA2)*(X-XPT)) - &
1155               1.0/(GRAVACC[B:58]*DNSFLUID[B:52]*COMPRES[B:52]))))
1156 PRESND  = (1.0/COMPRES[B:52])*LOG(DENND/DNSFLUID[B:52]) + REF_PRES[B:52]
1157 !NOW COMPUTE THE PRESSURE AT THE ELEMENT CENTER
1158 DENEL   = NOD2ELE(DENND)
1159 PRESEL  = NOD2ELE(PRESND)
1160 !*****************************************************************
1161 !*****************************************************************
1162 LIMIT ELEMENTS 1 TO 3264
1163 ! IF PRESSURES ARE NEGATIVE (INDICATING POINTS ABOVE THE WATERTABLE)
1164 ! SET THEM TO ATMPA[B:58] = 101325.0
1165 PRESEL  = IFGT0(PRESEL,PRESEL,ATMPA[B:58])
1166 !
1167 !=================================================================
1168 !*****************************************************************
1169 !CHAPTER 3.COMPUTE THE GRID BLOCK ELEVATIONS ACCOUNTING FOR
1170 !       1 DEGREE DIP IN SALADO.  FIRST DO SALADO. THE LAYERS ABOVE AND
1171 !       BELOW WILL HAVE NO DIP
1172 !       ALSO CALCULATE THE TOTAL POTENTIAL
1173 !*****************************************************************
1174 !=================================================================
1175 LIMIT ELEMENTS OFF
1176 YORIGIN =  (Y[N:2578] + Y[N:2675])/2.0
1177 XORIGIN =  (X[N:2578] + X[N:2579])/2.0
1178 LIMIT BLOCK 28 29 30 31 34 35 36 37
1179 !DEFINE GRID BLOCK ELEVATIONS DUE TO DIP
1180 ! (MEASURE WITH RESPECT TO I=23+24,J=6+7,K=1)  SHAFT AT ELEVATION OF MB139
1181 ELEVN   = MAKENODE(COS(THETA1)*(Y-YORIGIN) + SIN(THETA1)*(X-XORIGIN))
1182 ELEVE   = NOD2ELE(ELEVN) + YORIGIN
1183 !COMPUTE GRID BLOCK POTENTIAL
1184 POTE    = ELEVE + 1.0/(GRAVACC[B:58]*DNSFLUID[B:52]*COMPRES[B:52]) - &
1185          1.0/(GRAVACC[B:58]*DENEL*COMPRES[B:52])
1186 !*****************************************************************
1187 ! NOW DO BELL CANYON AND DEEPER AND RUSTLER WITH NO DIP (THETA2 = 0)
1188 !*****************************************************************
1189 LIMIT ELEMENTS 1 TO 2208, 2965 TO 3154, 3239, 3240
1190 ELEVN   = MAKENODE(COS(THETA2)*(Y-YORIGIN) + SIN(THETA2)*(X-XORIGIN))
1191 ELEVE   = NOD2ELE(ELEVN) + YORIGIN
1192 POTE    = ELEVE + 1.0/(GRAVACC[B:58]*DNSFLUID[B:52]*COMPRES[B:52]) - &
1193          1.0/(GRAVACC[B:58]*DENEL*COMPRES[B:52])
1194 !*****************************************************************
1195 LIMIT ELEMENTS OFF
1196 DELETE THETA1,THETA2, ELEVN, XORIGIN, YORIGIN, P0, DENEL, PRESND, XPT, YPT
1197 DELETE DIP1, DIP2, MOL_NO3, MOL_SO4, DEN0, PHIREF, DENND
1198 EXIT
```

```
1 !==========================================================================
2 !
3 !TITLE:  ALGEBRACDB INPUT FILE FOR....
4 !      BRAGFLO 1996 NMVP calculations
5 !
6 !ANAYLST: James E. Bean,  New Mexico Engineering Research Institute (NMERI)
7 !      Robert J. Mackinnon, Ecodynamics Research Associates Inc (ERAI)
8 !      David McArthur,  Sandia National Laboratory, Albuquerque
9 !
10 !CREATED: February 8-??,1996
11 !
12 !PURPOSE: ALGEBRA file computes properties that can not be obtained
13 !      from CAMDAT and/or assigns properties to element blocks.
14 !
15 !NOTE:   This input file is for the waste panel located down-dip or
16 !      south of the rest of the repository. Only the Salado formation
17 !      is dipping.
18 !
19 !      Different gas generation and salt seal treatment from the one
20 !      to be used in the CCA calculations..
21 !
22 !      FEB 29, 1996
23 !      THIS ALGEBRA FILE WAS ORIGIONALLY JEBEAN'S .INP FOR THE 1996 NMVP
24 !      CALCULATION.  CHANGES SPECIFIC TO THE WATERFLOOD MODEL, BASE01
25 !      WERE ADDED BY DM STOELZEL.  BASE01 REPRESENTS MEDIAN VALUES FOR UPPER
26 !      UNITS, AND MEDIAN GAS GEN PARAMS (NO CO2 SORPTION)
27 !
28 !            JUNE 14, 1996
29 !            CHANGES TO REFLECT NEW BHOLE PERMS
30 !
31 !            JUNE 17, 1996
32 !      BASE01_R002 REPRESENTS A "WORST CASE" WATERFLOOD SCENARIO IN WHICH
33 !            THE TWO DISPOSAL WELLS CAN LEAK TO THE HIGHEST PERM MARKER BEDS
34 !            THROUGH THE HIGHEST PERM BOREHOLES (10E-11) AND HIGHEST PERM SHAFT
35 !      SEALS.  EVERYTHING ELSE WILL
36 !            BE MEDIAN VALUES (GAS GEN, FRACTURING, ETC)
37 !
38 !            JUNE 17, 1996
39 !            CHANGED SO MAX SALADO PERM IS USED (10**-24.75)
40 !==========================================================================
41 !**************************************************************************
42 !CHAPTER 0:  DEFINE NEW VARIABLE NAMES AND SOME NEEDED CONSTANTS
43 !**************************************************************************
44 !==========================================================================
45 !
46 ! ***VARIABLE DEFINITION
47 !   DIP1 ( IN DEGREES) =  ANGLE OF DIP FOR SALADO FORMATION
48 !   DIP2 ( IN DEGREES) =  ANGLE OF DIP FOR NON-SALADO FORMATIONS =
49 !   THETA1 AND THETA2 ARE IN RADIANS
50 !==========================================================================
51 ===
52 DIP1    = 1.0
53 DIP2    = 0.0
54 THETA1  = DIP1*2.0*PI[B:58]/360.0
55 THETA2  = DIP2*2.0*PI[B:58]/360.0
56 !==========================================================================
57 !**************************************************************************
58 !CHAPTER 1:  DEFINE AND COMPUTE HYDROLOGIC MATERIAL PROPERTIES
59 !**************************************************************************
60 !==========================================================================
61 !
62 !**************************************************************************
63 !BLOCK 29 = S_HALITE = SALADO HALITE
64 !**************************************************************************
65 !***COMMENTS: SAMPLED PARAMETERS ARE:
66 ! PRMX_LOG,  POROSITY,  SAT_RBRN,  SAT_RGAS,  RELP_MOD,  PORE_DIS
67 ! COMP_RCK
68 !**************************************************************************
69 LIMIT BLOCK 29
70 !SINCE PRMX_LOG IS SAMPLED ASSIGN PERM_Y AND PERM_Z
71 ! 6/17/96
72 PERM_X  = MAKEPROP(10**(-24.75))
73 PERM_Y  = PERM_X
74 PERM_Z  = PERM_X
75 SB_MIN  = 1.05*SAT_RBRN
76 POR_COMP = COMP_RCK/POROSITY
77 !
78 !**************************************************************************
79 !BLOCK 37 = DRZ_0 = DRZ FROM -5 YRS TO 0 YRS
80 !**************************************************************************
81 !***COMMENTS: SAMPLED PARAMETERS: NONE
82 !1)CORRELATE DRZ_0 POROSITY TO SAMPLED S_HALITE BY ADDING 0.0029
83 !**************************************************************************
84 LIMIT BLOCK 37
85 PERM_X  = 10**PRMX_LOG
86 PERM_Y  = 10**PRMY_LOG
87 PERM_Z  = 10**PRMZ_LOG
88 POROSITY = POROSITY[B:29] + 0.0029
89 PORE_DIS = PORE_DIS
90 RELP_MOD = RELP_MOD
91 SB_MIN  = 1.05*SAT_RBRN
92 POR_COMP = COMP_RCK/POROSITY
93 !
94 !**************************************************************************
95 !BLOCK 30 = S_MB139  = SALADO MARKER BED 139
96 !**************************************************************************
97 !***COMMENTS: SAMPLED PARAMETERS: SAT_RBRN, SAT_RGAS, PORE_DIS, AND
98 RELP_MOD
99 !**************************************************************************
100 LIMIT BLOCK 30
101 ! 6/17/96
102 ! NEW PERMS HERE!! 10**-17.1 = 7.9433E-18
103 PERM_X  = MAKEPROP(10**(-17.1))
104 PERM_Y  = PERM_X
```

```
PERM_Z  = PERM_X
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
PHIMAX  = POROSITY + DPHIMAX
!TEMP   = POROSITY AT FRACTURE INITIATION PRESSURE
!PI_DELTA = FRACTURE INITIATION PRESSURE - REFERENCE PRESSURE
TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
!
!*****************************************************************
!BLOCK 31 = S_ANH_AB = SALADO ANHYDRITE LAYERS A + B
!        PLUS S_MB138  = SALADO MARKER BED 138
!*****************************************************************
!***COMMENTS: SAMPLED PARAMETERS: NONE
!1) USE S_MB139 SAMPLED VALUES FOR:SAT_RBRN, SAT_RGAS, PORE_DIS, AND RELP_MOD
!*****************************************************************
! 6/17/96 PERMS EQUAL S_MB139
LIMIT BLOCK 31
PERM_X  = PERM_X[B:30]
PERM_Y  = PERM_Y[B:30]
PERM_Z  = PERM_Z[B:30]
RELP_MOD = RELP_MOD[B:30]
PORE_DIS = PORE_DIS[B:30]
SAT_RBRN = SAT_RBRN[B:30]
SAT_RGAS = SAT_RGAS[B:30]
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
PHIMAX  = POROSITY + DPHIMAX
!TEMP   = POROSITY AT FRACTURE INITIATION PRESSURE
!PI_DELTA = FRACTURE INITIATION PRESSURE - REFERENCE PRESSURE
TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
!
!*****************************************************************
!BLOCK 34=CAVITY_2 = REST OF REPOSITORY WHERE WASTE WILL BE PLACED AT T= 0
YEARS
!BLOCK 35  = CAVITY_3 = EXPERIMENTAL REGION AND BACKFILLED REGION
!BLOCK 36  = CAVITY_4 = SHAFT AND PANEL SEALS
!*****************************************************************
!***COMMENTS:
!*****************
LIMIT BLOCK 34 35 36
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!*****************************************************************
!BLOCK 33 = IMPERM_Z
!*****************************************************************
!***COMMENTS:
!  INCLUDES THE RUSTLER, SANTA ROSA, DEWEY LAKE, AND CASTILE.
!  USED TO CONTROL DRAINAGE OF FORMATIONS ABOVE THE SALADO INTO THE
!  SHAFT PRIOR TO T=0 YEARS.  IT IS ALSO USED TO PREVENT BRINE POCKET
!  FROM BECOMING DE-PRESSURIZED PRIOR TO DRILLING INTRUSION.
!*****************************************************************
LIMIT BLOCK 33
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!*****************************************************************
!BLOCK 28 = CASTILER = NO BRINE POCKET: PERMEABILITIES HAVE BEEN DECREASED
!        IN MATSET
!*****************************************************************
!***COMMENTS:
!*****************************************************************
LIMIT BLOCK 28
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
SB_MIN  = 1.05*SAT_RBRN
!THE COMPRESSIBILITY COMP_RCK IS LOG10(BULK COMPRESSIBILITY) (G. FREEZE)
POR_COMP = (10**COMP_RCK)/POROSITY
!ACOMPPRM = LOG(COMP_RCK*PERM_X)
!COMP_RCK = (10**(ACOMPPRM))/PERM_X  *NOTE: HARDWIRE MEDIAN BRINE POCKET
PERM
!COMP_RCK = (10**(ACOMPPRM))/1.584892E-12
!POR_COMP = COMP_RCK/POROSITY
!
!*****************************************************************
!BLOCK 41 = WAS_AREA = WASTE MATERIAL
!*****************************************************************
!***COMMENTS: SAMPLED PARAMETERS ARE:
!1) SAT_RBRN, SAT_RGAS, SAT_WICK
!2) THE FOLLOWING GAS GENERATION PARAMETERS ARE PRESENTED IN TABLE 1.
!  IN THE MEMO DATED 01/02/1996, FROM Y.WANG AND L BRUSH TO M. TIERNEY,
!  SUBJECT: ESTIMATES OF GAS GENERATION PARAMETERS FOR THE LONG-TERM
!  WIPP PERFORMANCE ASSESSMENT
!
!*****************************************************************
LIMIT BLOCK 41
!HYDROLOGIC PARAMETERS
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!*****************************************************************
! GAS GENERATION DEFINITIONS
! SAMPLED PARAMETERS:        GRATMICI, GRATMICH, PROBDEG,
```

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209! ASSOCIATED SAMPLED PARAMETERS: CORRMCO2[B:56], CORRWCO2[B:56], FBETA[B:57]
210!
211! CORRMCO2[B:56]  = INUNDATED STEEL CORROSION RATE [M/SEC] WITHOUT
212!              MICROBIAL GAS GENERATION
213! CORRWCO2[B:56]  = INUNDATED STEEL CORROSION RATE [M/SEC] WITH
214!              MICROBIAL GAS GENERATION
215! GRATMICH[B:41]  = RATE OF HUMID CELLULOSICS BIODEGRADATION [MOLE C/KG/SEC]
216! GRATMICI[B:41]  = RATE OF INUNDATED CELLULOSICS BIODEGRADATION
217!              [MOLE C/KG/SEC]
218! FBETA[B:57]     = SCALING FACTOR FOR THE AVERAGE STOICIOMETRIC FACTOR Y IN
219!              THE MICROBIAL REACTION
220! PROBDEG         = FLAG TO INDICATE IF BIODEGRADATION IS ACTIVATED
221!              (0=NO,1=YES)
222!              PROBDEG = 0 => NO BIODEGRADATION
223!              PROBDEG = 1 => BIODEGRADATION BUT NO PLASTICS AND RUBBERS
224!              PROBDEG = 2 => BIODEGRADATION WITH PLASTICS AND RUBBERS
225!                     INCLUDED
226!              PROBDEG IS A SAMPLED PARAMETER DEFINED SUCH THAT
227!              IT'S VALUE IS  0  50% OF THE TIME,
228!                            1  25% OF THE TIME,
229!                            2  25% OF THE TIME.
230!*****************************************************************************
231!*****************************************************************************
232! STOICOR = IRON-CORROSION STOCHIOMETRIC FACTOR (Y.WANG MEMO)
233  STOICOR = MAKEPROP(STOIFX[B:56])
234!
235! CORROSION STOCHIOMETRIC FACTOR FOR H2 PRODUCTION=SCOR_H2=S(1,1)
236! SELL LINE 9.8 IN THE BRAGFLO INPUT MANUAL
237  SCOR_H2 =  MAKEPROP((4 - STOICOR)/3)
238!
239! CORROSION STOCHIOMETRIC FACTOR FOR H2O CONSUMPTION=SCOR_H2O=S(1,2)
240  SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
241!
242! CORROSION STOCHIOMETRIC FACTOR FOR FE CONSUMPTION=SCOR_FE=S(1,3)
243  SCOR_FE = MAKEPROP(1.0)
244!
245! HUMID STEEL CORROSION RATES (KCGSH) ARE ZERO
246! HUMCORR = HUMID STEEL CORROSION RATE
247!
248!*****************************************************************************
249! THE FOLLOWING INVENTORY PARAMETERS ARE OBTAINED FROM THE DATA BASE
250! **REMOTE HANDLED WASTE
251! DIRONRHW =    100  KG/M**3
252! DIRNCRHW =   2591 KG/M**3
253! DCELLRHW =    17  KG/M**3
254! DRUBBRHW =    3.3  KG/M**3
255! DPLASRHW =    15  KG/M**3
256! DPLSCRHW =    3.1  KG/M**3
257! VOLRHW  =    7080 M**3
258!
259! **CONTACT HANDLED WASTE
260! DIRONCHW =    170  KG/M**3
261! DIRNCCHW =    139  KG/M**3
262! DCELLCHW =    54  KG/M**3
263! DRUBBCHW =    10  KG/M**3
264! DPLASCHW =    34  KG/M**3
265! DPLSCCHW =    26  KG/M**3
266! VOLCHW  =    1.69E5 M**3
267!
268!*****************************************************************************
269! COMPUTE AVERAGE DENSITIES
270!
271! DRH_METL =    AVERAGE DENSITY OF RH METALS
272! DRH_BIO  =    AVERAGE DENSITY OF RH BIO
273! DCELLRHW =    AVERAGE DENSITY OF RH CELL
274! DCH_METL =    AVERAGE DENSITY OF CH METALS
275! DCH_BIO  =    AVERAGE DENSITY OF CH BIO
276! DCELLCHW =    AVERAGE DENSITY OF CH CELLULOSE
277! DRH_RUPL =    AVERAGE DENSITY OF RH RUBBERS AND PLASTICS
278! DCH_RUPL =    AVERAGE DENSITY OF CH RUBBERS AND PLASTICS
279!
280  DRH_METL =    DIRONRHW + DIRNCRHW
281  DRH_RUPL =    DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
282  DRH_BIO  =    DCELLRHW + DRH_RUPL
283  DCH_METL =    DIRONCHW + DIRNCCHW
284  DCH_RUPL =    DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
285  DCH_BIO  =    DCELLCHW + DCH_RUPL
286
287!
288!*****************************************************************************
289!
290! VPANLEX  =    VOLUME OF EXCAVATED PANEL    = 46097.65 M**3
291! VROOM    =    VOLUME OF EXCAVATED ROOM     = 3644.4 M**3
292! VREPOS   =    VOLUME OF WASTE STORAGE AREA  = 436023 M**3
293! DRROOM   =    NUMBER OF DRUMS PER ROOM      = 6804
294!
295!*****************************************************************************
296!
297!  BIOIDX  = 1 ===> MICROBIAL GAS GENERATION = YES
298!          = 0 ===> MICROBIAL GAS GENERATION = NO
299!  IF BIOIDX = 1, THEN
300!    PLASIDX = 1 ====> DEGRADATION OF RUBBERS, PLASTICS, AND CELLULOSICS
301!            = 0 ====> DEGRADATION OF CELLULOSE ONLY
302!*****************************************************************************
303!
304! TOTAL MASS OF CORRODIBLE METAL
305  WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
306!
307! TOTAL MASS OF CELLULOSICS ONLY
308  WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
309!
310! TOTAL MASS OF RUBBER AND PLASTICS
311  WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
312!
```

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313! TOTAL MASS OF BIODEGRADABLE MATERIAL
314! IF PROBDEG > 0,  NOZERO BIODEGRADATION REACTION RATES (BIOIDX = 1)
315! IF PROBDEG = 2,  ADD IN PLASTICS AND RUBBERS (PLASIDX = 1)
316  PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
317  BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
318!
319!ALTERNATE FORM FOR SETTING PLASIDX AND BIOIDX IF DISTRIBUTION IS DIFFERENT
320!  BIOIDX  = MAKEPROP(0)
321!  PLASIDX = MAKEPROP(0)
322!  BIOIDX  = IFGT0(PROBDEG - 0.50, 1,BIOIDX)
323!  PLASIDX = IFGT0(PROBDEG - 0.50, 1,PLASIDX)
324!  PLASIDX = IFGT0(PROBDEG - 0.75, 2,PLASIDX)
325!
326  WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
327!
328! INITIAL FE CONCENTRATION = CONCFE
329! (APPEARS IN THE BRAGFLO INPUT INITIAL CONDITIONS (SEE LINE 5.6
330! IN THE BRAGFLO INPUT MANUAL))
331!
332  CONCFE  =  WTFETOT/VREPOS[B:58]
333!
334! INITIAL BIODEGRADABLE MATERIAL CONCENTRATION = CONCBIO
335! (APPEARS IN THE BRAGFLO INPUT INITIAL CONDITIONS (SEE LINE 5.8
336! IN THE BRAGFLO INPUT MANUAL))
337!
338  CONCBIO  =  WTBIOTOT/VREPOS[B:58]
339!
340! INITIAL CELLULOSICS CONCENTRATION = CONCCEL
341!
342  CH20CONC  =  WTCELTOT/VREPOS[B:58]
343!
344!*************************************************************************
345!*************************************************************************
346! THE FOLLOWING CALCULATIONS DETERMINE THE AVERAGE STOCHIOMETRIC
347! COEFFICIENT IN THE BIODEGRADATION REACTION
348!
349! DRUMVOL  =  NO OF DRUMS PER UNIT VOL OF WASTE STORAGE
350! DRPANEL  =  NO OF DRUMS PER PANEL
351! DRUMTOT  =  NUMBER OF DRUMS IN REPOSITORY
352!
353  DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
354  DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
355  DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
356!
357! CALCULATE THE MAXIMUM QUANTITIES (IN MOLES) OF CELLULOSICS AND STEEL
358! THAT WILL BE POTENTIALLY CONSUMED IN 10000 YEARS
359! (SEE EQUATIONS 12 AND 13 IN THE Y. WANG MEMO)
360! CONVERT FROM DATABASE UNITS OF MOLES C/(KG-SEC) TO MOLES C/(KG-YR)
361!*********************************************************************
362! 6       = 6 MOLES OF C/MOLE OF CELLULOSE C6-H10-O5
363! 1000    = 1000 GRAMS/KG
364! WTBIOTOT  = KG
365! 162     = MW OF CELLULOSE C6-H10-O5
366  A1      = 6*1000*WTBIOTOT/162
367! 10000   = YEARS
368! GRATMICI  = MOLES C/KG-SEC
369! YRSEC    = 3.15569E7 SEC/YR
370  A2      = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
371  MAX_CELL  =  MIN(A1,A2)
372!*********************************************************************
373! 10000   =  GRAMS/KG
374! WTFETOT  =  KG
375! 56      =  MW OF FE
376  B1      =  1000*WTFETOT/56
377!*********************************************************************
378! 1410    =  10000 YRS* 0.141MOLES/MICROMETER/M**2
379! CORRWCO2 =  M/SEC
380! 1000000  =  MICROMETERS/M
381! YRSEC    =  3.15569E7 YEARS/SEC
382! ASDRUM   =  M**2 STEEL/DRUM
383! DRUMTOT  =  DRUMS/REPOSITORY
384! B2      =  MOLES
385  B2      =  1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
386  MAX_FE  =  MIN(B1,B2)
387!*********************************************************************
388!
389! CALCULATE THE MAXIMUM VALUE OF THE AVERAGE STOCHIOMETRIC COEFFICIENT
390! Y IN THE BIODEGRADATION REACTION (SEE EQUATION 15 IN THE y. WANG MEMO)
391  MOL_NO3  = QINIT[B:55]
392  MOL_SO4  = QINIT[B:54]
393! EQUATION 15 IS NEXT
394  NUM1 = MAKEPROP(8.4*MOL_NO3/4.8)
395  NUM2 = MAKEPROP(9*MOL_SO4/3)
396  NUM3 = MAX_CELL - 6*MOL_NO3/4.8 - 6*MOL_SO4/3
397  YMAX = (NUM1+NUM2+NUM3)/MAX_CELL
398!
399! CALCULATE THE MINIMUM VALUE OF Y (SEE EQUATIONS 16 AND 17)
400  C1   = 6*MOL_NO3/4.8 + NUM2 + 0.5*NUM3
401  C2   = MAX_FE
402  G    = MIN(C1,C2)
403  YMIN  =  YMAX - G/MAX_CELL
404!
405! THE VALUE OF Y (STOIMIC) IS (EQUATION 18)
406  STOIMIC  =  YMIN + FBETA[B:57]*(YMAX - YMIN)
407!
408! SBIO_H2 = S(2,1), SEE LINE 9.10 IN BRAGFLO INPUT MANUAL
409! SBIO_H2 = STOIMIC
410!
411! BIODEGRADATION STOICHIOMETRIC FACTOR FOR H20 CONSUMPTION
412! SBIO_H2O = S(2,2) = 0
413!
414! BIODEGRADATION STOICHIOMETRIC FACTOR FOR CELLULOSIC CONSUMPTION
415! SBIO_CH2O = S(2,3) = 1
416!
```

```
! DETERMINE THE INUNDATED STEEL CORROSION RATE
 KCGSI = CORRWCO2[B:56]*BIOIDX + CORRMCO2[B:56]*(1 - BIOIDX)
!
! CONVERT REACTION RATES TO GAS GENERATION RATES REQUIRED BY PREBRAG
!
! CONVERT THE UNITS OF KCGSI FROM M/SEC TO MOLE-FE/M3-S
! KCGSI = KCGSI(M/SEC)*0.141 (MOLE-FE/MICRON-M2)*6(M2/DRUM)
!       *100000 MICRONS/M* (6804 DRUMS/3644.4 M3)
 KCGSI = MAKEPROP(KCGSI*0.141*1000000*ASDRUM[B:58]* &
       DRROOM[B:58]/VROOM[B:58])
!
! CONVERT THE UNITS OF HUMCORR (= KCGSH) FROM M/SEC TO MOLE-FE/M3-S
 KCGSH = MAKEPROP(HUMCORR[B:56]*0.141*1000000*ASDRUM[B:58]* &
       DRROOM[B:58]/VROOM[B:58])
!
! COMPUTE THE INUNDATED GAS (H2) PRODUCTION RATE FROM THE REACTION RATE
 GRATCORI = MAKEPROP(KCGSI*VPANLEX[B:58]*SCOR_H2/ASDRUM[B:58]/DRPANEL)
!
! COMPUTE THE HUMID GAS (H2) PRODUCTION RATE FROM THE REACTION RATE
 GRATCORH = MAKEPROP(KCGSH*VPANLEX[B:58]*SCOR_H2/ASDRUM[B:58]/DRPANEL)
!
! CONVERT THE UNITS OF THE INUNDATED BIODEGRADATION RATE GRATMICI
! GRATMICI = GRATMICI(MOLE-C/KG/SEC)*(KG-CELL/M3)
 KBGSI   = GRATMICI*CONCBIO
!
! COMPUTE THE INUNDATED GAS (CO2) PRODUCTION RATE FROM THE REACTION RATE
 GRATMICI = KBGSI*STOIMIC/CONCBIO
!
! CONVERT THE UNITS OF THE HUMID BIODEGRADATION RATE GRATMICH
! GRATMICH = GRATMICH(MOLE-C/KG/SEC)
 KBGSH   = GRATMICH*CONCBIO
!
! NOW CONVERT KBGSH TO THE GAS GENERATION RATE REQUIRED BY PREBRAG
 GRATMICH = KBGSH*STOIMIC/CONCBIO
!
! COMPUTE RATIO OF HUMID TO INUNDATED (STORE IN HUMID)
! FOR INPUT TO PREBRAG
 GRATMICH = GRATMICH/GRATMICI
 GRATCORH = GRATCORH/GRATCORI
!
!*********************************************************************
!BLOCK 32  UNNAMED MEMBER OF RUSTLER
!*********************************************************************
!***COMMENTS:
!*********************************************************************
LIMIT BLOCK 32
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!*********************************************************************
!BLOCK 40  CULEBRA MEMBER OF RUSTLER
!*********************************************************************
!***COMMENTS:
!*********************************************************************
LIMIT BLOCK 40
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!*********************************************************************
!
!*********************************************************************
!BLOCK 42  OPERATIONS REGION
!BLOCK 43  EXPERIMENTAL REGION
!*********************************************************************
!***COMMENTS:
!  Operations and experimental region have same properties
!*********************************************************************
LIMIT BLOCK 42 43
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!*********************************************************************
!BLOCK 45 CLAY_RUS
!*********************************************************************
!***COMMENTS:
!  Clay shaft fill used in the Rustler formation:
!  Constant properties from 0 to 10000 years
!*********************************************************************
LIMIT BLOCK 45
!****************************************
! HIGHEST PERM GOES HERE!! PERM = 5E-18
! 6/17/96
PERM_X  = 5E-18
PERM_Y  = 5E-18
PERM_Z  = 5E-18
SB_MIN  = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!*********************************************************************
!BLOCK 46  CL_L_T1
!*********************************************************************
!***COMMENTS:
!  Clay shaft material
!  Time period 1: 0 to 10 years
```

```
!*********************************************************************
LIMIT BLOCK 46
PX_SALT = MAKEPROP(PERM_X[B:29])
! MAXIMUM PERM GOES HERE!
! 6/17/96
AKIS1   = MAKEPROP(5E-18)
!*********************************************************************
! CALCULATE AREA OF THE FOUR SHAFTS:
AAS1   = PI[B:58]*RSH_AIR**2
ASS2   = PI[B:58]*RSH_SAL**2
AWS3   = PI[B:58]*RSH_WAS**2
AES4   = PI[B:58]*RSH_EXH**2
AST    = AAS1 + ASS2 + AWS3 + AES4
!*************************************
! CALCULATE DRZ AREAS FOR EACH SHAFT:
RDF    = RADN_DRZ**2 - 1.0
AAD1   = PI[B:58]*RDF*RSH_AIR**2
ASD2   = PI[B:58]*RDF*RSH_SAL**2
AWD3   = PI[B:58]*RDF*RSH_WAS**2
AED4   = PI[B:58]*RDF*RSH_EXH**2
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
!
ADR    = (RADN_DRZ - 1)*RSH_AIR
ANUM1  = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
ATRM1  = ANUM1/DEN*PX_SALT
ANUM2  = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
ATRM2  = ANUM2/DEN*AKIS1
AKDRZ  = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
!
SDR    = (RADN_DRZ - 1)*RSH_SAL
SNUM1  = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
STRM1  = SNUM1/DEN*PX_SALT
SNUM2  = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
STRM2  = SNUM2/DEN*AKIS1
SKDRZ  = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
!
WDR    = (RADN_DRZ - 1)*RSH_WAS
WNUM1  = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
WTRM1  = WNUM1/DEN*PX_SALT
WNUM2  = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
WTRM2  = WNUM2/DEN*AKIS1
WKDRZ  = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
!
EDR    = (RADN_DRZ - 1)*RSH_EXH
ENUM1  = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
ETRM1  = ENUM1/DEN*PX_SALT
ENUM2  = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
ETRM2  = ENUM2/DEN*AKIS1
EKDRZ  = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
!*************************************
! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
KDAD   = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
!  PERMEABILITY (EQ. 3):
KMOD   = (AKIS1*AST + KDAD)/AST
!*********************************************************************
PERM_Y = KMOD
PERM_X = PERM_Y
PERM_Z = PERM_Y
SB_MIN = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!*********************************************************************
!BLOCK 47  CL_L_T4
!*********************************************************************
!***COMMENTS:
!  Clay shaft material
!  Time period 4: 50 to 10000 years
!*********************************************************************
LIMIT BLOCK 47
PX_SALT = MAKEPROP(PERM_X[B:29])
! MAXIMUM PERM GOES HERE!
! 6/17/96
AKIS1   = MAKEPROP(5E-18)
!*********************************************************************
! CALCULATE AREA OF THE FOUR SHAFTS:
AAS1   = PI[B:58]*RSH_AIR**2
ASS2   = PI[B:58]*RSH_SAL**2
AWS3   = PI[B:58]*RSH_WAS**2
AES4   = PI[B:58]*RSH_EXH**2
AST    = AAS1 + ASS2 + AWS3 + AES4
!*************************************
! CALCULATE DRZ AREAS FOR EACH SHAFT:
RDF    = RADN_DRZ**2 - 1.0
AAD1   = PI[B:58]*RDF*RSH_AIR**2
ASD2   = PI[B:58]*RDF*RSH_SAL**2
AWD3   = PI[B:58]*RDF*RSH_WAS**2
AED4   = PI[B:58]*RDF*RSH_EXH**2
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
!
ADR    = (RADN_DRZ - 1)*RSH_AIR
```

```
625 ANUM1  = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
626 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
627 ATRM1    = ANUM1/DEN*PX_SALT
628 ANUM2  = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
629 ATRM2    = ANUM2/DEN*AKIS1
630 AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
631 !****************************************
632 ! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
633 !
634 SDR   = (RADN_DRZ - 1)*RSH_SAL
635 SNUM1  = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
636 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
637 STRM1    = SNUM1/DEN*PX_SALT
638 SNUM2  = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
639 STRM2    = SNUM2/DEN*AKIS1
640 SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
641 !****************************************
642 ! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
643 !
644 WDR   = (RADN_DRZ - 1)*RSH_WAS
645 WNUM1  = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
646 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
647 WTRM1    = WNUM1/DEN*PX_SALT
648 WNUM2  = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
649 WTRM2    = WNUM2/DEN*AKIS1
650 WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
651 !****************************************
652 ! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
653 !
654 EDR   = (RADN_DRZ - 1)*RSH_EXH
655 ENUM1  = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
656 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
657 ETRM1    = ENUM1/DEN*PX_SALT
658 ENUM2  = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
659 ETRM2    = ENUM2/DEN*AKIS1
660 EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
661 !****************************************
662 ! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
663 KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
664 ! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
665 !  PERMEABILITY (EQ. 3):
666 KMOD    = (AKIS1*AST + KDAD)/AST
667 !*****************************************************************************
668 PERM_Y  = KMOD
669 PERM_X  = PERM_Y
670 PERM_Z  = PERM_Y
671 SB_MIN  = 1.05*SAT_RBRN
672 !POR_COMP = COMP_RCK/POROSITY
673 POR_COMP = COMP_RCK
674 !
675 !*****************************************************************************
676 !BLOCK 48  SALT_T1
677 !*****************************************************************************
678 !***COMMENTS:
679 !  Crushed salt shaft material
680 !  Time period 1: 0 to 10 years
681 !*****************************************************************************
682 LIMIT BLOCK 48
683 PX_SALT = MAKEPROP(PERM_X[B:29])
684 !*****************************************************************************
685 ! CALCULATE AREA OF THE FOUR SHAFTS:
686 AAS1   = PI[B:58]*RSH_AIR**2
687 ASS2   = PI[B:58]*RSH_SAL**2
688 AWS3   = PI[B:58]*RSH_WAS**2
689 AES4   = PI[B:58]*RSH_EXH**2
690 AST    = AAS1 + ASS2 + AWS3 + AES4
691 !****************************************
692 ! CALCULATE DRZ AREAS FOR EACH SHAFT:
693 RDF    = RADN_DRZ**2 - 1.0
694 AAD1   = PI[B:58]*RDF*RSH_AIR**2
695 ASD2   = PI[B:58]*RDF*RSH_SAL**2
696 AWD3   = PI[B:58]*RDF*RSH_WAS**2
697 AED4   = PI[B:58]*RDF*RSH_EXH**2
698 !****************************************
699 !****************************************
700 ! AKIS1   = MODE OF DISTRIBUTION
701 A      = PMLT_LO
702 B      = PMLT_MD
703 C      = PMLT_HI
704 AKIS1   = 10**B
705 !****************************************
706 ! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
707 !
708 ADR   = (RADN_DRZ - 1)*RSH_AIR
709 ANUM1  = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
710 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
711 ATRM1    = ANUM1/DEN*PX_SALT
712 ANUM2  = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
713 ATRM2    = ANUM2/DEN*AKIS1
714 AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
715 !****************************************
716 ! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
717 !
718 SDR   = (RADN_DRZ - 1)*RSH_SAL
719 SNUM1  = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
720 DEN  = (LOG(PX_SALT) - LOG(AKIS1))**2
721 STRM1    = SNUM1/DEN*PX_SALT
722 SNUM2  = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
723 STRM2    = SNUM2/DEN*AKIS1
724 SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
725 !****************************************
726 ! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
727 !
728 WDR   = (RADN_DRZ - 1)*RSH_WAS
```

```
WNUM1   = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
WTRM1    = WNUM1/DEN*PX_SALT
WNUM2   = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
WTRM2    = WNUM2/DEN*AKIS1
WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
!
EDR   = (RADN_DRZ - 1)*RSH_EXH
ENUM1   = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
ETRM1    = ENUM1/DEN*PX_SALT
ENUM2   = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
ETRM2    = ENUM2/DEN*AKIS1
EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
!*************************************
! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
!  PERMEABILITY (EQ. 3):
KMOD    = (AKIS1*AST + KDAD)/AST
!*****************************************************************************
PERM_Y  = KMOD
PERM_X  = PERM_Y
PERM_Z  = PERM_Y
SB_MIN   = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!*****************************************************************************
!BLOCK 49  SALT_T4
!*****************************************************************************
!***COMMENTS:
!  Crushed salt shaft material
!  Time period 4: 50 to 100 years
!*****************************************************************************
LIMIT BLOCK 49
PX_SALT  = MAKEPROP(PERM_X[B:29])
! CALCULATE AREA OF THE FOUR SHAFTS:
AAS1   = PI[B:58]*RSH_AIR**2
ASS2   = PI[B:58]*RSH_SAL**2
AWS3   = PI[B:58]*RSH_WAS**2
AES4   = PI[B:58]*RSH_EXH**2
AST    = AAS1 + ASS2 + AWS3 + AES4
!*****************************************
! CALCULATE DRZ AREAS FOR EACH SHAFT:
RDF    = RADN_DRZ**2 - 1.0
AAD1   = PI[B:58]*RDF*RSH_AIR**2
ASD2   = PI[B:58]*RDF*RSH_SAL**2
AWD3   = PI[B:58]*RDF*RSH_WAS**2
AED4   = PI[B:58]*RDF*RSH_EXH**2
!*****************************************
!*****************************************
! AKIS1   = MODE OF THE DISTRIBUTION
A       = PMLT_LO
B       = PMLT_MD
C       = PMLT_HI
AKIS1   = 10**B
!*****************************************
! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
!
ADR    = (RADN_DRZ - 1)*RSH_AIR
ANUM1   = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
ATRM1    = ANUM1/DEN*PX_SALT
ANUM2   = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
ATRM2    = ANUM2/DEN*AKIS1
AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
!*****************************************
! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
!
SDR    = (RADN_DRZ - 1)*RSH_SAL
SNUM1   = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
STRM1    = SNUM1/DEN*PX_SALT
SNUM2   = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
STRM2    = SNUM2/DEN*AKIS1
SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
!*****************************************
! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
!
WDR    = (RADN_DRZ - 1)*RSH_WAS
WNUM1   = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
WTRM1    = WNUM1/DEN*PX_SALT
WNUM2   = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
WTRM2    = WNUM2/DEN*AKIS1
WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
!*****************************************
! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
!
EDR    = (RADN_DRZ - 1)*RSH_EXH
ENUM1   = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
DEN   = (LOG(PX_SALT) - LOG(AKIS1))**2
ETRM1    = ENUM1/DEN*PX_SALT
ENUM2   = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
ETRM2    = ENUM2/DEN*AKIS1
EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
!*****************************************
! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
!  PERMEABILITY (EQ. 3):
```

