Waste Isolation Pilot Plant

Compliance Certification Application

Reference 611

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INFORMATION ONLY

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

FIGURES

TABLES

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.

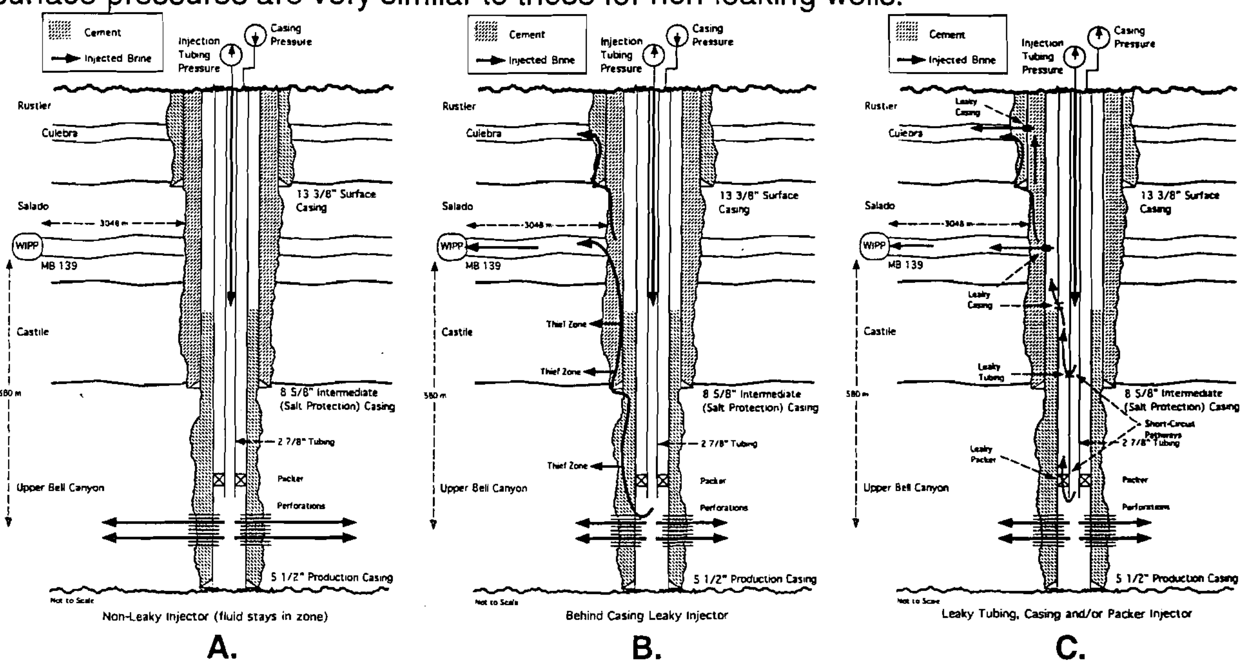


Figure 1: WIPP area geology typical Disposal Well Completion and Hypothetical Leaky Pathways

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:

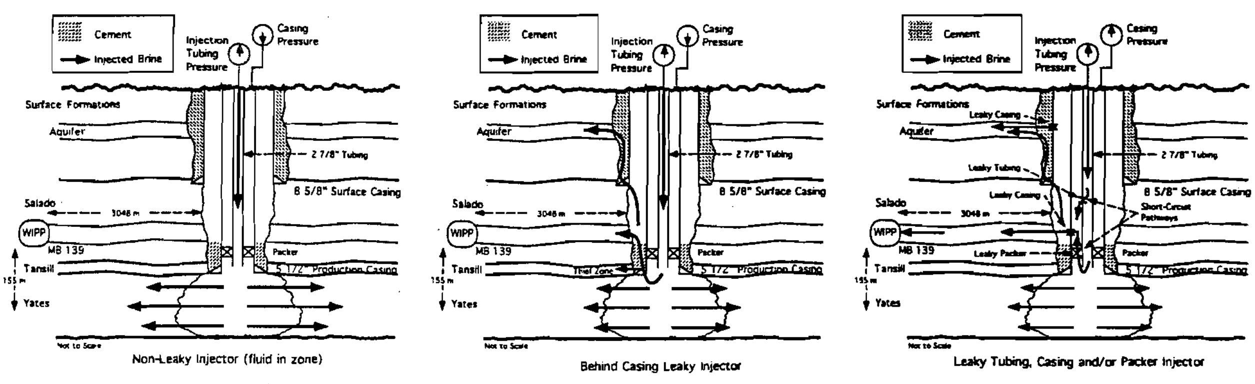
1) A tubing or a packer leak is easy to detect via pressure response at the surface. In this situation the pressure in the tubing-casing annulus is equal to the injection tubing pressure. The state requires that all known tubing and/or packer leaks be corrected.

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.



A. **B.** **C.**

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.

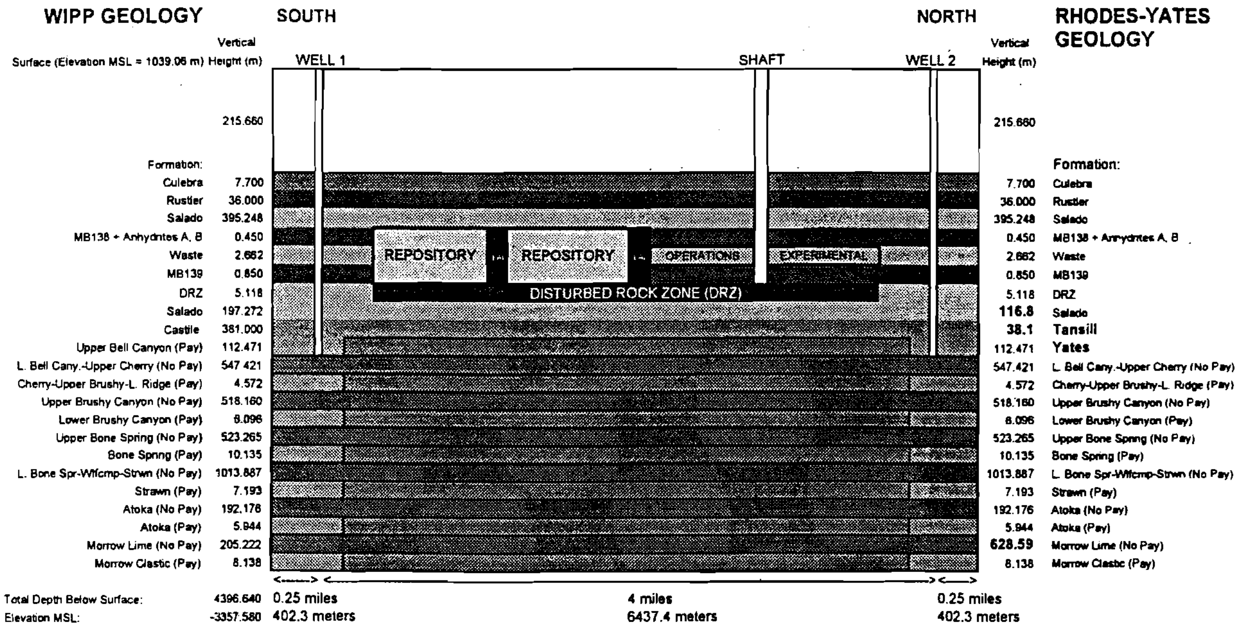


Figure 3: Representation of BRAGFLO fluid injection cross-sectional model

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	1.88636
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	3.2906E+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.

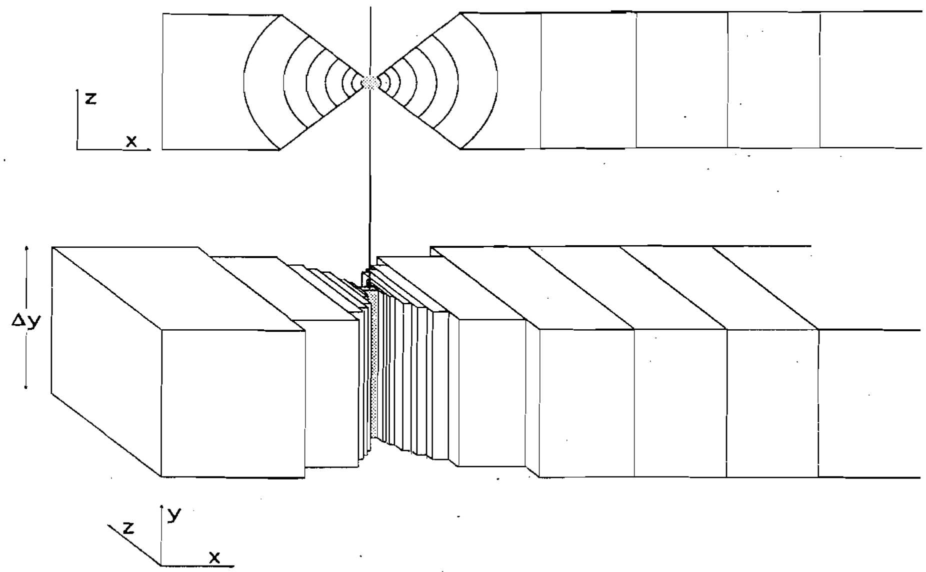
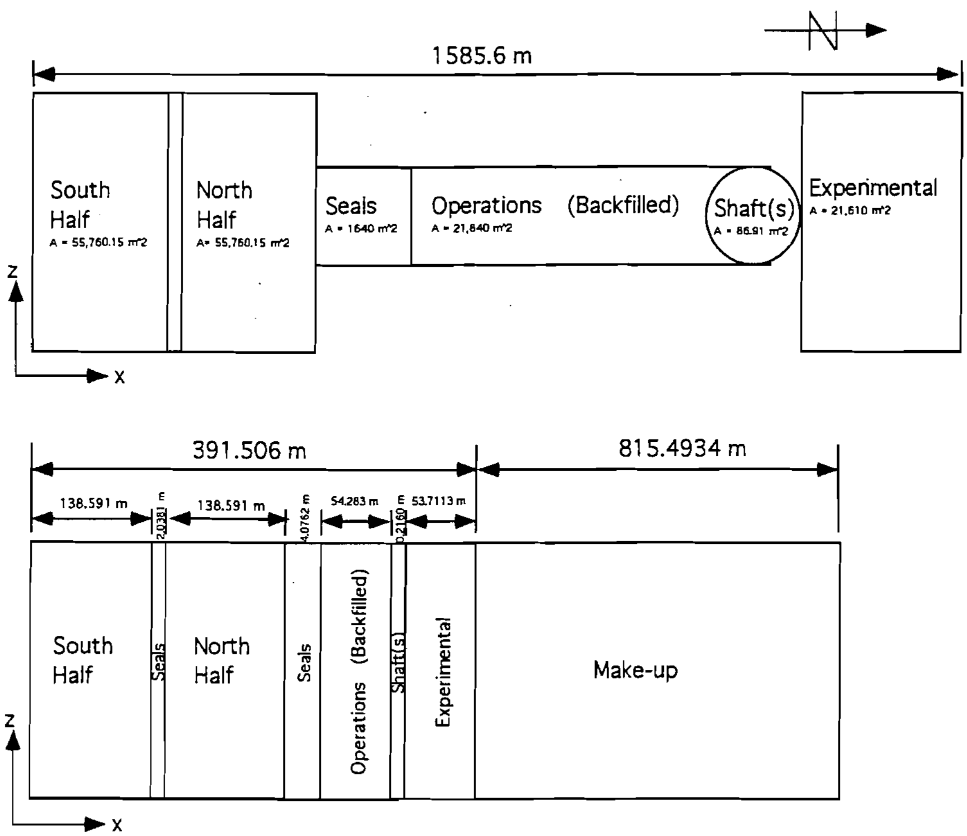


Figure 4: Representation of two dimensional radial flaring out from one wellbore (Fluid Injection Model)



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 (5×10^{-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).

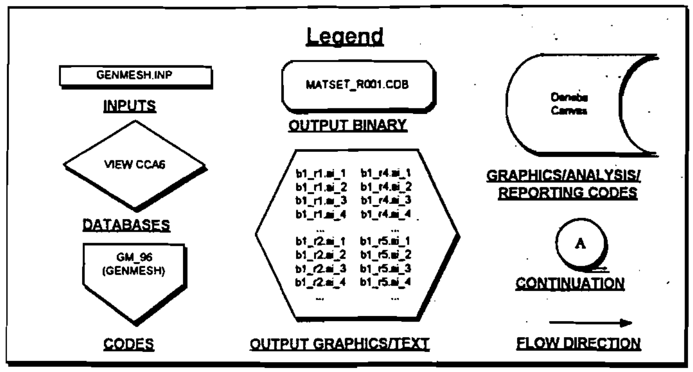
250 to 1250 years: Abandoned wells go to "silty sand" state throughout.

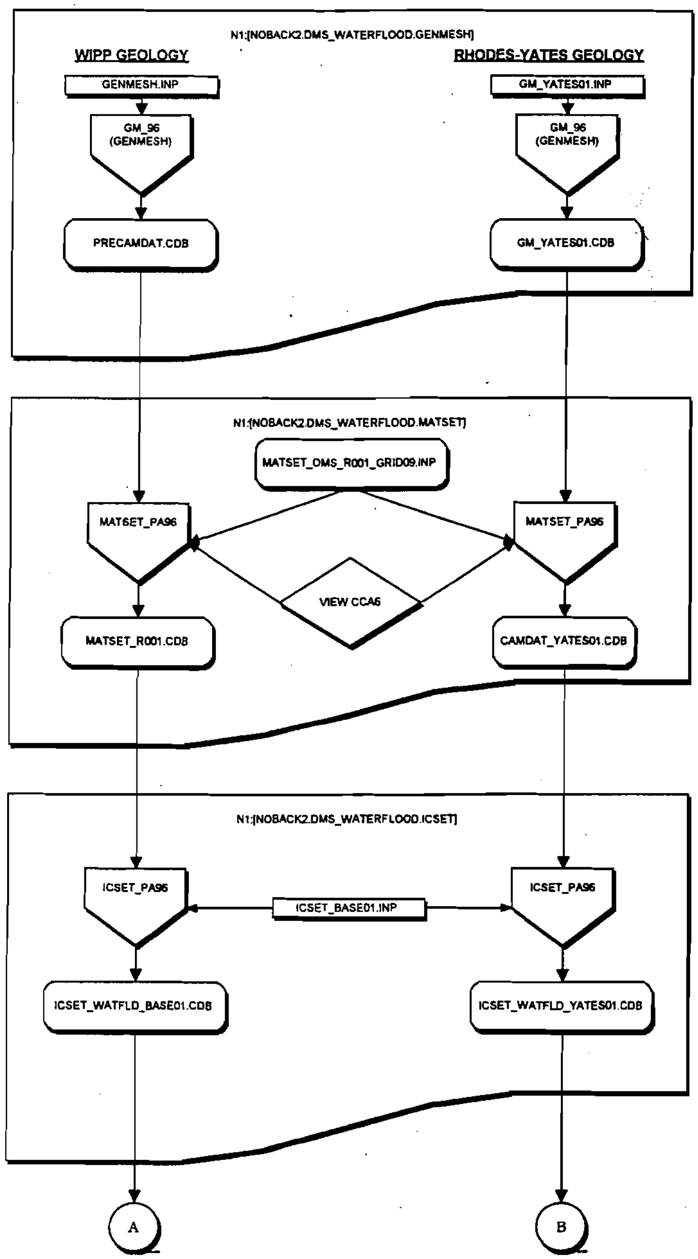
1250 to 10000 years: Abandoned wells in lower portion of salt have permeability reduced one order of magnitude due to salt creep.

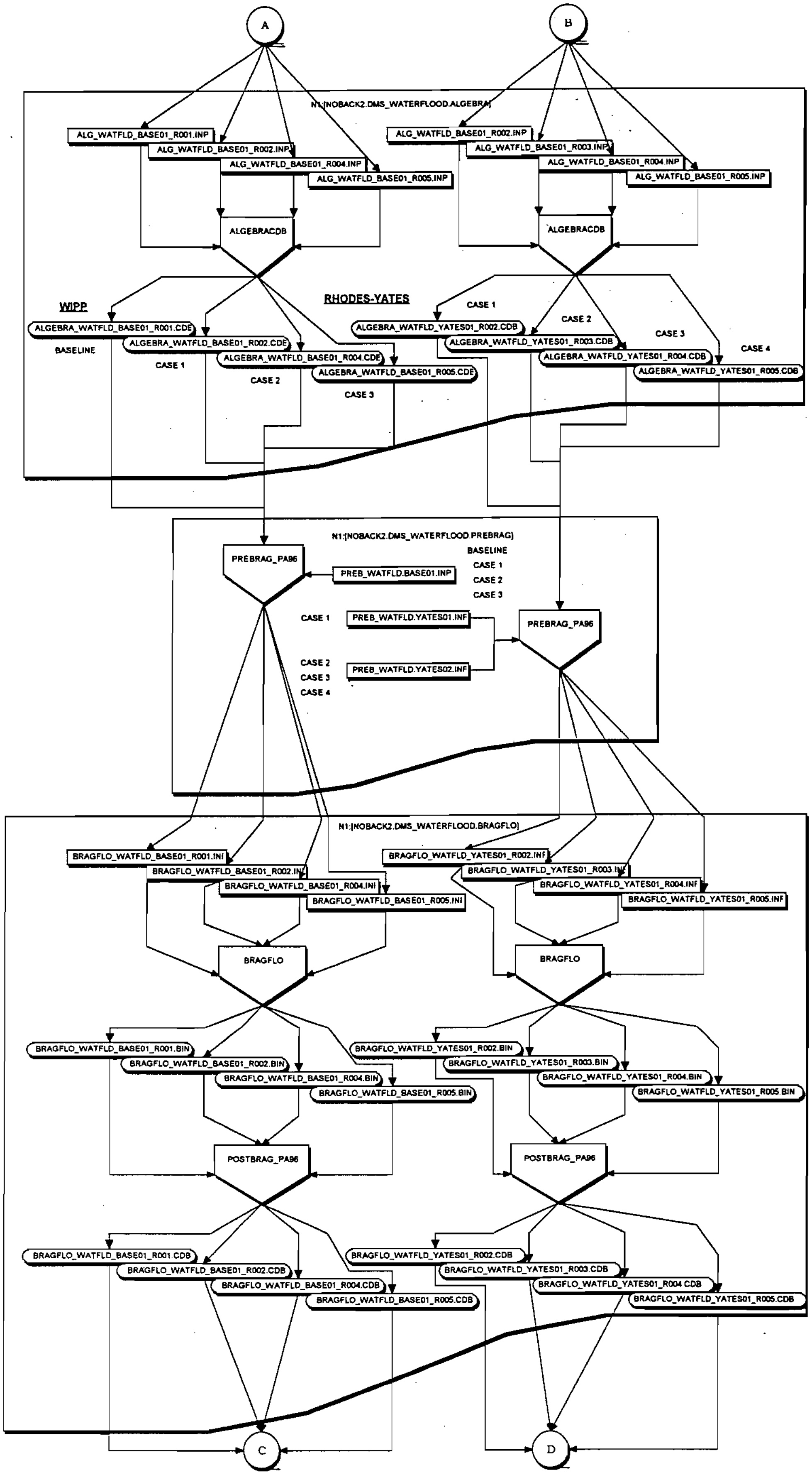
H. Name of Participants

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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ALG_WATFLD_BASE01_R005.INP
ALG_WATFLD_BASE01_R002.INP
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ALG_WATFLD_BASE01_R004.INP
ALG_WATFLD_BASE01_R005.INP
ALGEBRACDB
ALGEBRACDB
WIPP
RHODES-YATES
ALGEBRA_WATFLD_BASE01_R001.CDB
ALGEBRA_WATFLD_BASE01_R002.CDB
ALGEBRA_WATFLD_BASE01_R004.CDB
ALGEBRA_WATFLD_BASE01_R005.CDB
BASELINE
CASE 1
CASE 2
CASE 3
ALGEBRA_WATFLD_YATES01_R002.CDB
ALGEBRA_WATFLD_YATES01_R003.CDB
ALGEBRA_WATFLD_YATES01_R004.CDB
ALGEBRA_WATFLD_YATES01_R005.CDB
CASE 1
CASE 2
CASE 3
CASE 4
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PREB_WATFLD.BASE01.INP
BASELINE
CASE 1
CASE 2
CASE 3
CASE 1
PREB_WATFLD.YATES01.INP
CASE 2
CASE 3
CASE 4
PREB_WATFLD.YATES02.INP
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BRAGFLO
BRAGFLO
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POSTBRAG_PA96
POSTBRAG_PA96
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BRAGFLO_WATFLD_YATES01_R002.CDB
BRAGFLO_WATFLD_YATES01_R003.CDB
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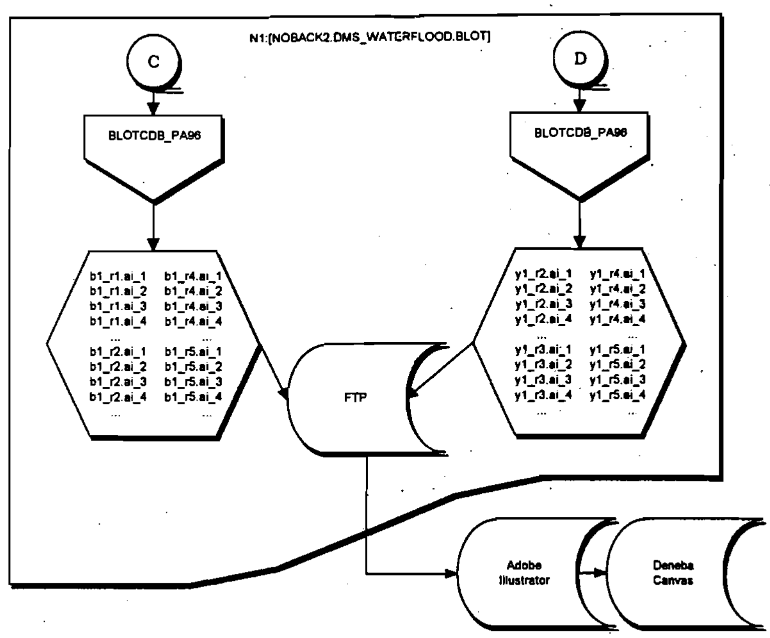
BRAGFLO_WATFLD_YATES01_R005.CDB
C
D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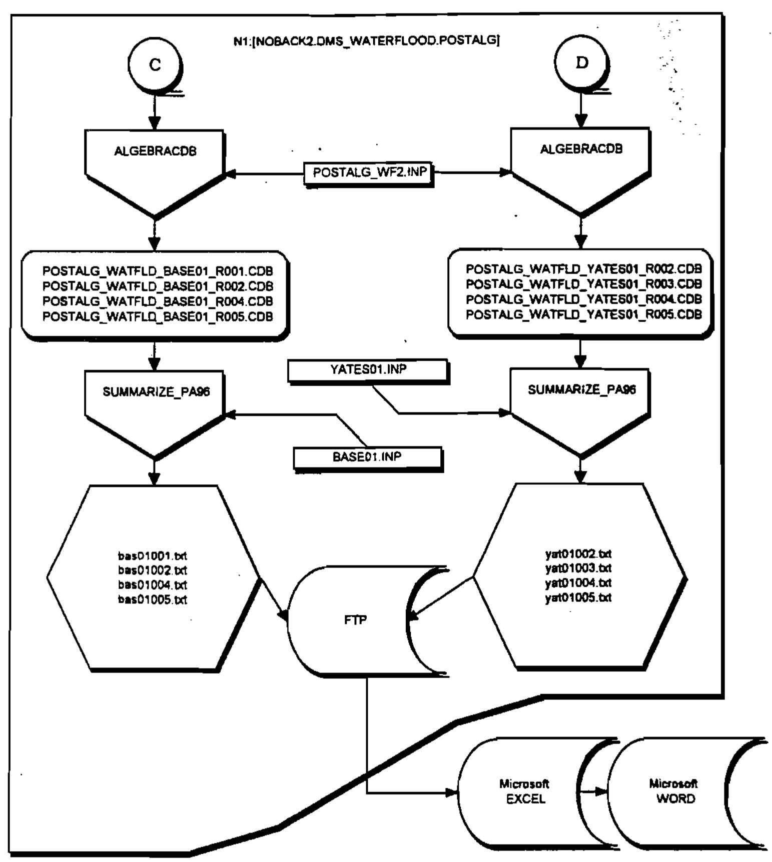
Adobe Illustrator
Deneba Canvas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D
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POSTALG_WATFLD_BASE01_R002.CDB
POSTALG_WATFLD_BASE01_R004.CDB
POSTALG_WATFLD_BASE01_R005.CDB
POSTALG_WATFLD_YATES01_R002.CDB
POSTALG_WATFLD_YATES01_R003.CDB
POSTALG_WATFLD_YATES01_R004.CDB
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YATES01.INP
SUMMARIZE_PA96
BASE01.INP
bas01001.txt
bas01002.txt
bas01004.txt
bas01005.txt
yat01002.txt
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.