```
KMOD    = (AKIS1*AST + KDAD)/AST
!*************************************************************************
PERM_Y = KMOD
PERM_X = PERM_Y
PERM_Z = PERM_Y
SB_MIN  = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!*************************************************************************
!BLOCK 50  SALT_T5
!*************************************************************************
!***COMMENTS:
!  Crushed salt shaft material
!  Time period 5: 100 to 200 years
!*************************************************************************
LIMIT BLOCK 50
PX_SALT  = MAKEPROP(PERM_X[B:29])
! CALCULATE AREA OF THE FOUR SHAFTS:
AAS1   = PI[B:58]*RSH_AIR**2
ASS2   = PI[B:58]*RSH_SAL**2
AWS3   = PI[B:58]*RSH_WAS**2
AES4   = PI[B:58]*RSH_EXH**2
AST    = AAS1 + ASS2 + AWS3 + AES4
!*************************************
! CALCULATE DRZ AREAS FOR EACH SHAFT:
RDF    = RADN_DRZ**2 - 1.0
AAD1   = PI[B:58]*RDF*RSH_AIR**2
ASD2   = PI[B:58]*RDF*RSH_SAL**2
AWD3   = PI[B:58]*RDF*RSH_WAS**2
AED4   = PI[B:58]*RDF*RSH_EXH**2
!*************************************
!*************************************
! AKIS1   = MODE OF THE DISTRIBUTION
A       = PMLT_LO
B       = PMLT_MD
C       = PMLT_HI
AKIS1   = 10**B
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR AIR SHAFT:
!
ADR    = (RADN_DRZ - 1)*RSH_AIR
ANUM1  = RADN_DRZ*RSH_AIR*(LOG(PX_SALT) - LOG(AKIS1)) - ADR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
ATRM1   = ANUM1/DEN*PX_SALT
ANUM2  = RSH_AIR*(LOG(PX_SALT)-LOG(AKIS1))-ADR
ATRM2   = ANUM2/DEN*AKIS1
AKDRZ   = 2*(ATRM1 - ATRM2)/(RADN_DRZ*RSH_AIR + RSH_AIR)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR SALT SHAFT:
!
SDR    = (RADN_DRZ - 1)*RSH_SAL
SNUM1  = RADN_DRZ*RSH_SAL*(LOG(PX_SALT) - LOG(AKIS1)) - SDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
STRM1   = SNUM1/DEN*PX_SALT
SNUM2  = RSH_SAL*(LOG(PX_SALT)-LOG(AKIS1))-SDR
STRM2   = SNUM2/DEN*AKIS1
SKDRZ   = 2*(STRM1 - STRM2)/(RADN_DRZ*RSH_SAL + RSH_SAL)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR WASTE SHAFT:
!
WDR    = (RADN_DRZ - 1)*RSH_WAS
WNUM1  = RADN_DRZ*RSH_WAS*(LOG(PX_SALT) - LOG(AKIS1)) - WDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
WTRM1   = WNUM1/DEN*PX_SALT
WNUM2  = RSH_WAS*(LOG(PX_SALT)-LOG(AKIS1))-WDR
WTRM2   = WNUM2/DEN*AKIS1
WKDRZ   = 2*(WTRM1 - WTRM2)/(RADN_DRZ*RSH_WAS + RSH_WAS)
!*************************************
! CALCULATE EFFECTIVE DRZ PERM FOR EXHAUST SHAFT:
!
EDR    = (RADN_DRZ - 1)*RSH_EXH
ENUM1  = RADN_DRZ*RSH_EXH*(LOG(PX_SALT) - LOG(AKIS1)) - EDR
DEN    = (LOG(PX_SALT) - LOG(AKIS1))**2
ETRM1   = ENUM1/DEN*PX_SALT
ENUM2  = RSH_EXH*(LOG(PX_SALT)-LOG(AKIS1))-EDR
ETRM2   = ENUM2/DEN*AKIS1
EKDRZ   = 2*(ETRM1 - ETRM2)/(RADN_DRZ*RSH_EXH + RSH_EXH)
!*************************************
! NOW CALCULATE KDRZ x AREA FOR EACH SHAFT AND SUM:
KDAD    = AKDRZ*AAD1 + SKDRZ*ASD2 + WKDRZ*AWD3 + EKDRZ*AED4
! NOW USE THE SAMPLED SHAFT FILL? PERMEABILITY TO FORM THE MODEL SHAFT
!  PERMEABILITY (EQ. 3):
KMOD    = (AKIS1*AST + KDAD)/AST
!*************************************************************************
PERM_Y = KMOD
PERM_X = PERM_Y
PERM_Z = PERM_Y
SB_MIN  = 1.05*SAT_RBRN
!POR_COMP = COMP_RCK/POROSITY
POR_COMP = COMP_RCK
!
!*************************************************************************
!BLOCK 51  SALT_T6
!*************************************************************************
!***COMMENTS:
!  Crushed salt shaft material
!  Time period 6: 200 to 10000 years
!*************************************************************************
LIMIT BLOCK 51
PX_SALT  = MAKEPROP(PERM_X[B:29])
! CALCULATE AREA OF THE FOUR SHAFTS:
AAS1   = PI[B:58]*RSH_AIR**2
ASS2   = PI[B:58]*RSH_SAL**2
```

```
105  106  LIMIT BLOCK 30
106  107
107  108
108  109  PERM_X  = MAKEPROP(10**(-17.1))
109  110  PERM_Y  = PERM_X
110  111  PERM_Z  = PERM_X
111  112  SB_MIN  = 1.05*SAT_RBRN
112 ************
113 ************
114 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
115  143  LIMIT BLOCK 34 35 36
116  144  PERM_X  = 10**PRMX_LOG
117  145  PERM_Y  = 10**PRMY_LOG
118  146  PERM_Z  = 10**PRMZ_LOG
119  147  SB_MIN  = 1.05*SAT_RBRN
120  148  POR_COMP = COMP_RCK/POROSITY
121  149
122 ******
123 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
124  127
125  128  LIMIT BLOCK 31
126  129  PERM_X  = PERM_X[B:30]
127  130  PERM_Y  = PERM_Y[B:30]
128  131  PERM_Z  = PERM_Z[B:30]
129  132  RELP_MOD = RELP_MOD[B:30]
130  133  PORE_DIS = PORE_DIS[B:30]
131  134  SAT_RBRN = SAT_RBRN[B:30]
132  135  SAT_RGAS = SAT_RGAS[B:30]
133  136  SB_MIN  = 1.05*SAT_RBRN
134  137  POR_COMP = COMP_RCK/POROSITY
135  138  PHIMAX  = POROSITY + DPHIMAX
136  139
137  140
138  141  TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
139  142  PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
140  143
141 ************
142 ************
143 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
144  157
145  158
146  159  LIMIT BLOCK 33
147  160  PERM_X  = 10**PRMX_LOG
148 ******
149 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
150  151  LIMIT BLOCK 34 35 36
151  152  PERM_X  = 10**PRMX_LOG
152 ************
153 ************
154 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
155  172  LIMIT BLOCK 28
156  173  PERM_X  = 10**PRMX_LOG
157 ******
158 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
159  164
160  165
161  166
162  167  LIMIT BLOCK 33
163  168  PERM_X  = 10**PRMX_LOG
164 ************
165 ************
166 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
167  177
168  178  POR_COMP = (10**COMP_RCK)/POROSITY
169  179
170 ******
171 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
172  172  POR_COMP = COMP_RCK/POROSITY
173  173
174 ************
175 ************
176 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
177  186
178 ******
179 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
180  180  LIMIT BLOCK 28
181  181  PERM_X  = 10**PRMX_LOG
182  182  PERM_Y  = 10**PRMY_LOG
183  183  PERM_Z  = 10**PRMZ_LOG
184  184  SB_MIN  = 1.05*SAT_RBRN
185  185
186  186  POR_COMP = (10**COMP_RCK)/POROSITY
187  187
188 ************
189 ************
190 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
191  195  LIMIT BLOCK 41
192  196
193  197  PERM_X  = 10**PRMX_LOG
194  198  PERM_Y  = 10**PRMY_LOG
195  199  PERM_Z  = 10**PRMZ_LOG
196  200  SB_MIN  = 1.05*SAT_RBRN
197  201  POR_COMP = COMP_RCK/POROSITY
198  202
199 ******
200 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
201  196
202 ************
203 ************
204 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
205  209
206 ******
207 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
208  203  LIMIT BLOCK 41
```

```
209 204
210 205  PERM_X  = 10**PRMX_LOG
211 206  PERM_Y  = 10**PRMY_LOG
212 207  PERM_Z  = 10**PRMZ_LOG
213 208  SB_MIN  = 1.05*SAT_RBRN
214 209  POR_COMP = COMP_RCK/POROSITY
215 210
216************
217************
218File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
219 229   STOICOR = MAKEPROP(STOIFX[B:56])
220 230
221******
222File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
223 230
224************
225************
226File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
227 233   SCOR_H2 =  MAKEPROP((4 - STOICOR)/3)
228 234
229 235
230 236   SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
231 237
232 238
233 239   SCOR_FE = MAKEPROP(1.0)
234 240
235******
236File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
237 233
238************
239************
240File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
241 244
242******
243File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
244 237   STOICOR = MAKEPROP(STOIFX[B:56])
245 238
246************
247************
248File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
249 247
250******
251File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
252 241   SCOR_H2 =  MAKEPROP((4 - STOICOR)/3)
253 242
254 243
255 244   SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
256 245
257 246
258 247   SCOR_FE = MAKEPROP(1.0)
259 248
260************
261************
262File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
263 276   DRH_METL =   DIRONRHW + DIRNCRHW
264 277   DRH_RUPL =   DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
265 278   DRH_BIO =   DCELLRHW + DRH_RUPL
266 279   DCH_METL =   DIRONCHW + DIRNCCHW
267 280   DCH_RUPL =   DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
268 281   DCH_BIO =   DCELLCHW + DCH_RUPL
269 282
270******
271File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
272 277
273************
274************
275File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
276 289
277******
278File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
279 284   DRH_METL =   DIRONRHW + DIRNCRHW
280 285   DRH_RUPL =   DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
281 286   DRH_BIO =   DCELLRHW + DRH_RUPL
282 287   DCH_METL =   DIRONCHW + DIRNCCHW
283 288   DCH_RUPL =   DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
284 289   DCH_BIO =   DCELLCHW + DCH_RUPL
285 290
286************
287************
288File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
289 301   WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
290 302
291 303
292 304   WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
293 305
294 306
295 307   WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
296 308
297******
298File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
299 302
300************
301************
302File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
303 312   PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
304 313   BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
305 314
306******
307File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
308 306
309************
310************
311File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
312 317
```

```
13******
14File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
15 309    WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
16 310
17 311
18 312    WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
19 313
20 314
21 315    WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
22 316
23************
24************
25File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
26 321
27 322    WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
28 323
29******
30File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
31 320    PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
32 321    BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
33 322
34************
35************
36File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
37 328    CONCFE  =  WTFETOT/VREPOS[B:58]
38 329
39******
40File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
41 327
42************
43************
44File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
45 332
46 333
47 334    CONCBIO  =  WTBIOTOT/VREPOS[B:58]
48 335
49******
50File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
51 330    WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
52 331
53************
54************
55File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
56 338    CH20CONC  =  WTCELTOT/VREPOS[B:58]
57 339
58******
59File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
60 334
61 335
62 336    CONCFE  =  WTFETOT/VREPOS[B:58]
63 337
64************
```

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365************
366File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
367 344
368******
369File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
370 342    CONCBIO  =  WTBIOTOT/VREPOS[B:58]
371 343
372************
373************
374File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
375 347
376 348
377 349    DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
378 350    DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
379 351    DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
380 352
381******
382File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
383 346    CH20CONC  =  WTCELTOT/VREPOS[B:58]
384 347
385************
386************
387File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
388 362    A1      = 6*1000*WTBIOTOT/162
389 363
390******
391File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
392 357    DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
393 358    DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
394 359    DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
395 360
396************
397************
398File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
399 366    A2      = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
400 367    MAX_CELL  =  MIN(A1,A2)
401 368
402******
403File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
404 363
405************
406************
407File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
408 372    B1      = 1000*WTFETOT/56
409 373
410******
411File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
412 367
413************
414************
415File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
416 376
```

```
417******
418File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
419 370    A1      = 6*1000*WTBIOTOT/162
420 371
421************
422************
423File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
424 379
425 380
426 381    B2      = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
427 382    MAX_FE  = MIN(B1,B2)
428 383
429******
430File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
431 374    A2      = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
432 375    MAX_CELL = MIN(A1,A2)
433 376
434************
435************
436File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
437 387    MOL_NO3 = QINIT[B:55]
438******
439File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
440 380    B1      = 1000*WTFETOT/56
441 381
442 382
443 383
444 384
445 385
446 386
447 387
448 388
449 389    B2      = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
450 390    MAX_FE  = MIN(B1,B2)
451 391
452 392
453 393
454 394
455 395    MOL_NO3 = QINIT[B:55]
456************
457************
458File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
459 1111   limit block 68
460******
461File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
462 1119
463 1120
464 1121   LIMIT BLOCK 60 62 64
465 1122   PERM_X = 1E-3
466 1123   PERM_Y = 1E-3*PRMY_MUL
467 1124   PERM_Z = 1E-3
468 1125
469 1126
470 1127   limit block 68
471************
472
473Number of difference sections found: 35
474Number of difference records found: 186
475
476DIFFERENCES
477/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[
478NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_R2_4.DIFF;1-
479    N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6-
480    N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
```

```
1 ************
2 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
3  51  DIP1    = 1.0
4  52  DIP2    = 0.0
5  53  THETA1  = DIP1*2.0*PI[B:58]/360.0
6  54  THETA2  = DIP2*2.0*PI[B:58]/360.0
7  55
8 ******
9 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
10  51
11 ************
12 ************
13 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
14  63
15 ******
16 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
17  59  DIP1    = 1.0
18  60  DIP2    = 0.0
19  61  THETA1  = DIP1*2.0*PI[B:58]/360.0
20  62  THETA2  = DIP2*2.0*PI[B:58]/360.0
21  63
22 ************
23 ************
24 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
25  68  LIMIT BLOCK 29
26  69
27  70
28  71  PERM_X  = MAKEPROP(10**(-24.75))
29  72  PERM_Y  = PERM_X
30  73  PERM_Z  = PERM_X
31  74  SB_MIN  = 1.05*SAT_RBRN
32  75  POR_COMP = COMP_RCK/POROSITY
33  76
34 ******
35 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
36  68
37 ************
38 ************
39 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
40  83  LIMIT BLOCK 37
41  84  PERM_X  = 10**PRMX_LOG
42  85  PERM_Y  = 10**PRMY_LOG
43  86  PERM_Z  = 10**PRMZ_LOG
44  87  POROSITY = POROSITY[B:29] + 0.0029
45  88  PORE_DIS = PORE_DIS
46  89  RELP_MOD = RELP_MOD
47  90  SB_MIN  = 1.05*SAT_RBRN
48 ******
49 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
50  75
51  76  LIMIT BLOCK 29
52  77
53  78
54  79  PERM_X  = MAKEPROP(10**(-24.75))
55  80  PERM_Y  = PERM_X
56  81  PERM_Z  = PERM_X
57  82  SB_MIN  = 1.05*SAT_RBRN
58 ************
59 ************
60 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
61  98  LIMIT BLOCK 30
62  99
63  100
64  101  PERM_X  = MAKEPROP(10**(-17.1))
65  102  PERM_Y  = PERM_X
66  103  PERM_Z  = PERM_X
67  104  SB_MIN  = 1.05*SAT_RBRN
68  105  POR_COMP = COMP_RCK/POROSITY
69  106  PHIMAX  = POROSITY + DPHIMAX
70  107
71  108
72  109  TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
73  110  PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
74  111
75 ******
76 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
77  90
78  91  LIMIT BLOCK 37
79  92  PERM_X  = 10**PRMX_LOG
80  93  PERM_Y  = 10**PRMY_LOG
81  94  PERM_Z  = 10**PRMZ_LOG
82  95  POROSITY = POROSITY[B:29] + 0.0029
83  96  PORE_DIS = PORE_DIS
84  97  RELP_MOD = RELP_MOD
85  98  SB_MIN  = 1.05*SAT_RBRN
86  99  POR_COMP = COMP_RCK/POROSITY
87  100
88 ************
89 ************
90 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
91  117
92 ******
93 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
94  106  LIMIT BLOCK 30
95  107
96 ************
97 ************
98 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
99  120  LIMIT BLOCK 31
100  121  PERM_X  = PERM_X[B:30]
101  122  PERM_Y  = PERM_Y[B:30]
102  123  PERM_Z  = PERM_Z[B:30]
103  124  RELP_MOD = RELP_MOD[B:30]
104  125  PORE_DIS = PORE_DIS[B:30]
```

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105  126  SAT_RBRN = SAT_RBRN[B:30]
106  127  SAT_RGAS = SAT_RGAS[B:30]
107  128  SB_MIN  = 1.05*SAT_RBRN
108******
109 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
110  110
111  111  KMAXLOG  = -3.0
112  112  PERM_X  = MAKEPROP(10**(-17.1))
113  113  PERM_Y  = PERM_X
114  114  PERM_Z  = PERM_X
115  115  SB_MIN  = 1.05*SAT_RBRN
116************
117************
118 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
119  143  LIMIT BLOCK 34 35 36
120  144  PERM_X  = 10**PRMX_LOG
121  145  PERM_Y  = 10**PRMY_LOG
122  146  PERM_Z  = 10**PRMZ_LOG
123  147  SB_MIN  = 1.05*SAT_RBRN
124  148  POR_COMP = COMP_RCK/POROSITY
125  149
126******
127 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
128  130
129  131  LIMIT BLOCK 31
130  132  KMAXLOG  = KMAXLOG[ID:30]
131  133  PERM_X  = PERM_X[B:30]
132  134  PERM_Y  = PERM_Y[B:30]
133  135  PERM_Z  = PERM_Z[B:30]
134  136  RELP_MOD = RELP_MOD[B:30]
135  137  PORE_DIS = PORE_DIS[B:30]
136  138  SAT_RBRN = SAT_RBRN[B:30]
137  139  SAT_RGAS = SAT_RGAS[B:30]
138  140  SB_MIN  = 1.05*SAT_RBRN
139  141  POR_COMP = COMP_RCK/POROSITY
140  142  PHIMAX  = POROSITY + DPHIMAX
141  143
142  144
143  145  TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
144  146  PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
145  147
146************
147************
148 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
149  157
150  158
151  159  LIMIT BLOCK 33
152  160  PERM_X  = 10**PRMX_LOG
153******
154 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
155  155  LIMIT BLOCK 34 35 36
156  156  PERM_X  = 10**PRMX_LOG
157************
158************
159 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
160  172  LIMIT BLOCK 28
161  173  PERM_X  = 10**PRMX_LOG
162******
163 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
164  168
165  169
166  170
167  171  LIMIT BLOCK 33
168  172  PERM_X  = 10**PRMX_LOG
169************
170************
171 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
172  177
173  178  POR_COMP = (10**COMP_RCK)/POROSITY
174  179
175******
176 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
177  176  POR_COMP = COMP_RCK/POROSITY
178  177
179************
180************
181 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
182  186
183******
184 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
185  184  LIMIT BLOCK 28
186  185  PERM_X  = 10**PRMX_LOG
187  186  PERM_Y  = 10**PRMY_LOG
188  187  PERM_Z  = 10**PRMZ_LOG
189  188  SB_MIN  = 1.05*SAT_RBRN
190  189
191  190  POR_COMP = (10**COMP_RCK)/POROSITY
192  191
193************
194************
195 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
196  195  LIMIT BLOCK 41
197  196
198  197  PERM_X  = 10**PRMX_LOG
199  198  PERM_Y  = 10**PRMY_LOG
200  199  PERM_Z  = 10**PRMZ_LOG
201  200  SB_MIN  = 1.05*SAT_RBRN
202  201  POR_COMP = COMP_RCK/POROSITY
203  202
204******
205 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
206  200
207************
208************
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209 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
210 209
211 ******
212 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
213 207   LIMIT BLOCK 41
214 208
215 209   PERM_X  = 10**PRMX_LOG
216 210   PERM_Y  = 10**PRMY_LOG
217 211   PERM_Z  = 10**PRMZ_LOG
218 212   SB_MIN  = 1.05*SAT_RBRN
219 213   POR_COMP = COMP_RCK/POROSITY
220 214
221 ************
222 ************
223 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
224 229   STOICOR = MAKEPROP(STOIFX[B:56])
225 230
226 ******
227 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
228 234
229 ************
230 ************
231 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
232 233   SCOR_H2 =  MAKEPROP((4 - STOICOR)/3)
233 234
234 235
235 236   SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
236 237
237 238
238 239   SCOR_FE = MAKEPROP(1.0)
239 240
240 ******
241 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
242 237
243 ************
244 ************
245 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
246 244
247 ******
248 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
249 241   STOICOR = MAKEPROP(STOIFX[B:56])
250 242
251 ************
252 ************
253 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
254 247
255 ******
256 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
257 245   SCOR_H2 =  MAKEPROP((4 - STOICOR)/3)
258 246
259 247
260 248   SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
261 249
262 250
263 251   SCOR_FE = MAKEPROP(1.0)
264 252
265 ************
266 ************
267 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
268 276   DRH_METL =   DIRONRHW + DIRNCRHW
269 277   DRH_RUPL =   DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
270 278   DRH_BIO =   DCELLRHW + DRH_RUPL
271 279   DCH_METL =   DIRONCHW + DIRNCCHW
272 280   DCH_RUPL =   DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
273 281   DCH_BIO =   DCELLCHW + DCH_RUPL
274 282
275 ******
276 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
277 281
278 ************
279 ************
280 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
281 289
282 ******
283 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
284 288   DRH_METL =   DIRONRHW + DIRNCRHW
285 289   DRH_RUPL =   DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
286 290   DRH_BIO =   DCELLRHW + DRH_RUPL
287 291   DCH_METL =   DIRONCHW + DIRNCCHW
288 292   DCH_RUPL =   DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
289 293   DCH_BIO =   DCELLCHW + DCH_RUPL
290 294
291 ************
292 ************
293 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
294 301   WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
295 302
296 303
297 304   WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
298 305
299 306
300 307   WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
301 308
302 ******
303 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
304 306
305 ************
306 ************
307 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
308 312   PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
309 313   BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
310 314
311 ******
312 File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
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313 310
314************
315************
316File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
317 317
318******
319File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
320 313    WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
321 314
322 315
323 316    WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
324 317
325 318
326 319    WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
327 320
328************
329************
330File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
331 321
332 322    WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
333 323
334******
335File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
336 324    PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
337 325    BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
338 326
339************
340************
341File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
342 328    CONCFE  =  WTFETOT/VREPOS[B:58]
343 329
344******
345File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
346 331
347************
348************
349File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
350 332
351 333
352 334    CONCBIO  =  WTBIOTOT/VREPOS[B:58]
353 335
354******
355File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
356 334    WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
357 335
358************
359************
360File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
361 338    CH20CONC  =  WTCELTOT/VREPOS[B:58]
362 339
363******
364File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
365 338
366 339
367 340    CONCFE  =  WTFETOT/VREPOS[B:58]
368 341
369************
370************
371File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
372 344
373******
374File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
375 346    CONCBIO  =  WTBIOTOT/VREPOS[B:58]
376 347
377************
378************
379File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
380 347
381 348
382 349    DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
383 350    DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
384 351    DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
385 352
386******
387File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
388 350    CH20CONC  =  WTCELTOT/VREPOS[B:58]
389 351
390************
391************
392File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
393 362    A1      = 6*1000*WTBIOTOT/162
394 363
395******
396File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
397 361    DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
398 362    DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
399 363    DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
400 364
401************
402************
403File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
404 366    A2      = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
405 367    MAX_CELL = MIN(A1,A2)
406 368
407******
408File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
409 367
410************
411************
412File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
413 372    B1      = 1000*WTFETOT/56
414 373
415******
416File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
```

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417 371
418************
419************
420File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
421 376
422******
423File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
424 374   A1      = 6*1000*WTBIOTOT/162
425 375
426************
427************
428File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
429 379
430 380
431 381   B2      = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
432 382   MAX_FE  = MIN(B1,B2)
433 383
434******
435File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
436 378   A2      = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
437 379   MAX_CELL = MIN(A1,A2)
438 380
439************
440************
441File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
442 387   MOL_NO3 = QINIT[B:55]
443******
444File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
445 384   B1      = 1000*WTFETOT/56
446 385
447 386
448 387
449 388
450 389
451 390
452 391
453 392
454 393   B2      = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
455 394   MAX_FE  = MIN(B1,B2)
456 395
457 396
458 397
459 398
460 399   MOL_NO3 = QINIT[B:55]
461************
462************
463File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
464 1111  limit block 68
465******
466File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
467 1123
468 1124
469 1125  LIMIT BLOCK 60 62 64
470 1126  PERM_X = 1E-3
471 1127  PERM_Y = 1E-3*PRMY_MUL
472 1128  PERM_Z = 1E-3
473 1129
474 1130
475 1131  limit block 68
476************
477
478Number of difference sections found: 36
479Number of difference records found: 185
480
481DIFFERENCES
482/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[
483NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_R2_5.DIFF;1-
484   N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6-
485   N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
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1 !==========================================================================
2 !
3 ! TITLE:  PREBRAG INPUT FOR 1995 2D OIL & GAS SCENARIO (WATERFLOOD) MODEL
4 !       SIDEBAR CALCULATIONS
5 ! ANALYST: DANIEL M. STOELZEL
6 ! DATE:   AUGUST 19, 1995
7 ! SCENARIO: DISTURBED WITH 2 WELLS AT 2400m, 2 WELLS PENETRATING WASTE, ONE
8 !       WELL OFFSET TO WASTE AREA (5 TOTAL)
9 !       : SINGLE CLOSURE SURFACE
10 !       :  A)CREEP CLOSURE IN WASTE AREAS
11 !       : FRACTURE IN MARKER BEDS
12 !       : LOWER GEOLOGICAL UNITS INCLUDED (BELL C. TO MORROW)
13 !       : ONE DEGREE DIP FOR SALADO AND DEEPER, SHAFT UP-DIP
14 !
15 !           MODIFIED: 3/5/96
16 !           BY: D.M. STOELZEL
17 !           CHANGES TO REFLECT NEW DATABASE, AND NEW MESH THAT FOLLOWS 40CFR194
18 !           REGULATIONS:
19 !                       : NO ACTIVE PHASE FOR FUTURE WELLS BOTH IN AND AROUND LWB
20 !                       : ONLY ACTIVE PHASE TO REFLECT CURRENT OIL & GAS ACTIVITY
21 !                       : TWO WELLS AT 2400 METERS WIL BE RADIALLY FLARED FOR 1/2 FLOW
22 !                       : NO TIME-DEPENDENT SHAFT SEAL PERMS (SIMPLIFIED FOR THIS MODEL
23 !
24 !           6/14/96
25 !           CHANGES TO REFLECT CCA BOREHOLE ABANDONING
26 !                       : CASING LEAK IN SALT ONLY FOR 50 YEAR ACTIVE PHASE
27 !                       : 200 YEARS OF CEMENT PLUG IN RUSTLER AND BELL CANYON, WITH
28 !                                 OPEN PIPE BETWEEN
29 !                       : SAND FILLED BOREHOLE FOR THE NEXT 1,000 YEARS
30 !                       : CREEP CLOSED IN LOWER PART OF SALT TO 10,000 YEARS
31 !==========================================================================
32 *HEADING
33 TITLE2 = 1996 FEPS: Present day effects of oil and gas development
34 !==========================================================================
35 !CLOSURE INFORMATION
36 *CLOSURE
37 CONTROL, TYPE = PRESSURE, AVE = CELL
38 SURFACE, MODEL = JAN_96,  PRES_LITHO = 50.0E6,  TIME_OFF = 3.155693E12,&
39                 PERM_FACTOR= WAS_AREA:PERM_X, PERM_EXP = 0.0
40 REGION,  MAT =   WAS_AREA, MODEL = JAN_96
41 !==========================================================================
42 *RESET
43 !RESET REGIONS ARE GIVEN THE INITIAL PRESSURE AND SATURATION SPECIFIED IN
44 ! THE INITIAL CONDITIONS AT THE RESET TIME
45 REGION,MAT=CAVITY_2
46 REGION,MAT=CAVITY_3
47 REGION,MAT=CAVITY_4
48 TIME=0.0
49 WASTE,MAT_OLD=CAVITY_2,MAT_NEW=WAS_AREA,&
50        PRES_BRINE=101325.0, SAT_BRINE=0.0
51 !==========================================================================
52 *INITIAL_CONDITIONS
53 !BEGIN SIMULATION AT -5 YEARS
54 BEGIN, TIME=-1.577846E8
55 SATBR,  ID_BRINE =SATBREL
56 PRESSURE,ID_PRES  =PRESEL
57 CONFE  , ID_CONFE =FECONC
58 CONCELL, ID_CONCEL=CH2OCONC
59 ELEVAT,  ID_ELEV  =ELEVE
60 !==========================================================================
61 *STEP_CONTROL
62 !TIME STEP IS REDUCED
63 ! 1. AT   0 YEARS: WASTE IS INTRODUCED,
64   TIME,BEGIN=0.0, DT=864.0
65 ! 2. AT  50 YEARS: MATERIAL CHANGE
66   TIME,BEGIN=1.577846E9, DT=864.0
67 ! 3. AT 100 YEARS: MATERIAL CHANGE
68   TIME,BEGIN=3.155693E9, DT=864.0
69 ! 4. AT 200 YEARS: MATERIAL CHANGE
70   TIME,BEGIN=6.311385E9, DT=864.0
71 ! 5. AT 250 YEARS: MATERIAL CHANGE
72   TIME,BEGIN=7.889225E9, DT=864.0
73 ! 6. AT 1250 YEARS: MATERIAL CHANGE
74   TIME,BEGIN=3.944613E10,DT=864.0
75 !==========================================================================
76 *MODIFY_MAP
77 ! ID=1 => 0 YEARS : WASTE INTRODUCED, SHAFT SEALS AND FILL INTRODUCED
78 !              ACTIVE PHASE OF WELLS AT 2,400 METERS
79 !              CASING LEAK THRU SALT
80 !<<<<<<<  TIME PERIODS 2 (10 YRS) & 3 (25 YRS) EXCLUDED FOR SIMPLICITY >>>>>>
81 ! ID=2 => 50 YEARS : MIDDLE AND LOWER CLAY AND COMPACTED SALT (TIME PERIOD 4)
82 !               WELLS TURNED OFF
83 !               CMT PLUGS IN RUSTLER AND BELL C. OPEN BH BETWEEN
84 ! ID=3 => 100 YEARS : MIDDLE CLAY  AND COMPACTED SALT (TIME PERIOD 5)
85 ! ID=4 => 200 YEARS : COMPACTED SALT (TIME PERIOD 6)
86 !
87 ! ID=5 => 250 YEARS : ENTIRE BOREHOLE(S) TO SAND FILLED
88 ! ID=6 => 1250 YEARS: LOWER SALT SECTION OF BH TO CREEP CLOSED
89 ! <<<<<<< 400 YEARS : CONCRETE (TIME PERIOD 2) NOT INCLUDED >>>>>>>>>>
90 TIME,TIME_ID=1, BEGIN= 0.0
91 TIME,TIME_ID=2, BEGIN= 1.577846E9
92 TIME,TIME_ID=3, BEGIN= 3.155693E9
93 TIME,TIME_ID=4, BEGIN= 6.311385E9
94 TIME,TIME_ID=5, BEGIN= 7.889225E9
95 TIME,TIME_ID=6, BEGIN= 3.944613E10
96 !********
97 ! 0 YEARS
98 !********
99 !INTRODUCE FINAL DRZ MATERIAL
100 MODIFY, MAT=DRZ_1,   TIME_ID=1, IRANGE=36,59, JRANGE=26,26,  KRANGE=1,1
101 !INTRODUCE WASTE INTO REST OF REPOSITORY
102 MODIFY, MAT=WAS_AREA,  TIME_ID=1, IRANGE= 36,42, JRANGE=27,30, KRANGE=1,1
103 MODIFY, MAT=WAS_AREA,  TIME_ID=1, IRANGE= 44,50, JRANGE=27,30, KRANGE=1,1
104 !INTRODUCE PANEL SEAL MATERIAL
105 MODIFY, MAT=PAN_SEAL, TIME_ID=1, IRANGE=43,43, JRANGE=27,30, KRANGE=1,1
106 MODIFY, MAT=PAN_SEAL, TIME_ID=1, IRANGE=51,51, JRANGE=27,30, KRANGE=1,1
107 !INTRODUCE OPERATIONS REGION MATERIAL
108 MODIFY, MAT=OPS_AREA, TIME_ID=1, IRANGE=52,55, JRANGE=28,29, KRANGE=1,1
109 !INTRODUCE EXPERIMENTAL REGION MATERIAL
110 MODIFY, MAT=EXP_AREA, TIME_ID=1, IRANGE=57,59, JRANGE=28,29, KRANGE=1,1
111 !INTRODUCE TRUE CULEBRA REGION TO ALLOW BRINE INFLOW TO SHAFT
112 MODIFY, MAT=CULEBRA,  TIME_ID=1, IRANGE= 1,55, JRANGE=34,34, KRANGE=1,1
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MODIFY, MAT=CULEBRA,  TIME_ID=1, IRANGE=57,96, JRANGE=34,34, KRANGE=1,1
!INTRODUCE UPPER CLAY FILL (RUSTLER)
MODIFY, MAT=CLAY_RUS,  TIME_ID=1, IRANGE=56,56, JRANGE=33,34, KRANGE=1,1
!INTRODUCE CRUSHED SALT
MODIFY, MAT=SALT_T1,  TIME_ID=1, IRANGE=56,56, JRANGE=32,32, KRANGE=1,1
!INTRODUCE LOWER CLAY
MODIFY, MAT=CL_L_T1,  TIME_ID=1, IRANGE=56,56, JRANGE=29,31, KRANGE=1,1
!INTRODUCE LOWER SHAFT: SAME AS OPS_AREA, NO CONCRETE MONOLITH
MODIFY, MAT=OPS_AREA,  TIME_ID=1, IRANGE=56,56, JRANGE=27,28, KRANGE=1,1
!TURN ON TWO WELLS OUTSIDE THE LWA
!DISPOSAL WELLS INTO UPPER BELL CANYON. LEAKING CASING THROUGH SALADO
!WELL NO. 1
MODIFY, MAT=BH_LOW_L, TIME_ID=1, IRANGE=  8, 8, JRANGE=23,23, KRANGE=1,1
MODIFY, MAT=BH_SLT_L, TIME_ID=1, IRANGE=  8, 8, JRANGE=24,32, KRANGE=1,1
!WELL NO. 2
MODIFY, MAT=BH_LOW_L, TIME_ID=1, IRANGE=89, 89, JRANGE=23,23, KRANGE=1,1
MODIFY, MAT=BH_SLT_L, TIME_ID=1, IRANGE=89, 89, JRANGE=24,32, KRANGE=1,1
!*************************************************************************
!        END OF TIME PERIOD 1 MATERIAL RESETS
!*************************************************************************
!********
! 50 YEARS
!********
!INTRODUCE CRUSHED SALT
MODIFY, MAT=SALT_T4,  TIME_ID=2, IRANGE=56,56, JRANGE=32,32, KRANGE=1,1
!INTRODUCE LOWER CLAY
MODIFY, MAT=CL_L_T4,  TIME_ID=2, IRANGE=56,56, JRANGE=29,31, KRANGE=1,1
!TURN OFF TWO WELLS OUTSIDE THE LWA
!DISPOSAL WELLS INTO UPPER BELL CANYON GO TO PLUGGED STATE AT BELL C & RUSTLER
!WELL NO. 1
MODIFY, MAT=CONC_PLG, TIME_ID=2, IRANGE=  8, 8, JRANGE=23,23, KRANGE=1,1
MODIFY, MAT=BH_OPEN,  TIME_ID=2, IRANGE=  8, 8, JRANGE=24,32, KRANGE=1,1
MODIFY, MAT=CONC_PLG, TIME_ID=2, IRANGE=  8, 8, JRANGE=33,34, KRANGE=1,1
!WELL NO. 2
MODIFY, MAT=CONC_PLG, TIME_ID=2, IRANGE=89, 89, JRANGE=23,23, KRANGE=1,1
MODIFY, MAT=BH_OPEN,  TIME_ID=2, IRANGE=89, 89, JRANGE=24,32, KRANGE=1,1
MODIFY, MAT=CONC_PLG, TIME_ID=2, IRANGE=89, 89, JRANGE=33,34, KRANGE=1,1
!*************************************************************************
!        END OF TIME PERIOD 2 MATERIAL RESETS
!*************************************************************************
!********
! 100 YEARS
!********
!INTRODUCE CRUSHED SALT
MODIFY, MAT=SALT_T5,  TIME_ID=3, IRANGE=56,56, JRANGE=32,32, KRANGE=1,1
!*************************************************************************
!        END OF TIME PERIOD 3 MATERIAL RESETS
!*************************************************************************
!********
! 200 YEARS
!********
!INTRODUCE CRUSHED SALT
MODIFY, MAT=SALT_T6,  TIME_ID=4, IRANGE=56,56, JRANGE=32,32, KRANGE=1,1
!*************************************************************************
!        END OF TIME PERIOD 4 MATERIAL RESETS
!*************************************************************************
!********
! 250 YEARS
!********
!DISPOSAL WELLS INTO UPPER BELL CANYON GO TO ABANDONED STATE (SAND-FILLED)
!WELL NO. 1
MODIFY, MAT=BH_LOW_A, TIME_ID=5, IRANGE=  8, 8, JRANGE=23,23, KRANGE=1,1
MODIFY, MAT=BH_SLT_A, TIME_ID=5, IRANGE=  8, 8, JRANGE=24,32, KRANGE=1,1
MODIFY, MAT=BH_SUR_A, TIME_ID=5, IRANGE=  8, 8, JRANGE=33,34, KRANGE=1,1
!WELL NO. 2
MODIFY, MAT=BH_LOW_A, TIME_ID=5, IRANGE=89, 89, JRANGE=23,23, KRANGE=1,1
MODIFY, MAT=BH_SLT_A, TIME_ID=5, IRANGE=89, 89, JRANGE=24,32, KRANGE=1,1
MODIFY, MAT=BH_SUR_A, TIME_ID=5, IRANGE=89, 89, JRANGE=33,34, KRANGE=1,1
!*************************************************************************
!        END OF TIME PERIOD 5 MATERIAL RESETS
!*************************************************************************
!********
! 1250 YEARS
!********
! LOWER SALT GOES TO CREEP CLOSED PERM
!WELL NO. 1
MODIFY, MAT=BH_CREEP, TIME_ID=6, IRANGE=  8, 8, JRANGE=25,26, KRANGE=1,1
!WELL NO. 2
MODIFY, MAT=BH_CREEP, TIME_ID=6, IRANGE=89, 89, JRANGE=25,26, KRANGE=1,1
!*************************************************************************
!        END OF TIME PERIOD 6 MATERIAL RESETS
!*************************************************************************
!
!=========================================================================
*GEOMETRY
COORD= CARTESIAN
!=========================================================================
*SIMULATION_CONTROL
INTEGRATION, TMAX=3.155693E11, DT_INIT=8.64,DT_MIN= 8.64E-4, DT_MAX=3.1557E8,&
        DT_INCR=1.25,  DT_REDU= 0.25,  AUTODT=YES,  TSWITCH=1.0,&
        MAXSTEPS=10000
!
ITERATION, DSATLIM= 2.E-1, DPRESLIM = -1.E8 , SATLIM= 1.E-3,&
        SATNORM= 0.30,  PRESNORM = 5.0E5,&
        ITMAX= 8,     IRESETMAX= 40, IJACINT= 1,&
        IJACSWITCH=41,  IJACMIN= 1,   IJACRESET= 5,&
        IUPRPFLAG =9,  IUPMFFLAG= 9,  IUPRPLOOSE= 9,&
        IUPMFLOOSE=9
!
ITERATION, DHSAT_REL= 1.0E-8,  DHPRES_REL=1.0E-8,&
        DHSAT_MIN= 1.0E-10,  DHPRES_MIN=1.0E-2
!
ITERATION, EPS_SAT  = 3.0E+0,    EPS_PRES   = 1.E-2,&
        R_EPS_SAT= 3.0E+0,    R_EPS_PRES  = 1.E-2,&
        FTOL_SAT = 1.0E-2,    FTOL_PRES  = 1.0E-2,&
        R_FTOL_SAT=1.0E-2,    R_FTOL_PRES = 1.0E-2, CONV_TEST = AND
!
NUMERICS,SOLVER=LU
NUMERICS,JACSCALE= 1.0e7,VSWITCH=NO
NUMERICS, ITRAVE= IIARMONIC, IMFRAVE=UPSTREAM
!
!=========================================================================
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*OUTPUT_CONTROL

 UNITS= SI
 MONITOR, ILOC = 47, JLOC = 23, KLOC = 1
 MONITOR, ILOC =  9, JLOC = 27, KLOC = 1
 MONITOR, ILOC = 46, JLOC = 28, KLOC = 1
 MONITOR, ILOC = 57, JLOC = 30, KLOC = 1
!
  STEPS, FILE= BINARY, NSTEP=40
  TIMES, FILE= ASCII,  VALUES= 0.0, 3.1557E11
  TIMES, FILE= RESTART,VALUES= 0.0, 3.1557E09, 3.1557E10
!
 PRIBIN,&
     PRESBRIN, PRESGAS,  POROS,   DENGAS,   PERMBRX, PERMGASX,&
     SATGAS,   FLOWGASX, FLOWGASY, FLOWBRX,  FLOWBRY,&
     FECONC,   CELLCONC, BRINRATE
!
 PRIASC,&
     PRESBRIN, PRESGAS,  POROS,   SATGAS,   FECONC,  CELLCONC
!
!HORIZONTAL BRINE FLOW ACROSS 2.4K SOUTH BOUNDARY (MARKER BEDS)
 HISTORY, NAMES=  FLOWBRX,  IRANGE= 9,9,   JRANGE=27,27, KRANGE=1,1
 HISTORY, NAMES=  FLOWBRX,  IRANGE= 9,9,   JRANGE=30,30, KRANGE=1,1
!HORIZONTAL BRINE FLOW ACROSS 2.4K SOUTH BOUNDARY (CULEBRA)
 HISTORY, NAMES=  FLOWBRX,  IRANGE= 9,9,   JRANGE=34,34, KRANGE=1,1
!HORIZONTAL BRINE FLOW ACROSS 2.4K NORTH BOUNDARY (MARKER BEDS)
 HISTORY, NAMES=  FLOWBRX,  IRANGE=89,89,  JRANGE=27,27, KRANGE=1,1
 HISTORY, NAMES=  FLOWBRX,  IRANGE=89,89,  JRANGE=30,30, KRANGE=1,1
!HORIZONTAL BRINE FLOW ACROSS 2.4K NORTH BOUNDARY (CULEBRA)
 HISTORY, NAMES=  FLOWBRX,  IRANGE=89,89,  JRANGE=34,34, KRANGE=1,1
!HORIZONTAL BRINE FLOW ACROSS 2.4K SOUTH BOUNDARY (MARKER BEDS)
 HISTORY, NAMES=  FLOWGASX, IRANGE= 9,9,   JRANGE=27,27, KRANGE=1,1
 HISTORY, NAMES=  FLOWGASX, IRANGE= 9,9,   JRANGE=30,30, KRANGE=1,1
!HORIZONTAL BRINE FLOW ACROSS 2.4K SOUTH BOUNDARY (CULEBRA)
 HISTORY, NAMES=  FLOWGASX, IRANGE= 9,9,   JRANGE=34,34, KRANGE=1,1
!HORIZONTAL BRINE FLOW ACROSS 2.4K NORTH BOUNDARY (MARKER BEDS)
 HISTORY, NAMES=  FLOWGASX, IRANGE=89,89,  JRANGE=27,27, KRANGE=1,1
 HISTORY, NAMES=  FLOWGASX, IRANGE=89,89,  JRANGE=30,30, KRANGE=1,1
!HORIZONTAL BRINE FLOW ACROSS 2.4K NORTH BOUNDARY (CULEBRA)
 HISTORY, NAMES=  FLOWGASX, IRANGE=89,89,  JRANGE=34,34, KRANGE=1,1
!BRINE FLOW ACROSS MARKER BEDS BOUNDARY SOUTH (FROM REPOSITORY)
 HISTORY, NAMES=  FLOWBRX,  IRANGE=36,36,  JRANGE=27,27, KRANGE=1,1
 HISTORY, NAMES=  FLOWBRX,  IRANGE=36,36,  JRANGE=30,30, KRANGE=1,1
!BRINE FLOW ACROSS MARKER BEDS BOUNDARY NORTH (FROM REPOSITORY)
 HISTORY, NAMES=  FLOWBRX,  IRANGE=60,60,  JRANGE=27,27, KRANGE=1,1
 HISTORY, NAMES=  FLOWBRX,  IRANGE=60,60,  JRANGE=30,30, KRANGE=1,1
!GAS  FLOW ACROSS MARKER BEDS BOUNDARY SOUTH (FROM REPOSITORY)
 HISTORY, NAMES=  FLOWGASX, IRANGE=36,36,  JRANGE=27,27, KRANGE=1,1
 HISTORY, NAMES=  FLOWGASX, IRANGE=36,36,  JRANGE=30,30, KRANGE=1,1
!GAS  FLOW ACROSS MARKER BEDS BOUNDARY NORTH (FROM REPOSITORY)
 HISTORY, NAMES=  FLOWGASX, IRANGE=60,60,  JRANGE=27,27, KRANGE=1,1
 HISTORY, NAMES=  FLOWGASX, IRANGE=60,60,  JRANGE=30,30, KRANGE=1,1
!
!VERTICAL BRINE FLOW UP SHAFT AT CULEBRA
 HISTORY, NAMES=  FLOWBRY,  IRANGE=56,56,  JRANGE=34,34, KRANGE=1,1
!VERTICAL GAS FLOW UP SHAFT AT CULEBRA
 HISTORY, NAMES=  FLOWGASY, IRANGE=56,56,  JRANGE=34,34, KRANGE=1,1
!
!VERTICAL BRINE FLOW UP SHAFT AT REPOSITORY
 HISTORY, NAMES=  FLOWBRY,  IRANGE=56,56,  JRANGE=31,31, KRANGE=1,1
!VERTICAL GAS FLOW UP SHAFT AT REPOSITORY
 HISTORY, NAMES=  FLOWGASY, IRANGE=56,56,  JRANGE=31,31, KRANGE=1,1
!
!FLOW RATE OF INJECTED BRINE FOR TWO DISPOSAL WELLS
 HISTORY, NAMES=  WELLBRINE, IRANGE= 8, 8,  JRANGE=23,23, KRANGE=1,1
 HISTORY, NAMES=  WELLBRINE, IRANGE=89,89,  JRANGE=23,23, KRANGE=1,1
! 'WATER TABLE WELLS'BRINE AND GAS INFLOW OR OUTFLOW TO SURFACE
 HISTORY, NAMES=  WELLBRINE, IRANGE= 8, 8,  JRANGE=34,34, KRANGE=1,1
 HISTORY, NAMES=  WELLBRINE, IRANGE=89,89,  JRANGE=34,34, KRANGE=1,1
 HISTORY, NAMES=  WELLGAS,   IRANGE= 8, 8,  JRANGE=34,34, KRANGE=1,1
 HISTORY, NAMES=  WELLGAS,   IRANGE=89,89,  JRANGE=34,34, KRANGE=1,1
!*********************************************************************
!          END OF HISTORY VARIABLES
!*********************************************************************
!
*REACTION_CHEMISTRY
!
 WICKING, MAT= WAS_AREA, VALUE=SAT_WICK
 NUMERICS, SMOOTH=ON,  ALPHARXN=1000.0
 RATES,  MAT=WAS_AREA, COR_IN=GRATCORI, COR_HUM=GRATCORH,&
              MIC_IN=GRATMICI, MIC_HUM=GRATMICH,&
              SCOR_GAS=STOICOR,SMIC_GAS=STOIMIC
!
 VOLUME, MAT=WAS_AREA,  VOL_CHW = VOLCHW, VOL_RHW = VOLRHW
!
 DENSITY, MAT=WAS_AREA, METAL_RH= DRH_METL, BIO_RH= DRH_BIO,&
              METAL_CH= DCH_METL, BIO_CH= DCH_BIO
!
 SATURATION, MAT=WAS_AREA, VALUE= SAT_IBRN
!=====================================================================
!=====================================================================
*PROPERTIES
! GET SOLID properties from CAMDAT file
!Salado Halite
 SOLID, MAT=S_HALITE,&
          PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
          PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
          BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
          BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
          SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
          PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
          RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
          PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
 SOLID, MAT=DRZ_0,&
          PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
          PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
          BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
          BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
          SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
          PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
          RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
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337          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
338!
339 SOLID, MAT=DRZ_1,&
340          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
341          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
342          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
343          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
344          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
345          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
346          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
347          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
348!
349 SOLID, MAT=S_MB139,&
350          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
351          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
352          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
353          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
354          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
355          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
356          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
357          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
358!
359 SOLID, MAT=S_MB138,&
360          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
361          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
362          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
363          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
364          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
365          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
366          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
367          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
368!
369 SOLID, MAT=CAVITY_2,&
370          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
371          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
372          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
373          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
374          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
375          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
376          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
377          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
378!
379 SOLID, MAT=CAVITY_3,&
380          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
381          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
382          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
383          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
384          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
385          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
386          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
387          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
388!
389 SOLID, MAT=CAVITY_4,&
390          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
391          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
392          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
393          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
394          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
395          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
396          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
397          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
398!
399 SOLID, MAT=IMPERM_Z,&
400          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
401          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
402          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
403          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
404          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
405          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
406          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
407          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
408!
409 SOLID, MAT=CASTILER,&
410          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
411          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
412          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
413          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
414          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
415          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
416          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
417          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
418!
419 SOLID, MAT=WAS_AREA,&
420          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
421          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
422          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
423          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
424          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
425          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
426          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
427          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
428!
429 SOLID, MAT=UNNAMED,&
430          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
431          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
432          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
433          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
434          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
435          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
436          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
437          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
438!
439 SOLID, MAT=CULEBRA,&
440          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
441          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
442          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
443          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
444          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
445          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
446          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
447          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
448!
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SOLID, MAT=OPS_AREA,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=EXP_AREA,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=CLAY_RUS,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=CL_L_T1,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=CL_L_T4,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=SALT_T1,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=SALT_T4,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=SALT_T5,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=SALT_T6,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=PAN_SEAL,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=BH_SUR_A,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
        PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
        BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
        BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
        SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
        PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
        RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
        PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
!
SOLID, MAT=BH_SLT_A,&
        PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
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51          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
52          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
53          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
54          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
55          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
56          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
57          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
58!
59 SOLID, MAT=BH_LOW_A,&
70          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
71          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
72          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
73          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
74          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
75          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
76          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
77          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
78!
79 SOLID, MAT=BH_SLT_L,&
80          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
81          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
82          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
83          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
84          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
85          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
86          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
87          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
88!
89 SOLID, MAT=BH_LOW_L,&
90          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
91          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
92          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
93          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
94          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
95          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
96          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
97          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
98!
99 SOLID, MAT=CONC_PLG,&
00          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
01          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
02          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
03          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
04          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
05          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
06          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
07          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
08!
09 SOLID, MAT=BH_OPEN,&
10          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
11          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
12          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
13          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
14          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
15          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
16          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
617         PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
618!
619 SOLID, MAT=BH_SAND,&
620         PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
621         PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
622         BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
623         BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
624         SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
625         PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
626         RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
627         PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
628!
629 SOLID, MAT=BH_CREEP,&
630         PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
631         PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
632         BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
633         BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
634         SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
635         PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
636         RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
637         PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
638!
639 ! GET FRACTURE PROPERTIES
640 FRACTURE, MAT= S_MB139, FRAC_PI = PI_DELTA, FRAC_PF = PF_DELTA,&
641             FRAC_PHI = PHIMAX, FRAC_EXP = PERM_EXP,&
642             FRAC_PMX = IFRX,   FRAC_PMY = IFRY,&
643             FRAC_PMZ = IFRZ
644!
645 FRACTURE, MAT= S_MB138, FRAC_PI = PI_DELTA, FRAC_PF = PF_DELTA,&
646             FRAC_PHI = PHIMAX, FRAC_EXP = PERM_EXP,&
647             FRAC_PMX = IFRX,   FRAC_PMY = IFRY,&
648             FRAC_PMZ = IFRZ
649!
650 ! GET FLUID (brine and gas) properties from CAMDAT file
651 FLUID, MAT=BRINESAL, SALINITY=WTF, DEN_BR=DNSFLUID,&
652            COMPR_BR= COMP, REF_TEMP= REF_TEMP,&
653            REF_PRES=REF_PRES, TABLE=INTERP, VIS_BR=VISCO
654 FLUID, MAT=H2,     VIS_GAS=VISCO,DGAS = OFF,&
655            H2_MOLE =1.0, CO2_MOLE=0.0, CH4_MOLE=0.0,&
656            N2_MOLE= 0.0, H2S_MOLE=0.0, O2_MOLE=0.0
657 FLUID, MAT=S_MB139, KLINK=ON, B_KLINK=BKLINK, EXP_KLINK=EXPKLINK
658!
659 SOLID, MAT=MORRO_P1,&
660         PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
661         PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
662         BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
663         BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
664         SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
665         PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
666         RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
667         PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
668!
669 SOLID, MAT=MORRO_P2,&
670         PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
671         PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
672         BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
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73          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
74          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
75          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
76          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
77          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
78!
79 SOLID, MAT=MORRO_P3,&
80          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
81          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
82          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
83          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
84          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
85          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
86          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
87          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
88!
89 SOLID, MAT=MORRO_NP,&
90          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
91          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
92          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
93          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
94          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
95          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
96          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
97          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
98!
99 SOLID, MAT=ATOKA_P1,&
00          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
01          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
02          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
03          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
04          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
05          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
06          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
07          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
08!
09 SOLID, MAT=ATOKA_P2,&
10          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
11          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
12          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
13          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
14          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
15          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
16          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
17          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
18!
19 SOLID, MAT=ATOKA_P3,&
20          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
21          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
22          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
23          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
24          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
25          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
26          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
27          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
28!
729 SOLID, MAT=ATOKA_NP,&
730         PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
731         PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
732         BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
733         BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
734         SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
735         PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
736         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
737         PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
738!
739 SOLID, MAT=STRWN_P1,&
740         PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
741         PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
742         BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
743         BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
744         SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
745         PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
746         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
747         PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
748!
749 SOLID, MAT=STRWN_P2,&
750         PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
751         PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
752         BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
753         BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
754         SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
755         PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
756         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
757         PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
758!
759 SOLID, MAT=STRWN_P3,&
760         PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
761         PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
762         BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
763         BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
764         SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
765         PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
766         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
767         PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
768!
769 SOLID, MAT=STRWN_NP,&
770         PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
771         PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
772         BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
773         BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
774         SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
775         PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
776         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
777         PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
778!
779 SOLID, MAT=BONES_P1,&
780         PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
781         PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
782         BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
783         BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
784         SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
```

```
5          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
6          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
7          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
8!
9 SOLID, MAT=BONES_P2,&
0          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
1          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
2          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
3          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
4          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
5          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
6          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
7          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
8!
9 SOLID, MAT=BONES_P3,&
0          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
1          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
2          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
3          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
4          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
5          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
6          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
7          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
8!
9 SOLID, MAT=BONES_NP,&
0          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
1          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
2          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
3          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
4          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
5          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
6          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
7          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
8!
9 SOLID, MAT=LBRSH_P1,&
0          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
1          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
2          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
3          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
4          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
5          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
6          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
7          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
8!
9 SOLID, MAT=LBRSH_P2,&
0          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
1          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
2          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
3          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
4          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
5          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
6          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
7          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
8!
9 SOLID, MAT=LBRSH_P3,&
0          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
841        PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
842        BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
843        BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
844        SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
845        PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
846        RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
847        PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
848!
849 SOLID, MAT=UBRSH_NP,&
850        PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
851        PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
852        BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
853        BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
854        SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
855        PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
856        RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
857        PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
858!
859 SOLID, MAT=UBRSH_P1,&
860        PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
861        PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
862        BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
863        BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
864        SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
865        PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
866        RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
867        PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
868!
869 SOLID, MAT=UBRSH_P2,&
870        PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
871        PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
872        BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
873        BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
874        SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
875        PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
876        RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
877        PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
878!
879 SOLID, MAT=UBRSH_P3,&
880        PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
881        PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
882        BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
883        BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
884        SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
885        PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
886        RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
887        PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
888!
889 SOLID, MAT=LBELL_NP,&
890        PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
891        PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
892        BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
893        BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
894        SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
895        PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
896        RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
```

```
          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
!
SOLID, MAT=UBELL_P1,&
          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
!
SOLID, MAT=UBELL_P2,&
          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
!
SOLID, MAT=UBELL_P3,&
          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
!
!==================================================================
! DIRICHLET CONDITIONS HERE!!!!
*DIRICHLET
DIRICHLET, PRESSURE=5.23152E07, SAT=1.0, IRANGE=1,1, JRANGE= 2, 2, KRANGE=1,1
DIRICHLET, PRESSURE=5.10678E07, SAT=1.0, IRANGE=1,1, JRANGE= 3, 3, KRANGE=1,1
DIRICHLET, PRESSURE=4.99205E07, SAT=1.0, IRANGE=1,1, JRANGE= 5, 5, KRANGE=1,1
DIRICHLET, PRESSURE=4.87533E07, SAT=1.0, IRANGE=1,1, JRANGE= 6, 6, KRANGE=1,1
DIRICHLET, PRESSURE=4.75817E07, SAT=1.0, IRANGE=1,1, JRANGE= 8, 8, KRANGE=1,1
DIRICHLET, PRESSURE=4.20503E07, SAT=1.0, IRANGE=1,1, JRANGE= 9, 9, KRANGE=1,1
DIRICHLET, PRESSURE=3.63427E07, SAT=1.0, IRANGE=1,1, JRANGE=10,10, KRANGE=1,1
DIRICHLET, PRESSURE=3.49942E07, SAT=1.0, IRANGE=1,1, JRANGE=12,12, KRANGE=1,1
DIRICHLET, PRESSURE=3.22003E07, SAT=1.0, IRANGE=1,1, JRANGE=13,13, KRANGE=1,1
DIRICHLET, PRESSURE=2.96514E07, SAT=1.0, IRANGE=1,1, JRANGE=14,14, KRANGE=1,1
DIRICHLET, PRESSURE=2.88419E07, SAT=1.0, IRANGE=1,1, JRANGE=16,16, KRANGE=1,1
DIRICHLET, PRESSURE=2.59925E07, SAT=1.0, IRANGE=1,1, JRANGE=17,17, KRANGE=1,1
DIRICHLET, PRESSURE=2.32357E07, SAT=1.0, IRANGE=1,1, JRANGE=18,18, KRANGE=1,1
DIRICHLET, PRESSURE=2.26297E07, SAT=1.0, IRANGE=1,1, JRANGE=20,20, KRANGE=1,1
DIRICHLET, PRESSURE=2.07943E07, SAT=1.0, IRANGE=1,1, JRANGE=21,21, KRANGE=1,1
DIRICHLET, PRESSURE=1.77753E07, SAT=1.0, IRANGE=1,1, JRANGE=22,22, KRANGE=1,1
DIRICHLET, PRESSURE=1.78803E07, SAT=1.0, IRANGE=1,1, JRANGE=24,24, KRANGE=1,1
DIRICHLET, PRESSURE=8.22000E05, SAT=1.0, IRANGE=1,1, JRANGE=34,34, KRANGE=1,1
!
DIRICHLET, PRESSURE=5.23152E07, SAT=1.0, IRANGE=96,96,JRANGE= 2, 2, KRANGE=1,1
DIRICHLET, PRESSURE=5.10678E07, SAT=1.0, IRANGE=96,96,JRANGE= 3, 3, KRANGE=1,1
DIRICHLET, PRESSURE=4.99205E07, SAT=1.0, IRANGE=96,96,JRANGE= 5, 5, KRANGE=1,1
DIRICHLET, PRESSURE=4.87533E07, SAT=1.0, IRANGE=96,96,JRANGE= 6, 6, KRANGE=1,1
DIRICHLET, PRESSURE=4.75817E07, SAT=1.0, IRANGE=96,96,JRANGE= 8, 8, KRANGE=1,1
DIRICHLET, PRESSURE=4.20503E07, SAT=1.0, IRANGE=96,96,JRANGE= 9, 9, KRANGE=1,1
DIRICHLET, PRESSURE=3.63427E07, SAT=1.0, IRANGE=96,96,JRANGE=10,10, KRANGE=1,1
DIRICHLET, PRESSURE=3.49942E07, SAT=1.0, IRANGE=96,96,JRANGE=12,12, KRANGE=1,1
DIRICHLET, PRESSURE=3.22003E07, SAT=1.0, IRANGE=96,96,JRANGE=13,13, KRANGE=1,1
DIRICHLET, PRESSURE=2.96514E07, SAT=1.0, IRANGE=96,96,JRANGE=14,14, KRANGE=1,1
DIRICHLET, PRESSURE=2.88419E07, SAT=1.0, IRANGE=96,96,JRANGE=16,16, KRANGE=1,1
DIRICHLET, PRESSURE=2.59925E07, SAT=1.0, IRANGE=96,96,JRANGE=17,17, KRANGE=1,1
DIRICHLET, PRESSURE=2.32357E07, SAT=1.0, IRANGE=96,96,JRANGE=18,18, KRANGE=1,1
DIRICHLET, PRESSURE=2.26297E07, SAT=1.0, IRANGE=96,96,JRANGE=20,20, KRANGE=1,1
DIRICHLET, PRESSURE=2.07943E07, SAT=1.0, IRANGE=96,96,JRANGE=21,21, KRANGE=1,1
DIRICHLET, PRESSURE=1.77753E07, SAT=1.0, IRANGE=96,96,JRANGE=22,22, KRANGE=1,1
DIRICHLET, PRESSURE=1.64025E07, SAT=1.0, IRANGE=96,96,JRANGE=24,24, KRANGE=1,1
DIRICHLET, PRESSURE=8.22000E05, SAT=1.0, IRANGE=96,96,JRANGE=34,34, KRANGE=1,1
!
!==================================================================
! WELL DATA GOES HERE!
*WELL_DATA
TIME_CONTROL, TIME_ID=1,WELLTIME=0.0
TIME_CONTROL, TIME_ID=2,WELLTIME=1.577846E9
!==================================================
!==================================================
!
WELL_CONTROL, TIME_ID=1,NUM=1,TYPE=INJP,ILOC= 8,JLOC=23,KLOC=1,&
          QO=0.0, QG=0.0, PIWELL=7.3816E-11&
          PRWELL= 22.8E6
!
WELL_CONTROL, TIME_ID=1,NUM=1,TYPE=INJP,ILOC=89,JLOC=23,KLOC=1,&
          QO=0.0, QG=0.0, PIWELL=7.3816E-11&
          PRWELL= 22.8E6
!
!==================================================
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 1,JLOC=27,KLOC=1,&
          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
          PRWELL= 1.31521E07,1.31521E07
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 1,JLOC=30,KLOC=1,&
          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
          PRWELL= 1.31124E07,1.31124E07
!
! COMMENTED OUT 3/12/96: REPLACED W DIRICHLET B.C.
! WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 1,JLOC=34,KLOC=1,&
!          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
!          PRWELL= 8.52000E05,8.52000E05
!
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=96,JLOC=27,KLOC=1,&
          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
          PRWELL= 1.16762E07,1.16762E07
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=96,JLOC=30,KLOC=1,&
          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
          PRWELL= 1.16366E07,1.16366E07
```

```
!
! COMMENTED OUT 3/12/96: REPLACED W DIRICHLET B.C.
! WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=96,JLOC=34,KLOC=1,&
!          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
!          PRWELL= 8.52000E05,8.52000E05
!
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=  8,JLOC=34,KLOC=1,&
         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-12,1.0E-12,&
         PRWELL= 2.03740E06,2.03740E06
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 89,JLOC=34,KLOC=1,&
         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-12,1.0E-12,&
         PRWELL= 2.03740E06,2.03740E06
!
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 1,JLOC=23,KLOC=1,&
         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-15,1.0E-15,&
         PRWELL= 1.564E07,1.564E07
!
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=96,JLOC=23,KLOC=1,&
         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-15,1.0E-15,&
         PRWELL= 1.564E07,1.564E07
!
*END
!==========================================================================
```