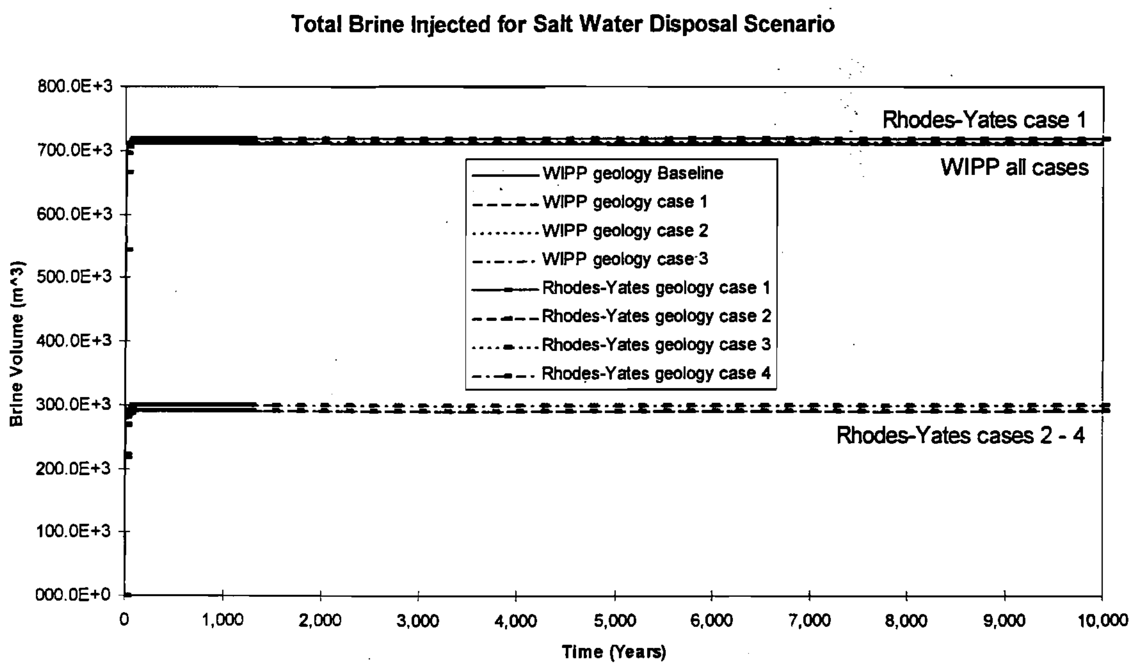

Figure 6: Total Brine Injected for Two Salt Water Disposal Wells

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).

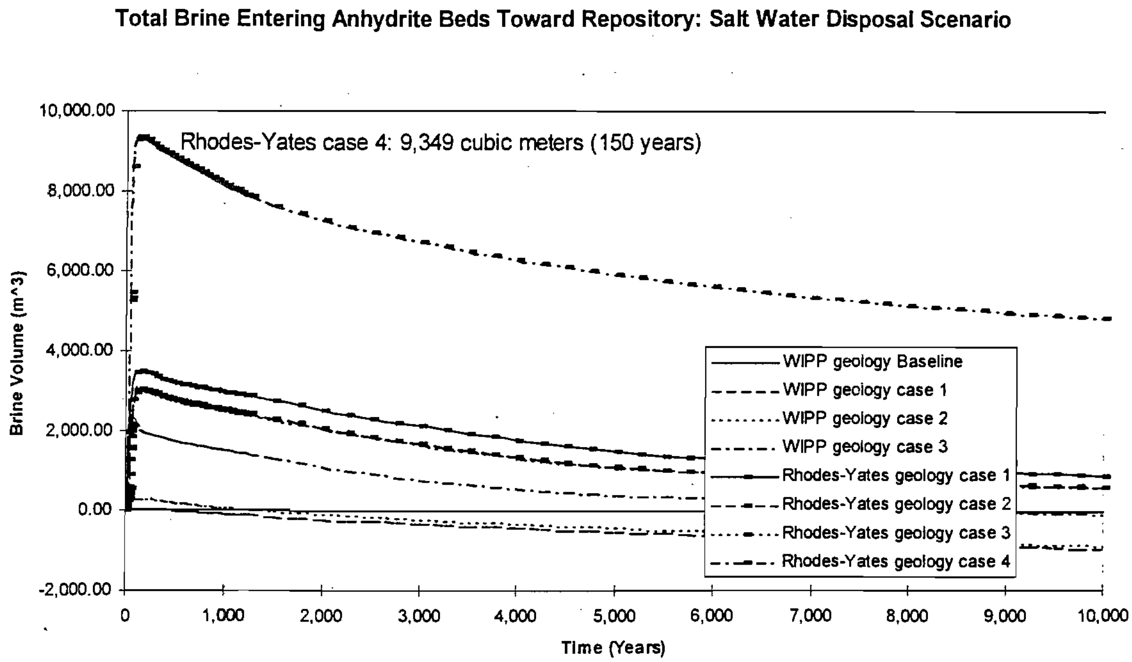

Figure 7: Total Brine Entering Anhydrite beds Toward Repository from Two Salt Water Disposal Wells

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).

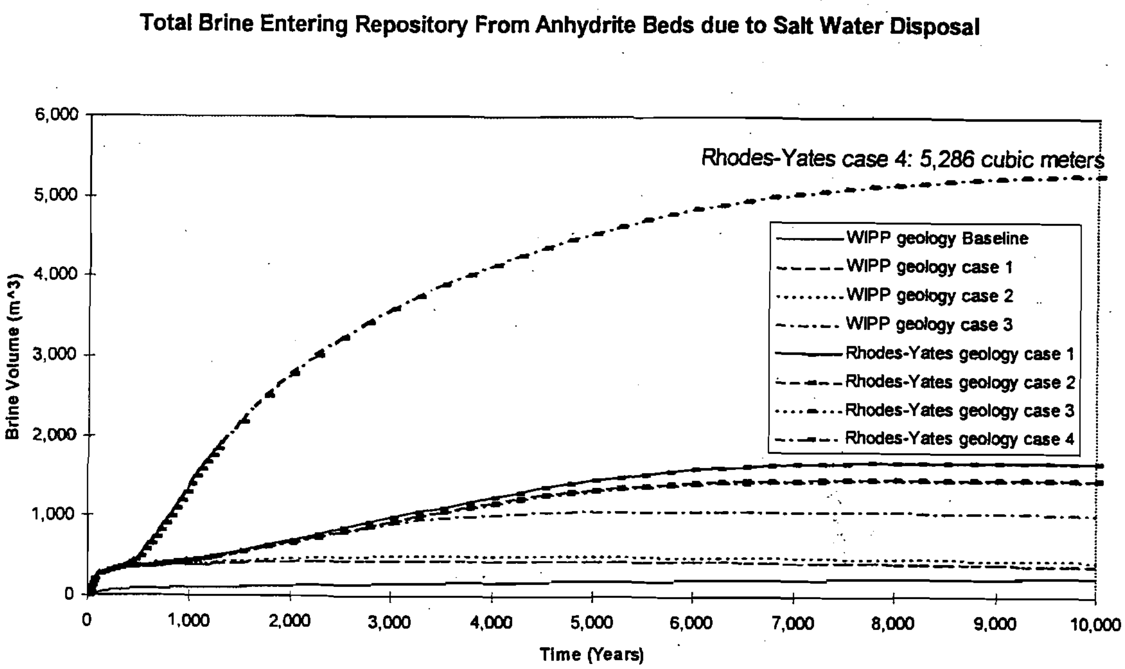

Figure 8: Total Brine Entering Repository from Anhydrite Beds due to Salt Water Injection

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).

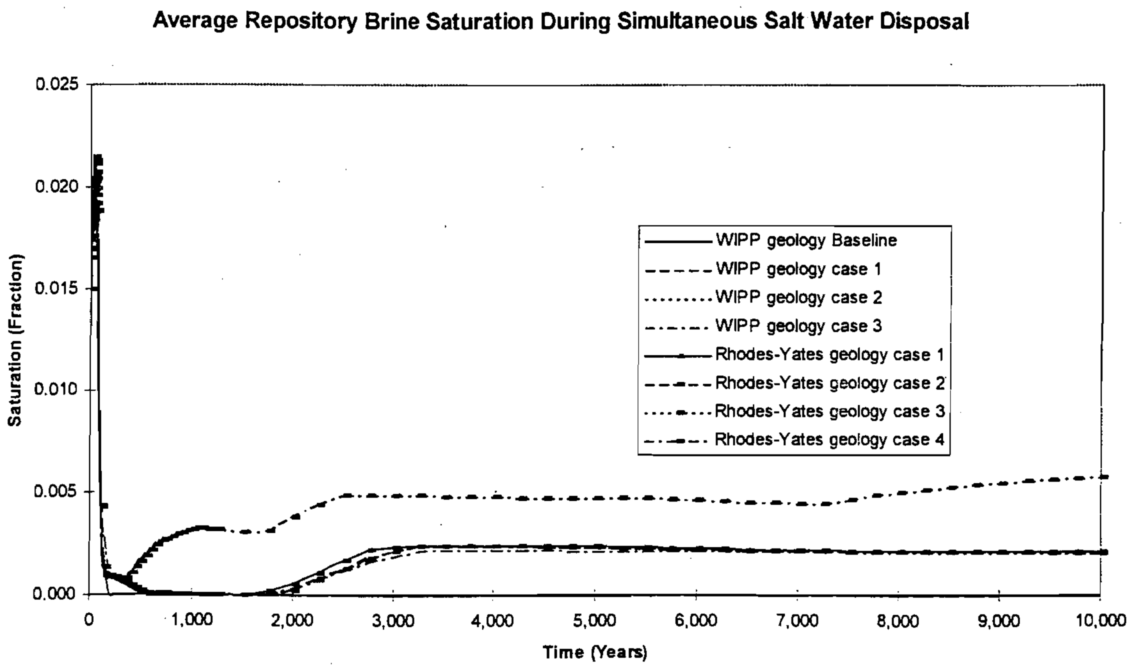

Figure 9: Average Repository Brine Saturation During Simultaneous Salt Water Disposal

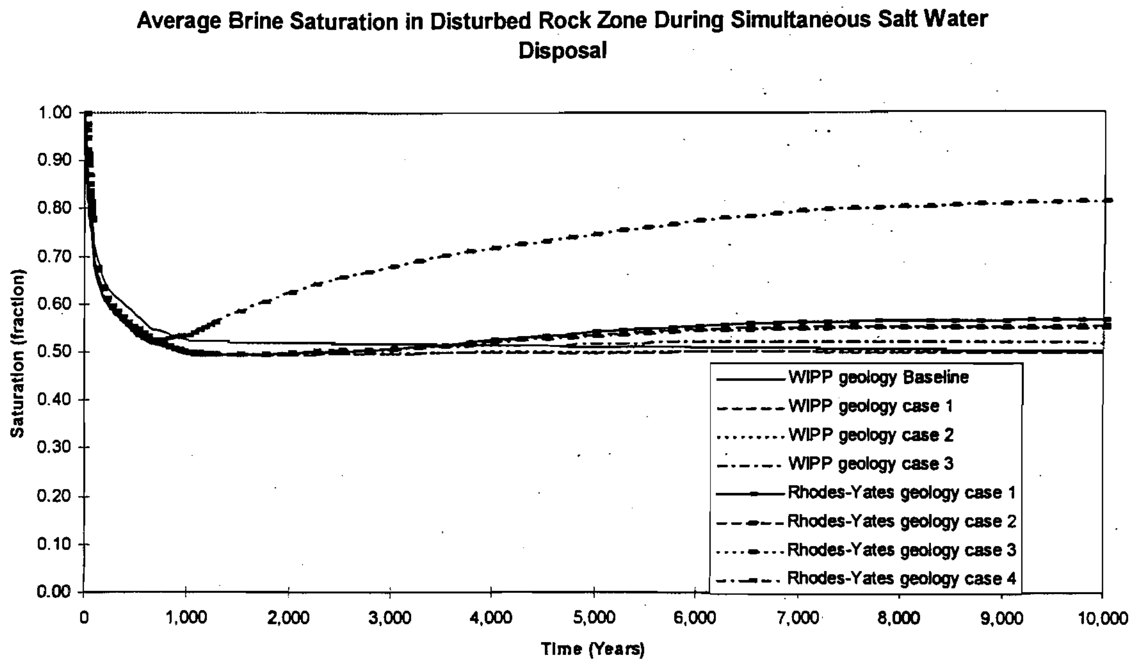

Figure 10: Average Brine Saturation in the DRZ During Simultaneous Salt Water Disposal

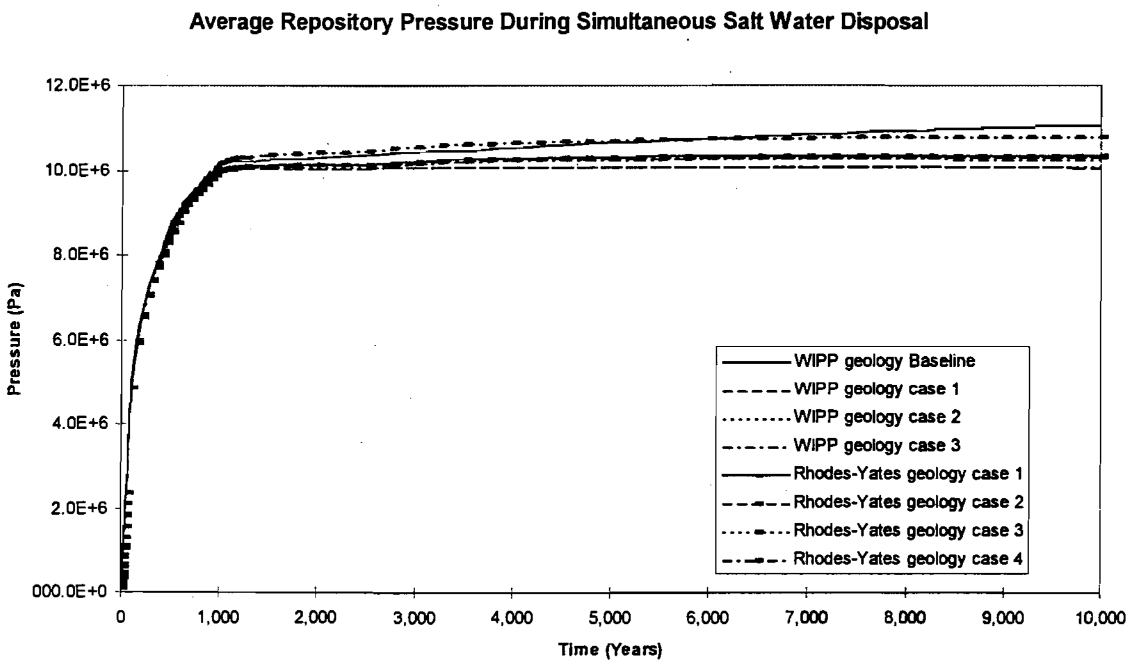

Figure 11: Average Repository Pressure During Simultaneous Salt Water Disposal

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.

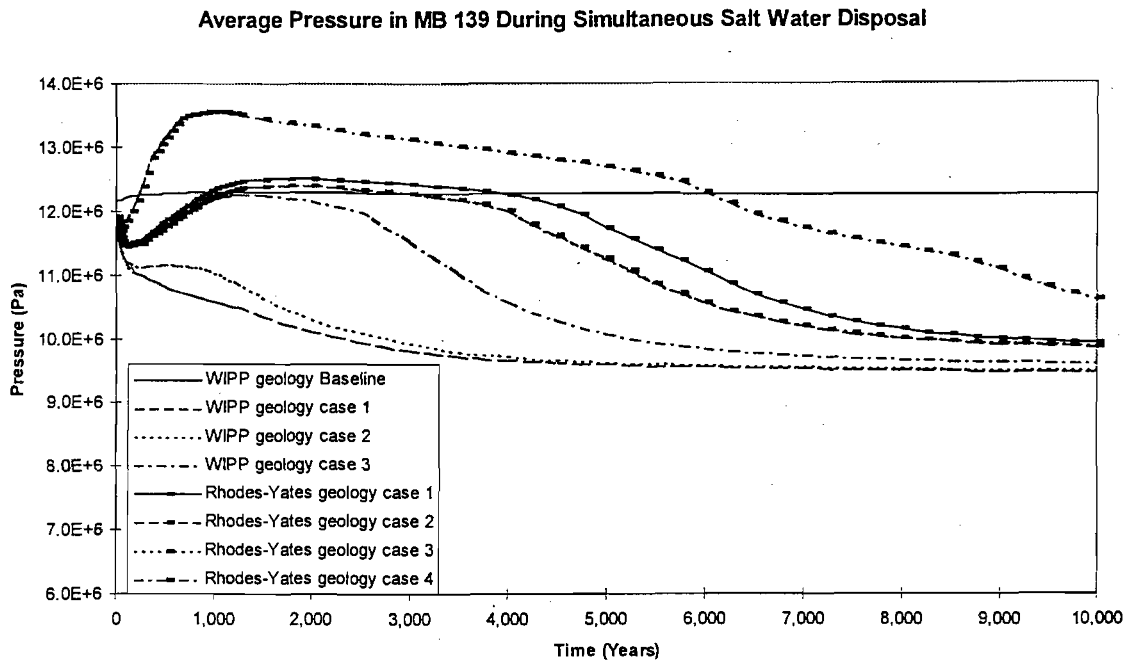

Figure 12: Average Pressure in MB 139 During Simultaneous Salt Water Disposal

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".

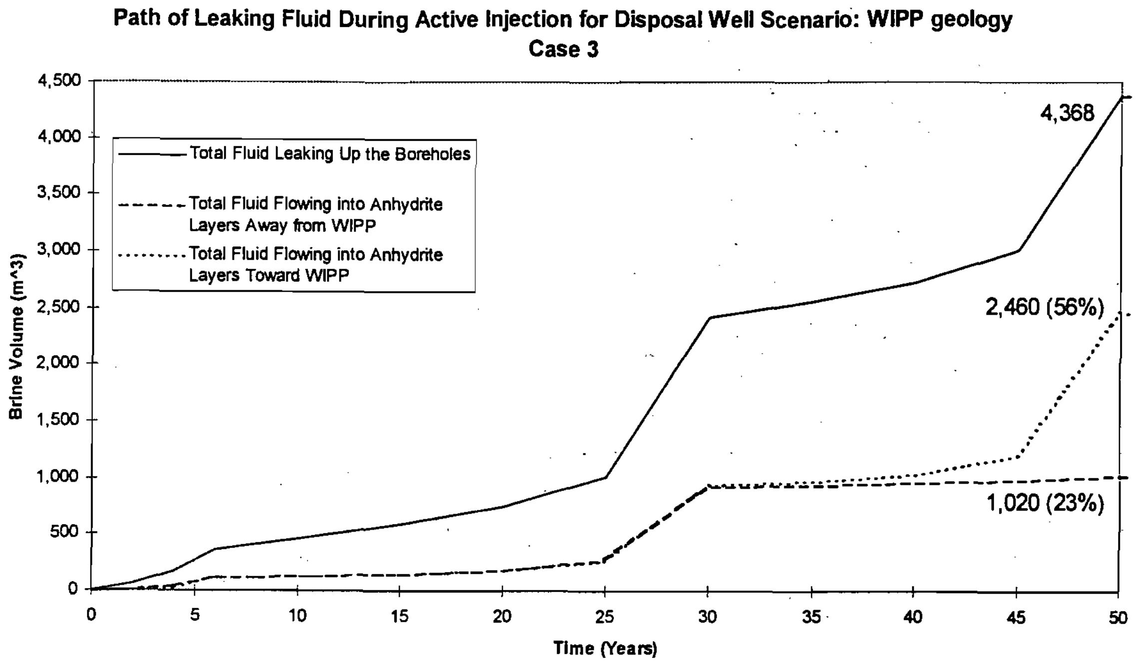

Figure 13: Path of Leaky Fluid During Active Injection for WIPP Geology Case 3

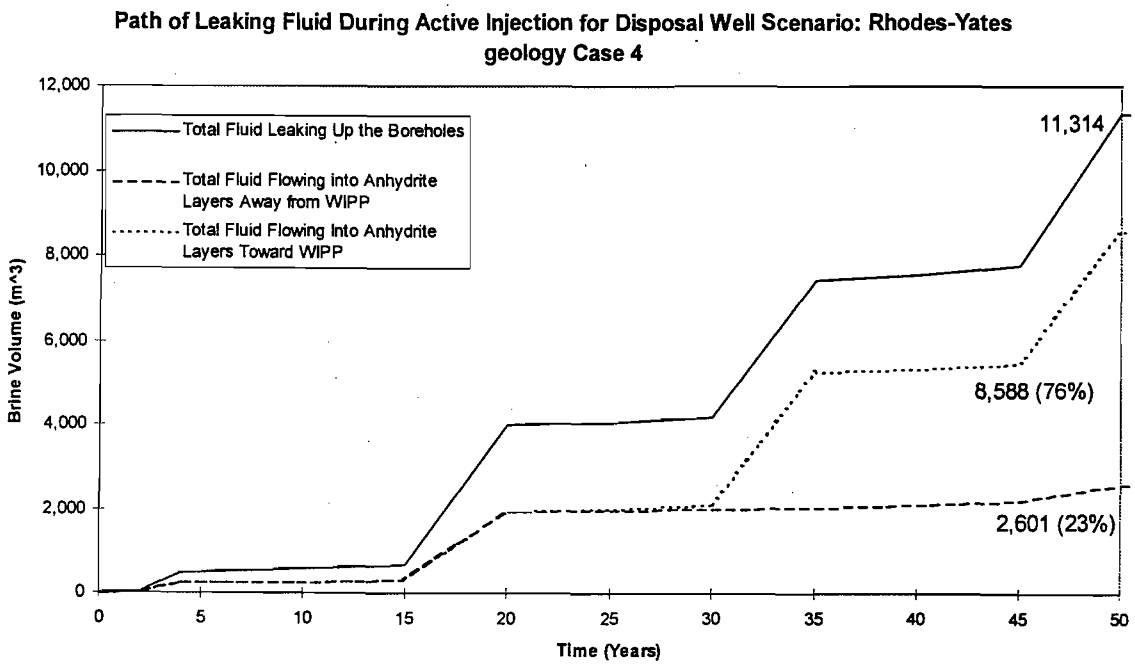

Figure 14: Path of Leaky Fluid During Active Injection for Rhodes-Yates Geology Case 4

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).

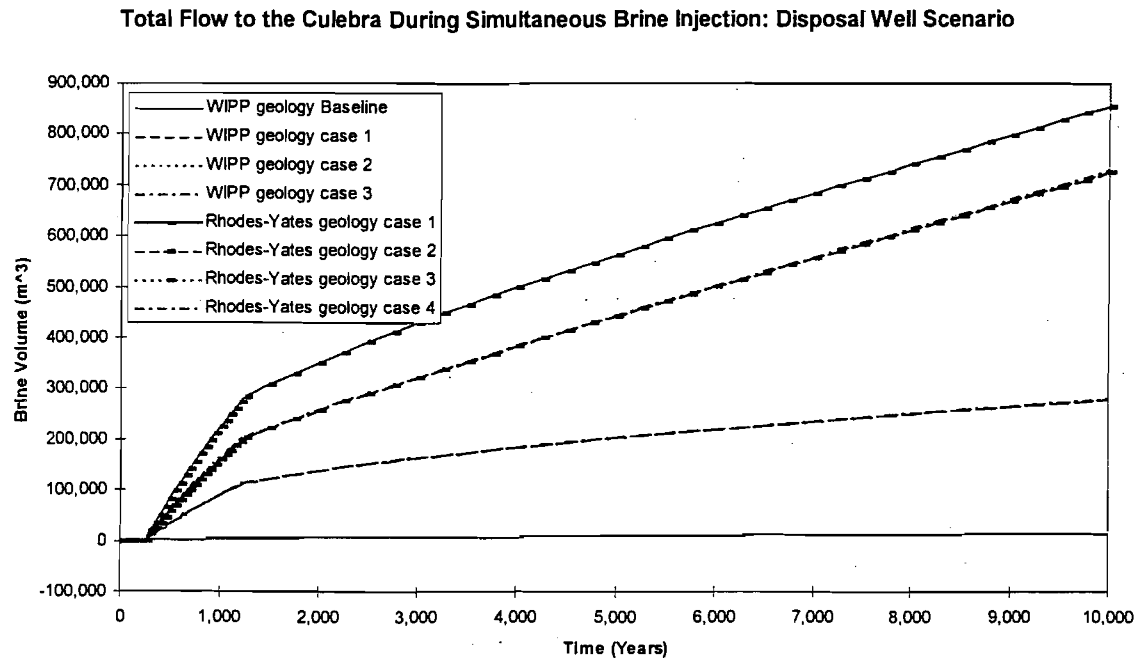

Figure 15: Total Flow to Culebra From Disposal Wells

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.

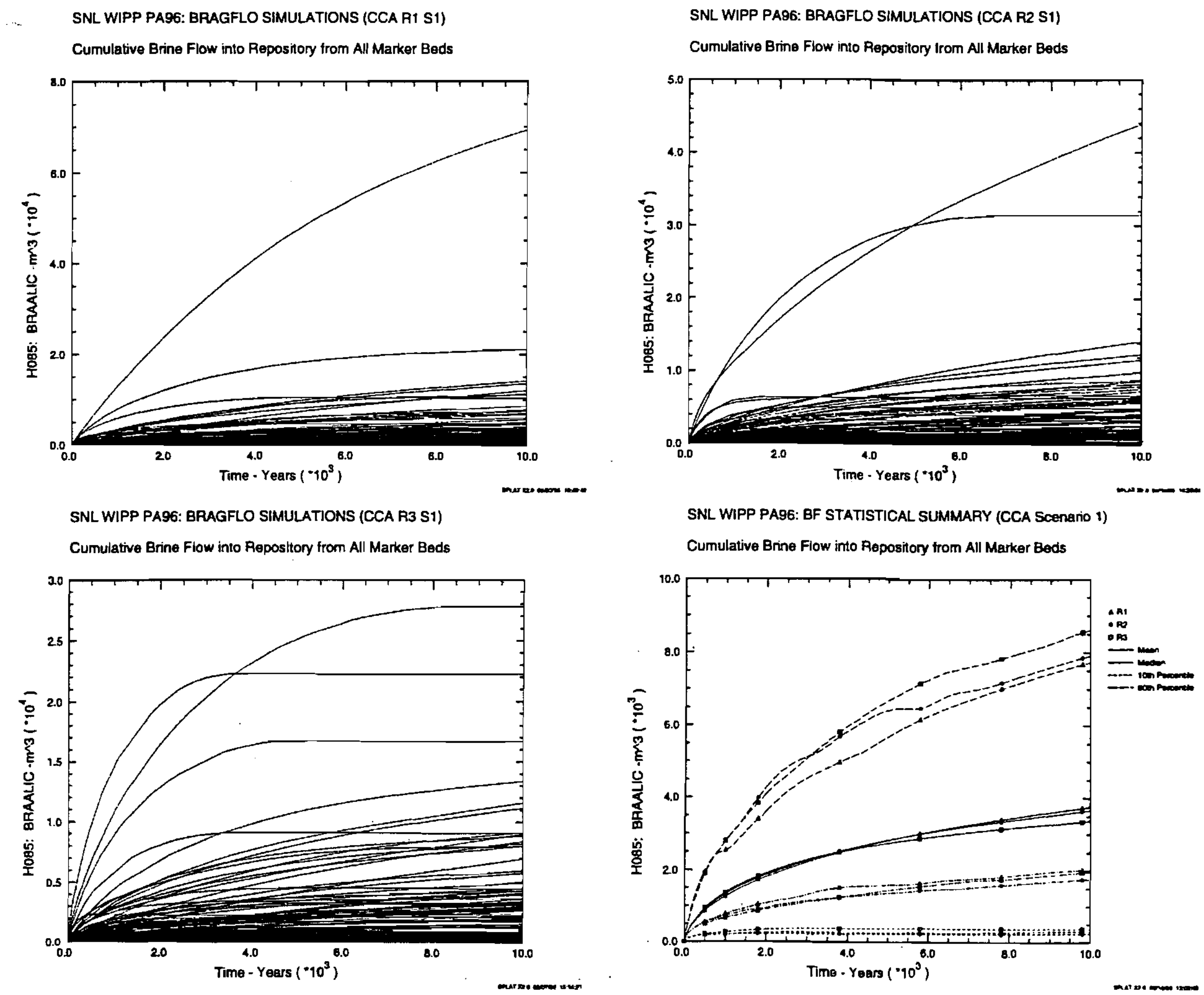

Figure 16: Cumulative Brine Flow into Repository from All Marker Beds (WIPP PA96: CCA Undisturbed Calculations)