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1 !==========================================================================
2 !
3 ! TITLE:  PREBRAG INPUT FOR 1995 2D OIL & GAS SCENARIO (WATERFLOOD) MODEL
4 !       SIDEBAR CALCULATIONS
5 ! ANALYST: DANIEL M. STOELZEL
6 ! DATE:   AUGUST 19, 1995
7 ! SCENARIO: DISTURBED WITH 2 WELLS AT 2400m, 2 WELLS PENETRATING WASTE, ONE
8 !       WELL OFFSET TO WASTE AREA (5 TOTAL)
9 !       : SINGLE CLOSURE SURFACE
10 !       :  A)CREEP CLOSURE IN WASTE AREAS
11 !       : FRACTURE IN MARKER BEDS
12 !       : LOWER GEOLOGICAL UNITS INCLUDED (BELL C. TO MORROW)
13 !       : ONE DEGREE DIP FOR SALADO AND DEEPER, SHAFT UP-DIP
14 !
15 !           MODIFIED: 3/5/96
16 !           BY: D.M. STOELZEL
17 !           CHANGES TO REFLECT NEW DATABASE, AND NEW MESH THAT FOLLOWS 40CFR194
18 !           REGULATIONS:
19 !                       : NO ACTIVE PHASE FOR FUTURE WELLS BOTH IN AND AROUND LWB
20 !                       : ONLY ACTIVE PHASE TO REFLECT CURRENT OIL & GAS ACTIVITY
21 !                       : TWO WELLS AT 2400 METERS WIL BE RADIALLY FLARED FOR 1/2 FLOW
22 !                       : NO TIME-DEPENDENT SHAFT SEAL PERMS (SIMPLIFIED FOR THIS MODEL
23 !
24 !           6/14/96
25 !           CHANGES TO REFLECT CCA BOREHOLE ABANDONING
26 !                       : CASING LEAK IN SALT ONLY FOR 50 YEAR ACTIVE PHASE
27 !                       : 200 YEARS OF CEMENT PLUG IN RUSTLER AND BELL CANYON, WITH
28 !                                 OPEN PIPE BETWEEN
29 !                       : SAND FILLED BOREHOLE FOR THE NEXT 1,000 YEARS
30 !                       : CREEP CLOSED IN LOWER PART OF SALT TO 10,000 YEARS
31 !==========================================================================
32 *HEADING
33 TITLE2 = 1996 FEPS: Present day effects of oil and gas development
34 !==========================================================================
35 !CLOSURE INFORMATION
36 *CLOSURE
37 CONTROL, TYPE = PRESSURE, AVE = CELL
38 SURFACE, MODEL = JAN_96,  PRES_LITHO = 50.0E6,  TIME_OFF = 3.155693E12,&
39                 PERM_FACTOR= WAS_AREA:PERM_X, PERM_EXP = 0.0
40 REGION,  MAT =   WAS_AREA, MODEL = JAN_96
41 !==========================================================================
42 *RESET
43 !RESET REGIONS ARE GIVEN THE INITIAL PRESSURE AND SATURATION SPECIFIED IN
44 ! THE INITIAL CONDITIONS AT THE RESET TIME
45 REGION,MAT=CAVITY_2
46 REGION,MAT=CAVITY_3
47 REGION,MAT=CAVITY_4
48 TIME=0.0
49 WASTE,MAT_OLD=CAVITY_2,MAT_NEW=WAS_AREA,&
50        PRES_BRINE=101325.0, SAT_BRINE=0.0
51 !==========================================================================
52 *INITIAL_CONDITIONS
53 !BEGIN SIMULATION AT -5 YEARS
54 BEGIN, TIME=-1.577846E8
55 SATBR,  ID_BRINE =SATBREL
56 PRESSURE,ID_PRES  =PRESEL
57 CONFE  , ID_CONFE =FECONC
58 CONCELL, ID_CONCEL=CH2OCONC
59 ELEVAT,  ID_ELEV  =ELEVE
60 !==========================================================================
61 *STEP_CONTROL
62 !TIME STEP IS REDUCED
63 ! 1. AT  0 YEARS: WASTE IS INTRODUCED,
64   TIME,BEGIN=0.0, DT=864.0
65 ! 2. AT  50 YEARS: MATERIAL CHANGE
66   TIME,BEGIN=1.577846E9, DT=864.0
67 ! 3. AT 100 YEARS: MATERIAL CHANGE
68   TIME,BEGIN=3.155693E9, DT=864.0
69 ! 4. AT 200 YEARS: MATERIAL CHANGE
70   TIME,BEGIN=6.311385E9, DT=864.0
71 ! 5. AT 250 YEARS: MATERIAL CHANGE
72   TIME,BEGIN=7.889225E9, DT=864.0
73 ! 6. AT 1250 YEARS: MATERIAL CHANGE
74   TIME,BEGIN=3.944613E10,DT=864.0
75 !==========================================================================
76 *MODIFY_MAP
77 ! ID=1 => 0 YEARS : WASTE INTRODUCED, SHAFT SEALS AND FILL INTRODUCED
78 !              ACTIVE PHASE OF WELLS AT 2,400 METERS
79 !              CASING LEAK THRU SALT
80 !<<<<<<<  TIME PERIODS 2 (10 YRS) & 3 (25 YRS) EXCLUDED FOR SIMPLICITY >>>>>>
81 ! ID=2 => 50 YEARS : MIDDLE AND LOWER CLAY AND COMPACTED SALT (TIME PERIOD 4)
82 !               WELLS TURNED OFF
83 !               CMT PLUGS IN RUSTLER AND BELL C. OPEN BH BETWEEN
84 ! ID=3 => 100 YEARS : MIDDLE CLAY  AND COMPACTED SALT (TIME PERIOD 5)
85 ! ID=4 => 200 YEARS : COMPACTED SALT (TIME PERIOD 6)
86 !
87 ! ID=5 => 250 YEARS : ENTIRE BOREHOLE(S) TO SAND FILLED
88 ! ID=6 => 1250 YEARS: LOWER SALT SECTION OF BH TO CREEP CLOSED
89 ! <<<<<<< 400 YEARS : CONCRETE (TIME PERIOD 2) NOT INCLUDED >>>>>>>>>>
90 TIME,TIME_ID=1, BEGIN= 0.0
91 TIME,TIME_ID=2, BEGIN= 1.577846E9
92 TIME,TIME_ID=3, BEGIN= 3.155693E9
93 TIME,TIME_ID=4, BEGIN= 6.311385E9
94 TIME,TIME_ID=5, BEGIN= 7.889225E9
95 TIME,TIME_ID=6, BEGIN= 3.944613E10
96 !********
97 ! 0 YEARS
98 !********
99 !INTRODUCE FINAL DRZ MATERIAL
100 MODIFY, MAT=DRZ_1,   TIME_ID=1, IRANGE=36,59, JRANGE=26,26,  KRANGE=1,1
101 !INTRODUCE WASTE INTO REST OF REPOSITORY
102 MODIFY, MAT=WAS_AREA,  TIME_ID=1, IRANGE= 36,42, JRANGE=27,30, KRANGE=1,1
103 MODIFY, MAT=WAS_AREA,  TIME_ID=1, IRANGE= 44,50, JRANGE=27,30, KRANGE=1,1
104 !INTRODUCE PANEL SEAL MATERIAL
105 MODIFY, MAT=PAN_SEAL, TIME_ID=1, IRANGE=43,43, JRANGE=27,30, KRANGE=1,1
106 MODIFY, MAT=PAN_SEAL, TIME_ID=1, IRANGE=51,51, JRANGE=27,30, KRANGE=1,1
107 !INTRODUCE OPERATIONS REGION MATERIAL
108 MODIFY, MAT=OPS_AREA, TIME_ID=1, IRANGE=52,55, JRANGE=28,29, KRANGE=1,1
109 !INTRODUCE EXPERIMENTAL REGION MATERIAL
110 MODIFY, MAT=EXP_AREA, TIME_ID=1, IRANGE=57,59, JRANGE=28,29, KRANGE=1,1
111 !INTRODUCE TRUE CULEBRA REGION TO ALLOW BRINE INFLOW TO SHAFT
112 MODIFY, MAT=CULEBRA,  TIME_ID=1, IRANGE= 1,55, JRANGE=34,34, KRANGE=1,1
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113 MODIFY, MAT=CULEBRA,  TIME_ID=1, IRANGE=57,96, JRANGE=34,34, KRANGE=1,1
114 !INTRODUCE UPPER CLAY FILL (RUSTLER)
115 MODIFY, MAT=CLAY_RUS,  TIME_ID=1, IRANGE=56,56, JRANGE=33,34, KRANGE=1,1
116 !INTRODUCE CRUSHED SALT
117 MODIFY, MAT=SALT_T1,  TIME_ID=1, IRANGE=56,56, JRANGE=32,32, KRANGE=1,1
118 !INTRODUCE LOWER CLAY
119 MODIFY, MAT=CL_L_T1,  TIME_ID=1, IRANGE=56,56, JRANGE=29,31, KRANGE=1,1
120 !INTRODUCE LOWER SHAFT: SAME AS OPS_AREA, NO CONCRETE MONOLITH
121 MODIFY, MAT=OPS_AREA,  TIME_ID=1, IRANGE=56,56, JRANGE=27,28, KRANGE=1,1
122 !TURN ON TWO WELLS OUTSIDE THE LWA
123 !DISPOSAL WELLS INTO UPPER BELL CANYON. LEAKING CASING THROUGH SALADO
124 !WELL NO. 1
125 MODIFY, MAT=BH_LOW_L, TIME_ID=1, IRANGE=  8, 8, JRANGE=23,23, KRANGE=1,1
126 MODIFY, MAT=BH_SLT_L, TIME_ID=1, IRANGE=  8, 8, JRANGE=24,32, KRANGE=1,1
127 !WELL NO. 2
128 MODIFY, MAT=BH_LOW_L, TIME_ID=1, IRANGE=89, 89, JRANGE=23,23, KRANGE=1,1
129 MODIFY, MAT=BH_SLT_L, TIME_ID=1, IRANGE=89, 89, JRANGE=24,32, KRANGE=1,1
130 !*****************************************************************************
131 !        END OF TIME PERIOD 1 MATERIAL RESETS
132 !*****************************************************************************
133 !********
134 ! 50 YEARS
135 !********
136 !INTRODUCE CRUSHED SALT
137 MODIFY, MAT=SALT_T4,  TIME_ID=2, IRANGE=56,56, JRANGE=32,32, KRANGE=1,1
138 !INTRODUCE LOWER CLAY
139 MODIFY, MAT=CL_L_T4,  TIME_ID=2, IRANGE=56,56, JRANGE=29,31, KRANGE=1,1
140 !TURN OFF TWO WELLS OUTSIDE THE LWA
141 !DISPOSAL WELLS INTO UPPER BELL CANYON GO TO PLUGGED STATE AT BELL C & RUSTLER
142 !WELL NO. 1
143 MODIFY, MAT=CONC_PLG, TIME_ID=2, IRANGE=  8, 8, JRANGE=23,23, KRANGE=1,1
144 MODIFY, MAT=BH_OPEN,  TIME_ID=2, IRANGE=  8, 8, JRANGE=24,32, KRANGE=1,1
145 MODIFY, MAT=CONC_PLG, TIME_ID=2, IRANGE=  8, 8, JRANGE=33,34, KRANGE=1,1
146 !WELL NO. 2
147 MODIFY, MAT=CONC_PLG, TIME_ID=2, IRANGE=89, 89, JRANGE=23,23, KRANGE=1,1
148 MODIFY, MAT=BH_OPEN,  TIME_ID=2, IRANGE=89, 89, JRANGE=24,32, KRANGE=1,1
149 MODIFY, MAT=CONC_PLG, TIME_ID=2, IRANGE=89, 89, JRANGE=33,34, KRANGE=1,1
150 !*****************************************************************************
151 !        END OF TIME PERIOD 2 MATERIAL RESETS
152 !*****************************************************************************
153 !********
154 ! 100 YEARS
155 !********
156 !INTRODUCE CRUSHED SALT
157 MODIFY, MAT=SALT_T5,  TIME_ID=3, IRANGE=56,56, JRANGE=32,32, KRANGE=1,1
158 !*****************************************************************************
159 !        END OF TIME PERIOD 3 MATERIAL RESETS
160 !*****************************************************************************
161 !********
162 ! 200 YEARS
163 !********
164 !INTRODUCE CRUSHED SALT
165 MODIFY, MAT=SALT_T6,  TIME_ID=4, IRANGE=56,56, JRANGE=32,32, KRANGE=1,1
166 !*****************************************************************************
167 !        END OF TIME PERIOD 4 MATERIAL RESETS
168 !*****************************************************************************
169 !********
170 ! 250 YEARS
171 !********
172 !DISPOSAL WELLS INTO UPPER BELL CANYON GO TO ABANDONED STATE (SAND-FILLED)
173 !WELL NO. 1
174 MODIFY, MAT=BH_LOW_A, TIME_ID=5, IRANGE=  8, 8, JRANGE=23,23, KRANGE=1,1
175 MODIFY, MAT=BH_SLT_A, TIME_ID=5, IRANGE=  8, 8, JRANGE=24,32, KRANGE=1,1
176 MODIFY, MAT=BH_SUR_A, TIME_ID=5, IRANGE=  8, 8, JRANGE=33,34, KRANGE=1,1
177 !WELL NO. 2
178 MODIFY, MAT=BH_LOW_A, TIME_ID=5, IRANGE=89, 89, JRANGE=23,23, KRANGE=1,1
179 MODIFY, MAT=BH_SLT_A, TIME_ID=5, IRANGE=89, 89, JRANGE=24,32, KRANGE=1,1
180 MODIFY, MAT=BH_SUR_A, TIME_ID=5, IRANGE=89, 89, JRANGE=33,34, KRANGE=1,1
181 !*****************************************************************************
182 !        END OF TIME PERIOD 5 MATERIAL RESETS
183 !*****************************************************************************
184 !********
185 ! 1250 YEARS
186 !********
187 ! LOWER SALT GOES TO CREEP CLOSED PERM
188 !WELL NO. 1
189 MODIFY, MAT=BH_CREEP, TIME_ID=6, IRANGE=  8, 8, JRANGE=25,26, KRANGE=1,1
190 !WELL NO. 2
191 MODIFY, MAT=BH_CREEP, TIME_ID=6, IRANGE=89, 89, JRANGE=25,26, KRANGE=1,1
192 !*****************************************************************************
193 !        END OF TIME PERIOD 6 MATERIAL RESETS
194 !*****************************************************************************
195 !
196 !=============================================================================
197 *GEOMETRY
198 COORD= CARTESIAN
199 !=============================================================================
200 *SIMULATION_CONTROL
201 INTEGRATION, TMAX=3.155693E11, DT_INIT=8.64,DT_MIN= 8.64E-4, DT_MAX=3.1557E8,&
202        DT_INCR=1.25,  DT_REDU= 0.25,  AUTODT=YES,  TSWITCH=1.0,&
203        MAXSTEPS=10000
204 !
205 ITERATION, DSATLIM= 2.E-1, DPRESLIM = -1.E8 , SATLIM= 1.E-3,&
206        SATNORM= 0.30,  PRESNORM = 5.0E5,&
207        ITMAX= 8,     IRESETMAX= 40, IJACINT= 1,&
208        IJACSWITCH=41, IJACMIN= 1,   IJACRESET= 5,&
209        IUPRPFLAG =9,  IUPMFFLAG= 9,  IUPRPLOOSE= 9,&
210        IUPMFLOOSE=9
211 !
212 ITERATION, DHSAT_REL= 1.0E-8,  DHPRES_REL=1.0E-8,&
213        DHSAT_MIN= 1.0E-10,  DHPRES_MIN=1.0E-2
214 !
215 ITERATION, EPS_SAT  = 3.0E+0,    EPS_PRES   = 1.E-2,&
216        R_EPS_SAT= 3.0E+0,    R_EPS_PRES  = 1.E-2,&
217        FTOL_SAT = 1.0E-2,    FTOL_PRES  = 1.0E-2,&
218        R_FTOL_SAT=1.0E-2,    R_FTOL_PRES = 1.0E-2, CONV_TEST = AND
219 !
220 NUMERICS,SOLVER=LU
221 NUMERICS,JACSCALE= 1.0e7,VSWITCH=NO
222 NUMERICS, ITRAVE= HARMONIC, IMFRAVE=UPSTREAM
223 !
224 !=============================================================================
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25 *OUTPUT_CONTROL
26
27 UNITS= SI
28 MONITOR, ILOC = 47, JLOC = 23, KLOC = 1
29 MONITOR, ILOC = 9, JLOC = 27, KLOC = 1
30 MONITOR, ILOC = 46, JLOC = 28, KLOC = 1
31 MONITOR, ILOC = 57, JLOC = 30, KLOC = 1
32!
33 STEPS, FILE= BINARY, NSTEP=40
34 TIMES, FILE= ASCII, VALUES= 0.0, 3.1557E11
35 TIMES, FILE= RESTART,VALUES= 0.0, 3.1557E09, 3.1557E10
36!
37 PRIBIN,&
38    PRESBRIN, PRESGAS, POROS,   DENGAS,   PERMBRX, PERMGASX,&
39    SATGAS,   FLOWGASX, FLOWGASY, FLOWBRX,  FLOWBRY,&
40    FECONC,   CELLCONC, BRINRATE
41!
42 PRIASC,&
43    PRESBRIN, PRESGAS, POROS,   SATGAS,   FECONC,  CELLCONC
44!
45 !HORIZONTAL BRINE FLOW ACROSS 2.4K SOUTH BOUNDARY (MARKER BEDS)
46 HISTORY, NAMES=  FLOWBRX, IRANGE= 9,9,  JRANGE=27,27, KRANGE=1,1
47 HISTORY, NAMES=  FLOWBRX, IRANGE= 9,9,  JRANGE=30,30, KRANGE=1,1
48 !HORIZONTAL BRINE FLOW ACROSS 2.4K SOUTH BOUNDARY (CULEBRA)
49 HISTORY, NAMES=  FLOWBRX, IRANGE= 9,9,  JRANGE=34,34, KRANGE=1,1
50 !HORIZONTAL BRINE FLOW ACROSS 2.4K NORTH BOUNDARY (MARKER BEDS)
51 HISTORY, NAMES=  FLOWBRX, IRANGE=89,89, JRANGE=27,27, KRANGE=1,1
52 HISTORY, NAMES=  FLOWBRX, IRANGE=89,89, JRANGE=30,30, KRANGE=1,1
53 !HORIZONTAL BRINE FLOW ACROSS 2.4K NORTH BOUNDARY (CULEBRA)
54 HISTORY, NAMES=  FLOWBRX, IRANGE=89,89, JRANGE=34,34, KRANGE=1,1
55 !HORIZONTAL BRINE FLOW ACROSS 2.4K SOUTH BOUNDARY (MARKER BEDS)
56 HISTORY, NAMES=  FLOWGASX, IRANGE= 9,9,  JRANGE=27,27, KRANGE=1,1
57 HISTORY, NAMES=  FLOWGASX, IRANGE= 9,9,  JRANGE=30,30, KRANGE=1,1
58 !HORIZONTAL BRINE FLOW ACROSS 2.4K SOUTH BOUNDARY (CULEBRA)
59 HISTORY, NAMES=  FLOWGASX, IRANGE= 9,9,  JRANGE=34,34, KRANGE=1,1
60 !HORIZONTAL BRINE FLOW ACROSS 2.4K NORTH BOUNDARY (MARKER BEDS)
61 HISTORY, NAMES=  FLOWGASX, IRANGE=89,89, JRANGE=27,27, KRANGE=1,1
62 HISTORY, NAMES=  FLOWGASX, IRANGE=89,89, JRANGE=30,30, KRANGE=1,1
63 !HORIZONTAL BRINE FLOW ACROSS 2.4K NORTH BOUNDARY (CULEBRA)
64 HISTORY, NAMES=  FLOWGASX, IRANGE=89,89, JRANGE=34,34, KRANGE=1,1
65 !BRINE FLOW ACROSS MARKER BEDS BOUNDARY SOUTH (FROM REPOSITORY)
66 HISTORY, NAMES=  FLOWBRX, IRANGE=36,36, JRANGE=27,27, KRANGE=1,1
67 HISTORY, NAMES=  FLOWBRX, IRANGE=36,36, JRANGE=30,30, KRANGE=1,1
68 !BRINE FLOW ACROSS MARKER BEDS BOUNDARY NORTH (FROM REPOSITORY)
69 HISTORY, NAMES=  FLOWBRX, IRANGE=60,60, JRANGE=27,27, KRANGE=1,1
70 HISTORY, NAMES=  FLOWBRX, IRANGE=60,60, JRANGE=30,30, KRANGE=1,1
71 !GAS  FLOW ACROSS MARKER BEDS BOUNDARY SOUTH (FROM REPOSITORY)
72 HISTORY, NAMES=  FLOWGASX, IRANGE=36,36, JRANGE=27,27, KRANGE=1,1
73 HISTORY, NAMES=  FLOWGASX, IRANGE=36,36, JRANGE=30,30, KRANGE=1,1
74 !GAS  FLOW ACROSS MARKER BEDS BOUNDARY NORTH (FROM REPOSITORY)
75 HISTORY, NAMES=  FLOWGASX, IRANGE=60,60, JRANGE=27,27, KRANGE=1,1
76 HISTORY, NAMES=  FLOWGASX, IRANGE=60,60, JRANGE=30,30, KRANGE=1,1
77!
78 !VERTICAL BRINE FLOW UP SHAFT AT CULEBRA
79 HISTORY, NAMES=  FLOWBRY, IRANGE=56,56, JRANGE=34,34, KRANGE=1,1
80 !VERTICAL GAS FLOW UP SHAFT AT CULEBRA
281 HISTORY, NAMES=  FLOWGASY, IRANGE=56,56,  JRANGE=34,34, KRANGE=1,1
282!
283 !VERTICAL BRINE FLOW UP SHAFT AT REPOSITORY
284 HISTORY, NAMES=  FLOWBRY, IRANGE=56,56,  JRANGE=31,31, KRANGE=1,1
285 !VERTICAL GAS FLOW UP SHAFT AT REPOSITORY
286 HISTORY, NAMES=  FLOWGASY, IRANGE=56,56,  JRANGE=31,31, KRANGE=1,1
287!
288 !FLOW RATE OF INJECTED BRINE FOR TWO DISPOSAL WELLS
289 HISTORY, NAMES=  WELLBRINE, IRANGE= 8, 8,  JRANGE=23,23, KRANGE=1,1
290 HISTORY, NAMES=  WELLBRINE, IRANGE=89,89,  JRANGE=23,23, KRANGE=1,1
291 !'WATER TABLE WELLS'BRINE AND GAS INFLOW OR OUTFLOW TO SURFACE
292 HISTORY, NAMES=  WELLBRINE, IRANGE= 8, 8,  JRANGE=34,34, KRANGE=1,1
293 HISTORY, NAMES=  WELLBRINE, IRANGE=89,89,  JRANGE=34,34, KRANGE=1,1
294 HISTORY, NAMES=  WELLGAS,  IRANGE= 8, 8,  JRANGE=34,34, KRANGE=1,1
295 HISTORY, NAMES=  WELLGAS,  IRANGE=89,89,  JRANGE=34,34, KRANGE=1,1
296 !*****************************************************************
297 !          END OF HISTORY VARIABLES
298 !*****************************************************************
299!
300 *REACTION_CHEMISTRY
301!
302 WICKING, MAT= WAS_AREA, VALUE=SAT_WICK
303 NUMERICS, SMOOTH=ON,  ALPHARXN=1000.0
304 RATES,  MAT=WAS_AREA, COR_IN=GRATCORI, COR_HUM=GRATCORH,&
305              MIC_IN=GRATMICI, MIC_HUM=GRATMICH,&
306              SCOR_GAS=STOICOR,SMIC_GAS=STOIMIC
307!
308 VOLUME, MAT=WAS_AREA,  VOL_CHW  = VOLCHW, VOL_RHW = VOLRHW
309!
310 DENSITY, MAT=WAS_AREA, METAL_RH= DRH_METL, BIO_RH= DRH_BIO,&
311              METAL_CH= DCH_METL, BIO_CH= DCH_BIO
312!
313 SATURATION, MAT=WAS_AREA, VALUE= SAT_IBRN
314 !=================================================================
315 !=================================================================
316 *PROPERTIES
317 ! GET SOLID properties from CAMDAT file
318 !Salado Halite
319 SOLID, MAT=S_HALITE,&
320              PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
321              PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
322              BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
323              BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
324              SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
325              PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
326              RELP_MODEL = RELP_MOD,  PCT_A    = PCT_A,&
327              PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
328!
329 SOLID, MAT=DRZ_0,&
330              PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
331              PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
332              BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
333              BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
334              SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
335              PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
336              RELP_MODEL = RELP_MOD,  PCT_A    = PCT_A,&
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337          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
338!
339 SOLID, MAT=DRZ_1,&
340          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
341          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
342          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
343          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
344          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
345          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
346          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
347          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
348!
349 SOLID, MAT=S_MB139,&
350          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
351          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
352          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
353          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
354          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
355          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
356          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
357          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
358!
359 SOLID, MAT=S_MB138,&
360          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
361          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
362          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
363          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
364          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
365          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
366          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
367          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
368!
369 SOLID, MAT=CAVITY_2,&
370          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
371          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
372          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
373          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
374          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
375          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
376          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
377          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
378!
379 SOLID, MAT=CAVITY_3,&
380          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
381          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
382          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
383          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
384          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
385          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
386          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
387          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
388!
389 SOLID, MAT=CAVITY_4,&
390          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
391          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
392          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
393          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
394          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
395          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
396          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
397          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
398!
399 SOLID, MAT=IMPERM_Z,&
400          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
401          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
402          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
403          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
404          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
405          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
406          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
407          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
408!
409 SOLID, MAT=CASTILER,&
410          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
411          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
412          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
413          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
414          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
415          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
416          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
417          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
418!
419 SOLID, MAT=WAS_AREA,&
420          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
421          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
422          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
423          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
424          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
425          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
426          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
427          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
428!
429 SOLID, MAT=UNNAMED,&
430          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
431          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
432          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
433          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
434          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
435          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
436          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
437          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
438!
439 SOLID, MAT=CULEBRA,&
440          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
441          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
442          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
443          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
444          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
445          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
446          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
447          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
448!
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49 SOLID, MAT=OPS_AREA,&
50          PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
51          PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
52          BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
53          BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
54          SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
55          PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
56          RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
57          PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
58!
59 SOLID, MAT=EXP_AREA,&
60          PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
61          PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
62          BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
63          BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
64          SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
65          PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
66          RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
67          PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
68!
69 SOLID, MAT=CLAY_RUS,&
70          PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
71          PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
72          BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
73          BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
74          SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
75          PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
76          RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
77          PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
78!
79 SOLID, MAT=CL_L_T1,&
80          PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
81          PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
82          BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
83          BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
84          SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
85          PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
86          RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
87          PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
88!
89 SOLID, MAT=CL_L_T4,&
90          PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
91          PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
92          BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
93          BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
94          SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
95          PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
96          RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
97          PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
98!
99 SOLID, MAT=SALT_T1,&
00          PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
01          PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
02          BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
03          BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
04          SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
505         PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
506         RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
507         PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
508!
509 SOLID, MAT=SALT_T4,&
510         PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
511         PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
512         BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
513         BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
514         SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
515         PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
516         RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
517         PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
518!
519 SOLID, MAT=SALT_T5,&
520         PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
521         PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
522         BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
523         BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
524         SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
525         PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
526         RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
527         PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
528!
529 SOLID, MAT=SALT_T6,&
530         PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
531         PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
532         BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
533         BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
534         SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
535         PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
536         RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
537         PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
538!
539 SOLID, MAT=PAN_SEAL,&
540         PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
541         PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
542         BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
543         BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
544         SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
545         PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
546         RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
547         PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
548!
549 SOLID, MAT=BH_SUR_A,&
550         PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
551         PRM_Z    = PERM_Z,     POROSITY = POROSITY,&
552         BCSOR    = SAT_RBRN,   BCSGR    = SAT_RGAS,&
553         BCLAM    = PORE_DIS,   COMPRES  = POR_COMP,&
554         SB_MIN   = SB_MIN,     PB_MIN   = PO_MIN,&
555         PC_MAX   = PC_MAX,     CAP_MOD  = CAP_MOD,&
556         RELP_MODEL = RELP_MOD, PCT_A    = PCT_A,&
557         PCT_EXP  = PCT_EXP,    PCT_FLAG = KPT
558!
559 SOLID, MAT=BH_SLT_A,&
560         PRM_X    = PERM_X,     PRM_Y    = PERM_Y,&
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561          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
562          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
563          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
564          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
565          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
566          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
567          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
568!
569 SOLID, MAT=BH_LOW_A,&
570          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
571          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
572          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
573          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
574          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
575          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
576          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
577          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
578!
579 SOLID, MAT=BH_SLT_L,&
580          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
581          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
582          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
583          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
584          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
585          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
586          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
587          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
588!
589 SOLID, MAT=BH_LOW_L,&
590          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
591          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
592          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
593          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
594          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
595          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
596          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
597          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
598!
599 SOLID, MAT=CONC_PLG,&
600          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
601          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
602          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
603          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
604          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
605          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
606          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
607          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
608!
609 SOLID, MAT=BH_OPEN,&
610          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
611          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
612          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
613          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
614          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
615          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
616          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
617          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
618!
619 SOLID, MAT=BH_SAND,&
620          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
621          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
622          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
623          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
624          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
625          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
626          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
627          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
628!
629 SOLID, MAT=BH_CREEP,&
630          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
631          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
632          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
633          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
634          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
635          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
636          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
637          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
638!
639! GET FRACTURE PROPERTIES
640 FRACTURE, MAT= S_MB139, FRAC_PI  = PI_DELTA, FRAC_PF  = PF_DELTA,&
641              FRAC_PHI = PHIMAX,  FRAC_EXP = PERM_EXP,&
642              FRAC_PMX = IFRX,    FRAC_PMY = IFRY,&
643              FRAC_PMZ = IFRZ
644!
645 FRACTURE, MAT= S_MB138, FRAC_PI  = PI_DELTA, FRAC_PF  = PF_DELTA,&
646              FRAC_PHI = PHIMAX,  FRAC_EXP = PERM_EXP,&
647              FRAC_PMX = IFRX,    FRAC_PMY = IFRY,&
648              FRAC_PMZ = IFRZ
649!
650! GET FLUID (brine and gas) properties from CAMDAT file
651 FLUID, MAT=BRINESAL, SALINITY=WTF, DEN_BR=DNSFLUID,&
652            COMPR_BR= COMP, REF_TEMP= REF_TEMP,&
653            REF_PRES=REF_PRES, TABLE=INTERP, VIS_BR=VISCO
654 FLUID, MAT=H2,     VIS_GAS=VISCO,DGAS = OFF,&
655            H2_MOLE =1.0, CO2_MOLE=0.0, CH4_MOLE=0.0,&
656            N2_MOLE= 0.0, H2S_MOLE=0.0, O2_MOLE=0.0
657 FLUID, MAT=S_MB139, KLINK=ON, B_KLINK=BKLINK, EXP_KLINK=EXPKLINK
658!
659 SOLID, MAT=MORRO_P1,&
660          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
661          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
662          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
663          BCLAM    = PORE_DIS,   COMPRES   = POR_COMP,&
664          SB_MIN   = SB_MIN,     PB_MIN    = PO_MIN,&
665          PC_MAX   = PC_MAX,     CAP_MOD   = CAP_MOD,&
666          RELP_MODEL = RELP_MOD, PCT_A     = PCT_A,&
667          PCT_EXP  = PCT_EXP,    PCT_FLAG  = KPT
668!
669 SOLID, MAT=MORRO_P2,&
670          PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
671          PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
672          BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
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573          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
574          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
575          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
576          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
577          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
578!
579 SOLID, MAT=MORRO_P3,&
580          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
581          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
582          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
583          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
584          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
585          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
586          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
587          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
588!
589 SOLID, MAT=MORRO_NP,&
590          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
591          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
592          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
593          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
594          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
595          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
596          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
597          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
598!
599 SOLID, MAT=ATOKA_P1,&
700          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
701          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
702          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
703          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
704          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
705          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
706          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
707          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
708!
709 SOLID, MAT=ATOKA_P2,&
710          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
711          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
712          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
713          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
714          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
715          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
716          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
717          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
718!
719 SOLID, MAT=ATOKA_P3,&
720          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
721          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
722          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
723          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
724          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
725          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
726          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
727          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
728!
729 SOLID, MAT=ATOKA_NP,&
730          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
731          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
732          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
733          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
734          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
735          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
736          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
737          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
738!
739 SOLID, MAT=STRWN_P1,&
740          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
741          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
742          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
743          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
744          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
745          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
746          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
747          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
748!
749 SOLID, MAT=STRWN_P2,&
750          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
751          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
752          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
753          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
754          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
755          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
756          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
757          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
758!
759 SOLID, MAT=STRWN_P3,&
760          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
761          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
762          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
763          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
764          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
765          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
766          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
767          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
768!
769 SOLID, MAT=STRWN_NP,&
770          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
771          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
772          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
773          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
774          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
775          PC_MAX   = PC_MAX,      CAP_MOD   = CAP_MOD,&
776          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
777          PCT_EXP  = PCT_EXP,     PCT_FLAG  = KPT
778!
779 SOLID, MAT=BONES_P1,&
780          PRM_X    = PERM_X,      PRM_Y     = PERM_Y,&
781          PRM_Z    = PERM_Z,      POROSITY  = POROSITY,&
782          BCSOR    = SAT_RBRN,    BCSGR     = SAT_RGAS,&
783          BCLAM    = PORE_DIS,    COMPRES   = POR_COMP,&
784          SB_MIN   = SB_MIN,      PB_MIN    = PO_MIN,&
```