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

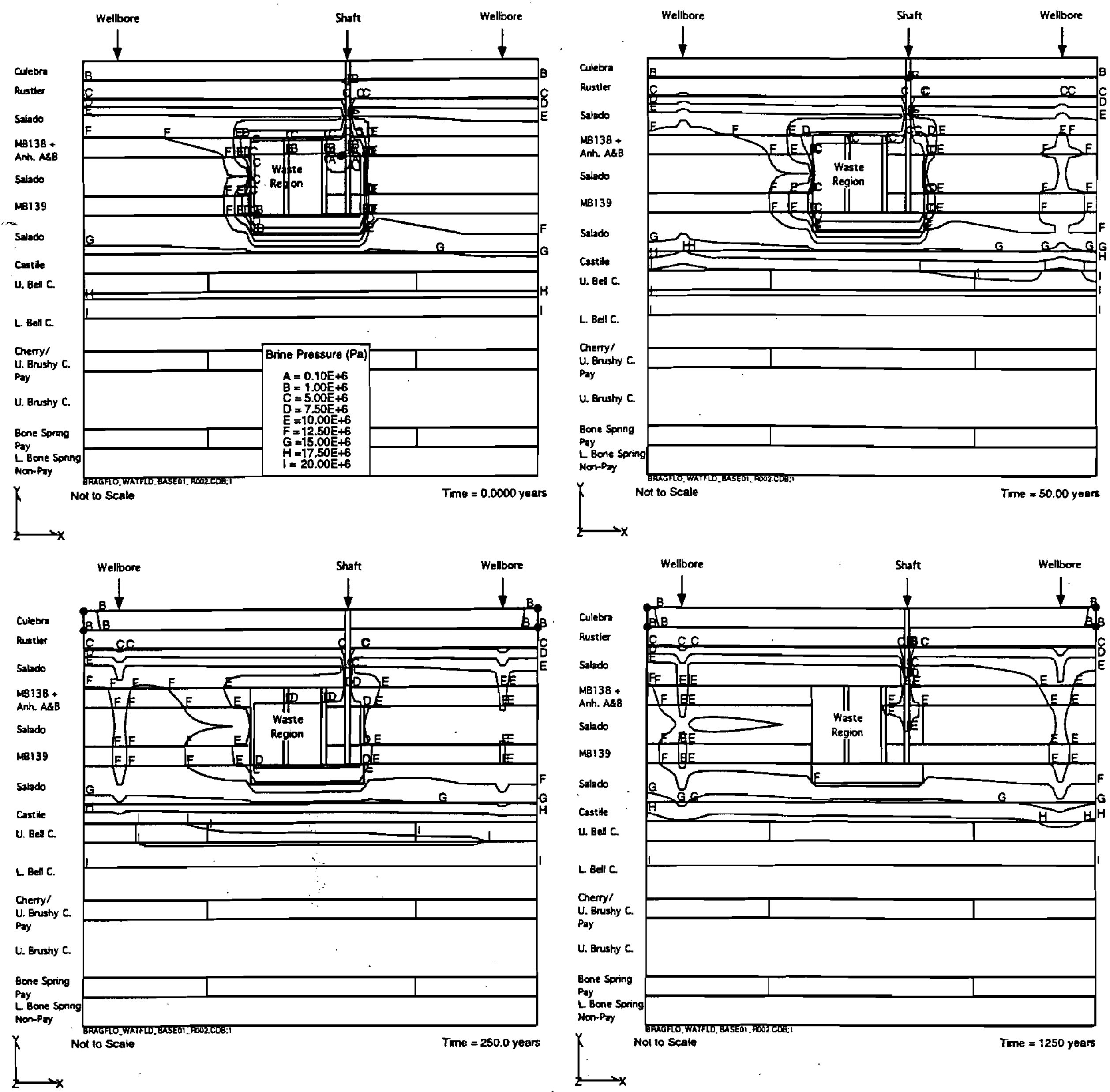

Figure 1: BRAGFLO results showing Pressure Contours: WIPP Geology Case 1

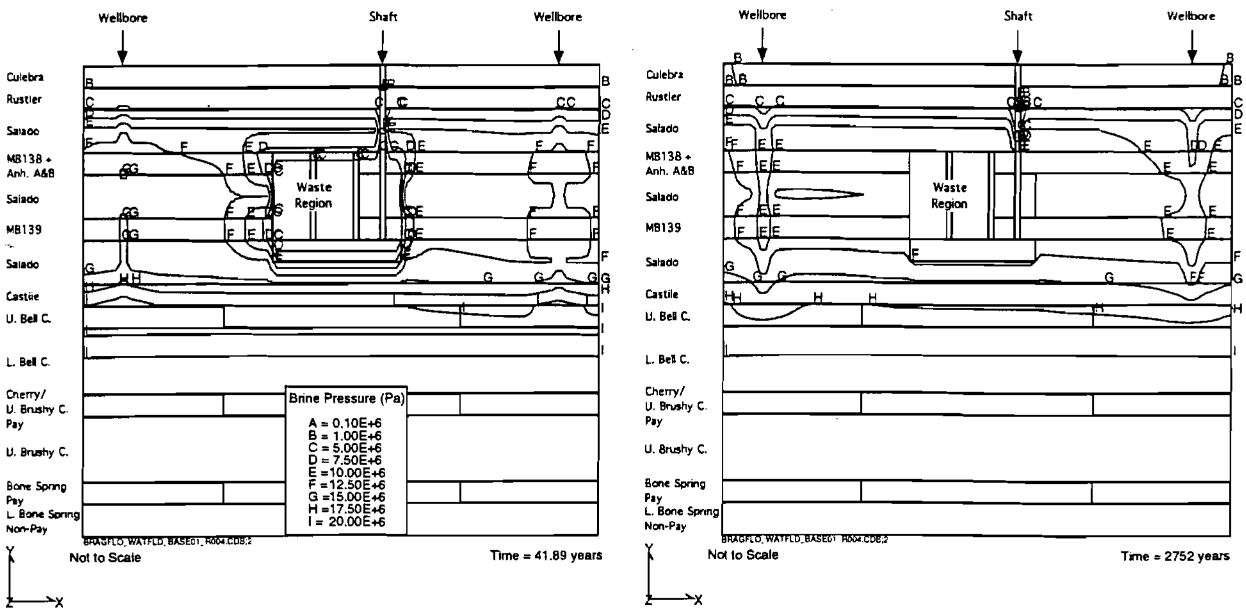

Figure 2: BRAGFLO results showing Pressure Contours: WIPP Geology Case 2

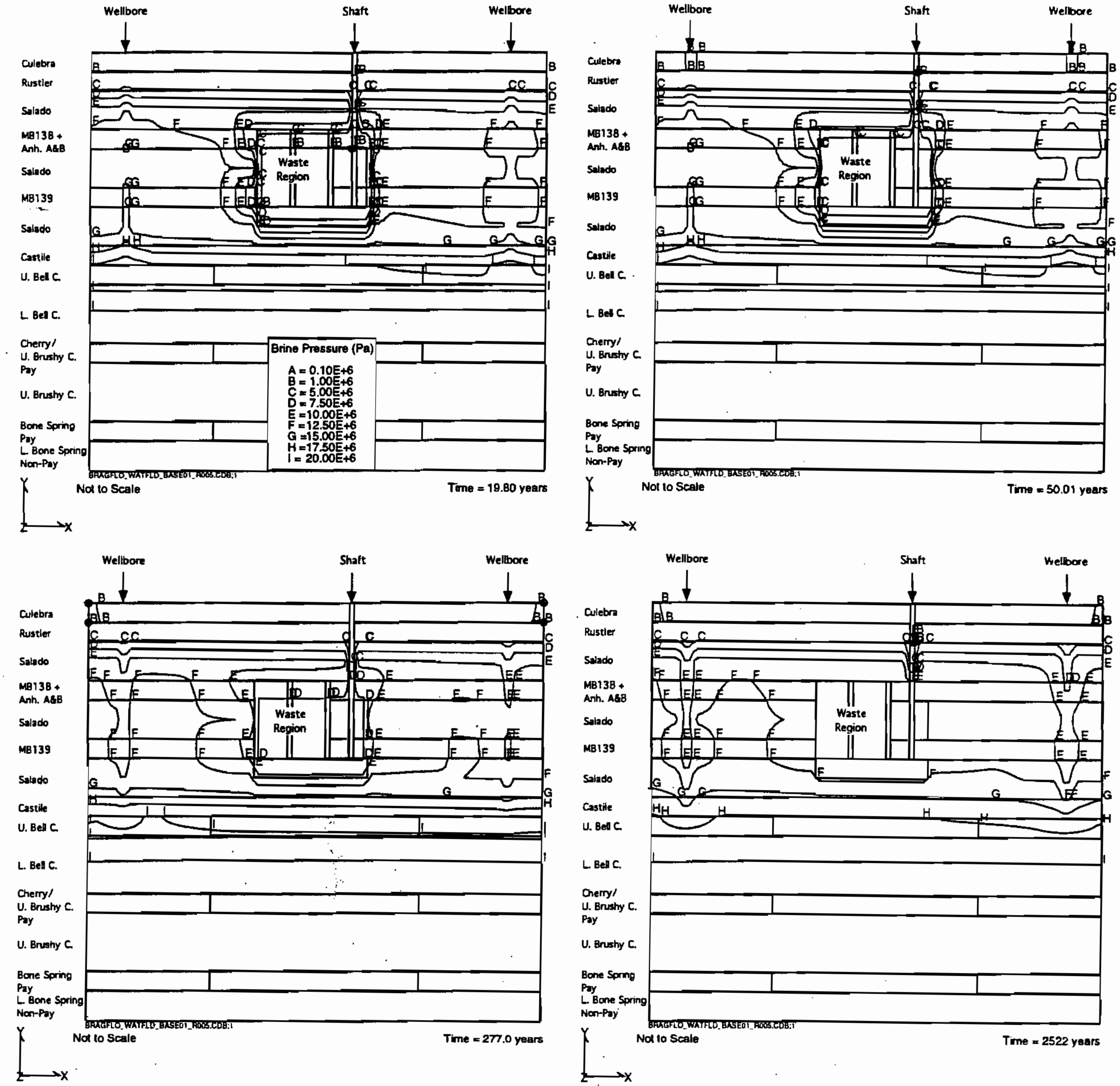

Figure 3: BRAGFLO results showing Pressure Contours: WIPP Geology Case 3

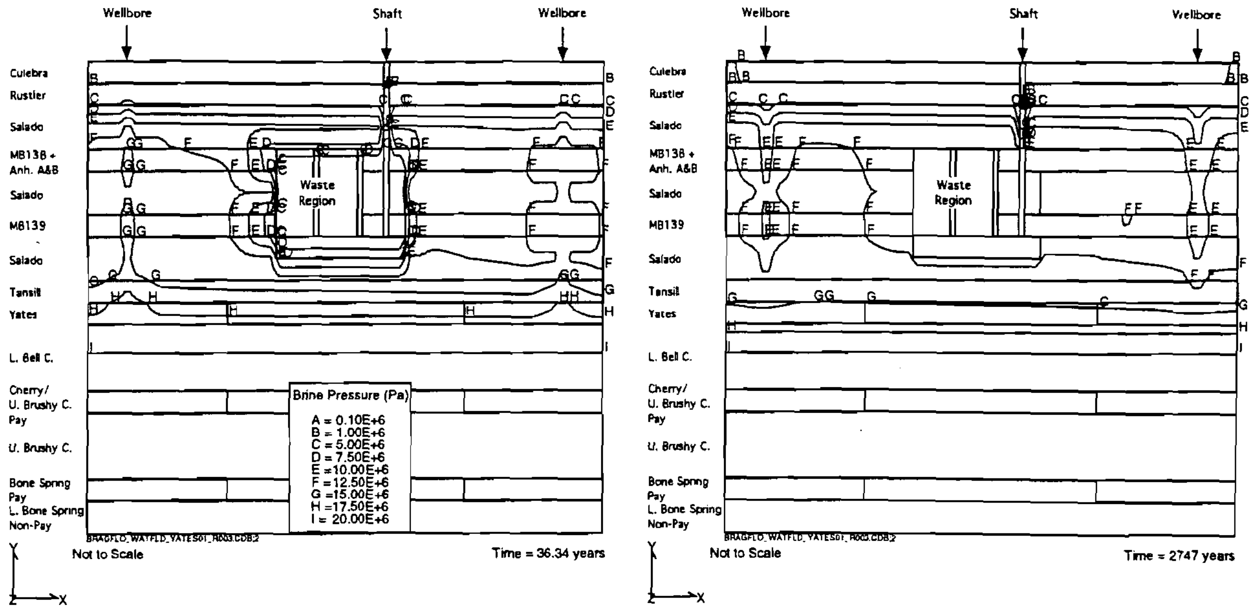

Figure 4: BRAGFLO results showing Pressure Contours: Rhodes-Yates Geology Case 2

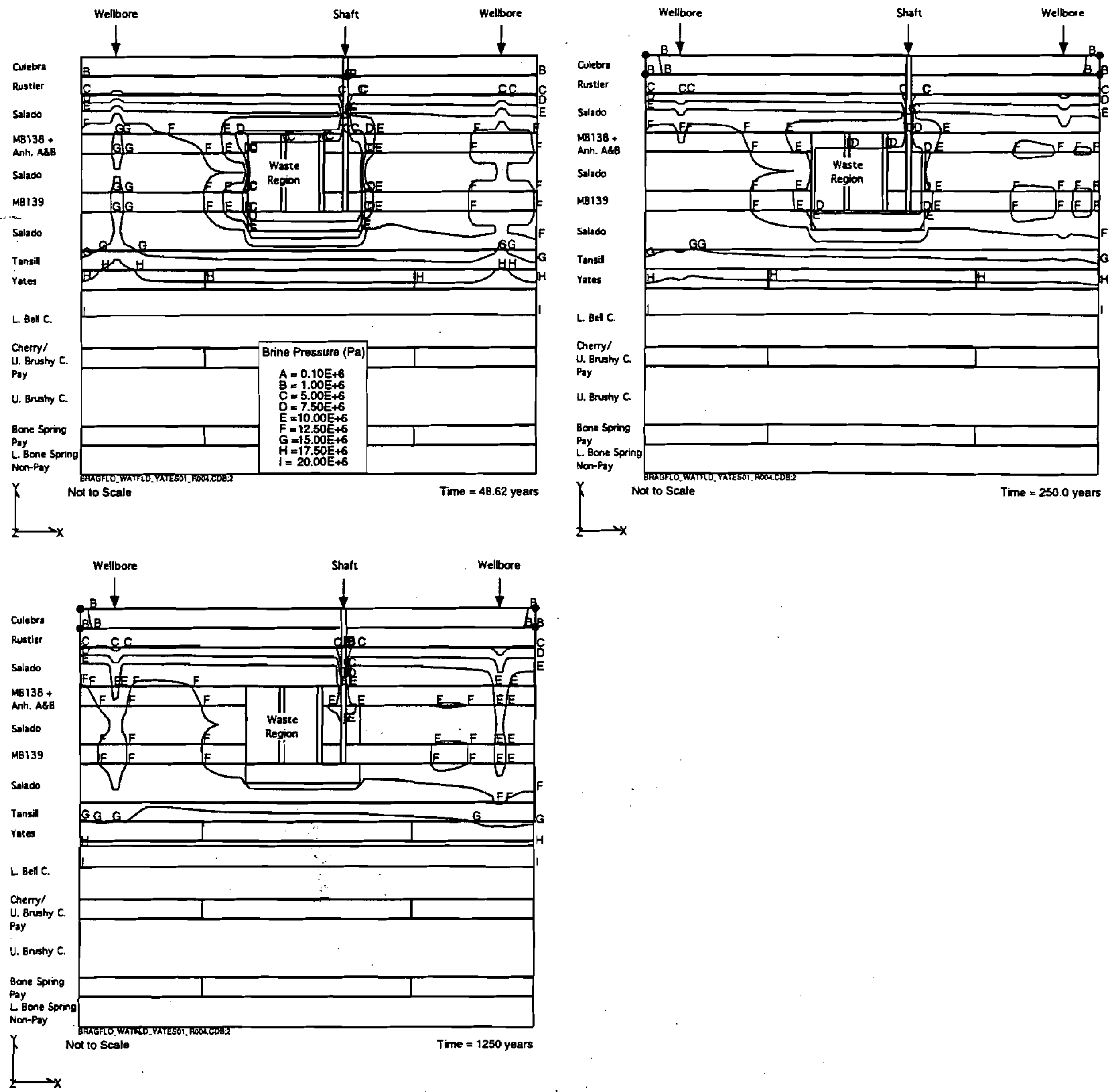

Figure 5: BRAGFLO results showing Pressure Contours: Rhodes-Yates Geology Case 3

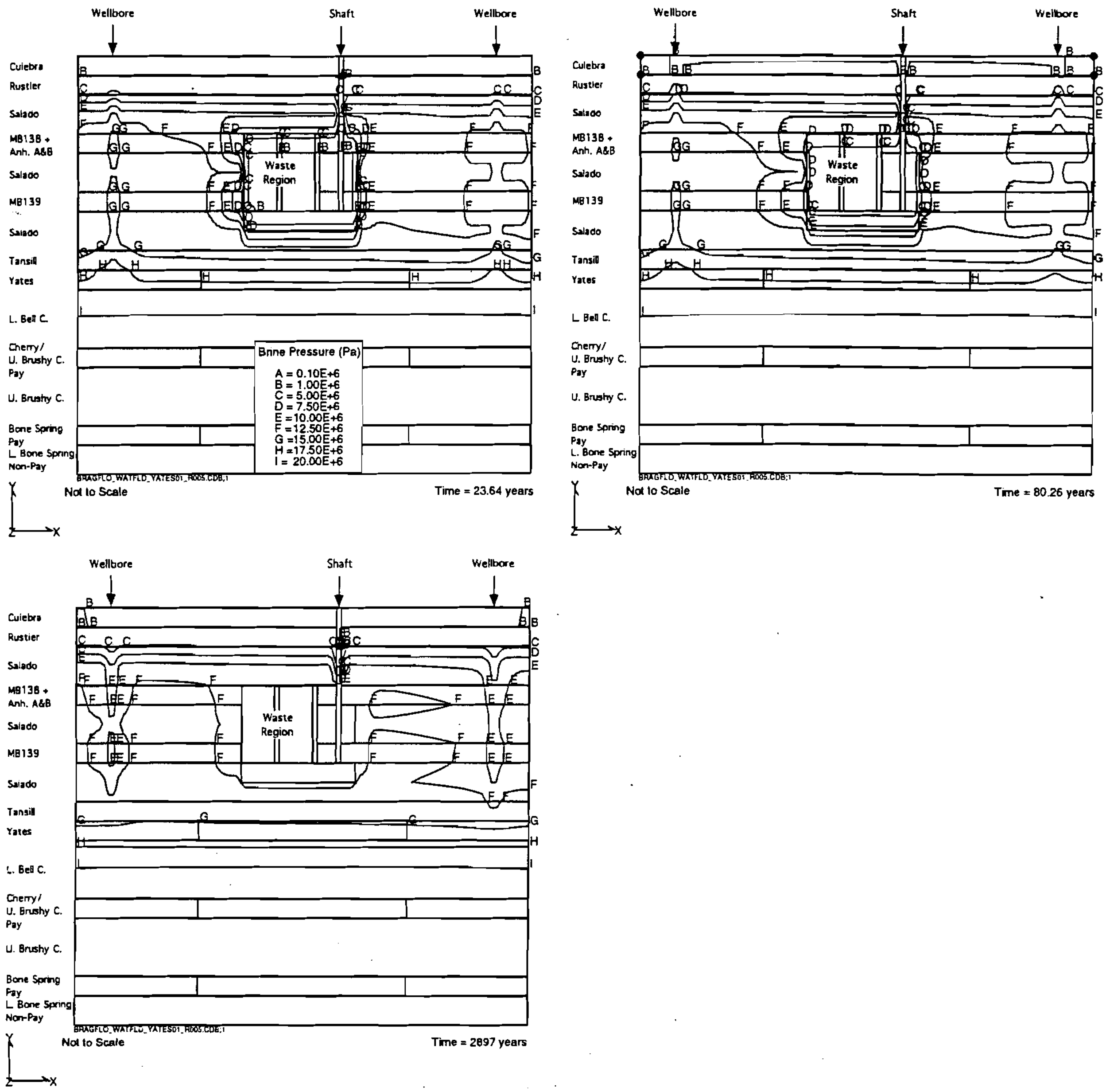

Figure 6: BRAGFLO results showing Pressure Contours: Rhodes-Yates Geology Case 4

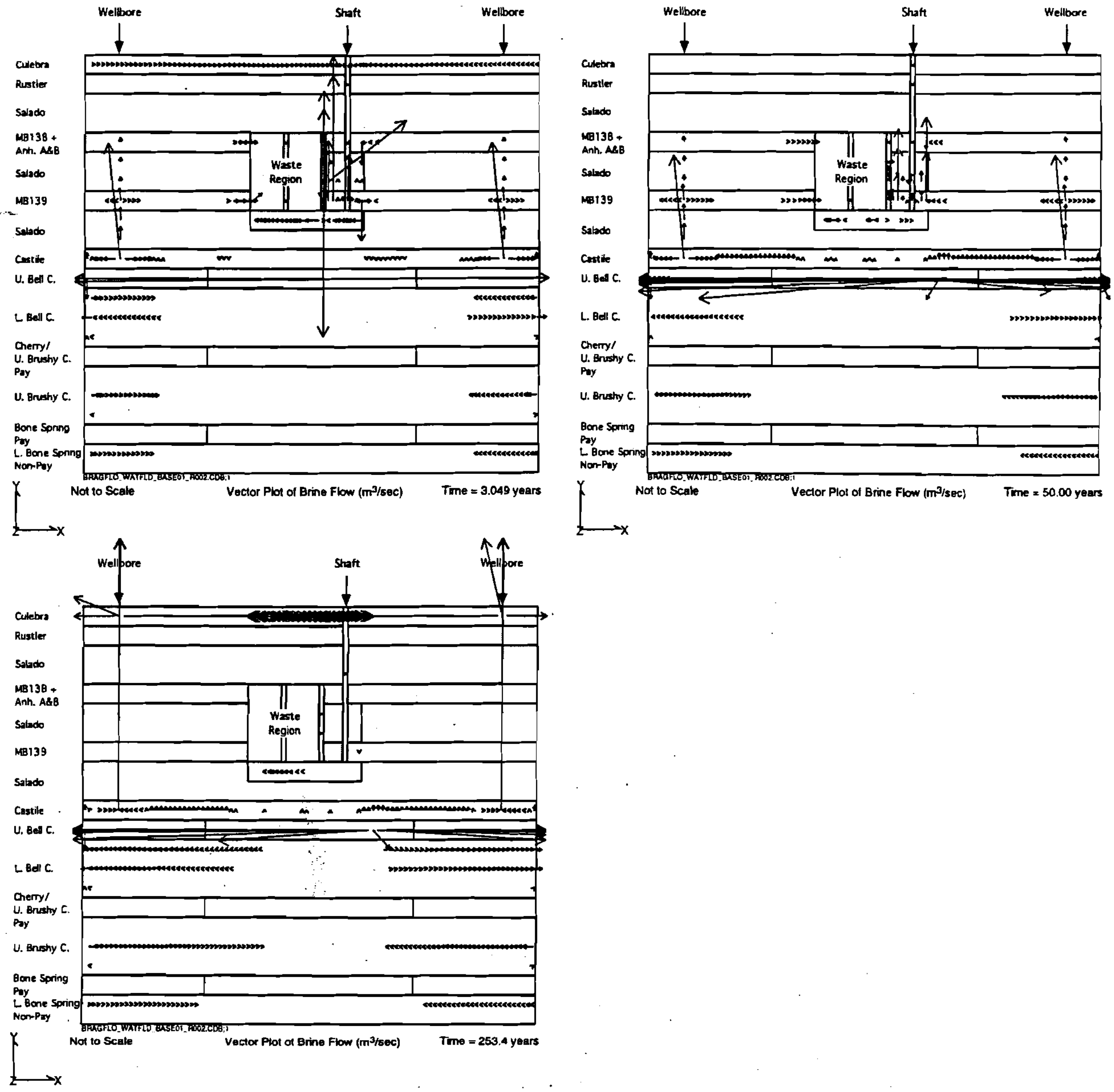

Figure 7: BRAGFLO results showing Flow Vectors: WIPP Geology Case 1

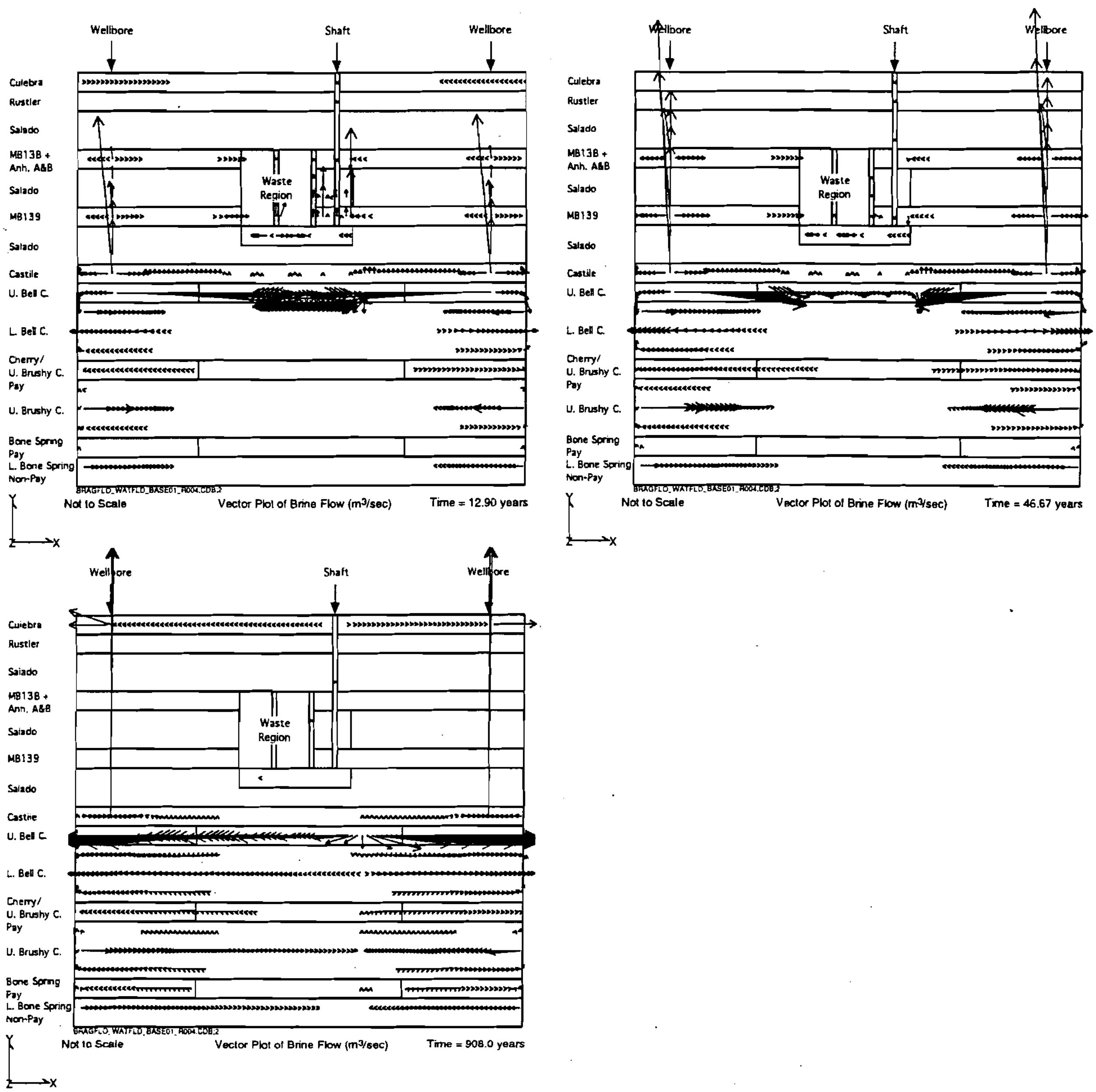

Figure 8: BRAGFLO results showing Flow Vectors: WIPP Geology Case 2

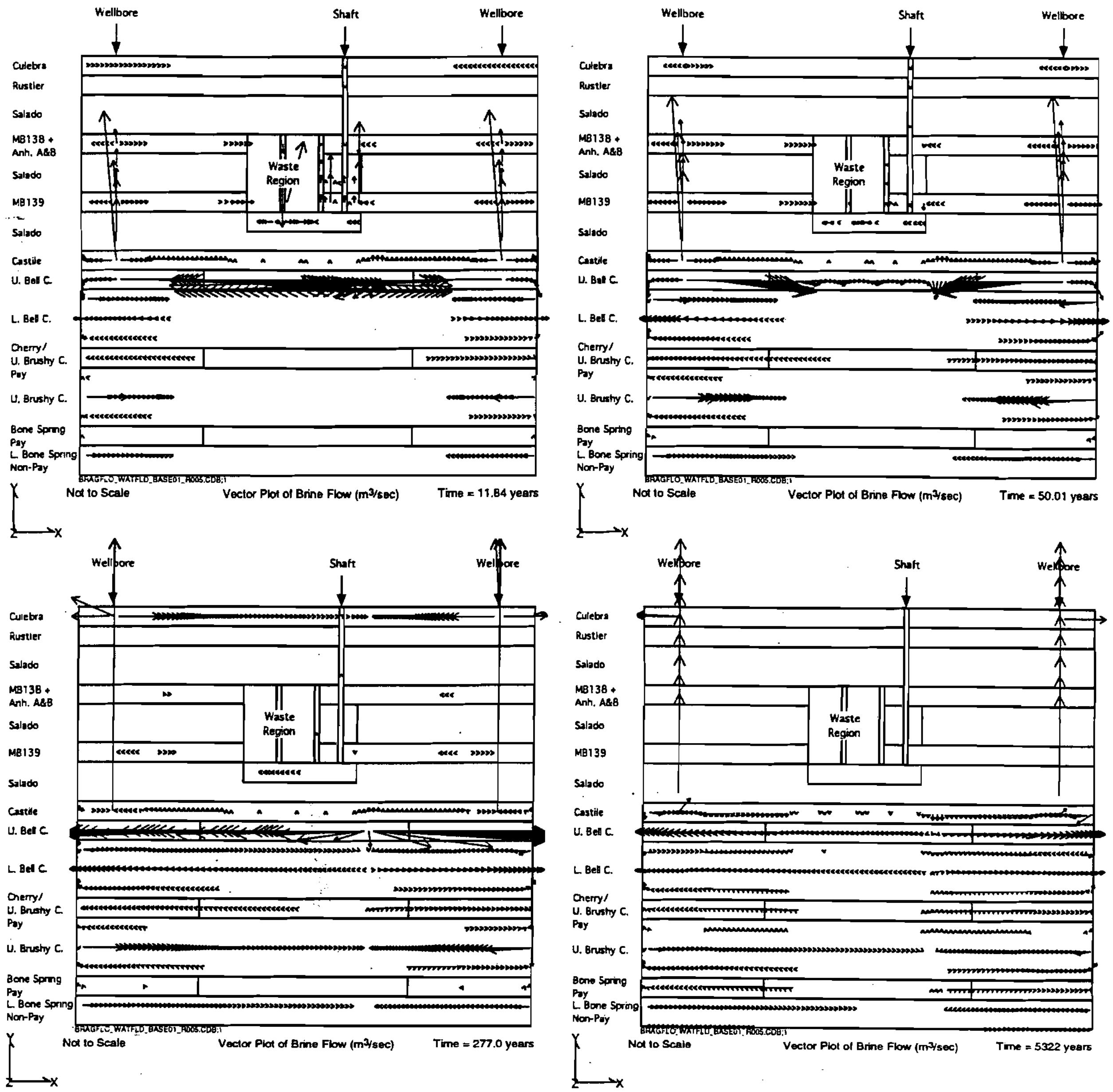

Figure 9: BRAGFLO results showing Flow Vectors: WIPP Geology Case 3

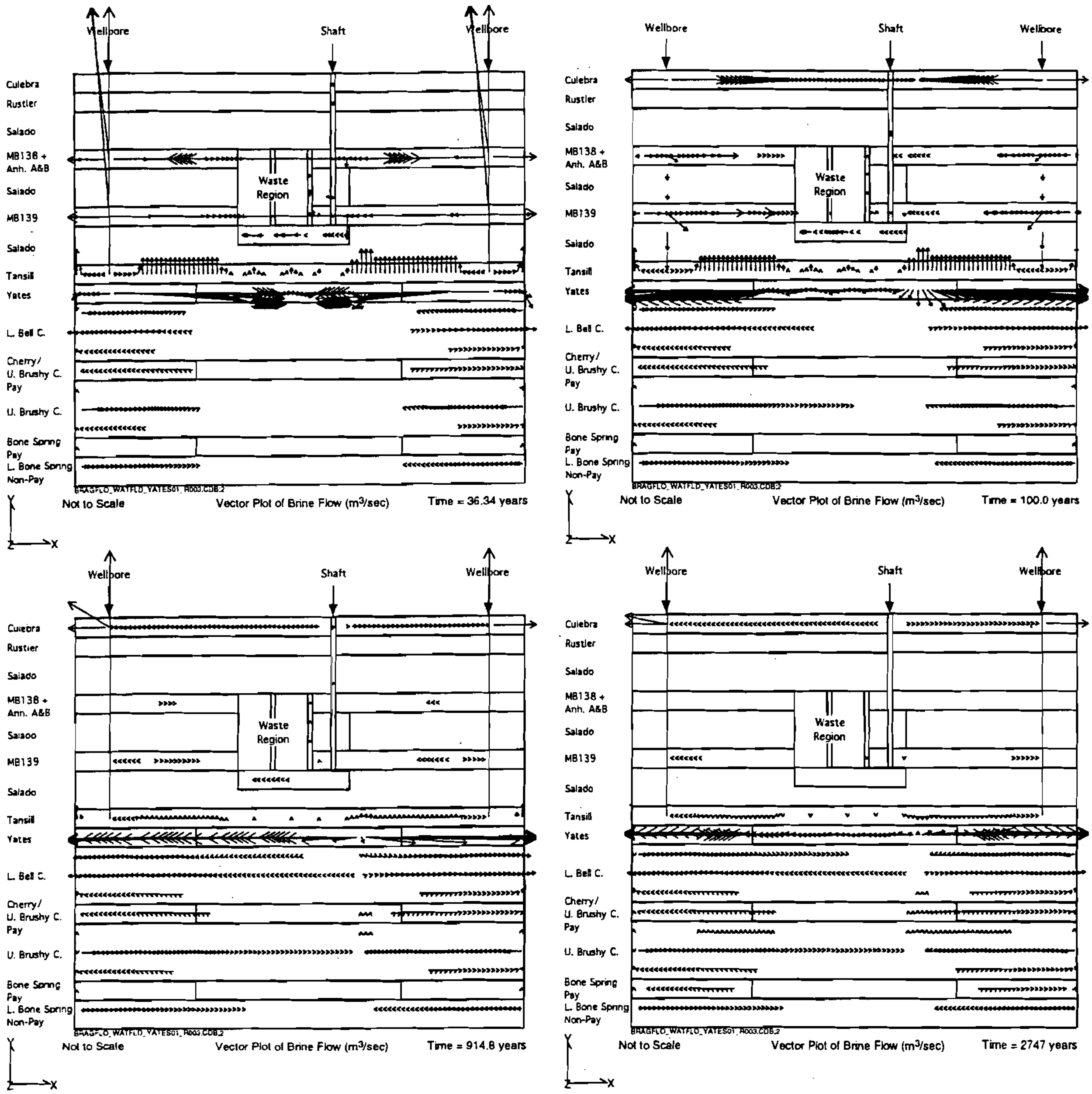

Figure 10: BRAGFLO results showing Flow Vectors: Rhodes-Yates Geology Case 2

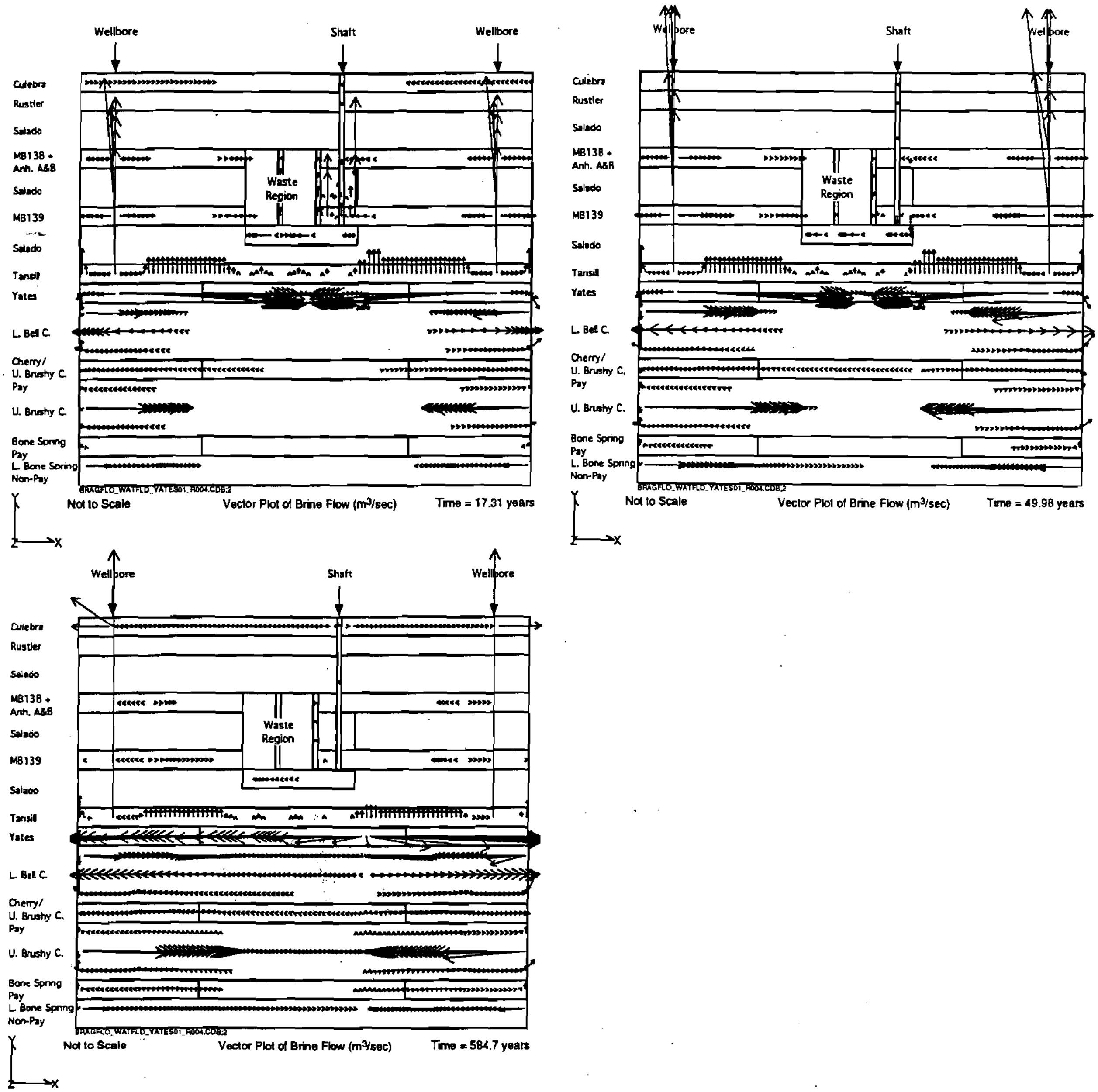

Figure 11: BRAGFLO results showing Flow Vectors: Rhodes-Yates Geology Case 3

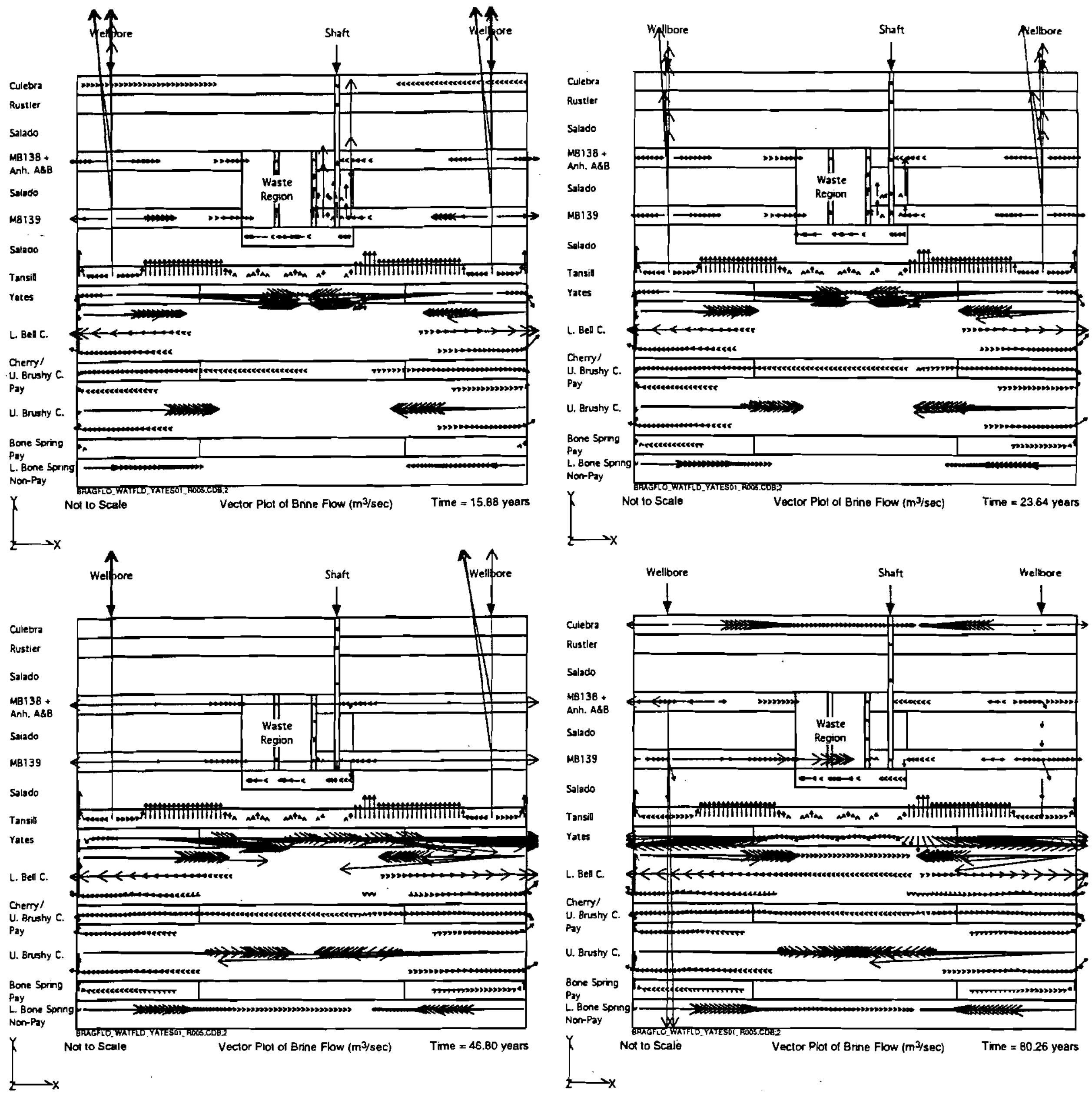

Figure 12: BRAGFLO results showing Flow Vectors: Rhodes-Yates Geology Case 4

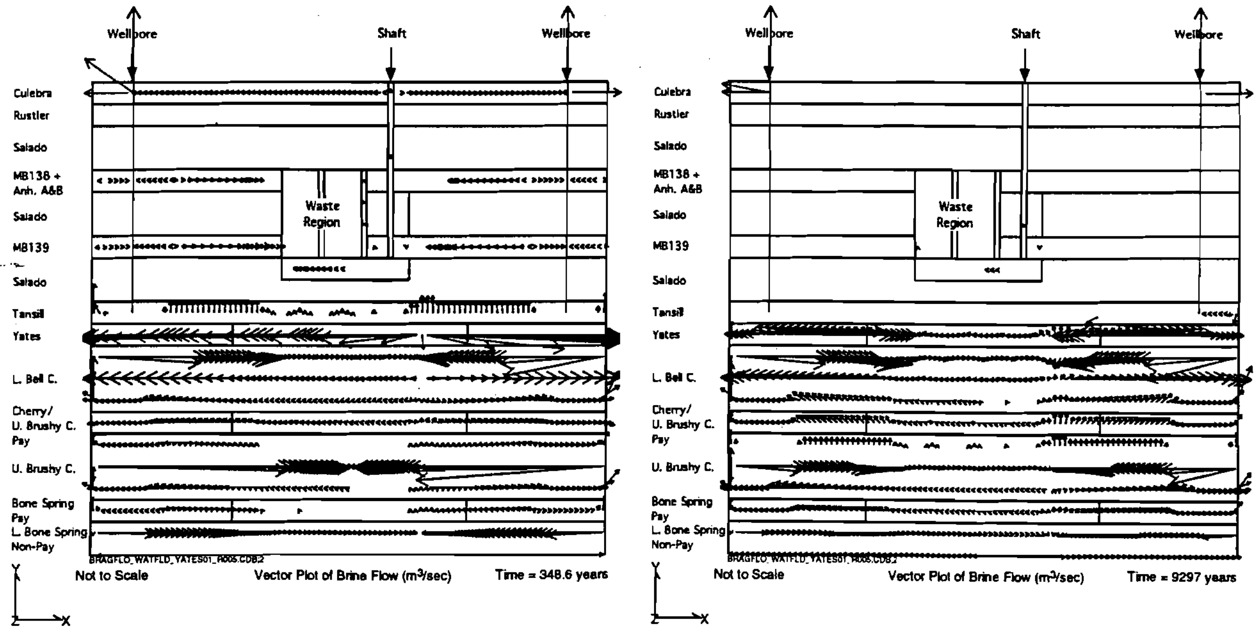

Figure 12 (cont) : BRAGFLO results showing Flow Vectors: Rhodes-Yates Geology Case 4

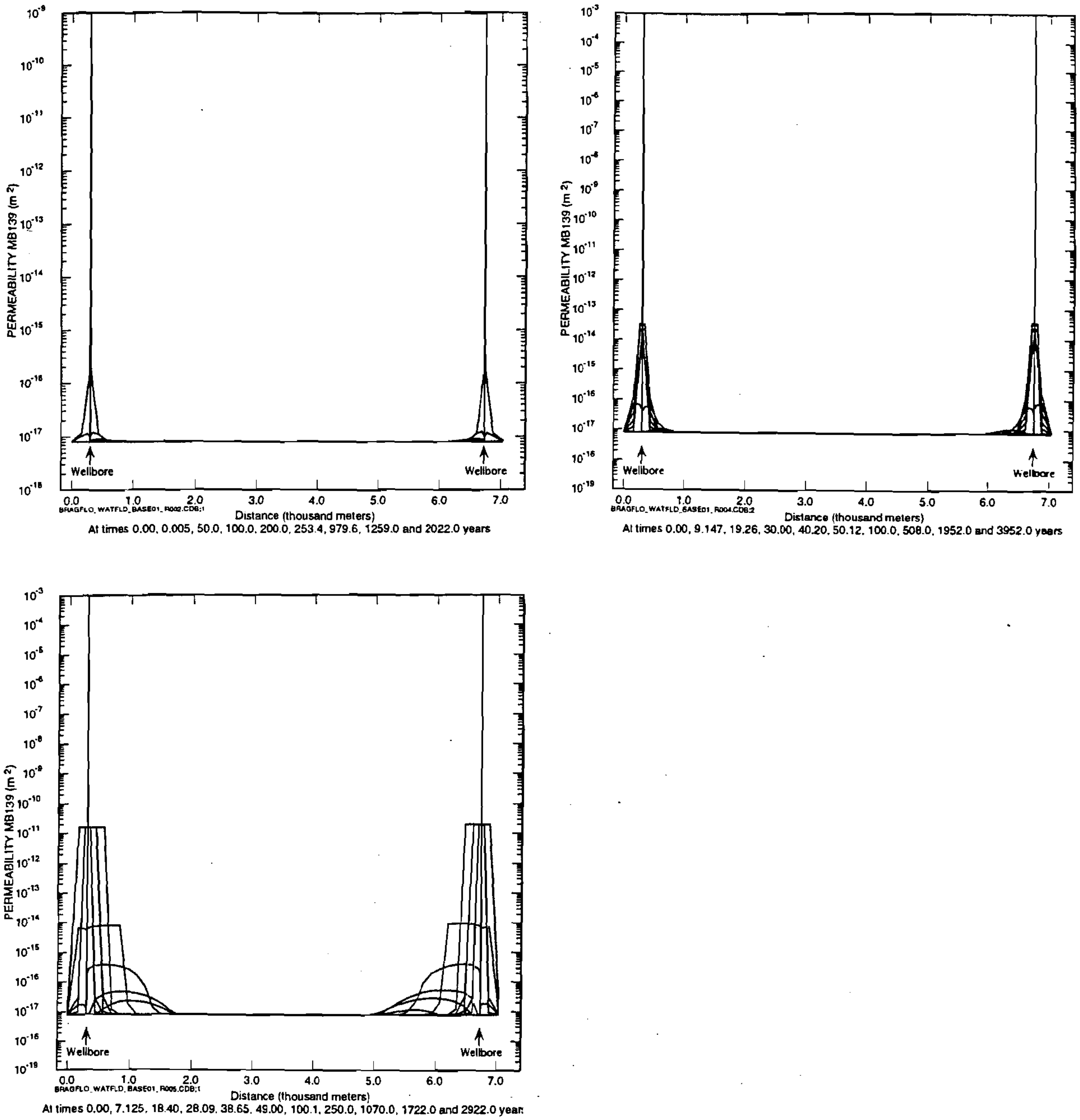

Figure 13: Permeability in MB 139 in response to Fracturing Model: WIPP geology Cases 1, 2 and 3

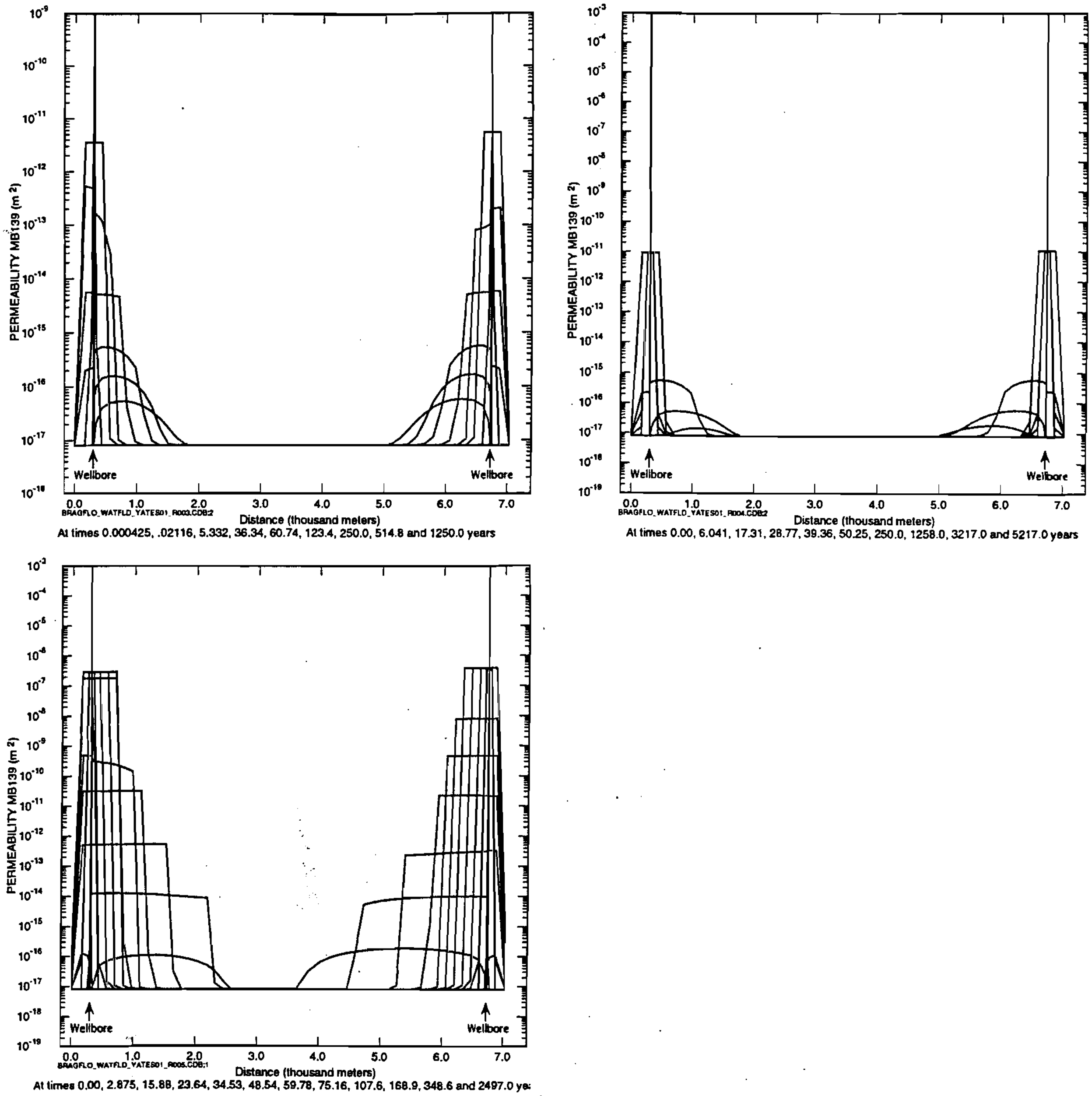

Figure 14: Permeability in MB 139 in response to Fracturing Model: Rhodes-Yates geology Cases 2, 3 and 4

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Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
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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
7	MORRO_P1	Morrow Formation, Pay 1	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
8	MORRO_P1	Morrow Formation, Pay 1	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
9	MORRO_P1	Morrow Formation, Pay 1	POROSITY	1.10E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
10	MORRO_P1	Morrow Formation, Pay 1	PRESSURE	5.29E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
11	MORRO_P1	Morrow Formation, Pay 1	PRMX_LOG	-1.37E+01	Log x-direction permeability (from NM Bureau of Mines)	Intermediate value	Analyst: DM Stoelzel
12	MORRO_P1	Morrow Formation, Pay 1	PRMY_LOG	-1.97E+01	Log y-direction permeability	Intermediate value	Analyst: DM Stoelzel
13	MORRO_P1	Morrow Formation, Pay 1	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
14	MORRO_P1	Morrow Formation, Pay 1	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
15	MORRO_P1	Morrow Formation, Pay 1	SAT_RBRN	2.00E-01	Residual Brine saturation	Required for BRAGFLO	Analyst: DM Stoelzel
16	MORRO_P1	Morrow Formation, Pay 1	SAT_RGAS	1.00E-02	Residual Gas saturation	Required for BRAGFLO	Analyst: DM Stoelzel
17	MORRO_P1	Morrow 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
18	MORRO_P1	Morrow Formation, Pay 1	PERM_Y	2.06E-20	Y-direction permeability (m^2) from Log value	Required for BRAGFLO	Analyst: DM Stoelzel
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20	MORRO_P1	Morrow Formation, Pay 1	SB_MIN	2.10E-01	Minimum saturation (SAT_RBRN * 1.05)	Required for BRAGFLO	Analyst: DM Stoelzel
21	MORRO_P1	Morrow Formation, Pay 1	POR_COMP	3.02E-10	Pore compress from petroleum liturature as function of depth (1/Pa)	Required for BRAGFLO	Analyst: DM Stoelzel
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23	MORRO_P2	Morrow Formation, Pay 2	COMP_RCK	3.02E-10	Rock compressibility (also pore compress) from Petroleum literature	Not used	Analyst: DM Stoelzel
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
28	MORRO_P2	Morrow Formation, Pay 2	PO_MIN	1.01E+05	Minimum Brine pressure (same for all materials)	Required for BRAGFLO	Analyst: DM Stoelzel
29	MORRO_P2	Morrow Formation, Pay 2	PORE_DIS	7.00E-01	Pore distribution (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
30	MORRO_P2	Morrow Formation, Pay 2	POROSITY	1.10E-01	Porosity (fraction)	Required for BRAGFLO	Analyst: DM Stoelzel
31	MORRO_P2	Morrow Formation, Pay 2	PRESSURE	5.29E+07	Hydrostatic initial pressure (Pa)	Not used	Analyst: DM Stoelzel
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
34	MORRO_P2	Morrow Formation, Pay 2	PRMZ_LOG	-1.37E+01	Log z-direction permeability (BRAGFLO required input)	Not used - 2D model	Analyst: DM Stoelzel
35	MORRO_P2	Morrow Formation, Pay 2	RELP_MOD	4.00E+00	Relative permeability model number	Required for BRAGFLO	Analyst: DM Stoelzel
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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
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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
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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
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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					
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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
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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
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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
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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
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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

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
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

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
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

	Material	File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
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

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
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

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
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	-3.46E-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

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
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

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
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	CH20CONC	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

	Material	File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB					
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
1,084	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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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	Cl 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

File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB

Number	Material Name	Material Description	Property	Value	Property Value Description	Usage	Source
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

	Material		File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				
Number	Name	Material Description	Property	Value	Property Value Description	Usage	Source
1,483	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

Number	Material Name	File Name: N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.CDB				Usage	Source
		Material Description	Property	Value	Property Value Description		
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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!=====================================================================
!
! TITLE:    GENMESH Input. Cross - sectional model for FEP analysis
! ANALYST:  Daniel M. Stoelzel
! NOTES:    This cross - sectional model will be used to analyse the effects
!           of oil and gas development on the WIPP site. It will specifically
!           address FEPs NS - 7: Leakage from wells from brine pockets,
!           injection, fluids from drilling; NS - 21: connections to units
!           beneath the repository, and S - 9: Near - miss boreholes.
!           Because current well spacing is at 40 acre intervals (1/4 mile