```
85          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
86          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
87          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
88!
89 SOLID, MAT=BONES_P2,&
90          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
91          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
92          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
93          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
94          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
95          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
96          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
97          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
98!
99 SOLID, MAT=BONES_P3,&
00          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
01          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
02          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
03          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
04          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
05          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
06          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
07          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
08!
09 SOLID, MAT=BONES_NP,&
10          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
11          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
12          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
13          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
14          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
15          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
16          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
17          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
18!
19 SOLID, MAT=LBRSH_P1,&
20          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
21          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
22          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
23          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
24          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
25          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
26          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
27          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
28!
29 SOLID, MAT=LBRSH_P2,&
30          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
31          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
32          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
33          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
34          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
35          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
36          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
37          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
38!
39 SOLID, MAT=LBRSH_P3,&
40          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
841         PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
842         BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
843         BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
844         SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
845         PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
846         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
847         PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
848!
849 SOLID, MAT=UBRSH_NP,&
850         PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
851         PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
852         BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
853         BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
854         SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
855         PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
856         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
857         PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
858!
859 SOLID, MAT=UBRSH_P1,&
860         PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
861         PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
862         BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
863         BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
864         SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
865         PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
866         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
867         PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
868!
869 SOLID, MAT=UBRSH_P2,&
870         PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
871         PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
872         BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
873         BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
874         SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
875         PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
876         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
877         PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
878!
879 SOLID, MAT=UBRSH_P3,&
880         PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
881         PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
882         BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
883         BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
884         SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
885         PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
886         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
887         PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
888!
889 SOLID, MAT=LBELL_NP,&
890         PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
891         PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
892         BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
893         BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
894         SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
895         PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
896         RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
```

```
397          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
398!
399 SOLID, MAT=UBELL_P1,&
400          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
401          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
402          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
403          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
404          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
405          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
406          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
407          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
408!
409 SOLID, MAT=UBELL_P2,&
410          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
411          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
412          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
413          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
414          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
415          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
416          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
417          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
418!
419 SOLID, MAT=UBELL_P3,&
420          PRM_X     = PERM_X,     PRM_Y     = PERM_Y,&
421          PRM_Z     = PERM_Z,     POROSITY  = POROSITY,&
422          BCSOR     = SAT_RBRN,   BCSGR     = SAT_RGAS,&
423          BCLAM     = PORE_DIS,   COMPRES   = POR_COMP,&
424          SB_MIN    = SB_MIN,     PB_MIN    = PO_MIN,&
425          PC_MAX    = PC_MAX,     CAP_MOD   = CAP_MOD,&
426          RELP_MODEL = RELP_MOD,  PCT_A     = PCT_A,&
427          PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
428!
429!==========================================================================
430! DIRICHLET CONDITIONS HERE!!!!
431 *DIRICHLET
432 DIRICHLET, PRESSURE=5.48919E07, SAT=1.0, IRANGE=1,1, JRANGE= 2, 2, KRANGE=1,1
433 DIRICHLET, PRESSURE=5.10678E07, SAT=1.0, IRANGE=1,1, JRANGE= 3, 3, KRANGE=1,1
434 DIRICHLET, PRESSURE=4.99205E07, SAT=1.0, IRANGE=1,1, JRANGE= 5, 5, KRANGE=1,1
435 DIRICHLET, PRESSURE=4.87533E07, SAT=1.0, IRANGE=1,1, JRANGE= 6, 6, KRANGE=1,1
436 DIRICHLET, PRESSURE=4.75817E07, SAT=1.0, IRANGE=1,1, JRANGE= 8, 8, KRANGE=1,1
437 DIRICHLET, PRESSURE=4.20503E07, SAT=1.0, IRANGE=1,1, JRANGE= 9, 9, KRANGE=1,1
438 DIRICHLET, PRESSURE=3.63427E07, SAT=1.0, IRANGE=1,1, JRANGE=10,10, KRANGE=1,1
439 DIRICHLET, PRESSURE=3.49942E07, SAT=1.0, IRANGE=1,1, JRANGE=12,12, KRANGE=1,1
440 DIRICHLET, PRESSURE=3.22003E07, SAT=1.0, IRANGE=1,1, JRANGE=13,13, KRANGE=1,1
441 DIRICHLET, PRESSURE=2.96514E07, SAT=1.0, IRANGE=1,1, JRANGE=14,14, KRANGE=1,1
442 DIRICHLET, PRESSURE=2.88419E07, SAT=1.0, IRANGE=1,1, JRANGE=16,16, KRANGE=1,1
443 DIRICHLET, PRESSURE=2.59925E07, SAT=1.0, IRANGE=1,1, JRANGE=17,17, KRANGE=1,1
444 DIRICHLET, PRESSURE=2.32357E07, SAT=1.0, IRANGE=1,1, JRANGE=18,18, KRANGE=1,1
445 DIRICHLET, PRESSURE=2.26297E07, SAT=1.0, IRANGE=1,1, JRANGE=20,20, KRANGE=1,1
446 DIRICHLET, PRESSURE=2.07943E07, SAT=1.0, IRANGE=1,1, JRANGE=21,21, KRANGE=1,1
447 DIRICHLET, PRESSURE=1.77753E07, SAT=1.0, IRANGE=1,1, JRANGE=22,22, KRANGE=1,1
448 DIRICHLET, PRESSURE=1.48508E07, SAT=1.0, IRANGE=1,1, JRANGE=24,24, KRANGE=1,1
449 DIRICHLET, PRESSURE=8.22000E05, SAT=1.0, IRANGE=1,1, JRANGE=34,34, KRANGE=1,1
450!
451 DIRICHLET, PRESSURE=5.48919E07, SAT=1.0, IRANGE=96,96,JRANGE= 2, 2, KRANGE=1,1
452 DIRICHLET, PRESSURE=5.10678E07, SAT=1.0, IRANGE=96,96,JRANGE= 3, 3, KRANGE=1,1
953 DIRICHLET, PRESSURE=4.99205E07, SAT=1.0, IRANGE=96,96,JRANGE= 5, 5, KRANGE=1,1
954 DIRICHLET, PRESSURE=4.87533E07, SAT=1.0, IRANGE=96,96,JRANGE= 6, 6, KRANGE=1,1
955 DIRICHLET, PRESSURE=4.75817E07, SAT=1.0, IRANGE=96,96,JRANGE= 8, 8, KRANGE=1,1
956 DIRICHLET, PRESSURE=4.20503E07, SAT=1.0, IRANGE=96,96,JRANGE= 9, 9, KRANGE=1,1
957 DIRICHLET, PRESSURE=3.63427E07, SAT=1.0, IRANGE=96,96,JRANGE=10,10, KRANGE=1,1
958 DIRICHLET, PRESSURE=3.49942E07, SAT=1.0, IRANGE=96,96,JRANGE=12,12, KRANGE=1,1
959 DIRICHLET, PRESSURE=3.22003E07, SAT=1.0, IRANGE=96,96,JRANGE=13,13, KRANGE=1,1
960 DIRICHLET, PRESSURE=2.96514E07, SAT=1.0, IRANGE=96,96,JRANGE=14,14, KRANGE=1,1
961 DIRICHLET, PRESSURE=2.88419E07, SAT=1.0, IRANGE=96,96,JRANGE=16,16, KRANGE=1,1
962 DIRICHLET, PRESSURE=2.59925E07, SAT=1.0, IRANGE=96,96,JRANGE=17,17, KRANGE=1,1
963 DIRICHLET, PRESSURE=2.32357E07, SAT=1.0, IRANGE=96,96,JRANGE=18,18, KRANGE=1,1
964 DIRICHLET, PRESSURE=2.26297E07, SAT=1.0, IRANGE=96,96,JRANGE=20,20, KRANGE=1,1
965 DIRICHLET, PRESSURE=2.07943E07, SAT=1.0, IRANGE=96,96,JRANGE=21,21, KRANGE=1,1
966 DIRICHLET, PRESSURE=1.77753E07, SAT=1.0, IRANGE=96,96,JRANGE=22,22, KRANGE=1,1
967 DIRICHLET, PRESSURE=1.33743E07, SAT=1.0, IRANGE=96,96,JRANGE=24,24, KRANGE=1,1
968 DIRICHLET, PRESSURE=8.22000E05, SAT=1.0, IRANGE=96,96,JRANGE=34,34, KRANGE=1,1
969!
970!==========================================================================
971! WELL DATA GOES HERE!
972 *WELL_DATA
973 TIME_CONTROL, TIME_ID=1,WELLTIME=0.0
974 TIME_CONTROL, TIME_ID=2,WELLTIME=1.577846E9
975!==========================================
976!==========================================
977!
978 WELL_CONTROL, TIME_ID=1,NUM=1,TYPE=INJP,ILOC= 8,JLOC=23,KLOC=1,&
979          QO=0.0, QG=0.0, PIWELL=7.3816E-11&
980          PRWELL= 22.8E6
981!
982 WELL_CONTROL, TIME_ID=1,NUM=1,TYPE=INJP,ILOC=89,JLOC=23,KLOC=1,&
983          QO=0.0, QG=0.0, PIWELL=7.3816E-11&
984          PRWELL= 22.8E6
985!
986!==========================================
987!
988 WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 1,JLOC=27,KLOC=1,&
989          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
990          PRWELL= 1.31521E07,1.31521E07
991!
992 WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 1,JLOC=30,KLOC=1,&
993          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
994          PRWELL= 1.31124E07,1.31124E07
995!
996! COMMENTED OUT 3/12/96: REPLACED W DIRICHLET B.C.
997! WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 1,JLOC=34,KLOC=1,&
998!          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
999!          PRWELL= 8.52000E05,8.52000E05
1000!
1001!
1002 WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=96,JLOC=27,KLOC=1,&
1003         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
1004         PRWELL= 1.16762E07,1.16762E07
1005!
1006 WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=96,JLOC=30,KLOC=1,&
1007         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
1008         PRWELL= 1.16366E07,1.16366E07
```

```
!
! COMMENTED OUT 3/12/96: REPLACED W DIRICHLET B.C.
! WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=96,JLOC=34,KLOC=1,&
!          QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-11,1.0E-11,&
!          PRWELL= 8.52000E05,8.52000E05
!
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 8,JLOC=34,KLOC=1,&
         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-12,1.0E-12,&
         PRWELL= 2.03740E06,2.03740E06
!
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 89,JLOC=34,KLOC=1,&
         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-12,1.0E-12,&
         PRWELL= 2.03740E06,2.03740E06
!
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC= 1,JLOC=23,KLOC=1,&
         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-15,1.0E-15,&
         PRWELL= 1.564E07,1.564E07
!
!
WELL_CONTROL, TIME_ID=2,NUM=2,TYPE=PROD,INJP,ILOC=96,JLOC=23,KLOC=1,&
         QO=0.0,0.0, QG=0.0,0.0, PIWELL=1.0E-15,1.0E-15,&
         PRWELL= 1.564E07,1.564E07
!
*END
!==========================================================================
```

```
1 ************
2 File N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES01.INP;2
3  980            PRWELL= 22.8E6
4  981
5 ******
6 File N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES02.INP;1
7  980            PRWELL= 18.53E6
8  981
9 ************
10 ************
11 File N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES01.INP;2
12  984            PRWELL= 22.8E6
13  985
14 ******
15 File N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES02.INP;1
16  984            PRWELL= 18.53E6
17  985
18 ************
19
20 Number of difference sections found: 2
21 Number of difference records found: 2
22
23 DIFFERENCES
24 /IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
25 K2.DMS_WATERFLOOD.PREBRAG]PRE_Y1_2.DIFF;1-
26    N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES01.INP,2-
27    N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES02.INP;1
```

```
**QA**      = PREBRAG QA RECORDS
PREBRAG_    = PROGRAM NAME
6.00        = PROGRAM VERSION
02/06/96    = PROGRAM REVISION DATE
06/17/96    = PROGRAM RUN DATE
16:19:04    = PROGRAM RUN TIME
1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
FILE FLAGS...ASCII, BINARY, SUMMARY, RESTART OUT, RESTART INPUT
T T T T F
MODEL TYPE AND NUMBER OF GRID BLOCKS IN X, Y, AND Z
  2  96  34  1
TSTART,  TMAX,    MAXSTEPS
 -1.5778E+08  3.1557E+11  10000
DT_INIT, DT_MIN,  DT_MAX,  DT_INCR, IAUTODT, TSWITCH
 8.6400E+00  8.6400E-04  3.1557E+08  1.2500E+00  1   1.0000E+00
TIME-STEP CHANGES: NUMBER OF CHANGES, TIME OF CHANGE, DELT USED
  6
  0.0000E+00  8.6400E+02
  1.5778E+09  8.6400E+02
  3.1557E+09  8.6400E+02
  6.3114E+09  8.6400E+02
  7.8892E+09  8.6400E+02
  3.9446E+10  8.6400E+02
IPRTYPEASC IPRTYPEBIN IPRTYPERST UNITSI UNITSO
  2  0  2   'SI'   'SI'
ASCII PRINTOUT CONTROLLED BY USER SPECIFIED TIMES
  2
USER REQUESTED PRINTOUT TIMES
 0.0000E+00  3.1557E+11
BINARY PRINTOUT CONTROLLED BY STEP INTERVAL, IPRNTBIN
  40
RESTART PRINTOUT CONTROLLED BY USER SPECIFIED TIMES
  3
USER REQUESTED RESTART TIMES
 0.0000E+00  3.1557E+09  3.1557E+10
ASCII PRINT FLAGS
 1 1 0 0 0  1 0 0 0 0  0 0 0 0 0  0 0 1 0 0  0 0 0 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 1 1 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
 0 0 0
 0
 0
 0
BINARY PRINT FLAGS
 1 1 0 0 0  1 0 0 0 1  1 0 0 1 0  0 0 1 0 0  0 0 0 0 0
 0 0 0 0 0  1 1 0 1 1  0 0 0 0 0  0 0 0 1 0  0 1 1 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
 0 0 0
 0
 0
 0
HISTORY VARIABLE OUTPUT
  6
  21   4   NAME=TIME-AVERAGE WELL BRINE FLOW RATE
  8 23  1   89 23  1   8 34  1   89 34  1
  22   2   NAME=TIME-AVERAGE WELL GAS FLOW RATE
  8 34  1   89 34  1
  31  10   NAME=TIME-AVERAGE INTERBLOCK BRINE FLOW, X-DIRECTION
  9 27  1   9 30  1   9 34  1   89 27  1   89 30  1   89 34  1
 36 27  1   36 30  1   60 27  1   60 30  1
  32   2   NAME=TIME-AVERAGE INTERBLOCK BRINE FLOW, Y-DIRECTION
 56 34  1   56 31  1
  34  10   NAME=TIME-AVERAGE INTERBLOCK GAS FLOW, X-DIRECTION
  9 27  1   9 30  1   9 34  1   89 27  1   89 30  1   89 34  1
 36 27  1   36 30  1   60 27  1   60 30  1
  35   2   NAME=TIME-AVERAGE INTERBLOCK GAS FLOW, Y-DIRECTION
 56 34  1   56 31  1
MONITOR PARAMETER VALUES AT GRIDBLOCK(S)
T
NUMBER OF MONITOR BLOCKS
  4
MONITOR BLOCKS (I,J,K)
  47  23  1
   9  27  1
  46  28  1
  57  30  1
GRID DATA FLAGS: IDXFLAG, IDYFLAG, IDZFLAG, IDEPTHFLAG
  1  2  1  7
GRID DATA CARDS: GRID BLOCK DX'S
2.011700E+02 1.310600E+02 5.486400E+01 1.097300E+01 2.743200E+00 9.144000E-01
4.540300E-01 3.111700E-01 4.540300E-01 9.144000E-01 2.743200E+00 1.097300E+01
5.486400E+01 1.310600E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02
1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02
1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02
1.341100E+02 6.096000E+01 4.876800E+01 1.828800E+01 6.096000E+00 6.096000E+00
1.219200E+01 2.438400E+01 5.486400E+01 2.438400E+01 1.219200E+01 4.479000E+00
2.038100E+00 4.479000E+00 1.219200E+01 2.438400E+01 4.876800E+01 3.048000E+01
1.219200E+01 6.096000E+00 4.076200E+00 1.000000E+01 3.828300E+01 5.000000E+00
9.999900E-01 2.160100E-01 9.999900E-01 8.000000E+00 4.471100E+01 1.117500E+02
1.117500E+02 1.973300E+02 1.973300E+02 1.973300E+02 1.341100E+02 1.341100E+02
1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02
1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02
1.341100E+02 1.341100E+02 1.341100E+02 1.341100E+02 1.310600E+02 5.486400E+01
1.097300E+01 2.743200E+00 9.144000E-01 4.540300E-01 3.111700E-01 4.540300E-01
9.144000E-01 2.743200E+00 1.097300E+01 5.486400E+01 1.310600E+02 2.011700E+02
GRID DATA CARDS: GRID BLOCK DY'S
8.138200E+00 1.137800E+02 9.144000E+01 5.943600E+00 8.549600E+01 1.066800E+02
7.193300E+00 7.193300E+01 8.406100E+02 1.013500E+02 1.013500E+01 1.013500E+02
3.609600E+02 6.096000E+01 6.096000E+00 6.096000E+01 4.114800E+02 4.572000E+01
4.572000E+00 4.572000E+01 2.590800E+02 2.426200E+02 1.124700E+02 3.810000E+02
1.972700E+02 5.117600E+00 8.500000E-01 1.331000E+00 1.331000E+00 4.500000E-01
1.452500E+02 2.500000E+02 3.600000E+01 7.700000E+00
GRID DATA CARDS: GRID BLOCK DZ'S
4.023360E+02 2.130553E+02 6.702860E+01 1.532080E+01 4.548500E+00 1.675700E+00
6.010000E-01 2.444000E-01 6.010000E-01 1.675700E+00 4.548500E+00 1.532080E+01
6.702860E+01 2.130553E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
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4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 2.130553E+02 6.702860E+01
1.532080E+01 4.548500E+00 1.675700E+00 6.010000E-01 2.444000E-01 6.010000E-01
1.675700E+00 4.548500E+00 1.532080E+01 6.702860E+01 2.130553E+02 4.023360E+02
GRID BLOCK ELEVATIONS
96*-3.353511E+03
96*-3.292552E+03
96*-3.189942E+03
96*-3.141250E+03
96*-3.095530E+03
96*-2.999442E+03
96*-2.942506E+03
96*-2.902942E+03
96*-2.446671E+03
96*-1.975691E+03
96*-1.919948E+03
96*-1.864206E+03
96*-1.633051E+03
96*-1.422091E+03
96*-1.388563E+03
96*-1.355035E+03
96*-1.118815E+03
96*-8.902151E+02
96*-8.650693E+02
96*-8.399232E+02
96*-6.875233E+02
96*-4.366732E+02
96*-2.591282E+02
1*-6.913361E+01 1*-6.623450E+01 1*-6.461209E+01 1*-6.403757E+01
1*-6.391788E+01 1*-6.388599E+01 1*-6.387402E+01 1*-6.386737E+01
1*-6.386069E+01 1*-6.384872E+01 1*-6.381680E+01 1*-6.369711E+01
1*-6.312259E+01 1*-6.150018E+01 1*-5.918628E+01 1*-5.684573E+01
1*-5.450519E+01 1*-5.216464E+01 1*-4.982410E+01 1*-4.748355E+01
1*-4.514301E+01 1*-4.280249E+01 1*-4.046194E+01 1*-3.812140E+01
1*-3.578085E+01 1*-3.344031E+01 1*-3.109976E+01 1*-2.875922E+01
1*-2.641864E+01 1*-2.407813E+01 1*-2.173758E+01 1*-2.003534E+01
1*-1.907785E+01 1*-1.849274E+01 1*-1.827994E+01 1*-1.817352E+01
1*-1.801395E+01 1*-1.769476E+01 1*-1.700323E+01 1*-1.631171E+01
1*-1.599252E+01 1*-1.584708E+01 1*-1.579022E+01 1*-1.573334E+01
1*-1.558786E+01 1*-1.526871E+01 1*-1.463037E+01 1*-1.393881E+01
1*-1.356644E+01 1*-1.340686E+01 1*-1.331812E+01 1*-1.319525E+01
1*-1.277393E+01 1*-1.239627E+01 1*-1.234387E+01 1*-1.233328E+01
1*-1.232263E+01 1*-1.224414E+01 1*-1.178418E+01 1*-1.041885E+01
1*-8.468506E+00 1*-5.771454E+00 1*-2.327576E+00 1* 1.116302E+00
1* 4.008514E+00 1* 6.349060E+00 1* 8.689606E+00 1* 1.103015E+01
1* 1.337070E+01 1* 1.571124E+01 1* 1.805176E+01 1* 2.039227E+01
1* 2.273282E+01 1* 2.507336E+01 1* 2.741394E+01 1* 2.975449E+01
1* 3.209503E+01 1* 3.443555E+01 1* 3.677606E+01 1* 3.911661E+01
1* 4.145715E+01 1* 4.379773E+01 1* 4.611166E+01 1* 4.773407E+01
1* 4.830853E+01 1* 4.842822E+01 1* 4.846011E+01 1* 4.847208E+01
1* 4.847876E+01 1* 4.848544E+01 1* 4.849738E+01 1* 4.852930E+01
1* 4.864899E+01 1* 4.922348E+01 1* 5.084589E+01 1* 5.374503E+01
1* 2.199574E+02 1* 2.228565E+02 1* 2.244789E+02 1* 2.250534E+02
1* 2.251731E+02 1* 2.252050E+02 1* 2.252170E+02 1* 2.252236E+02
1* 2.252303E+02 1* 2.252423E+02 1* 2.252742E+02 1* 2.253939E+02
1* 2.259684E+02 1* 2.275908E+02 1* 2.299047E+02 1* 2.322453E+02
1* 2.345858E+02 1* 2.369263E+02 1* 2.392669E+02 1* 2.416074E+02
1* 2.439480E+02 1* 2.462885E+02 1* 2.486291E+02 1* 2.509696E+02
1* 2.533102E+02 1* 2.556507E+02 1* 2.579912E+02 1* 2.603318E+02
1* 2.626723E+02 1* 2.650129E+02 1* 2.673534E+02 1* 2.690556E+02
1* 2.700132E+02 1* 2.705983E+02 1* 2.708111E+02 1* 2.709174E+02
1* 2.710770E+02 1* 2.713962E+02 1* 2.720877E+02 1* 2.727793E+02
1* 2.730984E+02 1* 2.732439E+02 1* 2.733008E+02 1* 2.733577E+02
1* 2.735031E+02 1* 2.738223E+02 1* 2.744606E+02 1* 2.751522E+02
1* 2.755245E+02 1* 2.756841E+02 1* 2.757729E+02 1* 2.758957E+02
1* 2.763170E+02 1* 2.766948E+02 1* 2.767471E+02 1* 2.767577E+02
1* 2.767683E+02 1* 2.768469E+02 1* 2.773068E+02 1* 2.786721E+02
1* 2.806224E+02 1* 2.833195E+02 1* 2.867634E+02 1* 2.902073E+02
1* 2.930995E+02 1* 2.954401E+02 1* 2.977806E+02 1* 3.001211E+02
1* 3.024617E+02 1* 3.048022E+02 1* 3.071428E+02 1* 3.094833E+02
1* 3.118238E+02 1* 3.141644E+02 1* 3.165049E+02 1* 3.188455E+02
1* 3.211860E+02 1* 3.235265E+02 1* 3.258671E+02 1* 3.282076E+02
1* 3.305482E+02 1* 3.328887E+02 1* 3.352026E+02 1* 3.368250E+02
1* 3.373995E+02 1* 3.375192E+02 1* 3.375511E+02 1* 3.375631E+02
1* 3.375698E+02 1* 3.375764E+02 1* 3.375884E+02 1* 3.376203E+02
1* 3.377400E+02 1* 3.383145E+02 1* 3.399369E+02 1* 3.428360E+02
1* 3.211358E+02 1* 3.240349E+02 1* 3.256573E+02 1* 3.262318E+02
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1* 3.264088E+02 1* 3.264207E+02 1* 3.264526E+02 1* 3.265723E+02
1* 3.271468E+02 1* 3.287692E+02 1* 3.310831E+02 1* 3.334237E+02
1* 3.357642E+02 1* 3.381048E+02 1* 3.404453E+02 1* 3.427858E+02
1* 3.451264E+02 1* 3.474669E+02 1* 3.498075E+02 1* 3.521480E+02
1* 3.544886E+02 1* 3.568291E+02 1* 3.591696E+02 1* 3.615102E+02
1* 3.638507E+02 1* 3.661913E+02 1* 3.685318E+02 1* 3.702340E+02
1* 3.711916E+02 1* 3.717767E+02 1* 3.719895E+02 1* 3.720959E+02
1* 3.722555E+02 1* 3.725746E+02 1* 3.732661E+02 1* 3.739577E+02
1* 3.742769E+02 1* 3.744223E+02 1* 3.744792E+02 1* 3.745361E+02
1* 3.746815E+02 1* 3.750007E+02 1* 3.756390E+02 1* 3.763306E+02
1* 3.767029E+02 1* 3.768625E+02 1* 3.769513E+02 1* 3.770741E+02
1* 3.774955E+02 1* 3.778731E+02 1* 3.779255E+02 1* 3.779361E+02
1* 3.779467E+02 1* 3.780253E+02 1* 3.784852E+02 1* 3.798506E+02
1* 3.818008E+02 1* 3.844980E+02 1* 3.879418E+02 1* 3.913857E+02
1* 3.942779E+02 1* 3.966185E+02 1* 3.989590E+02 1* 4.012996E+02
1* 4.036401E+02 1* 4.059806E+02 1* 4.083212E+02 1* 4.106617E+02
1* 4.130023E+02 1* 4.153428E+02 1* 4.176833E+02 1* 4.200239E+02
1* 4.223644E+02 1* 4.247050E+02 1* 4.270455E+02 1* 4.293860E+02
1* 4.317266E+02 1* 4.340671E+02 1* 4.363810E+02 1* 4.380034E+02
1* 4.385779E+02 1* 4.386976E+02 1* 4.387296E+02 1* 4.387415E+02
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1* 4.389184E+02 1* 4.394929E+02 1* 4.411153E+02 1* 4.440144E+02
1* 3.241192E+02 1* 3.270183E+02 1* 3.286407E+02 1* 3.292152E+02
1* 3.293349E+02 1* 3.293668E+02 1* 3.293788E+02 1* 3.293854E+02
1* 3.293921E+02 1* 3.294040E+02 1* 3.294359E+02 1* 3.295556E+02
1* 3.301302E+02 1* 3.317526E+02 1* 3.340665E+02 1* 3.364070E+02
1* 3.387476E+02 1* 3.410881E+02 1* 3.434286E+02 1* 3.457692E+02
1* 3.481097E+02 1* 3.504503E+02 1* 3.527908E+02 1* 3.551314E+02
1* 3.574719E+02 1* 3.598125E+02 1* 3.621530E+02 1* 3.644935E+02
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25	1* 3.668341E+02	1* 3.691746E+02	1* 3.715152E+02	1* 3.732174E+02
26	1* 3.741749E+02	1* 3.747600E+02	1* 3.749728E+02	1* 3.750792E+02
27	1* 3.752388E+02	1* 3.755580E+02	1* 3.762495E+02	1* 3.769410E+02
28	1* 3.772602E+02	1* 3.774057E+02	1* 3.774626E+02	1* 3.775194E+02
29	1* 3.776649E+02	1* 3.779841E+02	1* 3.786224E+02	1* 3.793139E+02
30	1* 3.796863E+02	1* 3.798459E+02	1* 3.799347E+02	1* 3.800575E+02
31	1* 3.804788E+02	1* 3.808565E+02	1* 3.809089E+02	1* 3.809195E+02
32	1* 3.809301E+02	1* 3.810086E+02	1* 3.814686E+02	1* 3.828339E+02
33	1* 3.847842E+02	1* 3.874813E+02	1* 3.909252E+02	1* 3.943691E+02
34	1* 3.972613E+02	1* 3.996018E+02	1* 4.019424E+02	1* 4.042829E+02
35	1* 4.066234E+02	1* 4.089640E+02	1* 4.113045E+02	1* 4.136451E+02
36	1* 4.159856E+02	1* 4.183261E+02	1* 4.206667E+02	1* 4.230072E+02
37	1* 4.253477E+02	1* 4.276883E+02	1* 4.300288E+02	1* 4.323694E+02
38	1* 4.347099E+02	1* 4.370505E+02	1* 4.393644E+02	1* 4.409868E+02
39	1* 4.415613E+02	1* 4.416810E+02	1* 4.417129E+02	1* 4.417249E+02
40	1* 4.417315E+02	1* 4.417382E+02	1* 4.417502E+02	1* 4.417821E+02
41	1* 4.419018E+02	1* 4.424763E+02	1* 4.440987E+02	1* 4.469978E+02
42	1* 3.252095E+02	1* 3.281086E+02	1* 3.297310E+02	1* 3.303055E+02
43	1* 3.304252E+02	1* 3.304571E+02	1* 3.304691E+02	1* 3.304757E+02
44	1* 3.304824E+02	1* 3.304944E+02	1* 3.305263E+02	1* 3.306460E+02
45	1* 3.312205E+02	1* 3.328429E+02	1* 3.351568E+02	1* 3.374974E+02
46	1* 3.398379E+02	1* 3.421784E+02	1* 3.445190E+02	1* 3.468595E+02
47	1* 3.492001E+02	1* 3.515406E+02	1* 3.538812E+02	1* 3.562217E+02
48	1* 3.585623E+02	1* 3.609028E+02	1* 3.632433E+02	1* 3.655839E+02
49	1* 3.679244E+02	1* 3.702650E+02	1* 3.726055E+02	1* 3.743077E+02
50	1* 3.752652E+02	1* 3.758504E+02	1* 3.760632E+02	1* 3.761696E+02
51	1* 3.763291E+02	1* 3.766483E+02	1* 3.773398E+02	1* 3.780314E+02
52	1* 3.783506E+02	1* 3.784960E+02	1* 3.785529E+02	1* 3.786098E+02
53	1* 3.787552E+02	1* 3.790744E+02	1* 3.797127E+02	1* 3.804043E+02
54	1* 3.807766E+02	1* 3.809362E+02	1* 3.810250E+02	1* 3.811478E+02
55	1* 3.815692E+02	1* 3.819468E+02	1* 3.819992E+02	1* 3.820098E+02
56	1* 3.820204E+02	1* 3.820990E+02	1* 3.825589E+02	1* 3.839242E+02
57	1* 3.858745E+02	1* 3.885716E+02	1* 3.920155E+02	1* 3.954594E+02
58	1* 3.983516E+02	1* 4.006922E+02	1* 4.030327E+02	1* 4.053732E+02
59	1* 4.077138E+02	1* 4.100543E+02	1* 4.123949E+02	1* 4.147354E+02
60	1* 4.170759E+02	1* 4.194165E+02	1* 4.217570E+02	1* 4.240976E+02
61	1* 4.264381E+02	1* 4.287786E+02	1* 4.311192E+02	1* 4.334597E+02
62	1* 4.358003E+02	1* 4.381408E+02	1* 4.404547E+02	1* 4.420771E+02
63	1* 4.426516E+02	1* 4.427713E+02	1* 4.428033E+02	1* 4.428152E+02
64	1* 4.428219E+02	1* 4.428286E+02	1* 4.428405E+02	1* 4.428724E+02
65	1* 4.429921E+02	1* 4.435666E+02	1* 4.451890E+02	1* 4.480881E+02
66	1* 3.265403E+02	1* 3.294394E+02	1* 3.310618E+02	1* 3.316363E+02
67	1* 3.317560E+02	1* 3.317879E+02	1* 3.317999E+02	1* 3.318065E+02
68	1* 3.318132E+02	1* 3.318252E+02	1* 3.318571E+02	1* 3.319768E+02
69	1* 3.325513E+02	1* 3.341737E+02	1* 3.364876E+02	1* 3.388282E+02
70	1* 3.411687E+02	1* 3.435092E+02	1* 3.458498E+02	1* 3.481903E+02
71	1* 3.505309E+02	1* 3.528714E+02	1* 3.552119E+02	1* 3.575525E+02
72	1* 3.598930E+02	1* 3.622336E+02	1* 3.645741E+02	1* 3.669147E+02
73	1* 3.692552E+02	1* 3.715958E+02	1* 3.739363E+02	1* 3.756385E+02
74	1* 3.765960E+02	1* 3.771812E+02	1* 3.773940E+02	1* 3.775003E+02
75	1* 3.776599E+02	1* 3.779791E+02	1* 3.786706E+02	1* 3.793622E+02
76	1* 3.796813E+02	1* 3.798268E+02	1* 3.798837E+02	1* 3.799406E+02
77	1* 3.800860E+02	1* 3.804052E+02	1* 3.810435E+02	1* 3.817351E+02
78	1* 3.821074E+02	1* 3.822670E+02	1* 3.823558E+02	1* 3.824786E+02
79	1* 3.828999E+02	1* 3.832776E+02	1* 3.833300E+02	1* 3.833406E+02
80	1* 3.833512E+02	1* 3.834297E+02	1* 3.838897E+02	1* 3.852550E+02
281	1* 3.872053E+02	1* 3.899024E+02	1* 3.933463E+02	1* 3.967902E+02
282	1* 3.996824E+02	1* 4.020229E+02	1* 4.043635E+02	1* 4.067040E+02
283	1* 4.090446E+02	1* 4.113851E+02	1* 4.137256E+02	1* 4.160662E+02
284	1* 4.184067E+02	1* 4.207473E+02	1* 4.230878E+02	1* 4.254283E+02
285	1* 4.277689E+02	1* 4.301094E+02	1* 4.324500E+02	1* 4.347905E+02
286	1* 4.371310E+02	1* 4.394716E+02	1* 4.417855E+02	1* 4.434079E+02
287	1* 4.439824E+02	1* 4.441021E+02	1* 4.441340E+02	1* 4.441460E+02
288	1* 4.441526E+02	1* 4.441593E+02	1* 4.441713E+02	1* 4.442032E+02
289	1* 4.443229E+02	1* 4.448974E+02	1* 4.465198E+02	1* 4.494189E+02
290	1* 3.274307E+02	1* 3.303298E+02	1* 3.319522E+02	1* 3.325267E+02
291	1* 3.326464E+02	1* 3.326783E+02	1* 3.326902E+02	1* 3.326969E+02
292	1* 3.327036E+02	1* 3.327155E+02	1* 3.327474E+02	1* 3.328671E+02
293	1* 3.334417E+02	1* 3.350641E+02	1* 3.373780E+02	1* 3.397185E+02
294	1* 3.420591E+02	1* 3.443996E+02	1* 3.467401E+02	1* 3.490807E+02
295	1* 3.514212E+02	1* 3.537618E+02	1* 3.561023E+02	1* 3.584429E+02
296	1* 3.607834E+02	1* 3.631240E+02	1* 3.654645E+02	1* 3.678050E+02
297	1* 3.701456E+02	1* 3.724861E+02	1* 3.748267E+02	1* 3.765289E+02
298	1* 3.774864E+02	1* 3.780715E+02	1* 3.782843E+02	1* 3.783907E+02
299	1* 3.785503E+02	1* 3.788695E+02	1* 3.795610E+02	1* 3.802525E+02
300	1* 3.805717E+02	1* 3.807172E+02	1* 3.807740E+02	1* 3.808309E+02
301	1* 3.809764E+02	1* 3.812956E+02	1* 3.819339E+02	1* 3.826254E+02
302	1* 3.829978E+02	1* 3.831574E+02	1* 3.832462E+02	1* 3.833690E+02
303	1* 3.837903E+02	1* 3.841680E+02	1* 3.842204E+02	1* 3.842310E+02
304	1* 3.842416E+02	1* 3.843201E+02	1* 3.847801E+02	1* 3.861454E+02
305	1* 3.880957E+02	1* 3.907928E+02	1* 3.942367E+02	1* 3.976806E+02
306	1* 4.005728E+02	1* 4.029133E+02	1* 4.052538E+02	1* 4.075944E+02
307	1* 4.099349E+02	1* 4.122755E+02	1* 4.146160E+02	1* 4.169565E+02
308	1* 4.192971E+02	1* 4.216376E+02	1* 4.239782E+02	1* 4.263187E+02
309	1* 4.286593E+02	1* 4.309998E+02	1* 4.333403E+02	1* 4.356809E+02
310	1* 4.380214E+02	1* 4.403620E+02	1* 4.426759E+02	1* 4.442983E+02
311	1* 4.448728E+02	1* 4.449925E+02	1* 4.450244E+02	1* 4.450363E+02
312	1* 4.450430E+02	1* 4.450497E+02	1* 4.450616E+02	1* 4.450936E+02
313	1* 4.452133E+02	1* 4.457878E+02	1* 4.474102E+02	1* 4.503093E+02
314	1* 4.002696E+02	1* 4.031687E+02	1* 4.047911E+02	1* 4.053656E+02
315	1* 4.054853E+02	1* 4.055172E+02	1* 4.055291E+02	1* 4.055358E+02
316	1* 4.055425E+02	1* 4.055544E+02	1* 4.055864E+02	1* 4.057061E+02
317	1* 4.062805E+02	1* 4.079030E+02	1* 4.102169E+02	1* 4.125574E+02
318	1* 4.148980E+02	1* 4.172385E+02	1* 4.195791E+02	1* 4.219196E+02
319	1* 4.242602E+02	1* 4.266007E+02	1* 4.289412E+02	1* 4.312818E+02
320	1* 4.336223E+02	1* 4.359629E+02	1* 4.383034E+02	1* 4.406440E+02
321	1* 4.429845E+02	1* 4.453250E+02	1* 4.476656E+02	1* 4.493678E+02
322	1* 4.503253E+02	1* 4.509105E+02	1* 4.511232E+02	1* 4.512296E+02
323	1* 4.513892E+02	1* 4.517084E+02	1* 4.523999E+02	1* 4.530915E+02
324	1* 4.534106E+02	1* 4.535561E+02	1* 4.536130E+02	1* 4.536698E+02
325	1* 4.538153E+02	1* 4.541345E+02	1* 4.547728E+02	1* 4.554644E+02
326	1* 4.558367E+02	1* 4.559963E+02	1* 4.560851E+02	1* 4.562079E+02
327	1* 4.566292E+02	1* 4.570069E+02	1* 4.570593E+02	1* 4.570699E+02
328	1* 4.570805E+02	1* 4.571590E+02	1* 4.576190E+02	1* 4.589843E+02
329	1* 4.609346E+02	1* 4.636317E+02	1* 4.670756E+02	1* 4.705195E+02
330	1* 4.734117E+02	1* 4.757522E+02	1* 4.780928E+02	1* 4.804333E+02
331	1* 4.827739E+02	1* 4.851144E+02	1* 4.874549E+02	1* 4.897955E+02
332	1* 4.921360E+02	1* 4.944766E+02	1* 4.968171E+02	1* 4.991576E+02
333	1* 5.014982E+02	1* 5.038387E+02	1* 5.061793E+02	1* 5.085198E+02
334	1* 5.108603E+02	1* 5.132009E+02	1* 5.155148E+02	1* 5.171372E+02
335	1* 5.177117E+02	1* 5.178314E+02	1* 5.178633E+02	1* 5.178752E+02
336	1* 5.178820E+02	1* 5.178886E+02	1* 5.179006E+02	1* 5.179325E+02

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1* 5.180522E+02   1* 5.186267E+02   1* 5.202491E+02   1* 5.231482E+02
1* 5.978645E+02   1* 6.007636E+02   1* 6.023860E+02   1* 6.029605E+02
1* 6.030802E+02   1* 6.031121E+02   1* 6.031240E+02   1* 6.031307E+02
1* 6.031375E+02   1* 6.031494E+02   1* 6.031813E+02   1* 6.033010E+02
1* 6.038755E+02   1* 6.054979E+02   1* 6.078118E+02   1* 6.101523E+02
1* 6.124929E+02   1* 6.148334E+02   1* 6.171740E+02   1* 6.195145E+02
1* 6.218550E+02   1* 6.241956E+02   1* 6.265361E+02   1* 6.288767E+02
1* 6.312172E+02   1* 6.335578E+02   1* 6.358983E+02   1* 6.382389E+02
1* 6.405794E+02   1* 6.429200E+02   1* 6.452605E+02   1* 6.469627E+02
1* 6.479202E+02   1* 6.485054E+02   1* 6.487181E+02   1* 6.488245E+02
1* 6.489841E+02   1* 6.493033E+02   1* 6.499948E+02   1* 6.506864E+02
1* 6.510056E+02   1* 6.511510E+02   1* 6.512079E+02   1* 6.512648E+02
1* 6.514102E+02   1* 6.517294E+02   1* 6.523677E+02   1* 6.530593E+02
1* 6.534316E+02   1* 6.535912E+02   1* 6.536800E+02   1* 6.538028E+02
1* 6.542242E+02   1* 6.546019E+02   1* 6.546542E+02   1* 6.546648E+02
1* 6.546754E+02   1* 6.547540E+02   1* 6.552139E+02   1* 6.565792E+02
1* 6.585295E+02   1* 6.612266E+02   1* 6.646705E+02   1* 6.681144E+02
1* 6.710066E+02   1* 6.733472E+02   1* 6.756877E+02   1* 6.780282E+02
1* 6.803688E+02   1* 6.827093E+02   1* 6.850499E+02   1* 6.873904E+02
1* 6.897310E+02   1* 6.920715E+02   1* 6.944120E+02   1* 6.967526E+02
1* 6.990931E+02   1* 7.014336E+02   1* 7.037742E+02   1* 7.061147E+02
1* 7.084553E+02   1* 7.107958E+02   1* 7.131097E+02   1* 7.147322E+02
1* 7.153066E+02   1* 7.154263E+02   1* 7.154583E+02   1* 7.154702E+02
1* 7.154769E+02   1* 7.154835E+02   1* 7.154955E+02   1* 7.155274E+02
1* 7.156471E+02   1* 7.162216E+02   1* 7.178440E+02   1* 7.207431E+02
96* 7.977065E+02
96* 8.195566E+02
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INJP
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 89  23   1   1
INJP
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1.5778E+09   8
 1  27   1   2
PROD
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INJP
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 1  30   1   2
PROD
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INJP
 0.000000E+00  0.000000E+00  1.000000E-11  1.311240E+07
 96  27   1   2
PROD
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INJP
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 96  30   1   2
PROD
 0.000000E+00  0.000000E+00  1.000000E-11  1.163660E+07
INJP
 0.000000E+00  0.000000E+00  1.000000E-11  1.163660E+07
 8  34   1   2
PROD
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INJP
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PROD
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INJP
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 1  23   1   2
PROD
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INJP
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 96  23   1   2
PROD
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INJP
 0.000000E+00  0.000000E+00  1.000000E-15  1.564000E+07
DIRICHLET CONDITIONS
T   36
 1  2  1  T  F  5.231520E+07  0.000000E+00
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 1  5  1  T  F  4.992050E+07  0.000000E+00
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 1  9  1  T  F  4.205030E+07  0.000000E+00
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 1  12  1  T  F  3.499420E+07  0.000000E+00
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 1  13  1  T  F  3.220030E+07  0.000000E+00
 96  13  1  T  F  3.220030E+07  0.000000E+00
 1  14  1  T  F  2.965140E+07  0.000000E+00
 96  14  1  T  F  2.965140E+07  0.000000E+00
 1  16  1  T  F  2.884190E+07  0.000000E+00
 96  16  1  T  F  2.884190E+07  0.000000E+00
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 96  18  1  T  F  2.323570E+07  0.000000E+00
 1  20  1  T  F  2.262970E+07  0.000000E+00
 96  20  1  T  F  2.262970E+07  0.000000E+00
 1  21  1  T  F  2.079430E+07  0.000000E+00
 96  21  1  T  F  2.079430E+07  0.000000E+00
 1  22  1  T  F  1.777530E+07  0.000000E+00
 96  22  1  T  F  1.777530E+07  0.000000E+00
 1  24  1  T  F  1.788030E+07  0.000000E+00
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49  96 24  1  T  F  1.640250E+07  0.000000E+00
50   1 34  1  T  F  8.220000E+05  0.000000E+00
51  96 34  1  T  F  8.220000E+05  0.000000E+00
52  GRID BLOCK BRINE PRESSURE INITIAL CONDITIONS
53  96* 5.305639E+07
54  96* 5.231517E+07
55  96* 5.106785E+07
56  96* 5.047622E+07
57  96* 4.992054E+07
58  96* 4.875330E+07
59  96* 4.806200E+07
60  96* 4.758172E+07
61  96* 4.205032E+07
62  96* 3.634266E+07
63  96* 3.566847E+07
64  96* 3.499420E+07
65  96* 3.220030E+07
66  96* 2.965135E+07
67  96* 2.924668E+07
68  96* 2.884192E+07
69  96* 2.599246E+07
70  96* 2.323571E+07
71  96* 2.293275E+07
72  96* 2.262974E+07
73  96* 2.079435E+07
74  96* 1.777526E+07
75  96* 1.564000E+07
76  1* 1.788033E+07   1* 1.784562E+07   1* 1.782612E+07   1* 1.781923E+07
77  1* 1.781770E+07   2* 1.781722E+07   1* 1.781713E+07   1* 1.781694E+07
78  1* 1.781684E+07   1* 1.781646E+07   1* 1.781503E+07   1* 1.780814E+07
79  1* 1.778854E+07   1* 1.776062E+07   1* 1.773251E+07   1* 1.770450E+07
80  1* 1.767639E+07   1* 1.764818E+07   1* 1.762007E+07   1* 1.759196E+07
81  1* 1.756375E+07   1* 1.753555E+07   1* 1.750734E+07   1* 1.747913E+07
82  1* 1.745102E+07   1* 1.742291E+07   1* 1.739470E+07   1* 1.736658E+07
83  1* 1.733847E+07   1* 1.731036E+07   1* 1.728989E+07   1* 1.727832E+07
84  1* 1.727125E+07   1* 1.726876E+07   1* 1.726742E+07   1* 1.726541E+07
85  1* 1.726159E+07   1* 1.725346E+07   1* 1.724514E+07   1* 1.724112E+07
86  1* 1.723950E+07   1* 1.723873E+07   1* 1.723797E+07   1* 1.723625E+07
87  1* 1.723242E+07   1* 1.722477E+07   1* 1.721636E+07   1* 1.721186E+07
88  1* 1.720995E+07   1* 1.720899E+07   1* 1.720756E+07   1* 1.720249E+07
89  1* 1.719790E+07   1* 1.719714E+07   2* 1.719704E+07   1* 1.719608E+07
90  1* 1.719035E+07   1* 1.717399E+07   1* 1.715075E+07   1* 1.711824E+07
91  1* 1.707674E+07   1* 1.703542E+07   1* 1.700061E+07   1* 1.697240E+07
92  1* 1.694419E+07   1* 1.691598E+07   1* 1.688795E+07   1* 1.685984E+07
93  1* 1.683172E+07   1* 1.680370E+07   1* 1.677558E+07   1* 1.674736E+07
94  1* 1.671915E+07   1* 1.669094E+07   1* 1.666272E+07   1* 1.663470E+07
95  1* 1.660648E+07   1* 1.657826E+07   1* 1.655024E+07   1* 1.652221E+07
96  1* 1.649448E+07   1* 1.647487E+07   1* 1.646789E+07   1* 1.646645E+07
97  2* 1.646617E+07   1* 1.646597E+07   2* 1.646578E+07   1* 1.646530E+07
98  1* 1.646377E+07   1* 1.645689E+07   1* 1.643728E+07   1* 1.640246E+07
99  1* 1.440389E+07   1* 1.436905E+07   1* 1.434962E+07   1* 1.434273E+07
00  1* 1.434129E+07   1* 1.434072E+07   1* 1.434052E+07   1* 1.434043E+07
01  2* 1.434033E+07   1* 1.433995E+07   1* 1.433852E+07   1* 1.433162E+07
02  1* 1.431200E+07   1* 1.428415E+07   1* 1.425611E+07   1* 1.422806E+07
03  1* 1.420001E+07   1* 1.417197E+07   1* 1.414383E+07   1* 1.411569E+07
04  1* 1.408745E+07   1* 1.405931E+07   1* 1.403126E+07   1* 1.400312E+07
505  1* 1.397498E+07   1* 1.394683E+07   1* 1.391869E+07   1* 1.389055E+07
506  1* 1.386240E+07   1* 1.383426E+07   1* 1.381387E+07   1* 1.380248E+07
507  1* 1.379539E+07   1* 1.379281E+07   1* 1.379156E+07   1* 1.378955E+07
508  1* 1.378572E+07   1* 1.377759E+07   1* 1.376926E+07   1* 1.376524E+07
509  1* 1.376361E+07   1* 1.376294E+07   1* 1.376217E+07   1* 1.376045E+07
510  1* 1.375662E+07   1* 1.374896E+07   1* 1.374054E+07   1* 1.373614E+07
511  1* 1.373422E+07   1* 1.373307E+07   1* 1.373173E+07   1* 1.372675E+07
512  1* 1.372216E+07   1* 1.372149E+07   1* 1.372139E+07   1* 1.372130E+07
513  1* 1.372034E+07   1* 1.371469E+07   1* 1.369823E+07   1* 1.367496E+07
514  1* 1.364260E+07   1* 1.360106E+07   1* 1.355970E+07   1* 1.352495E+07
515  1* 1.349680E+07   1* 1.346884E+07   1* 1.344070E+07   1* 1.341245E+07
516  1* 1.338440E+07   1* 1.335644E+07   1* 1.332839E+07   1* 1.330024E+07
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519  1* 1.304699E+07   1* 1.301932E+07   1* 1.299988E+07   1* 1.299299E+07
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521  2* 1.299069E+07   1* 1.299030E+07   1* 1.298877E+07   1* 1.298197E+07
522  1* 1.296244E+07   1* 1.292749E+07
523  1* 1.318806E+07   1* 1.315301E+07   1* 1.313358E+07   1* 1.312668E+07
524  1* 1.312534E+07   1* 1.312486E+07   3* 1.312457E+07   1* 1.312448E+07
525  1* 1.312410E+07   1* 1.312266E+07   1* 1.311576E+07   1* 1.309623E+07
526  1* 1.306837E+07   1* 1.304031E+07   1* 1.301226E+07   1* 1.298411E+07
527  1* 1.295605E+07   1* 1.292790E+07   1* 1.289965E+07   1* 1.287159E+07
528  1* 1.284363E+07   1* 1.281558E+07   1* 1.278752E+07   1* 1.275946E+07
529  1* 1.273131E+07   1* 1.270315E+07   1* 1.267490E+07   1* 1.264675E+07
530  1* 1.261859E+07   1* 1.259801E+07   1* 1.258661E+07   1* 1.257971E+07
531  1* 1.257723E+07   1* 1.257598E+07   1* 1.257397E+07   1* 1.257014E+07
532  1* 1.256181E+07   1* 1.255348E+07   1* 1.254964E+07   1* 1.254783E+07
533  1* 1.254725E+07   1* 1.254668E+07   1* 1.254486E+07   1* 1.254093E+07
534  1* 1.253327E+07   1* 1.252494E+07   1* 1.252053E+07   1* 1.251862E+07
535  1* 1.251747E+07   1* 1.251622E+07   1* 1.251115E+07   1* 1.250645E+07
536  1* 1.250588E+07   1* 1.250578E+07   1* 1.250559E+07   1* 1.250463E+07
537  1* 1.249918E+07   1* 1.248280E+07   1* 1.245934E+07   1* 1.242697E+07
538  1* 1.238559E+07   1* 1.234422E+07   1* 1.230945E+07   1* 1.228130E+07
539  1* 1.225333E+07   1* 1.222527E+07   1* 1.219711E+07   1* 1.216895E+07
540  1* 1.214089E+07   1* 1.211273E+07   1* 1.208457E+07   1* 1.205660E+07
541  1* 1.202844E+07   1* 1.200019E+07   1* 1.197222E+07   1* 1.194425E+07
542  1* 1.191609E+07   1* 1.188793E+07   1* 1.185967E+07   1* 1.183151E+07
543  1* 1.180392E+07   1* 1.178448E+07   1* 1.177748E+07   1* 1.177605E+07
544  1* 1.177557E+07   3* 1.177538E+07   1* 1.177528E+07   1* 1.177490E+07
545  1* 1.177346E+07   1* 1.176666E+07   1* 1.174712E+07   1* 1.171206E+07
546  1* 1.315215E+07   1* 1.311720E+07   1* 1.309767E+07   1* 1.309078E+07
547  1* 1.308953E+07   1* 1.308915E+07   3* 1.308896E+07   1* 1.308867E+07
548  1* 1.308819E+07   1* 1.308685E+07   1* 1.307995E+07   1* 1.306052E+07
549  1* 1.303265E+07   1* 1.300450E+07   1* 1.297645E+07   1* 1.294820E+07
550  1* 1.292005E+07   1* 1.289190E+07   1* 1.286365E+07   1* 1.283569E+07
551  1* 1.280782E+07   1* 1.277976E+07   1* 1.275170E+07   1* 1.272374E+07
552  1* 1.269559E+07   1* 1.266734E+07   1* 1.263909E+07   1* 1.261093E+07
553  1* 1.258278E+07   1* 1.256219E+07   1* 1.255070E+07   1* 1.254380E+07
554  1* 1.254141E+07   16* 1.013250E+05   1* 1.248041E+07   1* 1.247533E+07
555  1* 1.247054E+07   1* 1.246987E+07   1* 1.013250E+05   1* 1.246968E+07
556  1* 1.246882E+07   1* 1.246336E+07   1* 1.244698E+07   1* 1.242342E+07
557  1* 1.239105E+07   1* 1.234997E+07   1* 1.230850E+07   1* 1.227354E+07
558  1* 1.224548E+07   1* 1.221741E+07   1* 1.218935E+07   1* 1.216129E+07
559  1* 1.213313E+07   1* 1.210507E+07   1* 1.207691E+07   1* 1.204875E+07
560  1* 1.202078E+07   1* 1.199262E+07   1* 1.196446E+07   1* 1.193649E+07
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51	1* 1.190843E+07	1* 1.188026E+07	1* 1.185210E+07	1* 1.182385E+07
52	1* 1.179568E+07	1* 1.176810E+07	1* 1.174865E+07	1* 1.174156E+07
53	1* 1.174022E+07	1* 1.173984E+07	2* 1.173955E+07	1* 1.173946E+07
54	1* 1.173926E+07	1* 1.173898E+07	1* 1.173764E+07	1* 1.173074E+07
55	1* 1.171120E+07	1* 1.167623E+07		
56	1* 1.313903E+07	1* 1.310418E+07	1* 1.308465E+07	1* 1.307775E+07
57	1* 1.307651E+07	1* 1.307622E+07	1* 1.307593E+07	2* 1.307574E+07
58	1* 1.307545E+07	1* 1.307498E+07	1* 1.307373E+07	1* 1.306684E+07
59	1* 1.304740E+07	1* 1.301963E+07	1* 1.299148E+07	1* 1.296333E+07
70	1* 1.293498E+07	1* 1.290683E+07	1* 1.287878E+07	1* 1.285072E+07
71	1* 1.282266E+07	1* 1.279461E+07	1* 1.276664E+07	1* 1.273868E+07
72	1* 1.271062E+07	1* 1.268238E+07	1* 1.265412E+07	1* 1.262587E+07
73	1* 1.259781E+07	1* 1.256975E+07	1* 1.254917E+07	1* 1.253758E+07
74	1* 1.253059E+07	1* 1.252819E+07	24* 1.013250E+05	1* 1.243386E+07
75	1* 1.241030E+07	1* 1.237784E+07	1* 1.233685E+07	1* 1.229538E+07
76	1* 1.226042E+07	1* 1.223236E+07	1* 1.220429E+07	1* 1.217633E+07
77	1* 1.214817E+07	1* 1.212001E+07	1* 1.209204E+07	1* 1.206398E+07
78	1* 1.203582E+07	1* 1.200766E+07	1* 1.197950E+07	1* 1.195143E+07
79	1* 1.192346E+07	1* 1.189530E+07	1* 1.186705E+07	1* 1.183889E+07
80	1* 1.181063E+07	1* 1.178256E+07	1* 1.175497E+07	1* 1.173553E+07
81	1* 1.172863E+07	1* 1.172729E+07	1* 1.172691E+07	1* 1.172653E+07
82	1* 1.172633E+07	1* 1.172624E+07	1* 1.172605E+07	1* 1.172585E+07
83	1* 1.172461E+07	1* 1.171762E+07	1* 1.169798E+07	1* 1.166321E+07
84	1* 1.312304E+07	1* 1.308829E+07	1* 1.306875E+07	1* 1.306186E+07
85	1* 1.306061E+07	1* 1.306023E+07	1* 1.305985E+07	1* 1.305965E+07
86	1* 1.305956E+07	1* 1.305937E+07	1* 1.305899E+07	1* 1.305774E+07
87	1* 1.305094E+07	1* 1.303131E+07	1* 1.300345E+07	1* 1.297539E+07
88	1* 1.294734E+07	1* 1.291909E+07	1* 1.289094E+07	1* 1.286288E+07
89	1* 1.283482E+07	1* 1.280677E+07	1* 1.277861E+07	1* 1.275056E+07
90	1* 1.272259E+07	1* 1.269454E+07	1* 1.266629E+07	1* 1.263813E+07
91	1* 1.261007E+07	1* 1.258201E+07	1* 1.255386E+07	1* 1.253317E+07
92	1* 1.252159E+07	1* 1.251459E+07	1* 1.251210E+07	24* 1.013250E+05
93	1* 1.241796E+07	1* 1.239450E+07	1* 1.236203E+07	1* 1.232076E+07
94	1* 1.227929E+07	1* 1.224442E+07	1* 1.221627E+07	1* 1.218820E+07
95	1* 1.216024E+07	1* 1.213217E+07	1* 1.210411E+07	1* 1.207605E+07
96	1* 1.204798E+07	1* 1.201982E+07	1* 1.199166E+07	1* 1.196360E+07
97	1* 1.193544E+07	1* 1.190737E+07	1* 1.187931E+07	1* 1.185105E+07
98	1* 1.182289E+07	1* 1.179482E+07	1* 1.176676E+07	1* 1.173907E+07
99	1* 1.171953E+07	1* 1.171273E+07	1* 1.171129E+07	1* 1.171081E+07
100	1* 1.171062E+07	1* 1.171043E+07	1* 1.171034E+07	1* 1.171014E+07
101	1* 1.170995E+07	1* 1.170871E+07	1* 1.170162E+07	1* 1.168189E+07
102	1* 1.164721E+07			
103	1* 1.311241E+07	1* 1.307756E+07	1* 1.305793E+07	1* 1.305113E+07
104	1* 1.304989E+07	1* 1.304951E+07	1* 1.304922E+07	1* 1.304912E+07
105	1* 1.304903E+07	1* 1.304883E+07	1* 1.304836E+07	1* 1.304692E+07
106	1* 1.304012E+07	1* 1.302059E+07	1* 1.299273E+07	1* 1.296467E+07
107	1* 1.293661E+07	1* 1.290846E+07	1* 1.288040E+07	1* 1.285235E+07
108	1* 1.282420E+07	1* 1.279614E+07	1* 1.276798E+07	1* 1.273973E+07
109	1* 1.271168E+07	1* 1.268362E+07	1* 1.265546E+07	1* 1.262741E+07
110	1* 1.259944E+07	1* 1.257138E+07	1* 1.254323E+07	1* 1.252264E+07
111	1* 1.251105E+07	1* 1.250406E+07	1* 1.250147E+07	16* 1.013250E+05
112	1* 1.244047E+07	1* 1.243539E+07	1* 1.243099E+07	1* 1.243041E+07
113	1* 1.013250E+05	1* 1.243013E+07	1* 1.242907E+07	1* 1.242361E+07
114	1* 1.240724E+07	1* 1.238377E+07	1* 1.235150E+07	1* 1.231003E+07
115	1* 1.226846E+07	1* 1.223370E+07	1* 1.220563E+07	1* 1.217757E+07
116	1* 1.214951E+07	1* 1.212145E+07	1* 1.209329E+07	1* 1.206513E+07
617	1* 1.203716E+07	1* 1.200910E+07	1* 1.198094E+07	1* 1.195278E+07
618	1* 1.192461E+07	1* 1.189664E+07	1* 1.186858E+07	1* 1.184042E+07
619	1* 1.181235E+07	1* 1.178429E+07	1* 1.175612E+07	1* 1.172834E+07
620	1* 1.170890E+07	1* 1.170200E+07	1* 1.170047E+07	1* 1.170009E+07
621	1* 1.169999E+07	1* 1.169990E+07	1* 1.169980E+07	1* 1.169951E+07
622	1* 1.169923E+07	1* 1.169798E+07	1* 1.169089E+07	1* 1.167125E+07
623	1* 1.163658E+07			
624	1* 1.223770E+07	1* 1.220274E+07	1* 1.218320E+07	1* 1.217640E+07
625	1* 1.217506E+07	1* 1.217477E+07	1* 1.217458E+07	2* 1.217448E+07
626	1* 1.217420E+07	1* 1.217362E+07	1* 1.217228E+07	1* 1.216539E+07
627	1* 1.214594E+07	1* 1.211826E+07	1* 1.209010E+07	1* 1.206194E+07
628	1* 1.203378E+07	1* 1.200562E+07	1* 1.197756E+07	1* 1.194940E+07
629	1* 1.192133E+07	1* 1.189337E+07	1* 1.186521E+07	1* 1.183704E+07
630	1* 1.180888E+07	1* 1.178081E+07	1* 1.175275E+07	1* 1.172468E+07
631	1* 1.169661E+07	1* 1.166855E+07	1* 1.164805E+07	1* 1.163646E+07
632	1* 1.162946E+07	1* 1.162707E+07	1* 1.162573E+07	1* 1.162372E+07
633	1* 1.161998E+07	1* 1.161155E+07	1* 1.160322E+07	1* 1.159967E+07
634	1* 1.159785E+07	1* 1.159690E+07	1* 1.159632E+07	1* 1.159469E+07
635	1* 1.159086E+07	1* 1.158320E+07	1* 1.157496E+07	1* 1.157036E+07
636	1* 1.156844E+07	1* 1.156749E+07	1* 1.156586E+07	1* 1.156078E+07
637	1* 1.155637E+07	1* 1.155580E+07	1* 1.013250E+05	1* 1.155551E+07
638	1* 1.155446E+07	1* 1.154909E+07	1* 1.153262E+07	1* 1.150905E+07
639	1* 1.147686E+07	1* 1.143557E+07	1* 1.139409E+07	1* 1.135941E+07
640	1* 1.133144E+07	1* 1.130327E+07	1* 1.127510E+07	1* 1.124694E+07
641	1* 1.121877E+07	1* 1.119061E+07	1* 1.116263E+07	1* 1.113456E+07
642	1* 1.110639E+07	1* 1.107832E+07	1* 1.105025E+07	1* 1.102217E+07
643	1* 1.099400E+07	1* 1.096584E+07	1* 1.093776E+07	1* 1.090969E+07
644	1* 1.088161E+07	1* 1.085383E+07	1* 1.083447E+07	1* 1.082757E+07
645	1* 1.082604E+07	1* 1.082575E+07	1* 1.082556E+07	2* 1.082547E+07
646	1* 1.082527E+07	1* 1.082489E+07	1* 1.082355E+07	1* 1.081665E+07
647	1* 1.079720E+07	1* 1.076242E+07		
648	1* 9.865862E+06	1* 9.830879E+06	1* 9.811422E+06	1* 9.804616E+06
649	1* 9.803178E+06	1* 9.802795E+06	3* 9.802700E+06	1* 9.802412E+06
650	1* 9.801837E+06	1* 9.800590E+06	1* 9.793786E+06	1* 9.774232E+06
651	1* 9.746532E+06	1* 9.718449E+06	1* 9.690364E+06	1* 9.662183E+06
652	1* 9.633906E+06	1* 9.605918E+06	1* 9.577833E+06	1* 9.549747E+06
653	1* 9.521853E+06	1* 9.493768E+06	1* 9.465585E+06	1* 9.437499E+06
654	1* 9.409507E+06	1* 9.381421E+06	1* 9.353238E+06	1* 9.325150E+06
655	1* 9.297159E+06	1* 9.276644E+06	1* 9.265044E+06	1* 9.258046E+06
656	1* 9.255746E+06	1* 9.254404E+06	1* 9.252294E+06	1* 9.248651E+06
657	1* 9.240216E+06	1* 9.231779E+06	1* 9.228232E+06	1* 9.226411E+06
658	1* 9.225548E+06	1* 9.224974E+06	1* 9.223248E+06	1* 9.219509E+06
659	1* 9.211840E+06	1* 9.203499E+06	1* 9.198898E+06	1* 9.197076E+06
660	1* 9.196213E+06	1* 9.194487E+06	1* 9.189311E+06	1* 9.184997E+06
661	1* 9.184422E+06	1* 1.013250E+05	1* 9.184038E+06	1* 9.183080E+06
662	1* 9.177711E+06	1* 9.161222E+06	1* 9.137735E+06	1* 9.105523E+06
663	1* 9.064299E+06	1* 9.022979E+06	1* 8.988370E+06	1* 8.960375E+06
664	1* 8.932188E+06	1* 8.904001E+06	1* 8.875910E+06	1* 8.847818E+06
665	1* 8.819631E+06	1* 8.791538E+06	1* 8.763542E+06	1* 8.735450E+06
666	1* 8.707356E+06	1* 8.679360E+06	1* 8.651266E+06	1* 8.623173E+06
667	1* 8.594983E+06	1* 8.566793E+06	1* 8.538698E+06	1* 8.510796E+06
668	1* 8.483085E+06	1* 8.463619E+06	1* 8.456812E+06	1* 8.455277E+06
669	1* 8.454894E+06	1* 8.454702E+06	2* 8.454606E+06	1* 8.454510E+06
670	1* 8.454127E+06	1* 8.452688E+06	1* 8.445784E+06	1* 8.426415E+06
671	1* 8.391607E+06			
672	55* 8.220000E+05	1* 1.013250E+05	40* 8.220000E+05	

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55* 8.220000E+05   1* 1.013250E+05   40* 8.220000E+05
GRID BLOCK BRINE SATURATION INITIAL CONDITIONS
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96* 1.000000E+00
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35* 1.000000E+00   7* 1.500000E-02   1* 9.999999E-01   7* 1.500000E-02
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55* 1.000000E+00   1* 7.900000E-01   40* 1.000000E+00
55* 1.000000E+00   1* 7.900000E-01   40* 1.000000E+00
GRID BLOCK FE CONCENTRATION INITIAL CONDITIONS
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GRID BLOCK CH2O CONCENTRATION INITIAL CONDITIONS
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96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
35* 0.000000E+00   7* 6.516987E+01   1* 0.000000E+00   7* 6.516987E+01
46* 0.000000E+00
35* 0.000000E+00   7* 6.516987E+01   1* 0.000000E+00   7* 6.516987E+01
46* 0.000000E+00
35* 0.000000E+00   7* 6.516987E+01   1* 0.000000E+00   7* 6.516987E+01
```