!           square), the thickness dimension is set at a constant 1320 feet
!           throughout (402.334 meters). There are 5 discrete well regions
!           corresponding to an equivalent area of an 7-7/8 inch wellbore.
!           Boreholes will be treated in several ways: intact, in which no
!           vertical communication is allowed, leaky casing, in which vertical
!           permeability multipliers are used to represent equivalent K*A of
!           the annular space between casing and open - hole (the multiplier
!           changes according to the casing design & bit size used), and plug-
!           ged and abandoned (P&A), in which the vert. perm multipliers
!           represent the bit - size equivalent (sand - filled hole) for long
!           term (to 10,000 years) leakage
!
! CREATED:  June 22, 1995
!
! REVISED:  August 2, 1995
!           Revised repository area to reflect excavated volume only, added
!           backfill area (operations and experimental regions), and shaft.
!           This increased mesh to 95 x 25 (2375 elements) from 90 x 25
!           (2250 elements) for 125 elem increase
!
!           August 7, 1995
!           Changed grid to add seals and DRZ. Mesh now at 106 by 25 nodes.
!
!           August 9, 1995
!           added an additional region to the shaft to represent the shaft
!           seals.
!
!           AUG 25, 1995
!           TOOK OUT THE WELLS AS DISCRETE REGIONS. MESH REMAINS THE SAME,
!           (105 BY 24 ELEMENTS) BUT WELLS WILL BE "TURNED ON" IN THE PREBRAG/
!           BRAGFLO STEPS. THIS WILL ALLOW THE LAYER PROPERTIES TO BE
!           CONTINUOUS IF THE WELLS DO NOT EXIST.
!
!           Aug 29, 1995
!           NEW MESH!!! BRAGFLO struggling with small grid blocks. Changing
!           mesh to add more cells around wellbore regions, also taking out
!           upper Rustler and Dewey Lake regions, stopping mesh at Culebra.
!           Also added one more layer in waste region. Grid now at 131 x 23
!           blocks.
!
!           Sep 1, 1995
!           NEW MESH!!! BRAGFLO still having problems. Changing del X to 155
!           from 131. Del Y remains the same.
!
!           Sep 26, 1995
!           BRAGFLO appears to be time-step limited due to the extremely
!           small pore volume represented by the well grid blocks. Changing
!           the grid to increase the wellbore del-x's to 0.78 meters. The
!           perms will be reduced to maintain equiv. KA's, and the rock
!           compress for well regions will be 1e-99 to minimize storage
!           effects. New mesh is 124 by 34 elements.
!
!           Feb 26, 1996
!           New model to reflect new 40CFR 194 regulations, which do not
!           require active phase for future BH intrusions. Therefore have
!                removed wells 2, 3, and 4, and re-named well 5 as well 2. The two
!           wells are located opposite each other at the LWB, and radially
!                flared outward from an equivalent BH area of a 12-1/4 inch bit.
!           Only half the flow area out the borehole will be considered, and
!           the radial flaring will reflect 1/4 flow volume toward the WIPP,
!                and 1/4 flow volume away. The production/injection at the
!                productive zones in the wellbore will reflect 1/2 average
!                production (or injection) for a Delaware Basin Well. The
!                excavated volume will remain "undisturbed" (no future intrusions).
!           The latest assumptions used in PA will be incoorporated into the
!                model; gas generation, salt creep, fracture parameters, abandoned
!                borehole perms, etc.
!                Mesh is now 96 by 34 elements.
!
!                Feb 27, 1996
!           Eliminated CAVITY_1 region, (Panel) since this model only models
!                entire repository.
!=====================================================================
!
*SETUP
 DIM=   3
 ORIGIN= 0., -3357.58, 0.
 IJKMAX= 97, 35, 2
!
*GRID
  DEL, COORD = X, DEL = 2.0117E+02,INRANGE = 1,2,FACTOR = 1
  DEL, COORD = X, DEL = 1.3106E+02,INRANGE = 2,3,FACTOR = 1
  DEL, COORD = X, DEL = 5.4864E+01,INRANGE = 3,4,FACTOR = 1
  DEL, COORD = X, DEL = 1.0973E+01,INRANGE = 4,5,FACTOR = 1
  DEL, COORD = X, DEL = 2.7432E+00,INRANGE = 5,6,FACTOR = 1
  DEL, COORD = X, DEL = 9.1440E-01,INRANGE = 6,7,FACTOR = 1
  DEL, COORD = X, DEL = 4.5403E-01,INRANGE = 7,8,FACTOR = 1
  DEL, COORD = X, DEL = 3.1117E-01,INRANGE = 8,9,FACTOR = 1
  DEL, COORD = X, DEL = 4.5403E-01,INRANGE = 9,10,FACTOR = 1
  DEL, COORD = X, DEL = 9.1440E-01,INRANGE = 10,11,FACTOR = 1
  DEL, COORD = X, DEL = 2.7432E+00,INRANGE = 11,12,FACTOR = 1
  DEL, COORD = X, DEL = 1.0973E+01,INRANGE = 12,13,FACTOR = 1
  DEL, COORD = X, DEL = 5.4864E+01,INRANGE = 13,14,FACTOR = 1
  DEL, COORD = X, DEL = 1.3106E+02,INRANGE = 14,15,FACTOR = 1
```

```
DEL, COORD = X, DEL = 1.3411E+02,INRANGE = 15,16,FACTOR = 1
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DEL, COORD = X, DEL = 1.3411E+02,INRANGE = 20,21,FACTOR = 1
DEL, COORD = X, DEL = 1.3411E+02,INRANGE = 21,22,FACTOR = 1
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DEL, COORD = X, DEL = 1.2192E+01,INRANGE = 41,42,FACTOR = 1
DEL, COORD = X, DEL = 4.4790E+00,INRANGE = 42,43,FACTOR = 1
DEL, COORD = X, DEL = 2.0381E+00,INRANGE = 43,44,FACTOR = 1
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DEL, COORD = X, DEL = 3.8283E+01,INRANGE = 53,54,FACTOR = 1
DEL, COORD = X, DEL = 5.0000E+00,INRANGE = 54,55,FACTOR = 1
DEL, COORD = X, DEL = 9.9999E-01,INRANGE = 55,56,FACTOR = 1
DEL, COORD = X, DEL = 2.1601E-01,INRANGE = 56,57,FACTOR = 1
DEL, COORD = X, DEL = 9.9999E-01,INRANGE = 57,58,FACTOR = 1
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DEL, COORD = X, DEL = 1.3411E+02,INRANGE = 80,81,FACTOR = 1
DEL, COORD = X, DEL = 1.3411E+02,INRANGE = 81,82,FACTOR = 1
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DEL, COORD = X, DEL = 3.1117E-01,INRANGE = 89,90,FACTOR = 1
DEL, COORD = X, DEL = 4.5403E-01,INRANGE = 90,91,FACTOR = 1
DEL, COORD = X, DEL = 9.1440E-01,INRANGE = 91,92,FACTOR = 1
DEL, COORD = X, DEL = 2.7432E+00,INRANGE = 92,93,FACTOR = 1
DEL, COORD = X, DEL = 1.0973E+01,INRANGE = 93,94,FACTOR = 1
DEL, COORD = X, DEL = 5.4864E+01,INRANGE = 94,95,FACTOR = 1
DEL, COORD = X, DEL = 1.3106E+02,INRANGE = 95,96,FACTOR = 1
DEL, COORD = X, DEL = 2.0117E+02,INRANGE = 96,97,FACTOR = 1
!
DEL, COORD = Y, DEL =  7.7000E+00,INRANGE =  34,35,FACTOR = 1
DEL, COORD = Y, DEL =  3.6000E+01,INRANGE =  33,34,FACTOR = 1
DEL, COORD = Y, DEL =  2.5000E+02,INRANGE =  32,33,FACTOR = 1
DEL, COORD = Y, DEL =  1.4525E+02,INRANGE =  31,32,FACTOR = 1
DEL, COORD = Y, DEL =  4.5000E-01,INRANGE =  30,31,FACTOR = 1
DEL, COORD = Y, DEL =  1.3310E+00,INRANGE =  29,30,FACTOR = 1
DEL, COORD = Y, DEL =  1.3310E+00,INRANGE =  28,29,FACTOR = 1
DEL, COORD = Y, DEL =  8.5000E-01,INRANGE =  27,28,FACTOR = 1
DEL, COORD = Y, DEL =  5.1176E+00,INRANGE =  26,27,FACTOR = 1
DEL, COORD = Y, DEL =  1.9727E+02,INRANGE =  25,26,FACTOR = 1
DEL, COORD = Y, DEL =  3.8100E+02,INRANGE =  24,25,FACTOR = 1
DEL, COORD = Y, DEL =  1.1247E+02,INRANGE =  23,24,FACTOR = 1
DEL, COORD = Y, DEL =  2.4262E+02,INRANGE =  22,23,FACTOR = 1
DEL, COORD = Y, DEL =  2.5908E+02,INRANGE =  21,22,FACTOR = 1
DEL, COORD = Y, DEL =  4.5720E+01,INRANGE =  20,21,FACTOR = 1
DEL, COORD = Y, DEL =  4.5720E+00,INRANGE =  19,20,FACTOR = 1
DEL, COORD = Y, DEL =  4.5720E+01,INRANGE =  18,19,FACTOR = 1
DEL, COORD = Y, DEL =  4.1148E+02,INRANGE =  17,18,FACTOR = 1
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DEL, COORD = Y, DEL =  6.0960E+01,INRANGE =  14,15,FACTOR = 1
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DEL, COORD = Y, DEL = 3.6096E+02,INRANGE = 13,14,FACTOR = 1
DEL, COORD = Y, DEL = 1.0135E+02,INRANGE = 12,13,FACTOR = 1
DEL, COORD = Y, DEL = 1.0135E+01,INRANGE = 11,12,FACTOR = 1
DEL, COORD = Y, DEL = 1.0135E+02,INRANGE = 10,11,FACTOR = 1
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DEL, COORD = Y, DEL = 7.1933E+01,INRANGE = 8,9,FACTOR = 1
DEL, COORD = Y, DEL = 7.1933E+00,INRANGE = 7,8,FACTOR = 1
DEL, COORD = Y, DEL = 1.0668E+02,INRANGE = 6,7,FACTOR = 1
DEL, COORD = Y, DEL = 8.5496E+01,INRANGE = 5,6,FACTOR = 1
DEL, COORD = Y, DEL = 5.9436E+00,INRANGE = 4,5,FACTOR = 1
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
```