```
85  46* 0.000000E+00
86  35* 0.000000E+00   7* 6.516987E+01   1* 0.000000E+00   7* 6.516987E+01
87  46* 0.000000E+00
88  96* 0.000000E+00
89  96* 0.000000E+00
90  96* 0.000000E+00
91  96* 0.000000E+00
92  DSATLIM, DPRESLIM, SATLIMIT
93   2.0000E-01  -1.0000E+08  1.0000E-03
94  SATNORM, PRESNORM: NOMINAL CHANGE DEPENDENT VARIABLE
95   3.0000E-01  5.0000E+05
96  MAXIMUM ALLOWABLE VARIABLE CHANGES: DSAT_MAX  DPRES_MAX
97   1.0000E+00  1.0000E+07
98  CONVERGENGE TEST FLAG: 0=OR/1=AND
99   1
00  EPS_SAT, EPS_PRES:  NORMAL CONVERGENCE CRITERIA
01   3.0000E+00  1.0000E-02
02  EPS_SAT, EPS_PRES:  RELAXED CONVERGENCE CRITERIA
03   3.0000E+00  1.0000E-02
04  FTOL_SAT  FTOL_PRES:  NORMAL RESIDUAL' TOLERANCE
05   1.0000E-02  1.0000E-02
06  FTOL_SAT  FTOL_PRES:  RELAXED RESIDUAL' TOLERANCE
07   1.0000E-02  1.0000E-02
08  GAS TRANSPORT TOLERANCES
09   1.0000E-05  1.0000E-05  1.0000E-05  1.0000E-05
10  LINEAR EQUATION SOLVER TYPE
11  LU
12  ITMAX, IRESETMAX, IJACINT, LSCALE, P_SCALE, LVARSWITCH
13   8  40  1  T   1.0000E+07 F
14  IUPRPFLAG, IUPMFLAG, DT_REDU, ITRAVE, IMFRAVE
15   9  9  2.5000E-01  1  0
16  IJACSWITCH, IJACMIN, IJACRESET, IUPRPLOOSE, IUPMFLOOSE
17   41  1  5  9  9
18  DHSAT_REL, DHPRES_REL: REL. CHANGE FOR JACOBIAN ELEMENT CALCS
19   1.0000E-08  1.0000E-08
20  DHSAT_MIN, DHPRES_MIN: MIN. CHANGE ALLOWED FOR JACOBIAN CALCS
21   1.0000E-10  1.0000E-02
22  NUMBER OF TIMES FOR SPECIFYING MATERIAL MAP
23  7
24  START TIME FOR MAP 1
25  -1.5778E+08
26  MATERIAL TYPE GRID MAP
27  26* 1 44* 2 26* 3
28  96* 4
29  96* 4
30  26* 5 44* 6 26* 7
31  96* 8
32  96* 8
33  26* 9 44* 10 26* 11
34  96* 12
35  96* 12
36  96* 12
37  26* 13 44* 14 26* 15
38  96* 16
39  96* 16
40  96* 16
841 26* 17 44* 18 26* 19
842 96* 20
843 96* 20
844 96* 20
845 26* 21 44* 22 26* 23
846 96* 24
847 96* 24
848 96* 24
849 26* 25 44* 26 26* 27
850 96* 28
851 96* 29
852 35* 29 24* 37 37* 29
853 35* 30  7* 34  1* 36  7* 34  1* 36  4* 30  1* 36 40* 30
854 35* 29  7* 34  1* 36  7* 34  1* 36  4* 35  1* 36  3* 35 37* 29
855 35* 29  7* 34  1* 36  7* 34  1* 36  4* 35  1* 36  3* 35 37* 29
856 35* 31  7* 34  1* 36  7* 34  1* 36  4* 31  1* 36 40* 31
857 55* 29  1* 36 40* 29
858 55* 29  1* 36 40* 29
859 55* 32  1* 36 40* 32
860 55* 33  1* 36 40* 33
861 START TIME FOR MAP 2
862 0.0000E+00
863 MATERIAL TYPE GRID MAP
864 26* 1 44* 2 26* 3
865 96* 4
866 96* 4
867 26* 5 44* 6 26* 7
868 96* 8
869 96* 8
870 26* 9 44* 10 26* 11
871 96* 12
872 96* 12
873 96* 12
874 26* 13 44* 14 26* 15
875 96* 16
876 96* 16
877 96* 16
878 26* 17 44* 18 26* 19
879 96* 20
880 96* 20
881 96* 20
882 26* 21 44* 22 26* 23
883 96* 24
884 96* 24
885 96* 24
886 7* 25  1* 55 18* 25 44* 26 18* 27  1* 55  7* 27
887 7* 28  1* 53 80* 28  1* 53  7* 28
888 7* 29  1* 53 80* 29  1* 53  7* 29
889 7* 29  1* 53 27* 29 24* 38 29* 29  1* 53  7* 29
890 7* 30  1* 53 27* 30  7* 40  1* 43  7* 40  1* 43  4* 30  1* 41 32* 30  1* 53  7* 30
891 7* 29  1* 53 27* 29  7* 40  1* 43  7* 40  1* 43  5* 41  3* 42 29* 29  1* 53  7* 29
892 7* 29  1* 53 27* 29  7* 40  1* 43  7* 40  1* 43  4* 41  1* 45  3* 42 29* 29  1* 53  7* 29
893 7* 31  1* 53 27* 31  7* 40  1* 43  7* 40  1* 43  4* 31  1* 45 32* 31  1* 53  7* 31
894 7* 29  1* 53 47* 29  1* 45 32* 29  1* 53  7* 29
895 7* 29  1* 53 47* 29  1* 47 32* 29  1* 53  7* 29
896 55* 32  1* 44 40* 32
```

```
55* 39  1* 44  40* 39
START TIME FOR MAP 3
1.5778E+09
MATERIAL TYPE GRID MAP
26*  1  44*  2  26*  3
96*  4
96*  4
26*  5  44*  6  26*  7
96*  8
96*  8
26*  9  44*  10  26*  11
96*  12
96*  12
96*  12
26*  13  44*  14  26*  15
96*  16
96*  16
96*  16
26*  17  44*  18  26*  19
96*  20
96*  20
96*  20
26*  21  44*  22  26*  23
96*  24
96*  24
96*  24
7*  25  1*  56  18*  25  44*  26  18*  27  1*  56  7*  27
7*  28  1*  57  80*  28  1*  57  7*  28
7*  29  1*  57  80*  29  1*  57  7*  29
7*  29  1*  57  27*  29  24*  38  29*  29  1*  57  7*  29
7*  30  1*  57  27*  30  7*  40  1*  43  7*  40  1*  43  4*  30  1*  41  32*  30  1*  57  7*  30
7*  29  1*  57  27*  29  7*  40  1*  43  7*  40  1*  43  5*  41  3*  42  29*  29  1*  57  7*  29
7*  29  1*  57  27*  29  7*  40  1*  43  7*  40  1*  43  4*  41  1*  46  3*  42  29*  29  1*  57  7*  29
7*  31  1*  57  27*  31  7*  40  1*  43  7*  40  1*  43  4*  31  1*  46  32*  31  1*  57  7*  31
7*  29  1*  57  47*  29  1*  46  32*  29  1*  57  7*  29
7*  29  1*  57  47*  29  1*  48  32*  29  1*  57  7*  29
7*  32  1*  56  47*  32  1*  44  32*  32  1*  56  7*  32
7*  39  1*  56  47*  39  1*  44  32*  39  1*  56  7*  39
START TIME FOR MAP 4
3.1557E+09
MATERIAL TYPE GRID MAP
26*  1  44*  2  26*  3
96*  4
96*  4
26*  5  44*  6  26*  7
96*  8
96*  8
26*  9  44*  10  26*  11
96*  12
96*  12
96*  12
26*  13  44*  14  26*  15
96*  16
96*  16
96*  16
26*  17  44*  18  26*  19
96*  20
96*  20
96*  20
26*  21  44*  22  26*  23
96*  24
96*  24
96*  24
7*  25  1*  56  18*  25  44*  26  18*  27  1*  56  7*  27
7*  28  1*  57  80*  28  1*  57  7*  28
7*  29  1*  57  80*  29  1*  57  7*  29
7*  29  1*  57  27*  29  24*  38  29*  29  1*  57  7*  29
7*  30  1*  57  27*  30  7*  40  1*  43  7*  40  1*  43  4*  30  1*  41  32*  30  1*  57  7*  30
7*  29  1*  57  27*  29  7*  40  1*  43  7*  40  1*  43  5*  41  3*  42  29*  29  1*  57  7*  29
7*  29  1*  57  27*  29  7*  40  1*  43  7*  40  1*  43  4*  41  1*  46  3*  42  29*  29  1*  57  7*  29
7*  31  1*  57  27*  31  7*  40  1*  43  7*  40  1*  43  4*  31  1*  46  32*  31  1*  57  7*  31
7*  29  1*  57  47*  29  1*  46  32*  29  1*  57  7*  29
7*  29  1*  57  47*  29  1*  49  32*  29  1*  57  7*  29
7*  32  1*  56  47*  32  1*  44  32*  32  1*  56  7*  32
7*  39  1*  56  47*  39  1*  44  32*  39  1*  56  7*  39
START TIME FOR MAP 5
6.3114E+09
MATERIAL TYPE GRID MAP
26*  1  44*  2  26*  3
96*  4
96*  4
26*  5  44*  6  26*  7
96*  8
96*  8
26*  9  44*  10  26*  11
96*  12
96*  12
96*  12
26*  13  44*  14  26*  15
96*  16
96*  16
96*  16
26*  17  44*  18  26*  19
96*  20
96*  20
96*  20
26*  21  44*  22  26*  23
96*  24
96*  24
96*  24
7*  25  1*  56  18*  25  44*  26  18*  27  1*  56  7*  27
7*  28  1*  57  80*  28  1*  57  7*  28
7*  29  1*  57  80*  29  1*  57  7*  29
7*  29  1*  57  27*  29  24*  38  29*  29  1*  57  7*  29
7*  30  1*  57  27*  30  7*  40  1*  43  7*  40  1*  43  4*  30  1*  41  32*  30  1*  57  7*  30
7*  29  1*  57  27*  29  7*  40  1*  43  7*  40  1*  43  5*  41  3*  42  29*  29  1*  57  7*  29
7*  29  1*  57  27*  29  7*  40  1*  43  7*  40  1*  43  4*  41  1*  46  3*  42  29*  29  1*  57  7*  29
7*  31  1*  57  27*  31  7*  40  1*  43  7*  40  1*  43  4*  31  1*  46  32*  31  1*  57  7*  31
7*  29  1*  57  47*  29  1*  46  32*  29  1*  57  7*  29
7*  29  1*  57  47*  29  1*  50  32*  29  1*  57  7*  29
7*  32  1*  56  47*  32  1*  44  32*  32  1*  56  7*  32
7*  39  1*  56  47*  39  1*  44  32*  39  1*  56  7*  39
```

```
START TIME FOR MAP 6
7.8892E+09
MATERIAL TYPE GRID MAP
26* 1 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
 7* 25  1* 54  18* 25  44* 26  18* 27  1* 54  7* 27
 7* 28  1* 52  80* 28  1* 52  7* 28
 7* 29  1* 52  80* 29  1* 52  7* 29
 7* 29  1* 52  27* 29  24* 38  29* 29  1* 52  7* 29
 7* 30  1* 52  27* 30  7* 40  1* 43  7* 40  1* 43  4* 30  1* 41  32* 30  1* 52  7* 30
 7* 29  1* 52  27* 29  7* 40  1* 43  7* 40  1* 43  5* 41  3* 42  29* 29  1* 52  7* 29
 7* 29  1* 52  27* 29  7* 40  1* 43  7* 40  1* 43  4* 41  1* 46  3* 42  29* 29  1* 52  7* 29
 7* 31  1* 52  27* 31  7* 40  1* 43  7* 40  1* 43  4* 31  1* 46  32* 31  1* 52  7* 31
 7* 29  1* 52  47* 29  1* 46  32* 29  1* 52  7* 29
 7* 29  1* 52  47* 29  1* 50  32* 29  1* 52  7* 29
 7* 32  1* 51  47* 32  1* 44  32* 32  1* 51  7* 32
 7* 39  1* 51  47* 39  1* 44  32* 39  1* 51  7* 39
START TIME FOR MAP 7
3.9446E+10
MATERIAL TYPE GRID MAP
26* 1 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
 7* 25  1* 54  18* 25  44* 26  18* 27  1* 54  7* 27
 7* 28  1* 52  80* 28  1* 52  7* 28
 7* 29  1* 58  80* 29  1* 58  7* 29
 7* 29  1* 58  27* 29  24* 38  29* 29  1* 58  7* 29
 7* 30  1* 52  27* 30  7* 40  1* 43  7* 40  1* 43  4* 30  1* 41  32* 30  1* 52  7* 30
 7* 29  1* 52  27* 29  7* 40  1* 43  7* 40  1* 43  5* 41  3* 42  29* 29  1* 52  7* 29
 7* 29  1* 52  27* 29  7* 40  1* 43  7* 40  1* 43  4* 41  1* 46  3* 42  29* 29  1* 52  7* 29
 7* 31  1* 52  27* 31  7* 40  1* 43  7* 40  1* 43  4* 31  1* 46  32* 31  1* 52  7* 31
 7* 29  1* 52  47* 29  1* 46  32* 29  1* 52  7* 29
 7* 29  1* 52  47* 29  1* 50  32* 29  1* 52  7* 29
 7* 32  1* 51  47* 32  1* 44  32* 32  1* 51  7* 32
 7* 39  1* 51  47* 39  1* 44  32* 39  1* 51  7* 39
#   NAME
1   MORRO_P1
2   MORRO_P2
3   MORRO_P3
4   MORRO_NP
5   ATOKA_P1
6   ATOKA_P2
7   ATOKA_P3
8   ATOKA_NP
9   STRWN_P1
10  STRWN_P2
11  STRWN_P3
12  STRWN_NP
13  BONES_P1
14  BONES_P2
15  BONES_P3
16  BONES_NP
17  LBRSH_P1
18  LBRSH_P2
19  LBRSH_P3
20  UBRSH_NP
21  UBRSH_P1
22  UBRSH_P2
23  UBRSH_P3
24  LBELL_NP
25  UBELL_P1
26  UBELL_P2
27  UBELL_P3
28  CASTILER
29  S_HALITE
30  S_MB139
31  S_MB138
32  UNNAMED
33  IMPERM_Z
34  CAVITY_2
35  CAVITY_3
36  CAVITY_4
37  DRZ_0
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38   DRZ_I
39   CULEBRA
40   WAS_AREA
41   OPS_AREA
42   EXP_AREA
43   PAN_SEAL
44   CLAY_RUS
45   CL_L_T1
46   CL_L_T4
47   SALT_T1
48   SALT_T4
49   SALT_T5
50   SALT_T6
51   BH_SUR_A
52   BH_SLT_A
53   BH_SLT_L
54   BH_LOW_A
55   BH_LOW_L
56   CONC_PLG
57   BH_OPEN
58   BH_CREEP
NWST
1
MAT_WASTEI  MAT_WASTE
34
40
NDRZ
0
NMATRESET
3
MATRESET
34 35 36
BORE HOLE MATERIAL NUMBER
0
RESET TIME,  ICWASTE
0.0000E+00   1
PQWASTEIC
1.013250E+05
SOWASTEIC
0.000000E+00
PRESDRZ

# LAMBDA     SOR        SGR
1 7.000000E-01 2.000000E-01 1.000000E-02
2 7.000000E-01 2.000000E-01 1.000000E-02
3 7.000000E-01 2.000000E-01 1.000000E-02
4 7.000000E-01 2.000000E-01 1.000000E-02
5 7.000000E-01 2.000000E-01 1.000000E-02
6 7.000000E-01 2.000000E-01 1.000000E-02
7 7.000000E-01 2.000000E-01 1.000000E-02
8 7.000000E-01 2.000000E-01 1.000000E-02
9 7.000000E-01 2.000000E-01 1.000000E-02
10 7.000000E-01 2.000000E-01 1.000000E-02
11 7.000000E-01 2.000000E-01 1.000000E-02
12 7.000000E-01 2.000000E-01 1.000000E-02
13 7.000000E-01 2.000000E-01 1.000000E-02
14 7.000000E-01 2.000000E-01 1.000000E-02
15 7.000000E-01 2.000000E-01 1.000000E-02
16 7.000000E-01 2.000000E-01 1.000000E-02
17 7.000000E-01 2.000000E-01 1.000000E-02
18 7.000000E-01 2.000000E-01 1.000000E-02
19 7.000000E-01 2.000000E-01 1.000000E-02
20 7.000000E-01 2.000000E-01 1.000000E-02
21 7.000000E-01 2.000000E-01 1.000000E-02
22 7.000000E-01 2.000000E-01 1.000000E-02
23 7.000000E-01 2.000000E-01 1.000000E-02
24 7.000000E-01 2.000000E-01 1.000000E-02
25 7.000000E-01 2.000000E-01 1.000000E-02
26 7.000000E-01 2.000000E-01 1.000000E-02
27 7.000000E-01 2.000000E-01 1.000000E-02
28 7.000000E-01 2.000000E-01 2.000000E-01
29 7.000000E-01 3.000000E-01 2.000000E-01
30 6.436000E-01 8.363000E-02 7.711000E-02
31 6.436000E-01 8.363000E-02 7.711000E-02
32 7.000000E-01 2.000000E-01 2.000000E-01
33 7.000000E-01 0.000000E+00 0.000000E+00
34 7.000000E-01 0.000000E+00 0.000000E+00
35 7.000000E-01 0.000000E+00 0.000000E+00
36 7.000000E-01 0.000000E+00 0.000000E+00
37 7.000000E-01 0.000000E+00 0.000000E+00
38 7.000000E-01 0.000000E+00 0.000000E+00
39 6.436000E-01 8.363000E-02 7.711000E-02
40 2.890000E+00 2.760000E-01 7.500000E-02
41 7.000000E-01 0.000000E+00 0.000000E+00
42 7.000000E-01 0.000000E+00 0.000000E+00
43 9.400000E-01 2.000000E-01 2.000000E-01
44 9.400000E-01 2.000000E-01 2.000000E-01
45 9.400000E-01 2.000000E-01 2.000000E-01
46 9.400000E-01 2.000000E-01 2.000000E-01
47 9.400000E-01 2.000000E-01 2.000000E-01
48 9.400000E-01 2.000000E-01 2.000000E-01
49 9.400000E-01 2.000000E-01 2.000000E-01
50 9.400000E-01 2.000000E-01 2.000000E-01
51 9.400000E-01 0.000000E+00 0.000000E+00
52 9.400000E-01 0.000000E+00 0.000000E+00
53 9.400000E-01 0.000000E+00 0.000000E+00
54 9.400000E-01 0.000000E+00 0.000000E+00
55 9.400000E-01 0.000000E+00 0.000000E+00
56 9.400000E-01 0.000000E+00 0.000000E+00
57 7.000000E-01 0.000000E+00 0.000000E+00
58 9.400000E-01 0.000000E+00 0.000000E+00

# SBMIN      PBMIN      PCMAX      PCT_A      PCT_EXP    KRP KPC KTP
1 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
2 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
3 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
4 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
5 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
6 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
7 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
8 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
9 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
10 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
```

```
11 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
12 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
13 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
14 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
15 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
16 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
17 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
18 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
19 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
20 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
21 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
22 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
23 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
24 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
25 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
26 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
27 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
28 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
29 3.150000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
30 8.781150E-02 1.013250E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
31 8.781150E-02 1.013250E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
32 2.100000E-01 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
33 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
34 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
35 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
36 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
37 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
38 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
39 8.781150E-02 1.013250E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
40 2.898000E-01 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
41 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
42 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
43 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
44 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
45 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
46 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
47 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
48 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
49 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
50 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
51 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
52 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
53 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
54 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
55 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
56 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
57 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 5 1 0
58 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
# PERMX     PERMY     PERMZ     POROSITY   COMPRES
1 2.060631E-14 2.060626E-20 2.060631E-14 1.100000E-01 3.015400E-10
2 2.060631E-14 2.060626E-20 2.060631E-14 1.100000E-01 3.015400E-10
3 2.060631E-14 2.060626E-20 2.060631E-14 1.100000E-01 3.015400E-10
4 1.778279E-16 1.778279E-20 1.778279E-16 4.000000E-02 3.081300E-10
5 2.060631E-14 2.060626E-20 2.060631E-14 9.000000E-02 3.149400E-10
6 2.060631E-14 2.060626E-20 2.060631E-14 9.000000E-02 3.149400E-10
7 2.060631E-14 2.060626E-20 2.060631E-14 9.000000E-02 3.149400E-10
8 1.778279E-16 1.778279E-20 1.778279E-16 1.000000E-02 3.216200E-10
9 2.060631E-14 2.060626E-20 2.060631E-14 1.000000E-01 3.286300E-10
10 2.060631E-14 2.060626E-20 2.060631E-14 1.000000E-01 3.286300E-10
11 2.060631E-14 2.060626E-20 2.060631E-14 1.000000E-01 3.286300E-10
12 1.778279E-16 1.778279E-20 1.778279E-16 2.000000E-02 3.699000E-10
13 2.060631E-14 2.060626E-20 2.060631E-14 1.150000E-01 4.232100E-10
14 2.060631E-14 2.060626E-20 2.060631E-14 1.150000E-01 4.232100E-10
15 2.060631E-14 2.060626E-20 2.060631E-14 1.150000E-01 4.232100E-10
16 1.778279E-16 1.778279E-20 1.778279E-16 1.400000E-01 4.575600E-10
17 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 4.976500E-10
18 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 4.976500E-10
19 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 4.976500E-10
20 9.862783E-17 9.862783E-20 9.862783E-17 1.400000E-01 5.449300E-10
21 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 6.019500E-10
22 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 6.019500E-10
23 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 6.019500E-10
24 9.862783E-17 9.862783E-20 9.862783E-17 1.400000E-01 6.767300E-10
25 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 7.947600E-10
26 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 7.947600E-10
27 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 7.947600E-10
28 9.999999E-19 1.000000E-19 9.999999E-19 8.700000E-03 1.149425E-08
29 3.162278E-23 3.162278E-23 3.162278E-23 1.000000E-02 9.750000E-09
30 1.288251E-19 1.288251E-19 1.288251E-19 1.100000E-02 7.511818E-09
31 1.288251E-19 1.288251E-19 1.288251E-19 1.100000E-02 7.511818E-09
32 9.999999E-36 9.999999E-36 9.999999E-36 1.810000E-01 0.000000E+00
33 9.999999E-36 9.999999E-36 9.999999E-36 5.000000E-03 0.000000E+00
34 1.000000E-10 1.000000E-10 1.000000E-10 1.000000E+00 0.000000E+00
35 1.000000E-10 1.000000E-10 1.000000E-10 1.000000E+00 0.000000E+00
36 1.000000E-10 1.000000E-10 1.000000E-10 1.000000E+00 0.000000E+00
37 9.999999E-18 9.999999E-18 9.999999E-18 1.290000E-02 5.744186E-08
38 1.000000E-15 1.000000E-15 1.000000E-15 1.290000E-02 5.744186E-08
39 2.098938E-14 2.098938E-14 2.098938E-14 1.510000E-01 6.622517E-10
40 1.702158E-13 1.702158E-13 1.702158E-13 8.480000E-01 0.000000E+00
41 1.000000E-11 1.000000E-11 1.000000E-11 1.800000E-01 0.000000E+00
42 1.000000E-11 1.000000E-11 1.000000E-11 1.800000E-01 0.000000E+00
43 1.000000E-15 1.000000E-15 1.000000E-15 7.500000E-02 2.640000E-09
44 5.000338E-19 5.000338E-19 5.000338E-19 2.400000E-01 1.960000E-09
45 5.966457E-19 5.966457E-19 5.966457E-19 2.400000E-01 1.590000E-09
46 5.000338E-19 5.000338E-19 5.000338E-19 2.400000E-01 1.590000E-09
47 1.808153E-15 1.808153E-15 1.808153E-15 5.000000E-02 1.600000E-09
48 6.829677E-18 6.829677E-18 6.829677E-18 5.000000E-02 1.600000E-09
49 5.269869E-20 5.269869E-20 5.269869E-20 5.000000E-02 1.600000E-09
50 5.350560E-21 5.350560E-21 5.350560E-21 5.000000E-02 1.600000E-09
51 3.162278E-13 6.454208E-13 3.162278E-13 3.200000E-01 0.000000E+00
52 3.162278E-13 3.162278E-13 3.162278E-13 3.200000E-01 0.000000E+00
53 3.162278E-13 1.210204E-13 3.162278E-13 3.200000E-01 0.000000E+00
54 3.162278E-13 7.586304E-14 3.162278E-13 3.200000E-01 0.000000E+00
55 3.162278E-13 3.320391E-14 3.162278E-13 3.200000E-01 0.000000E+00
56 5.000339E-17 5.000339E-17 5.000339E-17 3.200000E-01 1.200000E-09
57 1.000000E-09 1.000000E-09 1.000000E-09 3.200000E-01 0.000000E+00
58 3.162278E-14 3.162278E-14 3.162278E-14 3.200000E-01 0.000000E+00
FRACTURE MODEL DATA TO FOLLOW :T OR F
T
NFRAC
2
# DELTA_PI   DELTA_PF    FRAC_PHI   FRAC_EXP   IFRX IFRY IFRZ
```

```
30 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
31 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
KLINKENBERG EFFECT TO BE USED? True or False
T
BKLINK      EXPKLINK
 2.71000E-01 -3.41000E-01
REFERENCE TEMPERATURE AND PRESSURE FOR DENSITY CALCULATIONS
 3.00150E+02  1.01325E+05
SALT(WT.%) DEN_BR  KGSAT  IDGAS   COMPR_BR
3.2400E+01 1.2200E+03   1   0     3.1000E-10
VISC_BR   VISC_GAS
 2.10000E-03  8.93389E-06
GAS DENSITY DATA: =0 COMPUTE; =1 INTERPOLATE
1
GAS MOLE FRACTIONS FOR H2, CO2, CH4, N2, H2S, AND O2
1.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00   1   1
IGASVAR (2= REACTION PATH,  1= USING AVG. STOICH. , 0= USING WELLS)
1
RATE CONSTANTS: CORROSION (RKCOR) AND BIODEGRADATION (RKBIO)
 1.6297E-07  3.2031E-07
HUMIDITY FACTORS: HUMFAC_COR, HUMFAC_BIO
 0.0000E+00   1.2903E-01
SCOR_H2=a,SCOR_H2O=b,SCOR_FE=c: where b*H2O + c*FE=> a*H2 + inert solids
 1.0000E+00   2.0000E+00   1.0000E+00
SBIO_GAS=a,SBIO_H2O=b,SBIO_CH2O=c: where b*H2O + c*CH2O=> a*GAS + inerts
 7.5465E-01   0.0000E+00   1.0000E+00
WICKING SATURATION, HUMID RATE SMOOTHING   ALPHARXN
 5.0000E-01 T   1.0000E+03
CREEP CLOSURE?
 T
NKLOS, KLOSINT (0=MOLES,1=PRESSURE) KLOSAVE (1=REGION AVE,2=CELL)
 1   1   2
CLOSURE PARAMETERS: PRES_LITHO, TIME_OFF PERM_FACTOR, PERM_EXP
4   5.0000E+07   3.1557E+12   1.7022E-13   0.0000E+00
NUMBER OF MATERIAL REGIONS FOR CLOSURE
 1
# MAT NO.   MODEL 1= WASTE-NOBACKFILL, 2=DRIFT-NOBACKFILL, 3=WASTE-BACKFILL
4=JAN_96:WASTE-NOBACKFILL
1  40      4
WILL RADIONUCLIDE DECAY BE CALCULATED? T or F
F
WILL TRANSPORT BE CALCULATED? T or F
F
WILL RADIOLYSIS BE CALCULATED? T or F
F
BRAGFLO GAS COMPONENT TRANSPORT MODEL
F
```

```
**QA**      = PREBRAG QA RECORDS
PREBRAG_    = PROGRAM NAME
6.00        = PROGRAM VERSION
02/06/96    = PROGRAM REVISION DATE
06/18/96    = PROGRAM RUN DATE
15:20:35    = PROGRAM RUN TIME
1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
FILE FLAGS...ASCII, BINARY, SUMMARY, RESTART OUT, RESTART INPUT
T T T T F
MODEL TYPE AND NUMBER OF GRID BLOCKS IN X, Y, AND Z
  2  96  34   1
TSTART,  TMAX,     MAXSTEPS
 -1.5778E+08  3.1557E+11  10000
DT_INIT,  DT_MIN,  DT_MAX,  DT_INCR, IAUTODT, TSWITCH
 8.6400E+00  8.6400E-04  3.1557E+08  1.2500E+00  1    1.0000E+00
TIME-STEP CHANGES: NUMBER OF CHANGES, TIME OF CHANGE, DELT USED
  6
 0.0000E+00  8.6400E+02
 1.5778E+09  8.6400E+02
 3.1557E+09  8.6400E+02
 6.3114E+09  8.6400E+02
 7.8892E+09  8.6400E+02
 3.9446E+10  8.6400E+02
IPRTYPEASC IPRTYPEBIN IPRTYPERST UNITSI UNITSO
  2   0   2    'SI'    'SI'
ASCII PRINTOUT CONTROLLED BY USER SPECIFIED TIMES
  2
USER REQUESTED PRINTOUT TIMES
 0.0000E+00  3.1557E+11
BINARY PRINTOUT CONTROLLED BY STEP INTERVAL, IPRNTBIN
 40
RESTART PRINTOUT CONTROLLED BY USER SPECIFIED TIMES
  3
USER REQUESTED RESTART TIMES
 0.0000E+00  3.1557E+09  3.1557E+10
ASCII PRINT FLAGS
 1 1 0 0 0  1 0 0 0 0  0 0 0 0 0  0 0 1 0 0  0 0 0 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 1 1 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
 0 0 0
 0
 0
 0
BINARY PRINT FLAGS
 1 1 0 0 0  1 0 0 0 1  1 0 0 1 0  0 0 1 0 0  0 0 0 0 0
 0 0 0 0 0  1 1 0 1 1  0 0 0 0 0  0 0 0 1 0  0 1 1 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
 0 0 0
 0
 0
 0
HISTORY VARIABLE OUTPUT
  6
  21   4    NAME=TIME-AVERAGE WELL BRINE FLOW RATE
  8 23  1   89 23  1    8 34  1   89 34  1
  22   2    NAME=TIME-AVERAGE WELL GAS FLOW RATE
  8 34  1   89 34  1
  31  10    NAME=TIME-AVERAGE INTERBLOCK BRINE FLOW, X-DIRECTION
  9 27  1   9 30  1   9 34  1   89 27  1   89 30  1   89 34  1
 36 27  1   36 30  1   60 27  1   60 30  1
  32   2    NAME=TIME-AVERAGE INTERBLOCK BRINE FLOW, Y-DIRECTION
 56 34  1   56 31  1
  34  10    NAME=TIME-AVERAGE INTERBLOCK GAS FLOW, X-DIRECTION
  9 27  1   9 30  1   9 34  1   89 27  1   89 30  1   89 34  1
 36 27  1   36 30  1   60 27  1   60 30  1
  35   2    NAME=TIME-AVERAGE INTERBLOCK GAS FLOW, Y-DIRECTION
 56 34  1   56 31  1
 MONITOR PARAMETER VALUES AT GRIDBLOCK(S)
 T
 NUMBER OF MONITOR BLOCKS
  4
 MONITOR BLOCKS (I,J,K)
  47  23   1
   9  27   1
  46  28   1
  57  30   1
 GRID DATA FLAGS: IDXFLAG, IDYFLAG, IDZFLAG, IDEPTHFLAG
   1   2   1   7
 GRID DATA CARDS: GRID BLOCK DX'S
 2.011700E+02  1.310600E+02  5.486400E+01  1.097300E+01  2.743200E+00  9.144000E-01
 4.540300E-01  3.111700E-01  4.540300E-01  9.144000E-01  2.743200E+00  1.097300E+01
 5.486400E+01  1.310600E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02
 1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02
 1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02
 1.341100E+02  6.096000E+01  4.876800E+01  1.828800E+01  6.096000E+00  6.096000E+00
 1.219200E+01  2.438400E+01  5.486400E+01  2.438400E+01  1.219200E+01  4.479000E+00
 2.038100E+00  4.479000E+00  1.219200E+01  2.438400E+01  4.876800E+01  3.048000E+01
 1.219200E+01  6.096000E+00  4.076200E+00  1.000000E+01  3.828300E+01  5.000000E+00
 9.999900E-01  2.160100E-01  9.999900E-01  8.000000E+00  4.471100E+01  1.117500E+02
 1.117500E+02  1.973300E+02  1.973300E+02  1.973300E+02  1.341100E+02  1.341100E+02
 1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02
 1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02
 1.341100E+02  1.341100E+02  1.341100E+02  1.341100E+02  1.310600E+02  5.486400E+01
 1.097300E+01  2.743200E+00  9.144000E-01  4.540300E-01  3.111700E-01  4.540300E-01
 9.144000E-01  2.743200E+00  1.097300E+01  5.486400E+01  1.310600E+02  2.011700E+02
 GRID DATA CARDS: GRID BLOCK DY'S
 8.138200E+00  5.371540E+02  9.144000E+01  5.943600E+00  8.549600E+01  1.066800E+02
 7.193300E+00  7.193300E+01  8.406100E+02  1.013500E+02  1.013500E+01  1.013500E+02
 3.609600E+02  6.096000E+01  6.096000E+00  6.096000E+01  4.114800E+02  4.572000E+01
 4.572000E+00  4.572000E+01  2.590800E+02  2.426200E+02  1.124700E+02  3.810000E+01
 1.168000E+02  5.117600E+00  8.500000E-01  1.331000E+00  1.331000E+00  4.500000E-01
 1.452500E+02  2.500000E+02  3.600000E+01  7.700000E+00
 GRID DATA CARDS: GRID BLOCK DZ'S
 4.023360E+02  2.130553E+02  6.702860E+01  1.532080E+01  4.548500E+00  1.675700E+00
 6.010000E-01  2.444000E-01  6.010000E-01  1.675700E+00  4.548500E+00  1.532080E+01
 6.702860E+01  2.130553E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02
 4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02
 4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02
 4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02
 4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02  4.023360E+02
```

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13 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
14 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
15 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
16 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
17 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
18 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02
19 4.023360E+02 4.023360E+02 4.023360E+02 4.023360E+02 2.130553E+02 6.702860E+01
20 1.532080E+01 4.548500E+00 1.675700E+00 6.010000E-01 2.444000E-01 6.010000E-01
21 1.675700E+00 4.548500E+00 1.532080E+01 6.702860E+01 2.130553E+02 4.023360E+02
22 GRID BLOCK ELEVATIONS
23 96*-3.353511E+03
24 96*-3.080865E+03
25 96*-2.766568E+03
26 96*-2.717876E+03
27 96*-2.672156E+03
28 96*-2.576068E+03
29 96*-2.519132E+03
30 96*-2.479568E+03
31 96*-2.023297E+03
32 96*-1.552317E+03
33 96*-1.496574E+03
34 96*-1.440832E+03
35 96*-1.209677E+03
36 96*-9.987171E+02
37 96*-9.651889E+02
38 96*-9.316609E+02
39 96*-6.954409E+02
40 96*-4.668409E+02
41 96*-4.416949E+02
42 96*-4.165489E+02
43 96*-2.641489E+02
44 96*-1.329886E+01
45 96* 1.642461E+02
46 1* 1.827523E+02 1* 1.856515E+02 1* 1.872739E+02 1* 1.878484E+02
47 1* 1.879681E+02 1* 1.880000E+02 1* 1.880119E+02 1* 1.880186E+02
48 1* 1.880253E+02 1* 1.880372E+02 1* 1.880691E+02 1* 1.881888E+02
49 1* 1.887633E+02 1* 1.903857E+02 1* 1.926997E+02 1* 1.950402E+02
50 1* 1.973808E+02 1* 1.997213E+02 1* 2.020618E+02 1* 2.044024E+02
51 1* 2.067429E+02 1* 2.090835E+02 1* 2.114240E+02 1* 2.137645E+02
52 1* 2.161051E+02 1* 2.184456E+02 1* 2.207862E+02 1* 2.231267E+02
53 1* 2.254673E+02 1* 2.278078E+02 1* 2.301484E+02 1* 2.318506E+02
54 1* 2.328081E+02 1* 2.333932E+02 1* 2.336060E+02 1* 2.337124E+02
55 1* 2.338720E+02 1* 2.341912E+02 1* 2.348827E+02 1* 2.355742E+02
56 1* 2.358934E+02 1* 2.360389E+02 1* 2.360957E+02 1* 2.361526E+02
57 1* 2.362981E+02 1* 2.366173E+02 1* 2.372556E+02 1* 2.379471E+02
58 1* 2.383195E+02 1* 2.384791E+02 1* 2.385678E+02 1* 2.386907E+02
59 1* 2.391120E+02 1* 2.394897E+02 1* 2.395421E+02 1* 2.395527E+02
60 1* 2.395633E+02 1* 2.396418E+02 1* 2.401018E+02 1* 2.414671E+02
61 1* 2.434174E+02 1* 2.461145E+02 1* 2.495584E+02 1* 2.530023E+02
62 1* 2.558945E+02 1* 2.582350E+02 1* 2.605756E+02 1* 2.629161E+02
63 1* 2.652566E+02 1* 2.675972E+02 1* 2.699377E+02 1* 2.722783E+02
64 1* 2.746188E+02 1* 2.769593E+02 1* 2.792999E+02 1* 2.816404E+02
65 1* 2.839810E+02 1* 2.863215E+02 1* 2.886620E+02 1* 2.910026E+02
66 1* 2.933431E+02 1* 2.956837E+02 1* 2.979976E+02 1* 2.996200E+02
67 1* 3.001945E+02 1* 3.003142E+02 1* 3.003461E+02 1* 3.003581E+02
68 1* 3.003647E+02 1* 3.003714E+02 1* 3.003833E+02 1* 3.004153E+02
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171 1* 2.654063E+02 1* 2.654382E+02 1* 2.654502E+02 1* 2.654568E+02
172 1* 2.654635E+02 1* 2.654755E+02 1* 2.655074E+02 1* 2.656270E+02
173 1* 2.662016E+02 1* 2.678240E+02 1* 2.701379E+02 1* 2.724785E+02
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182 1* 3.157577E+02 1* 3.159173E+02 1* 3.160061E+02 1* 3.161289E+02
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184 1* 3.170015E+02 1* 3.170800E+02 1* 3.175400E+02 1* 3.189053E+02
185 1* 3.208556E+02 1* 3.235527E+02 1* 3.269966E+02 1* 3.304405E+02
186 1* 3.333327E+02 1* 3.356732E+02 1* 3.380138E+02 1* 3.403543E+02
187 1* 3.426949E+02 1* 3.450354E+02 1* 3.473759E+02 1* 3.497165E+02
188 1* 3.520570E+02 1* 3.543976E+02 1* 3.567381E+02 1* 3.590786E+02
189 1* 3.614192E+02 1* 3.637597E+02 1* 3.661003E+02 1* 3.684408E+02
190 1* 3.707813E+02 1* 3.731219E+02 1* 3.754358E+02 1* 3.770582E+02
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200 1* 3.544929E+02 1* 3.568334E+02 1* 3.591740E+02 1* 3.615145E+02
201 1* 3.638550E+02 1* 3.661956E+02 1* 3.685361E+02 1* 3.702383E+02
202 1* 3.711959E+02 1* 3.717810E+02 1* 3.719938E+02 1* 3.721002E+02
203 1* 3.722598E+02 1* 3.725789E+02 1* 3.732704E+02 1* 3.739620E+02
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211 1* 4.036444E+02 1* 4.059849E+02 1* 4.083255E+02 1* 4.106660E+02
212 1* 4.130066E+02 1* 4.153471E+02 1* 4.176876E+02 1* 4.200282E+02
213 1* 4.223687E+02 1* 4.247093E+02 1* 4.270498E+02 1* 4.293903E+02
214 1* 4.317309E+02 1* 4.340714E+02 1* 4.363853E+02 1* 4.380078E+02
215 1* 4.385822E+02 1* 4.387019E+02 1* 4.387339E+02 1* 4.387458E+02
216 1* 4.387525E+02 1* 4.387592E+02 1* 4.387711E+02 1* 4.388030E+02
217 1* 4.389227E+02 1* 4.394972E+02 1* 4.411196E+02 1* 4.440187E+02
218 1* 3.241235E+02 1* 3.270226E+02 1* 3.286450E+02 1* 3.292195E+02
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222 1* 3.387519E+02 1* 3.410924E+02 1* 3.434330E+02 1* 3.457735E+02
223 1* 3.481140E+02 1* 3.504546E+02 1* 3.527951E+02 1* 3.551357E+02
224 1* 3.574762E+02 1* 3.598168E+02 1* 3.621573E+02 1* 3.644978E+02
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25	1* 3.668384E+02	1* 3.691789E+02	1* 3.715195E+02	1* 3.732217E+02
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27	1* 3.752431E+02	1* 3.755623E+02	1* 3.762538E+02	1* 3.769453E+02
28	1* 3.772645E+02	1* 3.774100E+02	1* 3.774669E+02	1* 3.775237E+02
29	1* 3.776692E+02	1* 3.779884E+02	1* 3.786267E+02	1* 3.793182E+02
30	1* 3.796906E+02	1* 3.798502E+02	1* 3.799390E+02	1* 3.800618E+02
31	1* 3.804831E+02	1* 3.808608E+02	1* 3.809132E+02	1* 3.809238E+02
32	1* 3.809344E+02	1* 3.810129E+02	1* 3.814729E+02	1* 3.828382E+02
33	1* 3.847885E+02	1* 3.874856E+02	1* 3.909295E+02	1* 3.943734E+02
34	1* 3.972656E+02	1* 3.996061E+02	1* 4.019467E+02	1* 4.042872E+02
35	1* 4.066277E+02	1* 4.089683E+02	1* 4.113088E+02	1* 4.136494E+02
36	1* 4.159899E+02	1* 4.183304E+02	1* 4.206710E+02	1* 4.230115E+02
37	1* 4.253521E+02	1* 4.276926E+02	1* 4.300331E+02	1* 4.323737E+02
38	1* 4.347142E+02	1* 4.370548E+02	1* 4.393687E+02	1* 4.409911E+02
39	1* 4.415656E+02	1* 4.416853E+02	1* 4.417172E+02	1* 4.417292E+02
40	1* 4.417358E+02	1* 4.417425E+02	1* 4.417545E+02	1* 4.417864E+02
41	1* 4.419061E+02	1* 4.424806E+02	1* 4.441030E+02	1* 4.470021E+02
42	1* 3.252138E+02	1* 3.281129E+02	1* 3.297353E+02	1* 3.303098E+02
43	1* 3.304295E+02	1* 3.304614E+02	1* 3.304734E+02	1* 3.304800E+02
44	1* 3.304867E+02	1* 3.304987E+02	1* 3.305306E+02	1* 3.306503E+02
45	1* 3.312248E+02	1* 3.328472E+02	1* 3.351611E+02	1* 3.375017E+02
46	1* 3.398422E+02	1* 3.421827E+02	1* 3.445233E+02	1* 3.468638E+02
47	1* 3.492044E+02	1* 3.515449E+02	1* 3.538855E+02	1* 3.562260E+02
48	1* 3.585666E+02	1* 3.609071E+02	1* 3.632477E+02	1* 3.655882E+02
49	1* 3.679287E+02	1* 3.702693E+02	1* 3.726098E+02	1* 3.743120E+02
50	1* 3.752695E+02	1* 3.758547E+02	1* 3.760675E+02	1* 3.761739E+02
51	1* 3.763334E+02	1* 3.766526E+02	1* 3.773441E+02	1* 3.780357E+02
52	1* 3.783549E+02	1* 3.785003E+02	1* 3.785572E+02	1* 3.786141E+02
53	1* 3.787595E+02	1* 3.790787E+02	1* 3.797170E+02	1* 3.804086E+02
54	1* 3.807809E+02	1* 3.809405E+02	1* 3.810293E+02	1* 3.811521E+02
55	1* 3.815735E+02	1* 3.819511E+02	1* 3.820035E+02	1* 3.820141E+02
56	1* 3.820247E+02	1* 3.821033E+02	1* 3.825632E+02	1* 3.839285E+02
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58	1* 3.983559E+02	1* 4.006965E+02	1* 4.030370E+02	1* 4.053775E+02
59	1* 4.077181E+02	1* 4.100586E+02	1* 4.123992E+02	1* 4.147397E+02
60	1* 4.170802E+02	1* 4.194208E+02	1* 4.217613E+02	1* 4.241019E+02
61	1* 4.264424E+02	1* 4.287829E+02	1* 4.311235E+02	1* 4.334640E+02
62	1* 4.358046E+02	1* 4.381451E+02	1* 4.404590E+02	1* 4.420815E+02
63	1* 4.426559E+02	1* 4.427756E+02	1* 4.428076E+02	1* 4.428195E+02
64	1* 4.428262E+02	1* 4.428329E+02	1* 4.428448E+02	1* 4.428767E+02
65	1* 4.429964E+02	1* 4.435709E+02	1* 4.451933E+02	1* 4.480924E+02
66	1* 3.265446E+02	1* 3.294437E+02	1* 3.310661E+02	1* 3.316406E+02
67	1* 3.317603E+02	1* 3.317922E+02	1* 3.318042E+02	1* 3.318109E+02
68	1* 3.318175E+02	1* 3.318295E+02	1* 3.318614E+02	1* 3.319811E+02
69	1* 3.325556E+02	1* 3.341780E+02	1* 3.364919E+02	1* 3.388325E+02
70	1* 3.411730E+02	1* 3.435135E+02	1* 3.458541E+02	1* 3.481946E+02
71	1* 3.505352E+02	1* 3.528757E+02	1* 3.552162E+02	1* 3.575568E+02
72	1* 3.598973E+02	1* 3.622379E+02	1* 3.645784E+02	1* 3.669190E+02
73	1* 3.692595E+02	1* 3.716001E+02	1* 3.739406E+02	1* 3.756428E+02
74	1* 3.766003E+02	1* 3.771855E+02	1* 3.773983E+02	1* 3.775046E+02
75	1* 3.776642E+02	1* 3.779834E+02	1* 3.786749E+02	1* 3.793665E+02
76	1* 3.796856E+02	1* 3.798311E+02	1* 3.798880E+02	1* 3.799449E+02
77	1* 3.800903E+02	1* 3.804095E+02	1* 3.810478E+02	1* 3.817394E+02
78	1* 3.821117E+02	1* 3.822713E+02	1* 3.823601E+02	1* 3.824829E+02
79	1* 3.829042E+02	1* 3.832819E+02	1* 3.833343E+02	1* 3.833449E+02
80	1* 3.833555E+02	1* 3.834341E+02	1* 3.838940E+02	1* 3.852593E+02
281	1* 3.872096E+02	1* 3.899067E+02	1* 3.933506E+02	1* 3.967945E+02
282	1* 3.996867E+02	1* 4.020273E+02	1* 4.043678E+02	1* 4.067083E+02
283	1* 4.090489E+02	1* 4.113894E+02	1* 4.137299E+02	1* 4.160705E+02
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285	1* 4.277732E+02	1* 4.301137E+02	1* 4.324543E+02	1* 4.347948E+02
286	1* 4.371353E+02	1* 4.394759E+02	1* 4.417898E+02	1* 4.434122E+02
287	1* 4.439867E+02	1* 4.441064E+02	1* 4.441383E+02	1* 4.441503E+02
288	1* 4.441570E+02	1* 4.441636E+02	1* 4.441756E+02	1* 4.442075E+02
289	1* 4.443272E+02	1* 4.449017E+02	1* 4.465241E+02	1* 4.494232E+02
290	1* 3.274350E+02	1* 3.303341E+02	1* 3.319565E+02	1* 3.325310E+02
291	1* 3.326507E+02	1* 3.326826E+02	1* 3.326945E+02	1* 3.327012E+02
292	1* 3.327079E+02	1* 3.327198E+02	1* 3.327517E+02	1* 3.328714E+02
293	1* 3.334460E+02	1* 3.350684E+02	1* 3.373823E+02	1* 3.397228E+02
294	1* 3.420634E+02	1* 3.444039E+02	1* 3.467444E+02	1* 3.490850E+02
295	1* 3.514255E+02	1* 3.537661E+02	1* 3.561066E+02	1* 3.584472E+02
296	1* 3.607877E+02	1* 3.631283E+02	1* 3.654688E+02	1* 3.678093E+02
297	1* 3.701499E+02	1* 3.724904E+02	1* 3.748310E+02	1* 3.765332E+02
298	1* 3.774907E+02	1* 3.780758E+02	1* 3.782886E+02	1* 3.783950E+02
299	1* 3.785546E+02	1* 3.788738E+02	1* 3.795653E+02	1* 3.802568E+02
300	1* 3.805760E+02	1* 3.807215E+02	1* 3.807784E+02	1* 3.808352E+02
301	1* 3.809807E+02	1* 3.812999E+02	1* 3.819382E+02	1* 3.826297E+02
302	1* 3.830021E+02	1* 3.831617E+02	1* 3.832505E+02	1* 3.833733E+02
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304	1* 3.842459E+02	1* 3.843244E+02	1* 3.847844E+02	1* 3.861497E+02
305	1* 3.881000E+02	1* 3.907971E+02	1* 3.942410E+02	1* 3.976849E+02
306	1* 4.005771E+02	1* 4.029176E+02	1* 4.052581E+02	1* 4.075987E+02
307	1* 4.099392E+02	1* 4.122798E+02	1* 4.146203E+02	1* 4.169608E+02
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311	1* 4.448771E+02	1* 4.449968E+02	1* 4.450287E+02	1* 4.450406E+02
312	1* 4.450473E+02	1* 4.450540E+02	1* 4.450659E+02	1* 4.450979E+02
313	1* 4.452176E+02	1* 4.457921E+02	1* 4.474145E+02	1* 4.503136E+02
314	1* 4.002739E+02	1* 4.031730E+02	1* 4.047954E+02	1* 4.053699E+02
315	1* 4.054896E+02	1* 4.055215E+02	1* 4.055335E+02	1* 4.055401E+02
316	1* 4.055468E+02	1* 4.055587E+02	1* 4.055907E+02	1* 4.057104E+02
317	1* 4.062849E+02	1* 4.079073E+02	1* 4.102212E+02	1* 4.125618E+02
318	1* 4.149023E+02	1* 4.172428E+02	1* 4.195834E+02	1* 4.219239E+02
319	1* 4.242645E+02	1* 4.266050E+02	1* 4.289456E+02	1* 4.312861E+02
320	1* 4.336266E+02	1* 4.359672E+02	1* 4.383077E+02	1* 4.406483E+02
321	1* 4.429888E+02	1* 4.453294E+02	1* 4.476699E+02	1* 4.493721E+02
322	1* 4.503296E+02	1* 4.509148E+02	1* 4.511276E+02	1* 4.512339E+02
323	1* 4.513935E+02	1* 4.517127E+02	1* 4.524042E+02	1* 4.530958E+02
324	1* 4.534149E+02	1* 4.535604E+02	1* 4.536173E+02	1* 4.536742E+02
325	1* 4.538196E+02	1* 4.541388E+02	1* 4.547771E+02	1* 4.554687E+02
326	1* 4.558410E+02	1* 4.560006E+02	1* 4.560894E+02	1* 4.562122E+02
327	1* 4.566335E+02	1* 4.570112E+02	1* 4.570636E+02	1* 4.570742E+02
328	1* 4.570848E+02	1* 4.571634E+02	1* 4.576233E+02	1* 4.589886E+02
329	1* 4.609389E+02	1* 4.636360E+02	1* 4.670799E+02	1* 4.705238E+02
330	1* 4.734160E+02	1* 4.757566E+02	1* 4.780971E+02	1* 4.804376E+02
331	1* 4.827782E+02	1* 4.851187E+02	1* 4.874593E+02	1* 4.897998E+02
332	1* 4.921403E+02	1* 4.944809E+02	1* 4.968214E+02	1* 4.991620E+02
333	1* 5.015025E+02	1* 5.038430E+02	1* 5.061836E+02	1* 5.085241E+02
334	1* 5.108647E+02	1* 5.132052E+02	1* 5.155191E+02	1* 5.171415E+02
335	1* 5.177161E+02	1* 5.178358E+02	1* 5.178677E+02	1* 5.178796E+02
336	1* 5.178863E+02	1* 5.178929E+02	1* 5.179049E+02	1* 5.179368E+02

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1* 5.180565E+02   1* 5.186310E+02   1* 5.202534E+02   1* 5.231525E+02
1* 5.978688E+02   1* 6.007679E+02   1* 6.023903E+02   1* 6.029648E+02
1* 6.030845E+02   1* 6.031165E+02   1* 6.031284E+02   1* 6.031351E+02
1* 6.031417E+02   1* 6.031537E+02   1* 6.031856E+02   1* 6.033053E+02
1* 6.038798E+02   1* 6.055022E+02   1* 6.078162E+02   1* 6.101567E+02
1* 6.124973E+02   1* 6.148378E+02   1* 6.171783E+02   1* 6.195189E+02
1* 6.218594E+02   1* 6.242000E+02   1* 6.265405E+02   1* 6.288810E+02
1* 6.312216E+02   1* 6.335621E+02   1* 6.359026E+02   1* 6.382432E+02
1* 6.405837E+02   1* 6.429243E+02   1* 6.452648E+02   1* 6.469670E+02
1* 6.479246E+02   1* 6.485097E+02   1* 6.487225E+02   1* 6.488289E+02
1* 6.489885E+02   1* 6.493076E+02   1* 6.499991E+02   1* 6.506907E+02
1* 6.510099E+02   1* 6.511553E+02   1* 6.512122E+02   1* 6.512691E+02
1* 6.514146E+02   1* 6.517337E+02   1* 6.523721E+02   1* 6.530636E+02
1* 6.534360E+02   1* 6.535956E+02   1* 6.536843E+02   1* 6.538071E+02
1* 6.542285E+02   1* 6.546061E+02   1* 6.546585E+02   1* 6.546691E+02
1* 6.546797E+02   1* 6.547583E+02   1* 6.552183E+02   1* 6.565836E+02
1* 6.585339E+02   1* 6.612310E+02   1* 6.646749E+02   1* 6.681187E+02
1* 6.710110E+02   1* 6.733515E+02   1* 6.756920E+02   1* 6.780326E+02
1* 6.803731E+02   1* 6.827136E+02   1* 6.850542E+02   1* 6.873948E+02
1* 6.897353E+02   1* 6.920758E+02   1* 6.944164E+02   1* 6.967569E+02
1* 6.990974E+02   1* 7.014380E+02   1* 7.037785E+02   1* 7.061190E+02
1* 7.084596E+02   1* 7.108001E+02   1* 7.131141E+02   1* 7.147365E+02
1* 7.153110E+02   1* 7.154307E+02   1* 7.154626E+02   1* 7.154745E+02
1* 7.154812E+02   1* 7.154879E+02   1* 7.154998E+02   1* 7.155317E+02
1* 7.156514E+02   1* 7.162260E+02   1* 7.178484E+02   1* 7.207474E+02
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96* 8.195609E+02
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PROD
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 96  23   1   2
PROD
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 1  22  1  T  F  1.777530E+07  0.000000E+00
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 1  24  1  T  F  1.485080E+07  0.000000E+00
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50   1 34  1  T  F  8.220000E+05  0.000000E+00
51  96 34  1  T  F  8.220000E+05  0.000000E+00
52  GRID BLOCK BRINE PRESSURE INITIAL CONDITIONS
53  96* 5.821000E+07
54  96* 5.489192E+07
55  96* 5.106785E+07
56  96* 5.047622E+07
57  96* 4.992054E+07
58  96* 4.875330E+07
59  96* 4.806200E+07
60  96* 4.758172E+07
61  96* 4.205032E+07
62  96* 3.634266E+07
63  96* 3.566847E+07
64  96* 3.499420E+07
65  96* 3.220030E+07
66  96* 2.965135E+07
67  96* 2.924668E+07
68  96* 2.884192E+07
69  96* 2.599246E+07
70  96* 2.323571E+07
71  96* 2.293275E+07
72  96* 2.262974E+07
73  96* 2.079435E+07
74  96* 1.777526E+07
75  96* 1.564000E+07
76  1* 1.485085E+07   1* 1.481592E+07   1* 1.479639E+07   1* 1.478941E+07
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78  1* 1.478673E+07   1* 1.478529E+07   1* 1.477859E+07   1* 1.475926E+07
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80  1* 1.461877E+07   1* 1.459054E+07   1* 1.456230E+07   1* 1.453426E+07
81  1* 1.450622E+07   1* 1.447817E+07   1* 1.445013E+07   1* 1.442209E+07
82  1* 1.439395E+07   1* 1.436572E+07   1* 1.433758E+07   1* 1.430944E+07
83  1* 1.428110E+07   1* 1.426053E+07   1* 1.424923E+07   1* 1.424234E+07
84  1* 1.423966E+07   1* 1.423842E+07   1* 1.423660E+07   1* 1.423277E+07
85  1* 1.422435E+07   1* 1.421592E+07   1* 1.421209E+07   1* 1.421047E+07
86  1* 1.420989E+07   1* 1.420903E+07   1* 1.420740E+07   1* 1.420367E+07
87  1* 1.419592E+07   1* 1.418749E+07   1* 1.418309E+07   1* 1.418118E+07
88  1* 1.417993E+07   1* 1.417869E+07   1* 1.417371E+07   1* 1.416883E+07
89  3* 1.416806E+07   1* 1.416720E+07   1* 1.416165E+07   1* 1.414519E+07
90  1* 1.412183E+07   1* 1.408948E+07   1* 1.404794E+07   1* 1.400658E+07
91  1* 1.397183E+07   1* 1.394360E+07   1* 1.391564E+07   1* 1.388769E+07
92  1* 1.385955E+07   1* 1.383140E+07   1* 1.380316E+07   1* 1.377492E+07
93  1* 1.374668E+07   1* 1.371854E+07   1* 1.369039E+07   1* 1.366244E+07
94  1* 1.363449E+07   1* 1.360634E+07   1* 1.357829E+07   1* 1.355014E+07
95  1* 1.352200E+07   1* 1.349385E+07   1* 1.346599E+07   1* 1.344646E+07
96  1* 1.343957E+07   1* 1.343823E+07   1* 1.343784E+07   2* 1.343765E+07
97  1* 1.343746E+07   1* 1.343727E+07   1* 1.343688E+07   1* 1.343535E+07
98  1* 1.342865E+07   1* 1.340922E+07   1* 1.337427E+07
99  1* 1.392036E+07   1* 1.388533E+07   1* 1.386590E+07   1* 1.385900E+07
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102 1* 1.380089E+07   1* 1.377275E+07   1* 1.374461E+07   1* 1.371646E+07
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507 1* 1.330929E+07   1* 1.330804E+07   1* 1.330622E+07   1* 1.330240E+07
508 1* 1.329407E+07   1* 1.328574E+07   1* 1.328181E+07   1* 1.328009E+07
509 1* 1.327961E+07   1* 1.327884E+07   1* 1.327702E+07   1* 1.327319E+07
510 1* 1.326553E+07   1* 1.325711E+07   1* 1.325280E+07   1* 1.325088E+07
511 1* 1.324954E+07   1* 1.324840E+07   1* 1.324342E+07   1* 1.323853E+07
512 2* 1.323786E+07   1* 1.323777E+07   1* 1.323691E+07   1* 1.323135E+07
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4	1* 1.171120E+07	1* 1.167623E+07		
5	1* 1.313903E+07	1* 1.310418E+07	1* 1.308465E+07	1* 1.307775E+07
6	1* 1.307651E+07	1* 1.307622E+07	1* 1.307593E+07	2* 1.307574E+07
7	1* 1.307545E+07	1* 1.307498E+07	1* 1.307373E+07	1* 1.306684E+07
8	1* 1.304740E+07	1* 1.301963E+07	1* 1.299148E+07	1* 1.296333E+07
9	1* 1.293498E+07	1* 1.290683E+07	1* 1.287878E+07	1* 1.285072E+07
10	1* 1.282266E+07	1* 1.279461E+07	1* 1.276664E+07	1* 1.273868E+07
11	1* 1.271062E+07	1* 1.268238E+07	1* 1.265412E+07	1* 1.262587E+07
12	1* 1.259781E+07	1* 1.256975E+07	1* 1.254917E+07	1* 1.253758E+07
13	1* 1.253059E+07	1* 1.252819E+07	24* 1.013250E+05	1* 1.243386E+07
14	1* 1.241030E+07	1* 1.237784E+07	1* 1.233685E+07	1* 1.229538E+07
15	1* 1.226042E+07	1* 1.223236E+07	1* 1.220429E+07	1* 1.217633E+07
16	1* 1.214817E+07	1* 1.212001E+07	1* 1.209204E+07	1* 1.206398E+07
17	1* 1.203582E+07	1* 1.200766E+07	1* 1.197950E+07	1* 1.195143E+07
18	1* 1.192346E+07	1* 1.189530E+07	1* 1.186705E+07	1* 1.183889E+07
19	1* 1.181063E+07	1* 1.178256E+07	1* 1.175497E+07	1* 1.173553E+07
20	1* 1.172863E+07	1* 1.172729E+07	1* 1.172691E+07	1* 1.172653E+07
21	1* 1.172633E+07	1* 1.172624E+07	1* 1.172605E+07	1* 1.172585E+07
22	1* 1.172461E+07	1* 1.171762E+07	1* 1.169798E+07	1* 1.166321E+07
23	1* 1.312304E+07	1* 1.308829E+07	1* 1.306875E+07	1* 1.306186E+07
24	1* 1.306061E+07	1* 1.306023E+07	1* 1.305985E+07	1* 1.305965E+07
25	1* 1.305956E+07	1* 1.305937E+07	1* 1.305899E+07	1* 1.305774E+07
26	1* 1.305094E+07	1* 1.303131E+07	1* 1.300345E+07	1* 1.297539E+07
27	1* 1.294734E+07	1* 1.291909E+07	1* 1.289094E+07	1* 1.286288E+07
28	1* 1.283482E+07	1* 1.280677E+07	1* 1.277861E+07	1* 1.275056E+07
29	1* 1.272259E+07	1* 1.269454E+07	1* 1.266629E+07	1* 1.263813E+07
30	1* 1.261007E+07	1* 1.258201E+07	1* 1.255386E+07	1* 1.253317E+07
31	1* 1.252159E+07	1* 1.251459E+07	1* 1.251210E+07	24* 1.013250E+05
32	1* 1.241796E+07	1* 1.239450E+07	1* 1.236203E+07	1* 1.232076E+07
33	1* 1.227929E+07	1* 1.224442E+07	1* 1.221627E+07	1* 1.218820E+07
34	1* 1.216024E+07	1* 1.213217E+07	1* 1.210411E+07	1* 1.207605E+07
35	1* 1.204798E+07	1* 1.201982E+07	1* 1.199166E+07	1* 1.196360E+07
36	1* 1.193544E+07	1* 1.190737E+07	1* 1.187931E+07	1* 1.185105E+07
37	1* 1.182289E+07	1* 1.179482E+07	1* 1.176676E+07	1* 1.173907E+07
38	1* 1.171953E+07	1* 1.171273E+07	1* 1.171129E+07	1* 1.171081E+07
39	1* 1.171062E+07	1* 1.171043E+07	1* 1.171034E+07	1* 1.171014E+07
40	1* 1.170995E+07	1* 1.170871E+07	1* 1.170162E+07	1* 1.168189E+07
41	1* 1.164721E+07			
42	1* 1.311241E+07	1* 1.307756E+07	1* 1.305793E+07	1* 1.305113E+07
43	1* 1.304989E+07	1* 1.304951E+07	1* 1.304922E+07	1* 1.304912E+07
44	1* 1.304903E+07	1* 1.304883E+07	1* 1.304836E+07	1* 1.304692E+07
45	1* 1.304012E+07	1* 1.302059E+07	1* 1.299273E+07	1* 1.296467E+07
46	1* 1.293661E+07	1* 1.290846E+07	1* 1.288040E+07	1* 1.285235E+07
47	1* 1.282420E+07	1* 1.279614E+07	1* 1.276798E+07	1* 1.273973E+07
48	1* 1.271168E+07	1* 1.268362E+07	1* 1.265546E+07	1* 1.262741E+07
49	1* 1.259944E+07	1* 1.257138E+07	1* 1.254323E+07	1* 1.252264E+07
50	1* 1.251105E+07	1* 1.250406E+07	1* 1.250147E+07	16* 1.013250E+05
51	1* 1.244047E+07	1* 1.243539E+07	1* 1.243099E+07	1* 1.243041E+07
52	1* 1.013250E+05	1* 1.243013E+07	1* 1.242907E+07	1* 1.242361E+07
53	1* 1.240724E+07	1* 1.238377E+07	1* 1.235150E+07	1* 1.231003E+07
54	1* 1.226846E+07	1* 1.223370E+07	1* 1.220563E+07	1* 1.217757E+07
55	1* 1.214951E+07	1* 1.212145E+07	1* 1.209329E+07	1* 1.206513E+07
56	1* 1.203716E+07	1* 1.200910E+07	1* 1.198094E+07	1* 1.195278E+07
617	1* 1.192461E+07	1* 1.189664E+07	1* 1.186858E+07	1* 1.184042E+07
618	1* 1.181235E+07	1* 1.178429E+07	1* 1.175612E+07	1* 1.172834E+07
619	1* 1.170890E+07	1* 1.170200E+07	1* 1.170047E+07	1* 1.170009E+07
620	1* 1.169999E+07	1* 1.169990E+07	1* 1.169980E+07	1* 1.169951E+07
621	1* 1.169923E+07	1* 1.169798E+07	1* 1.169089E+07	1* 1.167125E+07
622	1* 1.163658E+07			
623	1* 1.223770E+07	1* 1.220274E+07	1* 1.218320E+07	1* 1.217640E+07
624	1* 1.217506E+07	1* 1.217477E+07	1* 1.217458E+07	2* 1.217448E+07
625	1* 1.217420E+07	1* 1.217362E+07	1* 1.217228E+07	1* 1.216539E+07
626	1* 1.214594E+07	1* 1.211826E+07	1* 1.209010E+07	1* 1.206194E+07
627	1* 1.203378E+07	1* 1.200562E+07	1* 1.197756E+07	1* 1.194940E+07
628	1* 1.192124E+07	1* 1.189327E+07	1* 1.186521E+07	1* 1.183704E+07
629	1* 1.180888E+07	1* 1.178081E+07	1* 1.175275E+07	1* 1.172468E+07
630	1* 1.169661E+07	1* 1.166855E+07	1* 1.164805E+07	1* 1.163646E+07
631	1* 1.162946E+07	1* 1.162707E+07	1* 1.162573E+07	1* 1.162372E+07
632	1* 1.161998E+07	1* 1.161155E+07	1* 1.160322E+07	1* 1.159967E+07
633	1* 1.159785E+07	1* 1.159690E+07	1* 1.159632E+07	1* 1.159469E+07
634	1* 1.159086E+07	1* 1.158320E+07	1* 1.157496E+07	1* 1.157036E+07
635	1* 1.156844E+07	1* 1.156749E+07	1* 1.156586E+07	1* 1.156078E+07
636	1* 1.155637E+07	1* 1.155580E+07	1* 1.013250E+05	1* 1.155551E+07
637	1* 1.155446E+07	1* 1.154909E+07	1* 1.153262E+07	1* 1.150905E+07
638	1* 1.147686E+07	1* 1.143557E+07	1* 1.139409E+07	1* 1.135941E+07
639	1* 1.133144E+07	1* 1.130327E+07	1* 1.127510E+07	1* 1.124694E+07
640	1* 1.121877E+07	1* 1.119061E+07	1* 1.116263E+07	1* 1.113456E+07
641	1* 1.110639E+07	1* 1.107832E+07	1* 1.105025E+07	1* 1.102217E+07
642	1* 1.099400E+07	1* 1.096584E+07	1* 1.093776E+07	1* 1.090969E+07
643	1* 1.088161E+07	1* 1.085383E+07	1* 1.083447E+07	1* 1.082757E+07
644	1* 1.082604E+07	1* 1.082575E+07	1* 1.082556E+07	2* 1.082547E+07
645	1* 1.082527E+07	1* 1.082489E+07	1* 1.082355E+07	1* 1.081665E+07
646	1* 1.079720E+07	1* 1.076242E+07		
647	1* 9.865862E+06	1* 9.830879E+06	1* 9.811422E+06	1* 9.804616E+06
648	1* 9.803178E+06	1* 9.802795E+06	3* 9.802700E+06	1* 9.802412E+06
649	1* 9.801837E+06	1* 9.800590E+06	1* 9.793786E+06	1* 9.774232E+06
650	1* 9.746532E+06	1* 9.718449E+06	1* 9.690364E+06	1* 9.662183E+06
651	1* 9.633906E+06	1* 9.605918E+06	1* 9.577833E+06	1* 9.549651E+06
652	1* 9.521758E+06	1* 9.493768E+06	1* 9.465585E+06	1* 9.437499E+06
653	1* 9.409507E+06	1* 9.381421E+06	1* 9.353238E+06	1* 9.325150E+06
654	1* 9.297159E+06	1* 9.276644E+06	1* 9.265044E+06	1* 9.258046E+06
655	1* 9.255746E+06	1* 9.254404E+06	1* 9.252294E+06	1* 9.248651E+06
656	1* 9.240216E+06	1* 9.231779E+06	1* 9.228232E+06	1* 9.226411E+06
657	1* 9.225548E+06	1* 9.224974E+06	1* 9.223248E+06	1* 9.219509E+06
658	1* 9.211840E+06	1* 9.203499E+06	1* 9.198898E+06	1* 9.197076E+06
659	1* 9.196213E+06	1* 9.194487E+06	1* 9.189311E+06	1* 9.184997E+06
660	1* 9.184422E+06	1* 1.013250E+05	1* 9.184038E+06	1* 9.183080E+06
661	1* 9.177711E+06	1* 9.161222E+06	1* 9.137735E+06	1* 9.105523E+06
662	1* 9.064299E+06	1* 9.022979E+06	1* 8.988370E+06	1* 8.960375E+06
663	1* 8.932188E+06	1* 8.904001E+06	1* 8.875910E+06	1* 8.847818E+06
664	1* 8.819631E+06	1* 8.791538E+06	1* 8.763542E+06	1* 8.735450E+06
665	1* 8.707356E+06	1* 8.679360E+06	1* 8.651266E+06	1* 8.623173E+06
666	1* 8.594983E+06	1* 8.566793E+06	1* 8.538698E+06	1* 8.510796E+06
667	1* 8.483085E+06	1* 8.463619E+06	1* 8.456812E+06	1* 8.455277E+06
668	1* 8.454894E+06	1* 8.454702E+06	2* 8.454606E+06	1* 8.454510E+06
669	1* 8.454127E+06	1* 8.452688E+06	1* 8.445784E+06	1* 8.426415E+06
670	1* 8.391607E+06			
671	55* 8.220000E+05	1* 1.013250E+05	40* 8.220000E+05	
672	55* 8.220000E+05	1* 1.013250E+05	40* 8.220000E+05	

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GRID BLOCK BRINE SATURATION INITIAL CONDITIONS
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
96* 1.000000E+00
35* 1.000000E+00   7* 1.500000E-02   1* 9.999999E-01   7* 1.500000E-02
 1* 9.999999E-01   4* 1.000000E+00   1* 0.000000E+00  40* 1.000000E+00
35* 1.000000E+00   7* 1.500000E-02   1* 9.999999E-01   7* 1.500000E-02
 1* 9.999999E-01   8* 0.000000E+00  37* 1.000000E+00
35* 1.000000E+00   7* 1.500000E-02   1* 9.999999E-01   7* 1.500000E-02
 1* 9.999999E-01   4* 0.000000E+00   1* 7.900000E-01   3* 0.000000E+00
37* 1.000000E+00
35* 1.000000E+00   7* 1.500000E-02   1* 9.999999E-01   7* 1.500000E-02
 1* 9.999999E-01   4* 1.000000E+00   1* 7.900000E-01  40* 1.000000E+00
55* 1.000000E+00   1* 7.900000E-01  40* 1.000000E+00
55* 1.000000E+00   1* 3.200000E-01  40* 1.000000E+00
55* 1.000000E+00   1* 7.900000E-01  40* 1.000000E+00
55* 1.000000E+00   1* 7.900000E-01  40* 1.000000E+00
GRID BLOCK FE CONCENTRATION INITIAL CONDITIONS
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
35* 0.000000E+00   7* 1.634621E+02   1* 0.000000E+00   7* 1.634621E+02
46* 0.000000E+00
35* 0.000000E+00   7* 1.634621E+02   1* 0.000000E+00   7* 1.634621E+02
46* 0.000000E+00
35* 0.000000E+00   7* 1.634621E+02   1* 0.000000E+00   7* 1.634621E+02
46* 0.000000E+00
35* 0.000000E+00   7* 1.634621E+02   1* 0.000000E+00   7* 1.634621E+02
46* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
GRID BLOCK CH2O CONCENTRATION INITIAL CONDITIONS
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
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96* 0.000000E+00
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96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
35* 0.000000E+00   7* 6.516987E+01   1* 0.000000E+00   7* 6.516987E+01
46* 0.000000E+00
35* 0.000000E+00   7* 6.516987E+01   1* 0.000000E+00   7* 6.516987E+01
46* 0.000000E+00
35* 0.000000E+00   7* 6.516987E+01   1* 0.000000E+00   7* 6.516987E+01
46* 0.000000E+00
```

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35* 0.000000E+00   7* 6.516987E+01   1* 0.000000E+00   7* 6.516987E+01
46* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
96* 0.000000E+00
DSATLIM, DPRESLIM, SATLIMIT
 2.0000E-01  -1.0000E+08  1.0000E-03
SATNORM, PRESNORM: NOMINAL CHANGE DEPENDENT VARIABLE
 3.0000E-01  5.0000E+05
MAXIMUM ALLOWABLE VARIABLE CHANGES: DSAT_MAX  DPRES_MAX
 1.0000E+00  1.0000E+07
CONVERGENGE TEST FLAG: 0=OR/1=AND
 1
EPS_SAT, EPS_PRES:  NORMAL CONVERGENCE CRITERIA
 3.0000E+00  1.0000E-02
EPS_SAT, EPS_PRES:  RELAXED CONVERGENCE CRITERIA
 3.0000E+00  1.0000E-02
FTOL_SAT  FTOL_PRES:  NORMAL RESIDUAL' TOLERANCE
 1.0000E-02  1.0000E-02
FTOL_SAT  FTOL_PRES:  RELAXED RESIDUAL' TOLERANCE
 1.0000E-02  1.0000E-02
GAS TRANSPORT TOLERANCES
 1.0000E-05  1.0000E-05  1.0000E-05  1.0000E-05
LINEAR EQUATION SOLVER TYPE
LU
ITMAX, IRESETMAX, IJACINT, LSCALE, P_SCALE, LVARSWITCH
 8  40  1  T   1.0000E+07 F
IUPRPFLAG, IUPMFLAG, DT_REDU, ITRAVE, IMFRAVE
 9  9  2.5000E-01  1  0
IJACSWITCH, IJACMIN, IJACRESET, IUPRPLOOSE, IUPMFLOOSE
 41  1  5  9  9
DHSAT_REL, DHPRES_REL: REL. CHANGE FOR JACOBIAN ELEMENT CALCS
 1.0000E-08  1.0000E-08
DHSAT_MIN, DHPRES_MIN: MIN. CHANGE ALLOWED FOR JACOBIAN CALCS
 1.0000E-10  1.0000E-02
NUMBER OF TIMES FOR SPECIFYING MATERIAL MAP
7
START TIME FOR MAP 1
-1.5778E+08
MATERIAL TYPE GRID MAP
26* 1. 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
26* 25 44* 26 26* 27
96* 28
96* 29
35* 29 24* 37 37* 29
35* 30  7* 34  1* 36  7* 34  1* 36  4* 30  1* 36 40* 30
35* 29  7* 34  1* 36  7* 34  1* 36  4* 35  1* 36  3* 35 37* 29
35* 29  7* 34  1* 36  7* 34  1* 36  4* 35  1* 36  3* 35 37* 29
35* 31  7* 34  1* 36  7* 34  1* 36  4* 31  1* 36 40* 31
55* 29  1* 36 40* 29
55* 29  1* 36 40* 29
55* 32  1* 36 40* 32
55* 33  1* 36 40* 33
START TIME FOR MAP 2
0.0000E+00
MATERIAL TYPE GRID MAP
26* 1 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
7* 25  1* 55 18* 25 44* 26 18* 27  1* 55  7* 27
7* 28  1* 53 80* 28  1* 53  7* 28
7* 29  1* 53 80* 29  1* 53  7* 29
7* 29  1* 53 27* 29 24* 38 29* 29  1* 53  7* 29
7* 30  1* 53 27* 30  7* 40  1* 43  7* 40  1* 43  4* 30  1* 41 32* 30  1* 53  7* 30
7* 29  1* 53 27* 29  7* 40  1* 43  7* 40  1* 43  5* 41  3* 42 29* 29  1* 53  7* 29
7* 29  1* 53 27* 29  7* 40  1* 43  7* 40  1* 43  4* 41  1* 45  3* 42 29* 29  1* 53  7* 29
7* 31  1* 53 27* 31  7* 40  1* 43  7* 40  1* 43  4* 31  1* 45 32* 31  1* 53  7* 31
7* 29  1* 53 47* 29  1* 45 32* 29  1* 53  7* 29
7* 29  1* 53 47* 29  1* 47 32* 29  1* 53  7* 29
55* 32  1* 44 40* 32
55* 39  1* 44 40* 39
```

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START TIME FOR MAP 3
1.5778E+09
MATERIAL TYPE GRID MAP
26* 1 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
 7* 25  1* 56  18* 25  44* 26  18* 27  1* 56  7* 27
 7* 28  1* 57  80* 28  1* 57  7* 28
 7* 29  1* 57  80* 29  1* 57  7* 29
 7* 29  1* 57  27* 29  24* 38  29* 29  1* 57  7* 29
 7* 30  1* 57  27* 30  7* 40  1* 43  7* 40  1* 43  4* 30  1* 41  32* 30  1* 57  7* 30
 7* 29  1* 57  27* 29  7* 40  1* 43  7* 40  1* 43  5* 41  3* 42  29* 29  1* 57  7* 29
 7* 29  1* 57  27* 29  7* 40  1* 43  7* 40  1* 43  4* 41  1* 46  3* 42  29* 29  1* 57  7* 29
 7* 31  1* 57  27* 31  7* 40  1* 43  7* 40  1* 43  4* 31  1* 46  32* 31  1* 57  7* 31
 7* 29  1* 57  47* 29  1* 46  32* 29  1* 57  7* 29
 7* 29  1* 57  47* 29  1* 48  32* 29  1* 57  7* 29
 7* 32  1* 56  47* 32  1* 44  32* 32  1* 56  7* 32
 7* 39  1* 56  47* 39  1* 44  32* 39  1* 56  7* 39
START TIME FOR MAP 4
3.1557E+09
MATERIAL TYPE GRID MAP
26* 1 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
 7* 25  1* 56  18* 25  44* 26  18* 27  1* 56  7* 27
 7* 28  1* 57  80* 28  1* 57  7* 28
 7* 29  1* 57  80* 29  1* 57  7* 29
 7* 29  1* 57  27* 29  24* 38  29* 29  1* 57  7* 29
 7* 30  1* 57  27* 30  7* 40  1* 43  7* 40  1* 43  4* 30  1* 41  32* 30  1* 57  7* 30
 7* 29  1* 57  27* 29  7* 40  1* 43  7* 40  1* 43  5* 41  3* 42  29* 29  1* 57  7* 29
 7* 29  1* 57  27* 29  7* 40  1* 43  7* 40  1* 43  4* 41  1* 46  3* 42  29* 29  1* 57  7* 29
 7* 31  1* 57  27* 31  7* 40  1* 43  7* 40  1* 43  4* 31  1* 46  32* 31  1* 57  7* 31
 7* 29  1* 57  47* 29  1* 46  32* 29  1* 57  7* 29
 7* 29  1* 57  47* 29  1* 49  32* 29  1* 57  7* 29
 7* 32  1* 56  47* 32  1* 44  32* 32  1* 56  7* 32
 7* 39  1* 56  47* 39  1* 44  32* 39  1* 56  7* 39
START TIME FOR MAP 5
6.3114E+09
MATERIAL TYPE GRID MAP
26* 1 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
 7* 25  1* 56  18* 25  44* 26  18* 27  1* 56  7* 27
 7* 28  1* 57  80* 28  1* 57  7* 28
 7* 29  1* 57  80* 29  1* 57  7* 29
 7* 29  1* 57  27* 29  24* 38  29* 29  1* 57  7* 29
 7* 30  1* 57  27* 30  7* 40  1* 43  7* 40  1* 43  4* 30  1* 41  32* 30  1* 57  7* 30
 7* 29  1* 57  27* 29  7* 40  1* 43  7* 40  1* 43  5* 41  3* 42  29* 29  1* 57  7* 29
 7* 29  1* 57  27* 29  7* 40  1* 43  7* 40  1* 43  4* 41  1* 46  3* 42  29* 29  1* 57  7* 29
 7* 31  1* 57  27* 31  7* 40  1* 43  7* 40  1* 43  4* 31  1* 46  32* 31  1* 57  7* 31
 7* 29  1* 57  47* 29  1* 46  32* 29  1* 57  7* 29
 7* 29  1* 57  47* 29  1* 50  32* 29  1* 57  7* 29
 7* 32  1* 56  47* 32  1* 44  32* 32  1* 56  7* 32
 7* 39  1* 56  47* 39  1* 44  32* 39  1* 56  7* 39
START TIME FOR MAP 6
```

```
7.8892E+09
MATERIAL TYPE GRID MAP
26* 1 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
7* 25 1* 54 18* 25 44* 26 18* 27 1* 54 7* 27
7* 28 1* 52 80* 28 1* 52 7* 28
7* 29 1* 52 80* 29 1* 52 7* 29
7* 29 1* 52 27* 29 24* 38 29* 29 1* 52 7* 29
7* 30 1* 52 27* 30 7* 40 1* 43 7* 40 1* 43 4* 30 1* 41 32* 30 1* 52 7* 30
7* 29 1* 52 27* 29 7* 40 1* 43 7* 40 1* 43 5* 41 3* 42 29* 29 1* 52 7* 29
7* 29 1* 52 27* 29 7* 40 1* 43 7* 40 1* 43 4* 41 1* 46 3* 42 29* 29 1* 52 7* 29
7* 31 1* 52 27* 31 7* 40 1* 43 7* 40 1* 43 4* 31 1* 46 32* 31 1* 52 7* 31
7* 29 1* 52 47* 29 1* 46 32* 29 1* 52 7* 29
7* 29 1* 52 47* 29 1* 50 32* 29 1* 52 7* 29
7* 32 1* 51 47* 32 1* 44 32* 32 1* 51 7* 32
7* 39 1* 51 47* 39 1* 44 32* 39 1* 51 7* 39
START TIME FOR MAP 7
3.9446E+10
MATERIAL TYPE GRID MAP
26* 1 44* 2 26* 3
96* 4
96* 4
26* 5 44* 6 26* 7
96* 8
96* 8
26* 9 44* 10 26* 11
96* 12
96* 12
96* 12
26* 13 44* 14 26* 15
96* 16
96* 16
96* 16
26* 17 44* 18 26* 19
96* 20
96* 20
96* 20
26* 21 44* 22 26* 23
96* 24
96* 24
96* 24
7* 25 1* 54 18* 25 44* 26 18* 27 1* 54 7* 27
7* 28 1* 52 80* 28 1* 52 7* 28
7* 29 1* 58 80* 29 1* 58 7* 29
7* 29 1* 58 27* 29 24* 38 29* 29 1* 58 7* 29
7* 30 1* 52 27* 30 7* 40 1* 43 7* 40 1* 43 4* 30 1* 41 32* 30 1* 52 7* 30
7* 29 1* 52 27* 29 7* 40 1* 43 7* 40 1* 43 5* 41 3* 42 29* 29 1* 52 7* 29
7* 29 1* 52 27* 29 7* 40 1* 43 7* 40 1* 43 4* 41 1* 46 3* 42 29* 29 1* 52 7* 29
7* 31 1* 52 27* 31 7* 40 1* 43 7* 40 1* 43 4* 31 1* 46 32* 31 1* 52 7* 31
7* 29 1* 52 47* 29 1* 46 32* 29 1* 52 7* 29
7* 29 1* 52 47* 29 1* 50 32* 29 1* 52 7* 29
7* 32 1* 51 47* 32 1* 44 32* 32 1* 51 7* 32
7* 39 1* 51 47* 39 1* 44 32* 39 1* 51 7* 39
# NAME
1 MORRO_P1
2 MORRO_P2
3 MORRO_P3
4 MORRO_NP
5 ATOKA_P1
6 ATOKA_P2
7 ATOKA_P3
8 ATOKA_NP
9 STRWN_P1
10 STRWN_P2
11 STRWN_P3
12 STRWN_NP
13 BONES_P1
14 BONES_P2
15 BONES_P3
16 BONES_NP
17 LBRSH_P1
18 LBRSH_P2
19 LBRSH_P3
20 UBRSH_NP
21 UBRSH_P1
22 UBRSH_P2
23 UBRSH_P3
24 LBELL_NP
25 UBELL_P1
26 UBELL_P2
27 UBELL_P3
28 CASTILER
29 S_HALITE
30 S_MB139
31 S_MB138
32 UNNAMED
33 IMPERM_Z
34 CAVITY_2
35 CAVITY_3
36 CAVITY_4
37 DRZ_0
38 DRZ_1
```