```
************
File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.INP;9
 85  *SETUP
******
File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GM_YATES01.INP;2
 85
 86
 87
 88
 89
 90
 91
 92  *SETUP
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.INP;9
 197   DEL, COORD = Y, DEL =  1.9727E+02,INRANGE =  25,26,FACTOR = 1
 198   DEL, COORD = Y, DEL =  3.8100E+02,INRANGE =  24,25,FACTOR = 1
 199   DEL, COORD = Y, DEL =  1.1247E+02,INRANGE =  23,24,FACTOR = 1
******
File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GM_YATES01.INP;2
 204
 205
 206
 207
 208
 209   DEL, COORD = Y, DEL =  1.1680E+02,INRANGE =  25,26,FACTOR = 1
 210   DEL, COORD = Y, DEL =  3.8100E+01,INRANGE =  24,25,FACTOR = 1
 211
 212   DEL, COORD = Y, DEL =  1.1247E+02,INRANGE =  23,24,FACTOR = 1
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.INP;9
 220   DEL, COORD = Y, DEL =  1.1378E+02,INRANGE =  2,3,FACTOR = 1
 221   DEL, COORD = Y, DEL =  8.1382E+00,INRANGE =  1,2,FACTOR = 1
******
File N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GM_YATES01.INP;2
 233
 234   DEL, COORD = Y, DEL =  5.37154+02,INRANGE =  2,3,FACTOR = 1
 235
 236   DEL, COORD = Y, DEL =  8.1382E+00,INRANGE =  1,2,FACTOR = 1
************

Number of difference sections found: 3
Number of difference records found: 18

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[
NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.DIFF;1-
    N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GENMESH.INP;9-
    N1:[NOBACK2.DMS_WATERFLOOD.GENMESH]GM_YATES01.INP;2
```

```
!====================================================================
!
!TITLE:   BRAGFLO CROSS-SECTIONAL MODEL FOR FEP SCREENING CALCULATIONS
!ANALYST:  Daniel M. Stoelzel ,SNL
!CREATED:  June 29, 1995
!PURPOSE:  Define material and property names and selected values that
!          are not in the PROPERTY.SDB
!Modified: Aug 8, 1995
!          Redefined block assignments to reflect 3rd grid revision
!
!          AUG 15, 1995
!          ADDED PAN_S_2 REGION, CHANGED SOME PROPERTIES TO BE READ FROM
!          DATABASE
!
!          Aug 16, 1995
!          Reduced vertical perms one order of magnitude for all lower zones
!          (Bell Canyon through Morrow) to contain any potential gas
!          saturations in-zone.
!          Added PTHRESH property for S_HALITE (needed in algebra)
!
!          Aug 21, 1995
!          Added CAVITY_3 & CAVITY_4 Regions to define backfill and exp_area
!          initial conditions (-5 tto 0 years)
!
!          Aug 22, 1995
!          Changed well PRMY_MUL's to reflect scenario no 1: wells 1 & 5
!          to disposal (present-day development), well 2 to disposal (future
!          development), well 4 to future abandoned to bonespring (never
!          produced).
!
!          Eliminated one IMPERM_Z block.  Only Culebra is impermeable.
!
!          AUG 23, 1995
!          CHANGED CASTILLE PERM TO 1E-18H, E-19V (WAS 1E-11). CHANGED WELLBORE
!          VERT PERM MULT FOR MIDDLE AND LOWER SECTIONS TO 1E-5 TO ALLOW
!          EASIER EQUILIBRATION.
!
!          AUG 25, 1995
!          RE-DO MATSET TO REFLECT NEW GRID REGIONS.  DISCRETE WELL REGIONS
!          HAVE BEEN REMOVED FROM GENMESH.  WELLS WILL NOW BE DEFINED IN
!          PREBRAG/BRAGFLO.  THIS WILL ALLOW UNIFORM PROPERTIES FOR EACH LAYER
!          AT TIMES WHEN WELLS DO NOT EXIST
!
!          AUG 26, 1995
!          CHANGED MARKER BED LOG PERMEABILITIES TO -15, WHICH IS MAX ON DATA-
!          BASE.
!
!          Aug 28, 1995
!          Fixed fracture params. Changed pay zone cap models to zero cap
!          pressure.  Also lowered pay zone vert perm 3 orders of magnitude
!
!          AUG 29, 1995
!          NEW MESH!! INCREASED DEL-X TO REFINE GRID AROUND WELLBORES. STOP AT
!          CULEBRA
!
!              Feb. 27,1996
!              New grid reflecting the new 194 requirements.  No wells will be
!              included inside the LWB, since no future active phase is required.
!          Will therefore have only three time periods: -5 to 0 years, 0 to 50
!              years (active well phase with possible casing leaks), and 50 to
!              10,000 years (abandoned well phase).  Will also attempt to read as
!              many variables as possible off the database for the upper units
!              (Castile and above) instead of hard-wiring.  Database should be
!              QA'ed.
!
!          FEB 29, 1996
!              ADDED REGIONS 59 TO 64 TO REPRESENT THE BOREHOLE PERMS FOR
!              SURFACE, SALT, AND DEEP SECTIONS OF BOREHOLE (USING A VERTICAL PERM
!              MULTIPLIER: PERMY_MUL)
!
!              JUNE 14, 1996
!              ADDED CONC_PLUG, BH_OPEN, BH_SAND, BH_CREED.  LATEST MATERIAL
!              PROPERTIES FOR BOREHOLE PERMEABILITY (cca CALCS)
!====================================================================
*PRINT_ASSIGNED_VALUES
!
*HEADING
 TITLE, BRAGFLO: 1996 FEPs: OIL DEVEL. X-SECTIONAL MODEL WITH 2 WELLS
 SCALE, LOCAL
 SCENARIO, UNDIST
!
*UNITS=SI
!
*CREATE_BLOCKS
!...Create additional blocks for FLUID, WELL, and other properties
! for modeling corrosion and biodegradation reactions
 BLOCK_IDS=38
 BLOCK_IDS=39
 BLOCK_IDS=40
 BLOCK_IDS=41
 BLOCK_IDS=42
 BLOCK_IDS=43
 BLOCK_IDS=44
 BLOCK_IDS=45
 BLOCK_IDS=46
 BLOCK_IDS=47
 BLOCK_IDS=48
 BLOCK_IDS=49
 BLOCK_IDS=50
 BLOCK_IDS=51
 BLOCK_IDS=52
 BLOCK_IDS=53
 BLOCK_IDS=54
 BLOCK_IDS=55
```

```
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,&
```

```
 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,
```

```
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,&
```

```
 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,&
```

```
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,&
```

```
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,&
```

```
                        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
```

```
!=====================================================================
!
! 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
```

```
!=====================================================================
!
!TITLE:  ALGEBRACDB INPUT FILE FOR....
!       BRAGFLO 1996 NMVP calculations
!
!ANAYLST: James E. Bean, New Mexico Engineering Research Institute (NMERI)
!       Robert J. Mackinnon, Ecodynamics Research Associates Inc (ERAI)
!       David McArthur, Sandia National Laboratory, Albuquerque
!
!CREATED: February 8-??,1996
!
!PURPOSE: ALGEBRA file computes properties that can not be obtained
!       from CAMDAT and/or assigns properties to element blocks.
!
!NOTE:  This input file is for the waste panel located down-dip or
!       south of the rest of the repository. Only the Salado formation
!       is dipping.
!
!       Different gas generation and salt seal treatment from the one
!       to be used in the CCA calculations.
!
!       FEB 29, 1996
!       THIS ALGEBRA FILE WAS ORIGIONALLY JEBEAN'S .INP FOR THE 1996 NMVP
!       CALCULATION. CHANGES SPECIFIC TO THE WATERFLOOD MODEL, BASE01
!       WERE ADDED BY DM STOELZEL. BASE01 REPRESENTS MEDIAN VALUES FOR UPPER
!       UNITS, AND MEDIAN GAS GEN PARAMS (NO CO2 SORPTION)
!
!             JUNE 14, 1996
!             CHANGES TO REFLECT NEW BHOLE PERMS
!=====================================================================
!*********************************************************************
!CHAPTER 0: DEFINE NEW VARIABLE NAMES AND SOME NEEDED CONSTANTS
!*********************************************************************
!=====================================================================
!
! ***VARIABLE DEFINITION
!   DIP1 ( IN DEGREES) =  ANGLE OF DIP FOR SALADO FORMATION
!   DIP2 ( IN DEGREES) =  ANGLE OF DIP FOR NON-SALADO FORMATIONS =
!   THETA1 AND THETA2 ARE IN RADIANS
!=====================================================================
==
DIP1    = 1.0
DIP2    = 0.0
THETA1  = DIP1*2.0*PI[B:58]/360.0
THETA2  = DIP2*2.0*PI[B:58]/360.0
!=====================================================================
!*********************************************************************
!CHAPTER 1:  DEFINE AND COMPUTE HYDROLOGIC MATERIAL PROPERTIES
!*********************************************************************
!=====================================================================
!
!*********************************************************************
!BLOCK 29 = S_HALITE = SALADO HALITE
!*********************************************************************
!***COMMENTS: SAMPLED PARAMETERS ARE:
! PRMX_LOG, POROSITY, SAT_RBRN, SAT_RGAS, RELP_MOD, PORE_DIS
! COMP_RCK
!*********************************************************************
LIMIT BLOCK 29
!SINCE PRMX_LOG IS SAMPLED ASSIGN PERM_Y AND PERM_Z
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMX_LOG
PERM_Z  = 10**PRMX_LOG
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!*********************************************************************
!BLOCK 37 = DRZ_0 = DRZ FROM -5 YRS TO 0 YRS
!*********************************************************************
!***COMMENTS: SAMPLED PARAMETERS: NONE
!1)CORRELATE DRZ_0 POROSITY TO SAMPLED S_HALITE BY ADDING 0.0029
!*********************************************************************
LIMIT BLOCK 37
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
POROSITY = POROSITY[B:29] + 0.0029
PORE_DIS = PORE_DIS
RELP_MOD = RELP_MOD
SB_MIN  = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!*********************************************************************
!BLOCK 30 = S_MB139  = SALADO MARKER BED 139
!*********************************************************************
!***COMMENTS: SAMPLED PARAMETERS: SAT_RBRN, SAT_RGAS, PORE_DIS, AND
RELP_MOD
!*********************************************************************
LIMIT BLOCK 30
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
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
!*********************************************************************
!
LIMIT BLOCK 31
PERM_X  = 10**PRMX_LOG
PERM_Y  = 10**PRMY_LOG
PERM_Z  = 10**PRMZ_LOG
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,
! ASSOCIATED SAMPLED PARAMETERS: CORRMCO2[B:56], CORRWCO2[B:56], FBETA[B:57]
!
! CORRMCO2[B:56]  = INUNDATED STEEL CORROSION RATE [M/SEC] WITHOUT
!                   MICROBIAL GAS GENERATION
! CORRWCO2[B:56]  = INUNDATED STEEL CORROSION RATE [M/SEC] WITH
!                   MICROBIAL GAS GENERATION
! GRATMICH[B:41]  = RATE OF HUMID CELLULOSICS BIODEGRADATION [MOLE C/KG/SEC]
! GRATMICI[B:41]  = RATE OF INUNDATED CELLULOSICS BIODEGRADATION
!                   [MOLE C/KG/SEC]
! FBETA[B:57]     = SCALING FACTOR FOR THE AVERAGE STOICIOMETRIC FACTOR Y IN
!                   THE MICROBIAL REACTION
! PROBDEG         = FLAG TO INDICATE IF BIODEGRADATION IS ACTIVATED
!                   (0=NO,1=YES)
```

```
!            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)
!
```

```
WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
!
! INITIAL FE CONCENTRATION = CONCFE
! (APPEARS IN THE BRAGFLO INPUT INITIAL CONDITIONS (SEE LINE 5.6
! IN THE BRAGFLO INPUT MANUAL))
!
CONCFE = WTFETOT/VREPOS[B:58]
!
! INITIAL BIODEGRADABLE MATERIAL CONCENTRATION = CONCBIO
! (APPEARS IN THE BRAGFLO INPUT INITIAL CONDITIONS (SEE LINE 5.8
! IN THE BRAGFLO INPUT MANUAL))
!
CONCBIO = WTBIOTOT/VREPOS[B:58]
!
! INITIAL CELLULOSICS CONCENTRATION = CONCCEL
!
CH20CONC  = WTCELTOT/VREPOS[B:58]
!
!*********************************************************************
!*********************************************************************
! THE FOLLOWING CALCULATIONS DETERMINE THE AVERAGE STOCHIOMETRIC
! COEFFICIENT IN THE BIODEGRADATION REACTION
!
! DRUMVOL = NO OF DRUMS PER UNIT VOL OF WASTE STORAGE
! DRPANEL = NO OF DRUMS PER PANEL
! DRUMTOT = NUMBER OF DRUMS IN REPOSITORY

DRUMVOL = MAKEPROP(DRROOM[B:58]/VROOM[B:58])
DRUMTOT = MAKEPROP(VREPOS[B:58]*DRUMVOL)
DRPANEL = MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
!
! CALCULATE THE MAXIMUM QUANTITIES (IN MOLES) OF CELLULOSICS AND STEEL
! THAT WILL BE POTENTIALLY CONSUMED IN 10000 YEARS
! (SEE EQUATIONS 12 AND 13 IN THE Y. WANG MEMO)
! CONVERT FROM DATABASE UNITS OF MOLES C/(KG-SEC) TO MOLES C/(KG-YR)
!*******************************************************************
! 6        = 6 MOLES OF C/MOLE OF CELLULOSE C6-H10-O5
! 1000     = 1000 GRAMS/KG
! WTBIOTOT = KG
! 162      = MW OF CELLULOSE C6-H10-O5
A1       = 6*1000*WTBIOTOT/162
! 10000    = YEARS
! GRATMICI = MOLES C/KG-SEC
! YRSEC    = 3.15569E7 SEC/YR
A2       = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
MAX_CELL = MIN(A1,A2)
!*******************************************************************
! 10000  = GRAMS/KG
! WTFETOT = KG
! 56     = MW OF FE
B1       = 1000*WTFETOT/56
!*******************************************************************
! 1410    = 10000 YRS* 0.141MOLES/MICROMETER/M**2
! CORRWCO2 = M/SEC
! 1000000 = MICROMETERS/M
! YRSEC   = 3.15569E7 YEARS/SEC
! ASDRUM  = M**2 STEEL/DRUM
! DRUMTOT = DRUMS/REPOSITORY
! B2      = MOLES
B2      = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
MAX_FE  = MIN(B1,B2)
!*******************************************************************
!
! CALCULATE THE MAXIMUM VALUE OF THE AVERAGE STOCHIOMETRIC COEFFICIENT
! Y IN THE BIODEGRADATION REACTION (SEE EQUATION 15 IN THE y. WANG MEMO)
MOL_NO3 = QINIT[B:55]
MOL_SO4 = QINIT[B:54]
! EQUATION 15 IS NEXT
NUM1 = MAKEPROP(8.4*MOL_NO3/4.8)
NUM2 = MAKEPROP(9*MOL_SO4/3)
NUM3 = MAX_CELL - 6*MOL_NO3/4.8 - 6*MOL_SO4/3
YMAX = (NUM1+NUM2+NUM3)/MAX_CELL
!
! CALCULATE THE MINIMUM VALUE OF Y (SEE EQUATIONS 16 AND 17)
C1   = 6*MOL_NO3/4.8 + NUM2 + 0.5*NUM3
C2   = MAX_FE
G    = MIN(C1,C2)
YMIN = YMAX - G/MAX_CELL
!
! THE VALUE OF Y (STOIMIC) IS (EQUATION 18)
STOIMIC = YMIN + FBETA[B:57]*(YMAX - YMIN)
!
! SBIO_H2 = S(2,1), SEE LINE 9.10 IN BRAGFLO INPUT MANUAL
! SBIO_H2 = STOIMIC
!
! BIODEGRADATION STOICHIOMETRIC FACTOR FOR H20 CONSUMPTION
! SBIO_H2O = S(2,2) = 0
!
! BIODEGRADATION STOICHIOMETRIC FACTOR FOR CELLULOSIC CONSUMPTION
! SBIO_CH2O = S(2,3) = 1
!
! 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
!****************************************
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 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])
AKIS1    = 10**PRMX_LOG
!**************************************************************************
! 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])
AKIS1   = 10**PRMX_LOG
!****************************************************************************
! 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 48  SALT_T1
!********************************************************************
!***COMMENTS:
!  Crushed salt shaft material
!  Time period 1: 0 to 10 years
!********************************************************************
LIMIT BLOCK 48
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 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 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
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 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_1  = 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
```

```
! BL 38 (BOREHOLE) PROPERTIES WILL NO LONGER BE USED (BH_SAND INSTEAD),
! BUT WILL BE KEPT IN TO MINIMIZE CHANGES TO MATSET 6/14/96
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
!
!***********************************************************************
! CALCULATE VERTICAL PERMEABILITIES FOR BH's AT LWB AT DIFFERENT DEPTHS,
!BASED ON PEMRY MULTIPLIER AND BOREHOLE PROPERTIES FROM DBASE (BL67:BH_SAND)
LIMIT BLOCK 59 60 61 62 63 64
PERM_X = PERM_X[ID:67]
PERM_Y = PERM_Y[ID:67]*PRMY_MUL
PERM_Z = PERM_Z[ID:67]
CAP_MOD = CAP_MOD[ID:67]
PCT_EXP = PCT_EXP[ID:67]
PC_MAX  = PC_MAX[ID:67]
PCT_A   = PCT_A[ID:67]
KPT     = KPT[ID:67]
PO_MIN  = PO_MIN[ID:67]
PORE_DIS = PORE_DIS[ID:67]
POROSITY = POROSITY[ID:67]
RELP_MOD = RELP_MOD[ID:67]
SAT_RBRN = SAT_RBRN[ID:67]
SAT_RGAS = SAT_RGAS[ID:67]
SB_MIN  = SB_MIN[ID:67]
COMP_RCK = COMP_RCK[ID:67]
POR_COMP = POR_COMP[ID:67]
!***********************************************************************
! now modify bh_creep by vertical perm multiplier (6/14/96)
limit block 68
PERM_Y = PERM_Y*PRMY_MUL[ID:61]
!***********************************************************************
!BLOCK 52 = BRINESAL
LIMIT BLOCK 52
COMP    = COMPRES
!
!=======================================================================
!***********************************************************************
!CHAPTER 2.  COMPUTE BRINE PRESSURE INITIAL CONDITIONS
!        ACCOUNTING FOR DIP IN SPECIFIED FORMATIONS
!        (THIS FORMULATION ACCOUNTS FOR COMPRESSIBILITY OF LIQUID)
!***********************************************************************
!=======================================================================
! 1)   P0 IS THE INITIAL FAR FIELD PRESSURE IN SALADO
!      AND IS USED FOR DEFINING THE PRESSURE IN ALL OTHER BLOCKS
!      IN THE SALADO
! 2)   DEN0 IS THE FLUID DENSITY AT PRESSURE P0
! 3)   XPT AND YPT ARE CENTER COORDINATES OF SHAFT AT LEVEL OF MB139
!      I.E. THE REFERENCE POINT
! 4)   PHIREF IS THE TOTAL POTENTIAL RELATIVE TO XPT AND YPT
! 5)   DENND IS THE DENSITY CALCULATED AT THE GRID CELL CORNERS (NODES)
! 6)   PRESND IS THE LIQUID PRESSURE CALCULATED AT THE GRID CELL CORNERS
! 7)   DENEL IS THE DENSITY AVERAGED FROM THE CELL CORNERS
! 8)   PRESEL IS THE LIQUID PRESSURE AVERAGED FROM THE CELL CORNERS
!
P0    = PRESSURE[B:29]
DEN0  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(P0 - REF_PRES[B:52]))
PHIREF = (1.0/DNSFLUID[B:52] - 1.0/DEN0)/(GRAVACC[B:58]*COMPRES[B:52])
!
!***********************************************************************
!DEFINE PRESSURES IN SALADO
!***********************************************************************
!STEP 1) CALCULATE PRESSURES AT NODES WITH COORDINATES X AND Y
!STEP 2) CONVERT FROM NODAL VALUES TO CELL VALUES
LIMIT ELEMENTS OFF
YPT   = ( Y[N:2578] + Y[N:2675])/2.0
XPT   = ( X[N:2578] + X[N:2579])/2.0
LIMIT BLOCK 28 29 30 31 37
DENND  = MAKENODE(-1.0/((GRAVACC[B:58]*COMPRES[B:52])* &
           (PHIREF - (COS(THETA1)*(Y-YPT) + SIN(THETA1)*(X-XPT)) - &
            1.0/(GRAVACC[B:58]*DNSFLUID[B:52]*COMPRES[B:52]))))
PRESND  = (1.0/COMPRES[B:52])*LOG(DENND/DNSFLUID[B:52]) + REF_PRES[B:52]
!NOW COMPUTE THE PRESSURE AT THE ELEMENT CENTER
DENEL   = NOD2ELE(DENND)
PRESEL  = NOD2ELE(PRESND)
!***********************************************************************
! DEFINE THE PRESSURES IN THE CULEBRA, UNNAMED
!***********************************************************************
LIMIT BLOCK 32 33
DENEL   = DEN0*EXP(COMPRES[B:52]*(PRESSURE[B:40] - REF_PRES[B:52]))
PRESEL  = PRESSURE[B:40]
!***********************************************************************
!DEFINE PRESSURES IN CAVITIES (WASTE AREAS, NORTH END EXCAVATIONS AND SHAFTS)
!***********************************************************************
!CAVITY 2
LIMIT BLOCK 34
DENEL  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(PRESSURE[B:34] - REF_PRES[B:52]))
PRESEL = PRESSURE[B:34]
!CAVITY 3
LIMIT BLOCK 35
DENEL  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(PRESSURE[B:34] - REF_PRES[B:52]))
PRESEL = PRESSURE[B:35]
!CAVITY 4
LIMIT BLOCK 36
DENEL  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(PRESSURE[B:36] - REF_PRES[B:52]))
PRESEL = PRESSURE[B:36]
!***********************************************************************
! NOW CALCULATE PRESSURE FOR DEEPER UNITS WITH NO DIP
! PRESSURES ARE CALCULATED AT HYDROSTATIC WITH REFERENCE POINT AT SHAFT
! COORDINATES AT BELL CANYON ELEVATION
LIMIT ELEMENTS OFF
```