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39   CULEBRA
40   WAS_AREA
41   OPS_AREA
42   EXP_AREA
43   PAN_SEAL
44   CLAY_RUS
45   CL_L_T1
46   CL_L_T4
47   SALT_T1
48   SALT_T4
49   SALT_T5
50   SALT_T6
51   BH_SUR_A
52   BH_SLT_A
53   BH_SLT_L
54   BH_LOW_A
55   BH_LOW_L
56   CONC_PLG
57   BH_OPEN
58   BH_CREEP
NWST
1
MAT_WASTEI   MAT_WASTE
34
40
NDRZ
0
NMATRESET
3
MATRESET
34 35 36
BORE HOLE MATERIAL NUMBER
0
RESET TIME,  ICWASTE
0.0000E+00   1
POWASTEIC
1.013250E+05
SOWASTEIC
0.000000E+00
PRESDRZ

# LAMBDA      SOR         SGR
1 7.000000E-01 2.000000E-01 1.000000E-02
2 7.000000E-01 2.000000E-01 1.000000E-02
3 7.000000E-01 2.000000E-01 1.000000E-02
4 7.000000E-01 2.000000E-01 1.000000E-02
5 7.000000E-01 2.000000E-01 1.000000E-02
6 7.000000E-01 2.000000E-01 1.000000E-02
7 7.000000E-01 2.000000E-01 1.000000E-02
8 7.000000E-01 2.000000E-01 1.000000E-02
9 7.000000E-01 2.000000E-01 1.000000E-02
10 7.000000E-01 2.000000E-01 1.000000E-02
11 7.000000E-01 2.000000E-01 1.000000E-02
12 7.000000E-01 2.000000E-01 1.000000E-02
13 7.000000E-01 2.000000E-01 1.000000E-02
14 7.000000E-01 2.000000E-01 1.000000E-02
15 7.000000E-01 2.000000E-01 1.000000E-02
16 7.000000E-01 2.000000E-01 1.000000E-02
17 7.000000E-01 2.000000E-01 1.000000E-02
18 7.000000E-01 2.000000E-01 1.000000E-02
19 7.000000E-01 2.000000E-01 1.000000E-02
20 7.000000E-01 2.000000E-01 1.000000E-02
21 7.000000E-01 2.000000E-01 1.000000E-02
22 7.000000E-01 2.000000E-01 1.000000E-02
23 7.000000E-01 2.000000E-01 1.000000E-02
24 7.000000E-01 2.000000E-01 1.000000E-02
25 7.000000E-01 2.000000E-01 1.000000E-02
26 7.000000E-01 2.000000E-01 1.000000E-02
27 7.000000E-01 2.000000E-01 1.000000E-02
28 7.000000E-01 2.000000E-01 1.000000E-02
29 7.000000E-01 2.000000E-01 2.000000E-01
30 7.000000E-01 3.000000E-01 2.000000E-01
31 6.436000E-01 8.363000E-02 7.711000E-02
32 6.436000E-01 8.363000E-02 7.711000E-02
33 7.000000E-01 2.000000E-01 2.000000E-01
34 7.000000E-01 0.000000E+00 0.000000E+00
35 7.000000E-01 0.000000E+00 0.000000E+00
36 7.000000E-01 0.000000E+00 0.000000E+00
37 7.000000E-01 0.000000E+00 0.000000E+00
38 7.000000E-01 0.000000E+00 0.000000E+00
39 6.436000E-01 8.363000E-02 7.711000E-02
40 2.890000E+00 2.760000E-01 7.500000E-02
41 7.000000E-01 0.000000E+00 0.000000E+00
42 7.000000E-01 0.000000E+00 0.000000E+00
43 9.400000E-01 2.000000E-01 2.000000E-01
44 9.400000E-01 2.000000E-01 2.000000E-01
45 9.400000E-01 2.000000E-01 2.000000E-01
46 9.400000E-01 2.000000E-01 2.000000E-01
47 9.400000E-01 2.000000E-01 2.000000E-01
48 9.400000E-01 2.000000E-01 2.000000E-01
49 9.400000E-01 2.000000E-01 2.000000E-01
50 9.400000E-01 2.000000E-01 2.000000E-01
51 9.400000E-01 0.000000E+00 0.000000E+00
52 9.400000E-01 0.000000E+00 0.000000E+00
53 9.400000E-01 0.000000E+00 0.000000E+00
54 9.400000E-01 0.000000E+00 0.000000E+00
55 9.400000E-01 0.000000E+00 0.000000E+00
56 9.400000E-01 0.000000E+00 0.000000E+00
57 7.000000E-01 0.000000E+00 0.000000E+00
58 9.400000E-01 0.000000E+00 0.000000E+00
# SBMIN      PBMIN      PCMAX      PCT_A      PCT_EXP    KRP KPC KTP
1 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
2 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
3 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
4 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
5 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
6 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
7 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
8 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
9 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
10 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
11 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
```

```
12 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
13 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
14 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
15 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
16 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
17 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
18 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
19 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
20 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
21 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
22 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
23 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
24 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
25 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
26 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
27 2.100000E-01 1.013200E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
28 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
29 3.150000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
30 8.781150E-02 1.013250E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
31 8.781150E-02 1.013250E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
32 2.100000E-01 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
33 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
34 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
35 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
36 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
37 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
38 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
39 8.781150E-02 1.013250E+05 1.000000E+08 2.600000E-01 -3.480000E-01 4 2 0
40 2.898000E-01 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
41 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
42 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
43 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
44 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
45 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
46 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
47 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
48 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
49 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
50 2.100000E-01 1.013250E+05 1.000000E+08 5.600000E-01 -3.460000E-01 4 2 0
51 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
52 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
53 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
54 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
55 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
56 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
57 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 5 1 0
58 0.000000E+00 1.013250E+05 1.000000E+08 0.000000E+00 0.000000E+00 4 1 0
# PERMX     PERMY     PERMZ     POROSITY   COMPRES
1 2.060631E-14 2.060626E-20 2.060631E-14 1.100000E-01 3.015400E-10
2 2.060631E-14 2.060626E-20 2.060631E-14 1.100000E-01 3.015400E-10
3 2.060631E-14 2.060626E-20 2.060631E-14 1.100000E-01 3.015400E-10
4 1.778279E-16 1.778279E-20 1.778279E-16 4.000000E-02 3.081300E-10
5 2.060631E-14 2.060626E-20 2.060631E-14 9.000000E-02 3.149400E-10
6 2.060631E-14 2.060626E-20 2.060631E-14 9.000000E-02 3.149400E-10
7 2.060631E-14 2.060626E-20 2.060631E-14 9.000000E-02 3.149400E-10
8 1.778279E-16 1.778279E-20 1.778279E-16 1.000000E-02 3.216200E-10
9 2.060631E-14 2.060626E-20 2.060631E-14 1.000000E-01 3.286300E-10
10 2.060631E-14 2.060626E-20 2.060631E-14 1.000000E-01 3.286300E-10
11 2.060631E-14 2.060626E-20 2.060631E-14 1.000000E-01 3.286300E-10
12 1.778279E-16 1.778279E-20 1.778279E-16 2.000000E-02 3.699000E-10
13 2.060631E-14 2.060626E-20 2.060631E-14 1.150000E-01 4.232100E-10
14 2.060631E-14 2.060626E-20 2.060631E-14 1.150000E-01 4.232100E-10
15 2.060631E-14 2.060626E-20 2.060631E-14 1.150000E-01 4.232100E-10
16 1.778279E-16 1.778279E-20 1.778279E-16 1.400000E-01 4.575600E-10
17 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 4.976500E-10
18 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 4.976500E-10
19 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 4.976500E-10
20 9.862783E-17 9.862783E-20 9.862783E-17 1.400000E-01 5.449300E-10
21 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 6.019500E-10
22 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 6.019500E-10
23 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 6.019500E-10
24 9.862783E-17 9.862783E-20 9.862783E-17 1.400000E-01 6.767300E-10
25 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 7.947600E-10
26 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 7.947600E-10
27 1.267651E-13 1.267654E-20 1.267651E-13 2.900000E-01 7.947600E-10
28 9.999999E-19 1.000000E-19 9.999999E-19 8.700000E-03 1.149425E-08
29 1.778279E-25 1.778279E-25 1.778279E-25 1.000000E-02 9.750000E-09
30 7.943276E-18 7.943276E-18 7.943276E-18 1.100000E-02 7.511818E-09
31 7.943276E-18 7.943276E-18 7.943276E-18 1.100000E-02 7.511818E-09
32 9.999999E-36 9.999999E-36 9.999999E-36 1.810000E-01 0.000000E+00
33 9.999999E-36 9.999999E-36 9.999999E-36 5.000000E-03 0.000000E+00
34 1.000000E-10 1.000000E-10 1.000000E-10 1.000000E+00 0.000000E+00
35 1.000000E-10 1.000000E-10 1.000000E-10 1.000000E+00 0.000000E+00
36 1.000000E-10 1.000000E-10 1.000000E-10 1.000000E+00 0.000000E+00
37 9.999999E-18 9.999999E-18 9.999999E-18 1.290000E-02 5.744186E-08
38 1.000000E-15 1.000000E-15 1.000000E-15 1.290000E-02 5.744186E-08
39 2.098938E-14 2.098938E-14 2.098938E-14 1.510000E-01 6.622517E-10
40 1.702158E-13 1.702158E-13 1.702158E-13 8.480000E-01 0.000000E+00
41 1.000000E-11 1.000000E-11 1.000000E-11 1.800000E-01 0.000000E+00
42 1.000000E-11 1.000000E-11 1.000000E-11 1.800000E-01 0.000000E+00
43 1.000000E-15 1.000000E-15 1.000000E-15 7.500000E-02 2.640000E-09
44 5.000000E-18 5.000000E-18 5.000000E-18 2.400000E-01 1.960000E-09
45 5.525260E-18 5.525260E-18 5.525260E-18 2.400000E-01 1.590000E-09
46 5.000000E-18 5.000000E-18 5.000000E-18 2.400000E-01 1.590000E-09
47 1.771256E-15 1.771256E-15 1.771256E-15 5.000000E-02 1.600000E-09
48 6.829677E-18 6.829677E-18 6.829677E-18 5.000000E-02 1.600000E-09
49 5.269869E-20 5.269869E-20 5.269869E-20 5.000000E-02 1.600000E-09
50 5.350560E-21 5.350560E-21 5.350560E-21 5.000000E-02 1.600000E-09
51 1.000000E-11 2.041000E-11 1.000000E-11 3.200000E-01 0.000000E+00
52 1.000000E-11 1.000000E-11 1.000000E-11 3.200000E-01 0.000000E+00
53 1.000000E-11 3.827000E-12 1.000000E-11 3.200000E-01 0.000000E+00
54 1.000000E-11 2.399000E-12 1.000000E-11 3.200000E-01 0.000000E+00
55 1.000000E-11 1.050000E-12 1.000000E-11 3.200000E-01 0.000000E+00
56 5.000339E-17 5.000339E-17 5.000339E-17 3.200000E-01 1.200000E-09
57 1.000000E-09 1.000000E-09 1.000000E-09 3.200000E-01 0.000000E+00
58 1.000000E-12 1.000000E-12 1.000000E-12 3.200000E-01 0.000000E+00
FRACTURE MODEL DATA TO FOLLOW :T OR F
T
NFRAC
2
# DELTA_PI   DELTA_PF    FRAC_PHI    FRAC_EXP    IFRX IFRY IFRZ
30 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
```

```
31 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
KLINKENBERG EFFECT TO BE USED? True or False
T
BKLINK      EXPKLINK
 2.71000E-01 -3.41000E-01
REFERENCE TEMPERATURE AND PRESSURE FOR DENSITY CALCULATIONS
 3.00150E+02  1.01325E+05
SALT(WT.%) DEN_BR  KGSAT  IDGAS   COMPR_BR
3.2400E+01 1.2200E+03   1   0    3.1000E-10
VISC_BR   VISC_GAS
 2.10000E-03  8.93389E-06
GAS DENSITY DATA: =0 COMPUTE; =1 INTERPOLATE
1
GAS MOLE FRACTIONS FOR H2, CO2, CH4, N2, H2S, AND O2
1.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00   1   1
IGASVAR (2= REACTION PATH,  1= USING AVG. STOICH. , 0= USING WELLS)
1
RATE CONSTANTS: CORROSION (RKCOR) AND BIODEGRADATION (RKBIO)
 1.6297E-07   3.2031E-07
HUMIDITY FACTORS: HUMFAC_COR, HUMFAC_BIO
 0.0000E+00   1.2903E-01
SCOR_H2=a,SCOR_H2O=b,SCOR_FE=c: where b*H2O + c*FE=> a*H2 + inert solids
 1.0000E+00   2.0000E+00   1.0000E+00
SBIO_GAS=a,SBIO_H2O=b,SBIO_CH2O=c: where b*H2O + c*CH2O=> a*GAS + inerts
 7.5465E-01   0.0000E+00   1.0000E+00
WICKING SATURATION, HUMID RATE SMOOTHING   ALPHARXN
 5.0000E-01 T   1.0000E+03
CREEP CLOSURE?
T
NKLOS, KLOSINT (0=MOLES,1=PRESSURE) KLOSAVE (1=REGION AVE,2=CELL)
 1   1   2
CLOSURE PARAMETERS: PRES_LITHO, TIME_OFF PERM_FACTOR, PERM_EXP
4   5.0000E+07   3.1557E+12   1.7022E-13   0.0000E+00
NUMBER OF MATERIAL REGIONS FOR CLOSURE
 1
# MAT NO.   MODEL 1= WASTE-NOBACKFILL, 2=DRIFT-NOBACKFILL, 3=WASTE-BACKFILL
4=JAN_96:WASTE-NOBACKFILL
1  40      4
WILL RADIONUCLIDE DECAY BE CALCULATED? T or F
F
WILL TRANSPORT BE CALCULATED? T or F
F
WILL RADIOLYSIS BE CALCULATED? T or F
F
BRAGFLO GAS COMPONENT TRANSPORT MODEL
F
```

```
1 ************
2 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
3   6    16:19:04    = PROGRAM RUN TIME
4   7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
5 ******
6 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
7   6    17:53:41    = PROGRAM RUN TIME
8   7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
9 ************
10 ************
11 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
12 1310   29 3.162278E-23 3.162278E-23 3.162278E-23  1.000000E-02  9.750000E-09
13 1311   30 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
14 1312   31 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
15 1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
16 ******
17 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
18 1310   29 1.778279E-25 1.778279E-25 1.778279E-25  1.000000E-02  9.750000E-09
19 1311   30 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
20 1312   31 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
21 1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
22 ************
23 ************
24 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
25 1325   44 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.960000E-09
26 1326   45 5.966457E-19 5.966457E-19 5.966457E-19  2.400000E-01  1.590000E-09
27 1327   46 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.590000E-09
28 1328   47 1.808153E-15 1.808153E-15 1.808153E-15  5.000000E-02  1.600000E-09
29 1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
30 ******
31 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
32 1325   44 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.960000E-09
33 1326   45 5.525260E-18 5.525260E-18 5.525260E-18  2.400000E-01  1.590000E-09
34 1327   46 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.590000E-09
35 1328   47 1.771256E-15 1.771256E-15 1.771256E-15  5.000000E-02  1.600000E-09
36 1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
37 ************
38 ************
39 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
40 1332   51 3.162278E-13 6.454208E-13 3.162278E-13  3.200000E-01  0.000000E+00
41 1333   52 3.162278E-13 3.162278E-13 3.162278E-13  3.200000E-01  0.000000E+00
42 1334   53 3.162278E-13 1.210204E-13 3.162278E-13  3.200000E-01  0.000000E+00
43 1335   54 3.162278E-13 7.586304E-14 3.162278E-13  3.200000E-01  0.000000E+00
44 1336   55 3.162278E-13 3.320391E-14 3.162278E-13  3.200000E-01  0.000000E+00
45 1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
46 1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
47 1339   58 3.162278E-14 3.162278E-14 3.162278E-14  3.200000E-01  0.000000E+00
48 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
49 ******
50 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
51 1332   51 1.000000E-11 2.041000E-11 1.000000E-11  3.200000E-01  0.000000E+00
52 1333   52 1.000000E-11 1.000000E-11 1.000000E-11  3.200000E-01  0.000000E+00
53 1334   53 1.000000E-11 3.827000E-12 1.000000E-11  3.200000E-01  0.000000E+00
54 1335   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
55 1336   55 1.000000E-11 1.050000E-12 1.000000E-11  3.200000E-01  0.000000E+00
56 1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
57 1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
58 1339   58 1.000000E-12 1.000000E-12 1.000000E-12  3.200000E-01  0.000000E+00
59 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
60 ************
61 ************
62 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
63 1345   30 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
64 1346   31 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
65 1347    KLINKENBERG EFFECT TO BE USED? True or False
66 ******
67 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
68 1345   30 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
69 1346   31 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
70 1347    KLINKENBERG EFFECT TO BE USED? True or False
71 ************
72
73 Number of difference sections found: 5
74 Number of difference records found: 18
75
76 DIFFERENCES
77 /IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
78 K2.DMS_WATERFLOOD.BRAGFLO]BRA_B1_2.DIFF;1-
79   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1-
80   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
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1 ************
2 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
3   5   06/17/96    = PROGRAM RUN DATE
4   6   16:19:04    = PROGRAM RUN TIME
5   7   1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
6 ******
7 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
8   5   09/09/96    = PROGRAM RUN DATE
9   6   12:05:00    = PROGRAM RUN TIME
0   7   1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
1 ************
2 ************
3 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
4 1310   29 3.162278E-23 3.162278E-23 3.162278E-23  1.000000E-02  9.750000E-09
5 1311   30 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
6 1312   31 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
7 1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
8 ******
9 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
0 1310   29 1.778279E-25 1.778279E-25 1.778279E-25  1.000000E-02  9.750000E-09
1 1311   30 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
2 1312   31 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
3 1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
4 ************
5 ************
6 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
7 1325   44 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.960000E-09
8 1326   45 5.966457E-19 5.966457E-19 5.966457E-19  2.400000E-01  1.590000E-09
9 1327   46 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.590000E-09
0 1328   47 1.808153E-15 1.808153E-15 1.808153E-15  5.000000E-02  1.600000E-09
1 1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
2 ******
3 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
4 1325   44 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.960000E-09
5 1326   45 5.525260E-18 5.525260E-18 5.525260E-18  2.400000E-01  1.590000E-09
6 1327   46 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.590000E-09
7 1328   47 1.771256E-15 1.771256E-15 1.771256E-15  5.000000E-02  1.600000E-09
8 1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
9 ************
0 ************
1 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
42 1332   51 3.162278E-13 6.454208E-13 3.162278E-13  3.200000E-01  0.000000E+00
43 1333   52 3.162278E-13 3.162278E-13 3.162278E-13  3.200000E-01  0.000000E+00
44 1334   53 3.162278E-13 1.210204E-13 3.162278E-13  3.200000E-01  0.000000E+00
45 1335   54 3.162278E-13 7.586304E-14 3.162278E-13  3.200000E-01  0.000000E+00
46 1336   55 3.162278E-13 3.320391E-14 3.162278E-13  3.200000E-01  0.000000E+00
47 1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
48 1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
49 1339   58 3.162278E-14 3.162278E-14 3.162278E-14  3.200000E-01  0.000000E+00
50 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
51 ******
52 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
53 1332   51 1.000000E-11 2.041000E-11 1.000000E-11  3.200000E-01  0.000000E+00
54 1333   52 1.000000E-11 1.000000E-11 1.000000E-11  3.200000E-01  0.000000E+00
55 1334   53 1.000000E-03 3.827000E-04 1.000000E-03  3.200000E-01  0.000000E+00
56 1335   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
57 1336   55 1.000000E-03 1.050000E-04 1.000000E-03  3.200000E-01  0.000000E+00
58 1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
59 1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
60 1339   58 1.000000E-12 1.000000E-12 1.000000E-12  3.200000E-01  0.000000E+00
61 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
62 ************
63 ************
64 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
65 1345   30 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
66 1346   31 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
67 1347    KLINKENBERG EFFECT TO BE USED? True or False
68 ******
69 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
70 1345   30 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
71 1346   31 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
72 1347    KLINKENBERG EFFECT TO BE USED? True or False
73 ************
74
75 Number of difference sections found: 5
76 Number of difference records found: 19
77
78 DIFFERENCES
79 /IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
80 K2.DMS_WATERFLOOD.BRAGFLO]BRA_B1_4.DIFF;1-
81   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1-
82   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
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1 ************
2 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
3   5    06/17/96    = PROGRAM RUN DATE
4   6    16:19:04    = PROGRAM RUN TIME
5   7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
6 ******
7 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
8   5    09/12/96    = PROGRAM RUN DATE
9   6    09:36:39    = PROGRAM RUN TIME
0   7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
1 ************
2 ************
3 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
4 1310   29 3.162278E-23 3.162278E-23 3.162278E-23  1.000000E-02  9.750000E-09
5 1311   30 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
6 1312   31 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
7 1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
8 ******
9 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
0 1310   29 1.778279E-25 1.778279E-25 1.778279E-25  1.000000E-02  9.750000E-09
1 1311   30 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
2 1312   31 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
3 1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
4 ************
5 ************
6 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
7 1325   44 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.960000E-09
8 1326   45 5.966457E-19 5.966457E-19 5.966457E-19  2.400000E-01  1.590000E-09
9 1327   46 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.590000E-09
0 1328   47 1.808153E-15 1.808153E-15 1.808153E-15  5.000000E-02  1.600000E-09
1 1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
2 ******
3 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
4 1325   44 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.960000E-09
5 1326   45 5.525260E-18 5.525260E-18 5.525260E-18  2.400000E-01  1.590000E-09
6 1327   46 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.590000E-09
7 1328   47 1.771256E-15 1.771256E-15 1.771256E-15  5.000000E-02  1.600000E-09
8 1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
9 ************
0 ************
1 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
42 1332   51 3.162278E-13 6.454208E-13 3.162278E-13  3.200000E-01  0.000000E+00
43 1333   52 3.162278E-13 3.162278E-13 3.162278E-13  3.200000E-01  0.000000E+00
44 1334   53 3.162278E-13 1.210204E-13 3.162278E-13  3.200000E-01  0.000000E+00
45 1335   54 3.162278E-13 7.586304E-14 3.162278E-13  3.200000E-01  0.000000E+00
46 1336   55 3.162278E-13 3.320391E-14 3.162278E-13  3.200000E-01  0.000000E+00
47 1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
48 1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
49 1339   58 3.162278E-14 3.162278E-14 3.162278E-14  3.200000E-01  0.000000E+00
50 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
51 ******
52 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
53 1332   51 1.000000E-11 2.041000E-11 1.000000E-11  3.200000E-01  0.000000E+00
54 1333   52 1.000000E-11 1.000000E-11 1.000000E-11  3.200000E-01  0.000000E+00
55 1334   53 1.000000E-03 3.827000E-04 1.000000E-03  3.200000E-01  0.000000E+00
56 1335   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
57 1336   55 1.000000E-03 1.050000E-04 1.000000E-03  3.200000E-01  0.000000E+00
58 1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
59 1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
60 1339   58 1.000000E-12 1.000000E-12 1.000000E-12  3.200000E-01  0.000000E+00
61 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
62 ************
63 ************
64 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
65 1345   30 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
66 1346   31 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
67 1347    KLINKENBERG EFFECT TO BE USED? True or False
68 ******
69 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
70 1345   30 2.000000E+05 3.800000E+06 5.000000E-02 2.146364E+01   1   1   0
71 1346   31 2.000000E+05 3.800000E+06 5.000000E-02 2.146364E+01   1   1   0
72 1347    KLINKENBERG EFFECT TO BE USED? True or False
73 ************
74
75 Number of difference sections found: 5
76 Number of difference records found: 19
77
78 DIFFERENCES
79 /IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
80 K2.DMS_WATERFLOOD.BRAGFLO]BRA_B1_5.DIFF;1-
81   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1-
82   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
```

```
**********
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
  5    06/18/96    = PROGRAM RUN DATE
  6    15:20:35    = PROGRAM RUN TIME
  7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R003.INP;2
  5    06/19/96    = PROGRAM RUN DATE
  6    11:44:21    = PROGRAM RUN TIME
  7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
**********
**********
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
 369    0.000000E+00  0.000000E+00  7.381600E-11  2.280000E+07
 370     89  23   1   1
 371    INJP
 372    0.000000E+00  0.000000E+00  7.381600E-11  2.280000E+07
 373    1.5778E+09   8
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R003.INP;2
 369    0.000000E+00  0.000000E+00  7.381600E-11  1.853000E+07
 370     89  23   1   1
 371    INJP
 372    0.000000E+00  0.000000E+00  7.381600E-11  1.853000E+07
 373    1.5778E+09   8
**********
**********
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
 1333   53 1.000000E-11 3.827000E-12 1.000000E-11  3.200000E-01  0.000000E+00
 1334   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
 1335   55 1.000000E-11 1.050000E-12 1.000000E-11  3.200000E-01  0.000000E+00
 1336   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R003.INP;2
 1333   53 1.000000E-09 3.827000E-10 1.000000E-09  3.200000E-01  0.000000E+00
 1334   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
 1335   55 1.000000E-09 1.050000E-10 1.000000E-09  3.200000E-01  0.000000E+00
 1336   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
**********

Number of difference sections found: 3
Number of difference records found: 9

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
K2.DMS_WATERFLOOD.BRAGFLO]BRA_Y2_3.DIFF;1-
  N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2-
  N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R003.INP;2
```

```
1 ************
2 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
3   5    06/18/96    = PROGRAM RUN DATE
4   6    15:20:35    = PROGRAM RUN TIME
5   7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
6 ******
7 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R004.INP;1
8   5    09/09/96    = PROGRAM RUN DATE
9   6    12:05:31    = PROGRAM RUN TIME
10  7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
11 ************
12 ************
13 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
14 369    0.000000E+00 0.000000E+00 7.381600E-11 2.280000E+07
15 370    89  23   1   1
16 371    INJP
17 372    0.000000E+00 0.000000E+00 7.381600E-11 2.280000E+07
18 373    1.5778E+09   8
19 ******
20 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R004.INP;1
21 369    0.000000E+00 0.000000E+00 7.381600E-11 1.853000E+07
22 370    89  23   1   1
23 371    INJP
24 372    0.000000E+00 0.000000E+00 7.381600E-11 1.853000E+07
25 373    1.5778E+09   8
26 ************
27 ************
28 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
29 1333   53 1.000000E-11 3.827000E-12 1.000000E-11 3.200000E-01 0.000000E+00
30 1334   54 1.000000E-11 2.399000E-12 1.000000E-11 3.200000E-01 0.000000E+00
31 1335   55 1.000000E-11 1.050000E-12 1.000000E-11 3.200000E-01 0.000000E+00
32 1336   56 5.000339E-17 5.000339E-17 5.000339E-17 3.200000E-01 1.200000E-09
33 ******
34 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R004.INP;1
35 1333   53 1.000000E-03 3.827000E-04 1.000000E-03 3.200000E-01 0.000000E+00
36 1334   54 1.000000E-11 2.399000E-12 1.000000E-11 3.200000E-01 0.000000E+00
37 1335   55 1.000000E-03 1.050000E-04 1.000000E-03 3.200000E-01 0.000000E+00
38 1336   56 5.000339E-17 5.000339E-17 5.000339E-17 3.200000E-01 1.200000E-09
39 ************
40
41 Number of difference sections found: 3
42 Number of difference records found: 9
43
44 DIFFERENCES
45 /IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
46 K2.DMS_WATERFLOOD.BRAGFLO]BRA_Y2_4.DIFF;1-
47   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2-
48   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R004.INP;1
```

```
1 ************
2 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
3   5    06/18/96    = PROGRAM RUN DATE
4   6    15:20:35    = PROGRAM RUN TIME
5   7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
6 ******
7 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R005.INP;1
8   5    09/12/96    = PROGRAM RUN DATE
9   6    09:37:09    = PROGRAM RUN TIME
10  7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
11 ************
12 ************
13 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
14 369    0.000000E+00  0.000000E+00  7.381600E-11  2.280000E+07
15 370     89  23   1   1
16 371    INJP
17 372    0.000000E+00  0.000000E+00  7.381600E-11  2.280000E+07
18 373    1.5778E+09   8
19 ******
20 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R005.INP;1
21 369    0.000000E+00  0.000000E+00  7.381600E-11  1.853000E+07
22 370     89  23   1   1
23 371    INJP
24 372    0.000000E+00  0.000000E+00  7.381600E-11  1.853000E+07
25 373    1.5778E+09   8
26 ************
27 ************
28 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
29 1333   53 1.000000E-11 3.827000E-12 1.000000E-11  3.200000E-01  0.000000E+00
30 1334   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
31 1335   55 1.000000E-11 1.050000E-12 1.000000E-11  3.200000E-01  0.000000E+00
32 1336   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
33 ******
34 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R005.INP;1
35 1333   53 1.000000E-03 3.827000E-04 1.000000E-03  3.200000E-01  0.000000E+00
36 1334   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
37 1335   55 1.000000E-03 1.050000E-04 1.000000E-03  3.200000E-01  0.000000E+00
38 1336   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
39 ************
40 ************
41 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2
42 1344   30 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
43 1345   31 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
44 1346    KLINKENBERG EFFECT TO BE USED? True or False
45 ******
46 File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R005.INP;1
47 1344   30 2.000000E+05 3.800000E+06 5.000000E-02 2.146364E+01   1   1   0
48 1345   31 2.000000E+05 3.800000E+06 5.000000E-02 2.146364E+01   1   1   0
49 1346    KLINKENBERG EFFECT TO BE USED? True or False
50 ************
51
52 Number of difference sections found: 4
53 Number of difference records found: 11
54
55 DIFFERENCES
56 /IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
57 K2.DMS_WATERFLOOD.BRAGFLO]BRA_Y2_5.DIFF;1-
58    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2-
59    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R005.INP;1
```

```
!*************************
! algebra file to post-process waterflood model results
!
!            by: D.M. Stoelzel
!            created: 6/19/96
!     modified: 9/19/96
!     Created additional variables to track which formations the inj
!     fluid is entering.
!
!            modified 9/23/96
!            changed to cum NET flows (both directions included in integral)
!     new file name: POSTALG_WF2.INP
!*************************
delete all
inj1    = intright(h0210001)
inj2    = intright(h0210002)
TOT_INJ  = INJ1 + INJ2
!
t1      = flowbrx[e:2121]
bell1_r  = intright(t1)
delete t1
!
t2      = -1.0 * flowbrx[e:2120]
bell1_l  = intright(t2)
delete t2
!
t3      = flowbrx[e:2202]
bell2_r  = intright(t3)
delete t3
!
t4      = -1.0 * flowbrx[e:2201]
bell2_l  = intright(t4)
delete t4
!
bell_tot = bell1_r + bell1_l + bell2_r + bell2_l
!
brn1    = flowbry[e:2216]
flow_up1 = intright(brn1)
delete brn1
!
brn2    = flowbry[e:2297]
flow_up2 = intright(brn2)
delete brn2
!
TOT_FLUP = flow_up1 + flow_up2
!
brn3    = h0310001
mb139we1 = intright(brn3)
delete brn3
!
t5      = -1.0 * flowbrx[e:2814]
mb139_l1 = intright(t5)
delete t5
!
brn4    = h0310002
mb138we1 = intright(brn4)
delete brn4
!
t6      = -1.0 * flowbrx[e:2893]
mb138_l1 = intright(t6)
delete t6
!
brn5    = -1.0*h0310004
mb139we2 = intright(brn5)
delete brn5
!
t7      = flowbrx[e:2879]
mb139_r2 = intright(t7)
delete t7
!
brn6    = -1.0*h0310005
mb138we2 = intright(brn6)
delete brn6
!
t8      = flowbrx[e:2958]
mb138_r2 = intright(t8)
delete t8
!
TOT_WELL = mb139we1 + mb138we1 + mb139we2 + mb138we2
!
mb_away  = mb139_l1 + mb138_l1 + mb139_r2 + mb138_r2
!
brn7    = h0310007
mb139re1 = intright(brn7)
delete brn7
!
brn8    = h0310008
mb138re1 = intright(brn8)
delete brn8
!
brn9    = -1.0*h0310009
mb139re2 = intright(brn9)
delete brn9
!
brn10   = -1.0*h0310010
mb138re2 = intright(brn10)
delete brn10
!
TOT_REPO = mb139re1 + mb138re1 + mb139re2 + mb138re2
!
brna    = -1.0*h0310007
mb139ou1 = intright(brna)
delete brna
!
brnb    = -1.0*h0310008
mb138ou1 = intright(brnb)
delete brnb
!
brnc    = h0310009
mb139ou2 = intright(brnc)
delete brnc
!
```

```
113 brnd     = h0310010
114 mb138ou2 = intright(brnd)
115 delete brnd
116 !
117 TOT_OUT  = mb139ou1 + mb138ou1 + mb139ou2 + mb138ou2
118 !
119 c1       = flowbry[e:3067]
120 cul_wel1 = intright(c1)
121 delete c1
122 !
123 c2       = flowbry[e:3147]
124 cul_wel2 = intright(c2)
125 delete c2
126 !
127 tot_cul  = cul_wel1 + cul_wel2
128 !
129 !
130 limit block 34
131 tot_vol1 = sum(del_x*del_y*thick)
132 avg_pres = sum(presbrin*(del_x*del_y*thick)/tot_vol1)
133 avg_bsat = sum((1-satgas)*(del_x*del_y*thick)/tot_vol1)
134 delete tot_vol1
135 !
136 limit block 37
137 tot_vol2 = sum(del_x*del_y*thick)
138 pres_drz = sum(presbrin*(del_x*del_y*thick)/tot_vol2)
139 bsat_drz = sum((1-satgas)*(del_x*del_y*thick)/tot_vol2)
140 delete tot_vol2
141 !
142 limit block 30
143 tot_vol3 = sum(del_x*del_y*thick)
144 pres_139 = sum(presbrin*(del_x*del_y*thick)/tot_vol3)
145 bsat_139 = sum((1-satgas)*(del_x*del_y*thick)/tot_vol3)
146 delete tot_vol3
147 !
148 exit
```

```
1 !==========================================================================
2 !
3 ! ANALYST: D. M. STOELZEL
4 ! DATE:   6/20/96
5 ! WATERFLOOD ANALYSIS
6 !==========================================================================
7 !
8 *INPUT FILE
9  TEMPLATE = &
10 N1:[NOBACK2.DMS_WATERFLOOD.POSTALG]POSTALG_WATFLD_BASE01_R###.CDB
11 !
12 *VECTORS
13          ID="#"
14          VECTORS=1, 2, 4, 5
15 !
16 *TIMES
17          READ=SECONDS
18          INPUT=YEARS
19          OUTPUT=YEARS
20          INTERPOLATE= 0 TO 10 BY 2, 10 TO 50 BY 5, 50 TO 1250 BY 50,&
21          1250 TO 10000 BY 250
22          ORDER=FIRST
23 !
24 *ITEMS
25          TYPE=HISTORY
26 !
27          NAMES=  TOT_INJ,TOT_WELL,TOT_REPO,TOT_OUT
28 !
29          TYPE= GLOBAL
30 !
31          NAMES= BELL_TOT,TOT_FLUP,MB_AWAY,TOT_CUL,AVG_PRES,AVG_BSAT,PRES_DRZ,&
32                 BSAT_DRZ,PRES_139,BSAT_139
33 !
34 *OUTPUT FILE
35          DRIVER=EXCEL
36          WRITE=TIME VS ITEM
37          MULTIPLE FILES
38          NAME=BAS01%%%.EXT
39          ID="%"
40          EXTENSION=TXT
41 !
42 *END
```

```
1 !==========================================================================
2 !
3 ! ANALYST: D. M. STOELZEL
4 ! DATE:   6/20/96
5 ! WATERFLOOD ANALYSIS
6 !==========================================================================
7 !
8 *INPUT FILE
9  TEMPLATE = &
10 N1:[NOBACK2.DMS_WATERFLOOD.POSTALG]POSTALG_WATFLD_YATES01_R###.CDB
11 !
12 *VECTORS
13          ID="#"
14          VECTORS=2 TO 5
15 !
16 *TIMES
17          READ=SECONDS
18          INPUT=YEARS
19          OUTPUT=YEARS
20          INTERPOLATE= 0 TO 10 BY 2, 10 TO 50 BY 5, 50 TO 1250 BY 50,&
21          1250 TO 10000 BY 250
22          ORDER=FIRST
23 !
24 *ITEMS
25          TYPE=HISTORY
26 !
27          NAMES=  TOT_INJ,TOT_WELL,TOT_REPO,TOT_OUT
28 !
29          TYPE= GLOBAL
30 !
31          NAMES= BELL_TOT,TOT_FLUP,MB_AWAY,TOT_CUL,AVG_PRES,AVG_BSAT,PRES_DRZ,&
32                 BSAT_DRZ,PRES_139,BSAT_139
33 !
34 *OUTPUT FILE
35          DRIVER=EXCEL
36          WRITE=TIME VS ITEM
37          MULTIPLE FILES
38          NAME=YAT01%%%.EXT
39          ID="%"
40          EXTENSION=TXT
41 !
42 *END
```