```
P0    = PRESSURE[B:26]
DEN0  = DNSFLUID[B:52]*EXP(COMPRES[B:52]*(P0 - REF_PRES[B:52]))
PHIREF = (1.0/DNSFLUID[B:52] - 1.0/DEN0)/(GRAVACC[B:58]*COMPRES[B:52])
!
YPT   = ( Y[N:2190] + Y[N:2287])/2.0
XPT   = ( X[N:2190] + X[N:2191])/2.0
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
DENND  = MAKENODE(-1.0/((GRAVACC[B:58]*COMPRES[B:52])* &
         (PHIREF - (COS(THETA2)*(Y-YPT) + SIN(THETA2)*(X-XPT)) - &
          1.0/(GRAVACC[B:58]*DNSFLUID[B:52]*COMPRES[B:52]))))
PRESND  = (1.0/COMPRES[B:52])*LOG(DENND/DNSFLUID[B:52]) + REF_PRES[B:52]
!NOW COMPUTE THE PRESSURE AT THE ELEMENT CENTER
DENEL   = NOD2ELE(DENND)
PRESEL  = NOD2ELE(PRESND)
!*********************************************************************
!*********************************************************************
LIMIT ELEMENTS 1 TO 3264
! IF PRESSURES ARE NEGATIVE (INDICATING POINTS ABOVE THE WATERTABLE)
! SET THEM TO ATMPA[B:58] = 101325.0
PRESEL  = IFGT0(PRESEL,PRESEL,ATMPA[B:58])
!
!=====================================================================
!*********************************************************************
!CHAPTER 3.COMPUTE THE GRID BLOCK ELEVATIONS ACCOUNTING FOR
!      1 DEGREE DIP IN SALADO.  FIRST DO SALADO. THE LAYERS ABOVE AND
!      BELOW WILL HAVE NO DIP
!      ALSO CALCULATE THE TOTAL POTENTIAL
!*********************************************************************
!=====================================================================
LIMIT ELEMENTS OFF
YORIGIN =  (Y[N:2578] + Y[N:2675])/2.0
XORIGIN =  (X[N:2578] + X[N:2579])/2.0
LIMIT BLOCK 28 29 30 31 34 35 36 37
!DEFINE GRID BLOCK ELEVATIONS DUE TO DIP
! (MEASURE WITH RESPECT TO I=23+24,J=6+7,K=1)  SHAFT AT ELEVATION OF MB139
ELEVN  = MAKENODE(COS(THETA1)*(Y-YORIGIN) + SIN(THETA1)*(X-XORIGIN))
ELEVE  = NOD2ELE(ELEVN) + YORIGIN
!COMPUTE GRID BLOCK POTENTIAL
POTE   = ELEVE + 1.0/(GRAVACC[B:58]*DNSFLUID[B:52]*COMPRES[B:52]) - &
         1.0/(GRAVACC[B:58]*DENEL*COMPRES[B:52])
!*********************************************************************
! NOW DO BELL CANYON AND DEEPER AND RUSTLER WITH NO DIP (THETA2 = 0)
!*********************************************************************
LIMIT ELEMENTS 1 TO 2208, 2965 TO 3154, 3239, 3240
ELEVN  = MAKENODE(COS(THETA2)*(Y-YORIGIN) + SIN(THETA2)*(X-XORIGIN))
ELEVE  = NOD2ELE(ELEVN) + YORIGIN
POTE   = ELEVE + 1.0/(GRAVACC[B:58]*DNSFLUID[B:52]*COMPRES[B:52]) - &
         1.0/(GRAVACC[B:58]*DENEL*COMPRES[B:52])
!*********************************************************************
LIMIT ELEMENTS OFF
DELETE THETA1,THETA2, ELEVN, XORIGIN, YORIGIN, P0, DENEL, PRESND, XPT, YPT
DELETE DIP1, DIP2, MOL_NO3, MOL_SO4, DEN0, PHIREF, DENND
EXIT
```

```
!=============================================================================
!
!TITLE:  ALGEBRACDB INPUT FILE FOR....
!       BRAGFLO 1996 NMVP calculations
!
!ANAYLST: James E. Bean,  New Mexico Engineering Research Institute (NMERI)
!       Robert J. Mackinnon, Ecodynamics Research Associates Inc (ERAI)
!       David McArthur,  Sandia National Laboratory, Albuquerque
!
!CREATED: February 8-??,1996
!
!PURPOSE: ALGEBRA file computes properties that can not be obtained
!       from CAMDAT and/or assigns properties to element blocks.
!
!NOTE:   This input file is for the waste panel located down-dip or
!       south of the rest of the repository. Only the Salado formation
!       is dipping.
!
!       Different gas generation and salt seal treatment from the one
!       to be used in the CCA calculations..
!
!       FEB 29, 1996
!       THIS ALGEBRA FILE WAS ORIGIONALLY JEBEAN'S .INP FOR THE 1996 NMVP
!       CALCULATION.  CHANGES SPECIFIC TO THE WATERFLOOD MODEL, BASE01
!       WERE ADDED BY DM STOELZEL.  BASE01 REPRESENTS MEDIAN VALUES FOR UPPER
!       UNITS, AND MEDIAN GAS GEN PARAMS (NO CO2 SORPTION)
!
!               JUNE 14, 1996
!               CHANGES TO REFLECT NEW BHOLE PERMS
!
!               JUNE 17, 1996
!       BASE01_R002 REPRESENTS A "WORST CASE" WATERFLOOD SCENARIO IN WHICH
!               THE TWO DISPOSAL WELLS CAN LEAK TO THE HIGHEST PERM MARKER BEDS
!               THROUGH THE HIGHEST PERM BOREHOLES (10E-11) AND HIGHEST PERM SHAFT
!       SEALS.  EVERYTHING ELSE WILL
!               BE MEDIAN VALUES (GAS GEN, FRACTURING, ETC)
!
!               JUNE 17, 1996
!               CHANGED SO MAX SALADO PERM IS USED (10**-24.75)
!=============================================================================
!**************************************************************************
!CHAPTER 0:  DEFINE NEW VARIABLE NAMES AND SOME NEEDED CONSTANTS
!**************************************************************************
!=============================================================================
!
! ***VARIABLE DEFINITION
!    DIP1 ( IN DEGREES) =  ANGLE OF DIP FOR SALADO FORMATION
!    DIP2 ( IN DEGREES) =  ANGLE OF DIP FOR NON-SALADO FORMATIONS =
!    THETA1 AND THETA2 ARE IN RADIANS
!=============================================================================
===
DIP1    = 1.0
DIP2    = 0.0
THETA1  = DIP1*2.0*PI[B:58]/360.0
THETA2  = DIP2*2.0*PI[B:58]/360.0
!=============================================================================
!**************************************************************************
!CHAPTER 1:  DEFINE AND COMPUTE HYDROLOGIC MATERIAL PROPERTIES
!**************************************************************************
!=============================================================================
!
!**************************************************************************
!BLOCK 29 = S_HALITE = SALADO HALITE
!**************************************************************************
!***COMMENTS: SAMPLED PARAMETERS ARE:
! PRMX_LOG, POROSITY, SAT_RBRN, SAT_RGAS, RELP_MOD, PORE_DIS
! COMP_RCK
!**************************************************************************
LIMIT BLOCK 29
!SINCE PRMX_LOG IS SAMPLED ASSIGN PERM_Y AND PERM_Z
! 6/17/96
PERM_X   = MAKEPROP(10**(-24.75))
PERM_Y   = PERM_X
PERM_Z   = PERM_X
SB_MIN   = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!**************************************************************************
!BLOCK 37 = DRZ_0 = DRZ FROM -5 YRS TO 0 YRS
!**************************************************************************
!***COMMENTS: SAMPLED PARAMETERS: NONE
!1)CORRELATE DRZ_0 POROSITY TO SAMPLED S_HALITE BY ADDING 0.0029
!**************************************************************************
LIMIT BLOCK 37
PERM_X   = 10**PRMX_LOG
PERM_Y   = 10**PRMY_LOG
PERM_Z   = 10**PRMZ_LOG
POROSITY = POROSITY[B:29] + 0.0029
PORE_DIS = PORE_DIS
RELP_MOD = RELP_MOD
SB_MIN   = 1.05*SAT_RBRN
POR_COMP = COMP_RCK/POROSITY
!
!**************************************************************************
!BLOCK 30 = S_MB139  = SALADO MARKER BED 139
!**************************************************************************
!***COMMENTS: SAMPLED PARAMETERS: SAT_RBRN, SAT_RGAS, PORE_DIS, AND
RELP_MOD
!**************************************************************************
LIMIT BLOCK 30
! 6/17/96
! NEW PERMS HERE!! 10**-17.1 = 7.9433E-18
PERM_X   = MAKEPROP(10**(-17.1))
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,
```

```
! ASSOCIATED SAMPLED PARAMETERS: CORRMCO2[B:56], CORRWCO2[B:56], FBETA[B:57]
!
! CORRMCO2[B:56]  = INUNDATED STEEL CORROSION RATE [M/SEC] WITHOUT
!                   MICROBIAL GAS GENERATION
! CORRWCO2[B:56]  = INUNDATED STEEL CORROSION RATE [M/SEC] WITH
!                   MICROBIAL GAS GENERATION
! GRATMICH[B:41]  = RATE OF HUMID CELLULOSICS BIODEGRADATION [MOLE C/KG/SEC]
! GRATMICI[B:41]  = RATE OF INUNDATED CELLULOSICS BIODEGRADATION
!                   [MOLE C/KG/SEC]
! FBETA[B:57]     = SCALING FACTOR FOR THE AVERAGE STOICIOMETRIC FACTOR Y IN
!                   THE MICROBIAL REACTION
! PROBDEG         = FLAG TO INDICATE IF BIODEGRADATION IS ACTIVATED
!                   (0=NO,1=YES)
!                   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)
!
 WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
!
! INITIAL FE CONCENTRATION = CONCFE
! (APPEARS IN THE BRAGFLO INPUT INITIAL CONDITIONS (SEE LINE 5.6
! IN THE BRAGFLO INPUT MANUAL))
!
 CONCFE  =  WTFETOT/VREPOS[B:58]
!
! INITIAL BIODEGRADABLE MATERIAL CONCENTRATION = CONCBIO
! (APPEARS IN THE BRAGFLO INPUT INITIAL CONDITIONS (SEE LINE 5.8
! IN THE BRAGFLO INPUT MANUAL))
!
 CONCBIO  =  WTBIOTOT/VREPOS[B:58]
!
! INITIAL CELLULOSICS CONCENTRATION = CONCCEL
!
 CH20CONC   =  WTCELTOT/VREPOS[B:58]
!
!**********************************************************************
!**********************************************************************
! THE FOLLOWING CALCULATIONS DETERMINE THE AVERAGE STOCHIOMETRIC
! COEFFICIENT IN THE BIODEGRADATION REACTION
!
! DRUMVOL  =  NO OF DRUMS PER UNIT VOL OF WASTE STORAGE
! DRPANEL  =  NO OF DRUMS PER PANEL
! DRUMTOT  =  NUMBER OF DRUMS IN REPOSITORY

 DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
 DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
 DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
!
! CALCULATE THE MAXIMUM QUANTITIES (IN MOLES) OF CELLULOSICS AND STEEL
! THAT WILL BE POTENTIALLY CONSUMED IN 10000 YEARS
! (SEE EQUATIONS 12 AND 13 IN THE Y. WANG MEMO)
! CONVERT FROM DATABASE UNITS OF MOLES C/(KG-SEC) TO MOLES C/(KG-YR)
!*******************************************************************
! 6      = 6 MOLES OF C/MOLE OF CELLULOSE C6-H10-O5
! 1000     = 1000 GRAMS/KG
! WTBIOTOT  = KG
! 162      = MW OF CELLULOSE C6-H10-O5
 A1        = 6*1000*WTBIOTOT/162
! 10000    = YEARS
! GRATMICI  = MOLES C/KG-SEC
! YRSEC    = 3.15569E7 SEC/YR
 A2        = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
 MAX_CELL  =  MIN(A1,A2)
!*******************************************************************
! 10000   =  GRAMS/KG
! WTFETOT  =  KG
! 56      =  MW OF FE
 B1       =  1000*WTFETOT/56
!*******************************************************************
! 1410    =  10000 YRS* 0.141MOLES/MICROMETER/M**2
! CORRWCO2 =  M/SEC
! 1000000  =  MICROMETERS/M
! YRSEC    =  3.15569E7 YEARS/SEC
! ASDRUM   =  M**2 STEEL/DRUM
! DRUMTOT  =  DRUMS/REPOSITORY
! B2       =  MOLES
 B2        =  1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
 MAX_FE   =  MIN(B1,B2)
!*******************************************************************
!
! CALCULATE THE MAXIMUM VALUE OF THE AVERAGE STOCHIOMETRIC COEFFICIENT
! Y IN THE BIODEGRADATION REACTION (SEE EQUATION 15 IN THE y. WANG MEMO)
 MOL_NO3  = QINIT[B:55]
 MOL_SO4  = QINIT[B:54]
! EQUATION 15 IS NEXT
 NUM1 = MAKEPROP(8.4*MOL_NO3/4.8)
 NUM2 = MAKEPROP(9*MOL_SO4/3)
 NUM3 = MAX_CELL - 6*MOL_NO3/4.8 - 6*MOL_SO4/3
 YMAX = (NUM1+NUM2+NUM3)/MAX_CELL
!
! CALCULATE THE MINIMUM VALUE OF Y (SEE EQUATIONS 16 AND 17)
 C1    = 6*MOL_NO3/4.8 + NUM2 + 0.5*NUM3
 C2    = MAX_FE
 G     = MIN(C1,C2)
 YMIN  =  YMAX - G/MAX_CELL
!
! THE VALUE OF Y (STOIMIC) IS (EQUATION 18)
 STOIMIC  =  YMIN + FBETA[B:57]*(YMAX - YMIN)
!
! SBIO_H2 = S(2,1), SEE LINE 9.10 IN BRAGFLO INPUT MANUAL
! SBIO_H2 = STOIMIC
!
! BIODEGRADATION STOICHIOMETRIC FACTOR FOR H20 CONSUMPTION
! SBIO_H2O = S(2,2) = 0
!
! BIODEGRADATION STOICHIOMETRIC FACTOR FOR CELLULOSIC CONSUMPTION
! SBIO_CH2O = S(2,3) = 1
!
```

```
! 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
```

```
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 48  SALT_T1
!*******************************************************************************
!***COMMENTS:
!  Crushed salt shaft material
!  Time period 1: 0 to 10 years
!*******************************************************************************
LIMIT BLOCK 48
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 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 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
```

```
106  LIMIT BLOCK 30
107
108
109  PERM_X  = MAKEPROP(10**(-17.1))
110  PERM_Y  = PERM_X
111  PERM_Z  = PERM_X
112  SB_MIN  = 1.05*SAT_RBRN
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
143  LIMIT BLOCK 34 35 36
144  PERM_X  = 10**PRMX_LOG
145  PERM_Y  = 10**PRMY_LOG
146  PERM_Z  = 10**PRMZ_LOG
147  SB_MIN  = 1.05*SAT_RBRN
148  POR_COMP = COMP_RCK/POROSITY
149
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
127
128  LIMIT BLOCK 31
129  PERM_X  = PERM_X[B:30]
130  PERM_Y  = PERM_Y[B:30]
131  PERM_Z  = PERM_Z[B:30]
132  RELP_MOD = RELP_MOD[B:30]
133  PORE_DIS = PORE_DIS[B:30]
134  SAT_RBRN = SAT_RBRN[B:30]
135  SAT_RGAS = SAT_RGAS[B:30]
136  SB_MIN  = 1.05*SAT_RBRN
137  POR_COMP = COMP_RCK/POROSITY
138  PHIMAX  = POROSITY + DPHIMAX
139
140
141  TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
142  PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
143
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
157
158
159  LIMIT BLOCK 33
160  PERM_X  = 10**PRMX_LOG
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
151  LIMIT BLOCK 34 35 36
152  PERM_X  = 10**PRMX_LOG
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
172  LIMIT BLOCK 28
173  PERM_X  = 10**PRMX_LOG
```

```
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
164
165
166
167  LIMIT BLOCK 33
168  PERM_X  = 10**PRMX_LOG
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
177
178  POR_COMP = (10**COMP_RCK)/POROSITY
179
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
172  POR_COMP = COMP_RCK/POROSITY
173
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
186
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
180  LIMIT BLOCK 28
181  PERM_X  = 10**PRMX_LOG
182  PERM_Y  = 10**PRMY_LOG
183  PERM_Z  = 10**PRMZ_LOG
184  SB_MIN  = 1.05*SAT_RBRN
185
186  POR_COMP = (10**COMP_RCK)/POROSITY
187
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
195  LIMIT BLOCK 41
196
197  PERM_X  = 10**PRMX_LOG
198  PERM_Y  = 10**PRMY_LOG
199  PERM_Z  = 10**PRMZ_LOG
200  SB_MIN  = 1.05*SAT_RBRN
201  POR_COMP = COMP_RCK/POROSITY
202
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
196
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
209
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
203  LIMIT BLOCK 41
```

```
204
205  PERM_X  = 10**PRMX_LOG
206  PERM_Y  = 10**PRMY_LOG
207  PERM_Z  = 10**PRMZ_LOG
208  SB_MIN  = 1.05*SAT_RBRN
209  POR_COMP = COMP_RCK/POROSITY
210
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
229    STOICOR = MAKEPROP(STOIFX[B:56])
230
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
230
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
233    SCOR_H2 = MAKEPROP((4 - STOICOR)/3)
234
235
236    SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
237
238
239    SCOR_FE = MAKEPROP(1.0)
240
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
233
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
244
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
237    STOICOR = MAKEPROP(STOIFX[B:56])
238
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
247
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
241    SCOR_H2 = MAKEPROP((4 - STOICOR)/3)
242
243
244    SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
245
246
247    SCOR_FE = MAKEPROP(1.0)
248
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
276    DRH_METL =    DIRONRHW + DIRNCRHW
277    DRH_RUPL =    DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
278    DRH_BIO =     DCELLRHW + DRH_RUPL
279    DCH_METL =    DIRONCHW + DIRNCCHW
280    DCH_RUPL =    DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
281    DCH_BIO =     DCELLCHW + DCH_RUPL
282
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
277
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
289
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
284    DRH_METL =    DIRONRHW + DIRNCRHW
285    DRH_RUPL =    DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
286    DRH_BIO =     DCELLRHW + DRH_RUPL
287    DCH_METL =    DIRONCHW + DIRNCCHW
288    DCH_RUPL =    DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
289    DCH_BIO =     DCELLCHW + DCH_RUPL
290
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
301    WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
302
303
304    WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
305
306
307    WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
308
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
302
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
312    PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
313    BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
314
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
306
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
317
```

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******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
309   WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
310
311
312   WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
313
314
315   WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
316
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
321
322   WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
323
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
320   PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
321   BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
322
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
328   CONCFE  =  WTFETOT/VREPOS[B:58]
329
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
327
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
332
333
334   CONCBIO  =  WTBIOTOT/VREPOS[B:58]
335
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
330   WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
331
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
338   CH20CONC  =  WTCELTOT/VREPOS[B:58]
339
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
334
335
336   CONCFE  =  WTFETOT/VREPOS[B:58]
337
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
344
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
342   CONCBIO  =  WTBIOTOT/VREPOS[B:58]
343
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
347
348
349   DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
350   DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
351   DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
352
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
346   CH20CONC   =  WTCELTOT/VREPOS[B:58]
347
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
362   A1       = 6*1000*WTBIOTOT/162
363
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
357   DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
358   DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
359   DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
360
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
366   A2       = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
367   MAX_CELL  =  MIN(A1,A2)
368
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
363
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
372   B1       = 1000*WTFETOT/56
373
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
367
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
376
```

```
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
370   A1      = 6*1000*WTBIOTOT/162
371
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
379
380
381   B2      = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
382   MAX_FE  = MIN(B1,B2)
383
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
374   A2      = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
375   MAX_CELL = MIN(A1,A2)
376
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
387   MOL_NO3 = QINIT[B:55]
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
380   B1      = 1000*WTFETOT/56
381
382
383
384
385
386
387
388
389   B2      = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
390   MAX_FE  = MIN(B1,B2)
391
392
393
394
395   MOL_NO3 = QINIT[B:55]
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
1111  limit block 68
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
1119
1120
1121  LIMIT BLOCK 60 62 64
1122  PERM_X = 1E-3
1123  PERM_Y = 1E-3*PRMY_MUL
1124  PERM_Z = 1E-3
1125
1126
1127  limit block 68
************

Number of difference sections found: 35
Number of difference records found: 186

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[
NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_R2_4.DIFF;1-
    N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6-
    N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R004.INP;1
```

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************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
  51  DIP1    = 1.0
  52  DIP2    = 0.0
  53  THETA1  = DIP1*2.0*PI[B:58]/360.0
  54  THETA2  = DIP2*2.0*PI[B:58]/360.0
  55
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
  51
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
  63
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
  59  DIP1    = 1.0
  60  DIP2    = 0.0
  61  THETA1  = DIP1*2.0*PI[B:58]/360.0
  62  THETA2  = DIP2*2.0*PI[B:58]/360.0
  63
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
  68  LIMIT BLOCK 29
  69
  70
  71  PERM_X  = MAKEPROP(10**(-24.75))
  72  PERM_Y  = PERM_X
  73  PERM_Z  = PERM_X
  74  SB_MIN  = 1.05*SAT_RBRN
  75  POR_COMP = COMP_RCK/POROSITY
  76
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
  68
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
  83  LIMIT BLOCK 37
  84  PERM_X  = 10**PRMX_LOG
  85  PERM_Y  = 10**PRMY_LOG
  86  PERM_Z  = 10**PRMZ_LOG
  87  POROSITY = POROSITY[B:29] + 0.0029
  88  PORE_DIS = PORE_DIS
  89  RELP_MOD = RELP_MOD
  90  SB_MIN  = 1.05*SAT_RBRN
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
  75
  76  LIMIT BLOCK 29
  77
  78
  79  PERM_X  = MAKEPROP(10**(-24.75))
  80  PERM_Y  = PERM_X
  81  PERM_Z  = PERM_X
  82  SB_MIN  = 1.05*SAT_RBRN
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
  98  LIMIT BLOCK 30
  99
  100
  101  PERM_X  = MAKEPROP(10**(-17.1))
  102  PERM_Y  = PERM_X
  103  PERM_Z  = PERM_X
  104  SB_MIN  = 1.05*SAT_RBRN
  105  POR_COMP = COMP_RCK/POROSITY
  106  PHIMAX  = POROSITY + DPHIMAX
  107
  108
  109  TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
  110  PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
  111
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
  90
  91  LIMIT BLOCK 37
  92  PERM_X  = 10**PRMX_LOG
  93  PERM_Y  = 10**PRMY_LOG
  94  PERM_Z  = 10**PRMZ_LOG
  95  POROSITY = POROSITY[B:29] + 0.0029
  96  PORE_DIS = PORE_DIS
  97  RELP_MOD = RELP_MOD
  98  SB_MIN  = 1.05*SAT_RBRN
  99  POR_COMP = COMP_RCK/POROSITY
  100
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
  117
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
  106  LIMIT BLOCK 30
  107
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
  120  LIMIT BLOCK 31
  121  PERM_X  = PERM_X[B:30]
  122  PERM_Y  = PERM_Y[B:30]
  123  PERM_Z  = PERM_Z[B:30]
  124  RELP_MOD = RELP_MOD[B:30]
  125  PORE_DIS = PORE_DIS[B:30]
```

```
126  SAT_RBRN = SAT_RBRN[B:30]
127  SAT_RGAS = SAT_RGAS[B:30]
128  SB_MIN  = 1.05*SAT_RBRN
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
110
111  KMAXLOG = -3.0
112  PERM_X  = MAKEPROP(10**(-17.1))
113  PERM_Y  = PERM_X
114  PERM_Z  = PERM_X
115  SB_MIN  = 1.05*SAT_RBRN
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
143  LIMIT BLOCK 34 35 36
144  PERM_X  = 10**PRMX_LOG
145  PERM_Y  = 10**PRMY_LOG
146  PERM_Z  = 10**PRMZ_LOG
147  SB_MIN  = 1.05*SAT_RBRN
148  POR_COMP = COMP_RCK/POROSITY
149
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
130
131  LIMIT BLOCK 31
132  KMAXLOG  = KMAXLOG[ID:30]
133  PERM_X  = PERM_X[B:30]
134  PERM_Y  = PERM_Y[B:30]
135  PERM_Z  = PERM_Z[B:30]
136  RELP_MOD = RELP_MOD[B:30]
137  PORE_DIS = PORE_DIS[B:30]
138  SAT_RBRN = SAT_RBRN[B:30]
139  SAT_RGAS = SAT_RGAS[B:30]
140  SB_MIN  = 1.05*SAT_RBRN
141  POR_COMP = COMP_RCK/POROSITY
142  PHIMAX  = POROSITY + DPHIMAX
143
144
145  TEMP    = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
146  PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/TEMP))
147
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
157
158
159  LIMIT BLOCK 33
160  PERM_X  = 10**PRMX_LOG
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
155  LIMIT BLOCK 34 35 36
156  PERM_X  = 10**PRMX_LOG
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
172  LIMIT BLOCK 28
173  PERM_X  = 10**PRMX_LOG
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
168
169
170
171  LIMIT BLOCK 33
172  PERM_X  = 10**PRMX_LOG
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
177
178  POR_COMP = (10**COMP_RCK)/POROSITY
179
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
176  POR_COMP = COMP_RCK/POROSITY
177
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
186
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
184  LIMIT BLOCK 28
185  PERM_X  = 10**PRMX_LOG
186  PERM_Y  = 10**PRMY_LOG
187  PERM_Z  = 10**PRMZ_LOG
188  SB_MIN  = 1.05*SAT_RBRN
189
190  POR_COMP = (10**COMP_RCK)/POROSITY
191
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
195  LIMIT BLOCK 41
196
197  PERM_X  = 10**PRMX_LOG
198  PERM_Y  = 10**PRMY_LOG
199  PERM_Z  = 10**PRMZ_LOG
200  SB_MIN  = 1.05*SAT_RBRN
201  POR_COMP = COMP_RCK/POROSITY
202
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
200
************
************
```

```
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 209
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
 207  LIMIT BLOCK 41
 208
 209  PERM_X  = 10**PRMX_LOG
 210  PERM_Y  = 10**PRMY_LOG
 211  PERM_Z  = 10**PRMZ_LOG
 212  SB_MIN  = 1.05*SAT_RBRN
 213  POR_COMP = COMP_RCK/POROSITY
 214
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 229   STOICOR = MAKEPROP(STOIFX[B:56])
 230
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
 234
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 233   SCOR_H2 =  MAKEPROP((4 - STOICOR)/3)
 234
 235
 236   SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
 237
 238
 239   SCOR_FE = MAKEPROP(1.0)
 240
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
 237
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 244
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
 241   STOICOR = MAKEPROP(STOIFX[B:56])
 242
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 247
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
 245   SCOR_H2 =  MAKEPROP((4 - STOICOR)/3)
 246
 247
 248   SCOR_H2O = MAKEPROP((4 + 2*STOICOR)/3)
 249
 250
 251   SCOR_FE = MAKEPROP(1.0)
 252
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 276   DRH_METL =    DIRONRHW + DIRNCRHW
 277   DRH_RUPL =    DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
 278   DRH_BIO =     DCELLRHW + DRH_RUPL
 279   DCH_METL =    DIRONCHW + DIRNCCHW
 280   DCH_RUPL =    DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
 281   DCH_BIO =     DCELLCHW + DCH_RUPL
 282
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
 281
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 289
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
 288   DRH_METL =    DIRONRHW + DIRNCRHW
 289   DRH_RUPL =    DRUBBRHW + 1.7*(DPLASRHW+DPLSCRHW)
 290   DRH_BIO =     DCELLRHW + DRH_RUPL
 291   DCH_METL =    DIRONCHW + DIRNCCHW
 292   DCH_RUPL =    DRUBBCHW + 1.7*(DPLASCHW+DPLSCCHW)
 293   DCH_BIO =     DCELLCHW + DCH_RUPL
 294
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 301   WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
 302
 303
 304   WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
 305
 306
 307   WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
 308
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
 306
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
 312   PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
 313   BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
 314
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
```

```
310
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
317
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
313   WTFETOT = DRH_METL*VOLRHW + DCH_METL*VOLCHW
314
315
316   WTCELTOT = DCELLRHW*VOLRHW + DCELLCHW*VOLCHW
317
318
319   WTRPLTOT = DRH_RUPL*VOLRHW + DCH_RUPL*VOLCHW
320
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
321
322   WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
323
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
324   PLASIDX  = IFEQ0(PROBDEG-2,1.0,0.0)
325   BIOIDX   = IFGT0(PROBDEG,1.0,0.0)
326
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
328   CONCFE  =  WTFETOT/VREPOS[B:58]
329
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
331
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
332
333
334   CONCBIO  =  WTBIOTOT/VREPOS[B:58]
335
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
334   WTBIOTOT = WTCELTOT + WTRPLTOT*PLASIDX
335
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
338   CH20CONC  =  WTCELTOT/VREPOS[B:58]
339
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
338
339
340   CONCFE  =  WTFETOT/VREPOS[B:58]
341
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
344
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
346   CONCBIO  =  WTBIOTOT/VREPOS[B:58]
347
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
347
348
349   DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
350   DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
351   DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
352
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
350   CH20CONC  =  WTCELTOT/VREPOS[B:58]
351
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
362   A1      = 6*1000*WTBIOTOT/162
363
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
361   DRUMVOL  =  MAKEPROP(DRROOM[B:58]/VROOM[B:58])
362   DRUMTOT  =  MAKEPROP(VREPOS[B:58]*DRUMVOL)
363   DRPANEL  =  MAKEPROP(DRROOM[B:58]*VPANLEX[B:58]/VROOM[B:58])
364
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
366   A2      = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
367   MAX_CELL  =  MIN(A1,A2)
368
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
367
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
372   B1      = 1000*WTFETOT/56
373
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
```

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371
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
376
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
374   A1     = 6*1000*WTBIOTOT/162
375
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
379
380
381   B2     = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
382   MAX_FE  = MIN(B1,B2)
383
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
378   A2     = 10000*GRATMICI*YRSEC[B:58]*WTBIOTOT
379   MAX_CELL = MIN(A1,A2)
380
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
387   MOL_NO3  = QINIT[B:55]
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
384   B1     = 1000*WTFETOT/56
385
386
387
388
389
390
391
392
393   B2     = 1410*CORRWCO2[B:56]*1000000*YRSEC[B:58]*ASDRUM[B:58]*DRUMTOT
394   MAX_FE  = MIN(B1,B2)
395
396
397
398
399   MOL_NO3  = QINIT[B:55]
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6
1111  limit block 68
******
File N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
1123
1124
1125  LIMIT BLOCK 60 62 64
1126  PERM_X = 1E-3
1127  PERM_Y = 1E-3*PRMY_MUL
1128  PERM_Z = 1E-3
1129
1130
1131  limit block 68
************

Number of difference sections found: 36
Number of difference records found: 185

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[
NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_R2_5.DIFF;1-
  N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R002.INP;6-
  N1:[NOBACK2.DMS_WATERFLOOD.ALGEBRA]ALG_WATFLD_BASE01_R005.INP;1
```

```
!========================================================================
!
! TITLE: PREBRAG INPUT FOR 1995 2D OIL & GAS SCENARIO (WATERFLOOD) MODEL
!        SIDEBAR CALCULATIONS
! ANALYST: DANIEL M. STOELZEL
! DATE:   AUGUST 19, 1995
! SCENARIO: DISTURBED WITH 2 WELLS AT 2400m, 2 WELLS PENETRATING WASTE, ONE
!          WELL OFFSET TO WASTE AREA (5 TOTAL)
!        : SINGLE CLOSURE SURFACE
!        :  A)CREEP CLOSURE IN WASTE AREAS
!        : FRACTURE IN MARKER BEDS
!        : LOWER GEOLOGICAL UNITS INCLUDED (BELL C. TO MORROW)
!        : ONE DEGREE DIP FOR SALADO AND DEEPER, SHAFT UP-DIP
!
!            MODIFIED: 3/5/96
!            BY: D.M. STOELZEL
!            CHANGES TO REFLECT NEW DATABASE, AND NEW MESH THAT FOLLOWS 40CFR194
!            REGULATIONS:
!                      : NO ACTIVE PHASE FOR FUTURE WELLS BOTH IN AND AROUND LWB
!                      : ONLY ACTIVE PHASE TO REFLECT CURRENT OIL & GAS ACTIVITY
!                      : TWO WELLS AT 2400 METERS WIL BE RADIALLY FLARED FOR 1/2 FLOW
!                      : NO TIME-DEPENDENT SHAFT SEAL PERMS (SIMPLIFIED FOR THIS MODEL
!
!            6/14/96
!            CHANGES TO REFLECT CCA BOREHOLE ABANDONING
!                      : CASING LEAK IN SALT ONLY FOR 50 YEAR ACTIVE PHASE
!                      : 200 YEARS OF CEMENT PLUG IN RUSTLER AND BELL CANYON, WITH
!                                 OPEN PIPE BETWEEN
!                      : SAND FILLED BOREHOLE FOR THE NEXT 1,000 YEARS
!                      : CREEP CLOSED IN LOWER PART OF SALT TO 10,000 YEARS
!========================================================================
*HEADING
TITLE2 = 1996 FEPS: Present day effects of oil and gas development
!========================================================================
!CLOSURE INFORMATION
*CLOSURE
CONTROL, TYPE = PRESSURE, AVE = CELL
SURFACE, MODEL = JAN_96, PRES_LITHO = 50.0E6, TIME_OFF = 3.155693E12,&
            PERM_FACTOR= WAS_AREA:PERM_X, PERM_EXP = 0.0
REGION, MAT =  WAS_AREA, MODEL = JAN_96
!========================================================================
*RESET
!RESET REGIONS ARE GIVEN THE INITIAL PRESSURE AND SATURATION SPECIFIED IN
! THE INITIAL CONDITIONS AT THE RESET TIME
REGION,MAT=CAVITY_2
REGION,MAT=CAVITY_3
REGION,MAT=CAVITY_4
TIME=0.0
WASTE,MAT_OLD=CAVITY_2,MAT_NEW=WAS_AREA,&
      PRES_BRINE=101325.0, SAT_BRINE=0.0
!========================================================================
*INITIAL_CONDITIONS
!BEGIN SIMULATION AT -5 YEARS
BEGIN, TIME=-1.577846E8
SATBR,  ID_BRINE =SATBREL
PRESSURE,ID_PRES  =PRESEL
CONFE  , ID_CONFE =FECONC
CONCELL, ID_CONCEL=CH2OCONC
ELEVAT,  ID_ELEV  =ELEVE
!========================================================================
*STEP_CONTROL
!TIME STEP IS REDUCED
! 1. AT   0 YEARS: WASTE IS INTRODUCED,
  TIME,BEGIN=0.0, DT=864.0
! 2. AT  50 YEARS: MATERIAL CHANGE
  TIME,BEGIN=1.577846E9, DT=864.0
! 3. AT 100 YEARS: MATERIAL CHANGE
  TIME,BEGIN=3.155693E9, DT=864.0
! 4. AT 200 YEARS: MATERIAL CHANGE
  TIME,BEGIN=6.311385E9, DT=864.0
! 5. AT 250 YEARS: MATERIAL CHANGE
  TIME,BEGIN=7.889225E9, DT=864.0
! 6. AT 1250 YEARS: MATERIAL CHANGE
  TIME,BEGIN=3.944613E10,DT=864.0
!========================================================================
*MODIFY_MAP
! ID=1 => 0 YEARS : WASTE INTRODUCED, SHAFT SEALS AND FILL INTRODUCED
!              ACTIVE PHASE OF WELLS AT 2,400 METERS
!              CASING LEAK THRU SALT
!<<<<<<< TIME PERIODS 2 (10 YRS) & 3 (25 YRS) EXCLUDED FOR SIMPLICITY >>>>>>
! ID=2 => 50 YEARS : MIDDLE AND LOWER CLAY AND COMPACTED SALT (TIME PERIOD 4)
!              WELLS TURNED OFF
!              CMT PLUGS IN RUSTLER AND BELL C. OPEN BH BETWEEN
! ID=3 => 100 YEARS : MIDDLE CLAY  AND COMPACTED SALT (TIME PERIOD 5)
! ID=4 => 200 YEARS : COMPACTED SALT (TIME PERIOD 6)
!
! ID=5 => 250 YEARS : ENTIRE BOREHOLE(S) TO SAND FILLED
! ID=6 => 1250 YEARS: LOWER SALT SECTION OF BH TO CREEP CLOSED
! <<<<<<< 400 YEARS : CONCRETE (TIME PERIOD 2) NOT INCLUDED >>>>>>>>>>
TIME,TIME_ID=1, BEGIN= 0.0
TIME,TIME_ID=2, BEGIN= 1.577846E9
TIME,TIME_ID=3, BEGIN= 3.155693E9
TIME,TIME_ID=4, BEGIN= 6.311385E9
TIME,TIME_ID=5, BEGIN= 7.889225E9
TIME,TIME_ID=6, BEGIN= 3.944613E10
!********
! 0 YEARS
!********
!INTRODUCE FINAL DRZ MATERIAL
MODIFY, MAT=DRZ_1,    TIME_ID=1, IRANGE=36,59, JRANGE=26,26,  KRANGE=1,1
!INTRODUCE WASTE INTO REST OF REPOSITORY
MODIFY, MAT=WAS_AREA,  TIME_ID=1, IRANGE= 36,42, JRANGE=27,30, KRANGE=1,1
MODIFY, MAT=WAS_AREA,  TIME_ID=1, IRANGE= 44,50, JRANGE=27,30, KRANGE=1,1
!INTRODUCE PANEL SEAL MATERIAL
MODIFY, MAT=PAN_SEAL, TIME_ID=1, IRANGE=43,43, JRANGE=27,30, KRANGE=1,1
MODIFY, MAT=PAN_SEAL, TIME_ID=1, IRANGE=51,51, JRANGE=27,30, KRANGE=1,1
!INTRODUCE OPERATIONS REGION MATERIAL
MODIFY, MAT=OPS_AREA, TIME_ID=1, IRANGE=52,55, JRANGE=28,29, KRANGE=1,1
!INTRODUCE EXPERIMENTAL REGION MATERIAL
MODIFY, MAT=EXP_AREA, TIME_ID=1, IRANGE=57,59, JRANGE=28,29, KRANGE=1,1
!INTRODUCE TRUE CULEBRA REGION TO ALLOW BRINE INFLOW TO SHAFT
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= HARMONIC, IMFRAVE=UPSTREAM
!
!======================================================================
```

```
*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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           PCT_EXP   = PCT_EXP,    PCT_FLAG  = KPT
!
SOLID, MAT=DRZ_1,&
           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=S_MB139,&
           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=S_MB138,&
           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=CAVITY_2,&
           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=CAVITY_3,&
           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=CAVITY_4,&
           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=IMPERM_Z,&
           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=CASTILER,&
           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=WAS_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=UNNAMED,&
           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=CULEBRA,&
           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
!
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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,&
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          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,&
```

```
           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_LOW_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_L,&
           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_LOW_L,&
           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=CONC_PLG,&
           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_OPEN,&
           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_SAND,&
           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_CREEP,&
           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
!
! GET FRACTURE PROPERTIES
FRACTURE, MAT=S_MB139, FRAC_PI =PI_DELTA, FRAC_PF =PF_DELTA,&
              FRAC_PHI =PHIMAX,  FRAC_EXP=PERM_EXP,&
              FRAC_PMX =IFRX,    FRAC_PMY=IFRY,&
              FRAC_PMZ =IFRZ
!
FRACTURE, MAT=S_MB138, FRAC_PI =PI_DELTA, FRAC_PF =PF_DELTA,&
              FRAC_PHI =PHIMAX,  FRAC_EXP=PERM_EXP,&
              FRAC_PMX =IFRX,    FRAC_PMY=IFRY,&
              FRAC_PMZ =IFRZ
!
! GET FLUID (brine and gas) properties from CAMDAT file
FLUID, MAT=BRINESAL, SALINITY=WTF, DEN_BR=DNSFLUID,&
            COMPR_BR=COMP, REF_TEMP=REF_TEMP,&
            REF_PRES=REF_PRES, TABLE=INTERP, VIS_BR=VISCO
FLUID, MAT=H2,     VIS_GAS=VISCO,DGAS = OFF,&
            H2_MOLE =1.0, CO2_MOLE=0.0, CH4_MOLE=0.0,&
            N2_MOLE= 0.0, H2S_MOLE=0.0, O2_MOLE=0.0
FLUID, MAT=S_MB139, KLINK=ON, B_KLINK=BKLINK, EXP_KLINK=EXPKLINK
!
SOLID, MAT=MORRO_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=MORRO_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=MORRO_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
!
SOLID, MAT=MORRO_NP,&
          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=ATOKA_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=ATOKA_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=ATOKA_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
!
SOLID, MAT=ATOKA_NP,&
          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=STRWN_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=STRWN_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=STRWN_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
!
SOLID, MAT=STRWN_NP,&
          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=BONES_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,&
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         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=BONES_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=BONES_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
!
SOLID, MAT=BONES_NP,&
         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=LBRSH_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=LBRSH_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=LBRSH_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
!
SOLID, MAT=UBRSH_NP,&
         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=UBRSH_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=UBRSH_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=UBRSH_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
!
SOLID, MAT=LBELL_NP,&
         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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```
           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
```

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!
! 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
!=========================================================================
```

```
!=====================================================================
!
! TITLE:  PREBRAG INPUT FOR 1995 2D OIL & GAS SCENARIO (WATERFLOOD) MODEL
!         SIDEBAR CALCULATIONS
! ANALYST: DANIEL M. STOELZEL
! DATE:   AUGUST 19, 1995
! SCENARIO: DISTURBED WITH 2 WELLS AT 2400m, 2 WELLS PENETRATING WASTE, ONE
!         WELL OFFSET TO WASTE AREA (5 TOTAL)
!         : SINGLE CLOSURE SURFACE
!         :  A)CREEP CLOSURE IN WASTE AREAS
!         : FRACTURE IN MARKER BEDS
!         : LOWER GEOLOGICAL UNITS INCLUDED (BELL C. TO MORROW)
!         : ONE DEGREE DIP FOR SALADO AND DEEPER, SHAFT UP-DIP
!
!            MODIFIED: 3/5/96
!            BY: D.M. STOELZEL
!            CHANGES TO REFLECT NEW DATABASE, AND NEW MESH THAT FOLLOWS 40CFR194
!            REGULATIONS:
!                     : NO ACTIVE PHASE FOR FUTURE WELLS BOTH IN AND AROUND LWB
!                     : ONLY ACTIVE PHASE TO REFLECT CURRENT OIL & GAS ACTIVITY
!                     : TWO WELLS AT 2400 METERS WIL BE RADIALLY FLARED FOR 1/2 FLOW
!                     : NO TIME-DEPENDENT SHAFT SEAL PERMS (SIMPLIFIED FOR THIS MODEL
!
!            6/14/96
!            CHANGES TO REFLECT CCA BOREHOLE ABANDONING
!                     : CASING LEAK IN SALT ONLY FOR 50 YEAR ACTIVE PHASE
!                     : 200 YEARS OF CEMENT PLUG IN RUSTLER AND BELL CANYON, WITH
!                                 OPEN PIPE BETWEEN
!                     : SAND FILLED BOREHOLE FOR THE NEXT 1,000 YEARS
!                     : CREEP CLOSED IN LOWER PART OF SALT TO 10,000 YEARS
!=====================================================================
*HEADING
TITLE2 = 1996 FEPS: Present day effects of oil and gas development
!=====================================================================
!CLOSURE INFORMATION
*CLOSURE
CONTROL, TYPE = PRESSURE, AVE = CELL
SURFACE, MODEL = JAN_96,  PRES_LITHO = 50.0E6,  TIME_OFF = 3.155693E12,&
            PERM_FACTOR= WAS_AREA:PERM_X, PERM_EXP = 0.0
REGION,  MAT =  WAS_AREA, MODEL = JAN_96
!=====================================================================
*RESET
!RESET REGIONS ARE GIVEN THE INITIAL PRESSURE AND SATURATION SPECIFIED IN
! THE INITIAL CONDITIONS AT THE RESET TIME
REGION,MAT=CAVITY_2
REGION,MAT=CAVITY_3
REGION,MAT=CAVITY_4
TIME=0.0
WASTE,MAT_OLD=CAVITY_2,MAT_NEW=WAS_AREA,&
      PRES_BRINE=101325.0, SAT_BRINE=0.0
!=====================================================================
*INITIAL_CONDITIONS
!BEGIN SIMULATION AT -5 YEARS
BEGIN, TIME=-1.577846E8
SATBR,  ID_BRINE =SATBREL
PRESSURE,ID_PRES  =PRESEL
CONFE  , ID_CONFE =FECONC
CONCELL, ID_CONCEL=CH2OCONC
ELEVAT,  ID_ELEV  =ELEVE
!=====================================================================
*STEP_CONTROL
!TIME STEP IS REDUCED
! 1. AT   0 YEARS: WASTE IS INTRODUCED,
  TIME,BEGIN=0.0, DT=864.0
! 2. AT  50 YEARS: MATERIAL CHANGE
  TIME,BEGIN=1.577846E9, DT=864.0
! 3. AT 100 YEARS: MATERIAL CHANGE
  TIME,BEGIN=3.155693E9, DT=864.0
! 4. AT 200 YEARS: MATERIAL CHANGE
  TIME,BEGIN=6.311385E9, DT=864.0
! 5. AT 250 YEARS: MATERIAL CHANGE
  TIME,BEGIN=7.889225E9, DT=864.0
! 6. AT 1250 YEARS: MATERIAL CHANGE
  TIME,BEGIN=3.944613E10,DT=864.0
!=====================================================================
*MODIFY_MAP
! ID=1 => 0 YEARS : WASTE INTRODUCED, SHAFT SEALS AND FILL INTRODUCED
!                 ACTIVE PHASE OF WELLS AT 2,400 METERS
!                 CASING LEAK THRU SALT
!<<<<<<<  TIME PERIODS 2 (10 YRS) & 3 (25 YRS) EXCLUDED FOR SIMPLICITY >>>>>>
! ID=2 => 50 YEARS : MIDDLE AND LOWER CLAY AND COMPACTED SALT (TIME PERIOD 4)
!                  WELLS TURNED OFF
!                  CMT PLUGS IN RUSTLER AND BELL C. OPEN BH BETWEEN
! ID=3 => 100 YEARS : MIDDLE CLAY  AND COMPACTED SALT (TIME PERIOD 5)
! ID=4 => 200 YEARS : COMPACTED SALT (TIME PERIOD 6)
!
! ID=5 => 250 YEARS : ENTIRE BOREHOLE(S) TO SAND FILLED
! ID=6 => 1250 YEARS: LOWER SALT SECTION OF BH TO CREEP CLOSED
! <<<<<<< 400 YEARS : CONCRETE (TIME PERIOD 2) NOT INCLUDED >>>>>>>>>>
TIME,TIME_ID=1, BEGIN= 0.0
TIME,TIME_ID=2, BEGIN= 1.577846E9
TIME,TIME_ID=3, BEGIN= 3.155693E9
TIME,TIME_ID=4, BEGIN= 6.311385E9
TIME,TIME_ID=5, BEGIN= 7.889225E9
TIME,TIME_ID=6, BEGIN= 3.944613E10
!********
! 0 YEARS
!********
!INTRODUCE FINAL DRZ MATERIAL
MODIFY, MAT=DRZ_1,    TIME_ID=1, IRANGE=36,59, JRANGE=26,26,  KRANGE=1,1
!INTRODUCE WASTE INTO REST OF REPOSITORY
MODIFY, MAT=WAS_AREA,  TIME_ID=1, IRANGE= 36,42, JRANGE=27,30, KRANGE=1,1
MODIFY, MAT=WAS_AREA,  TIME_ID=1, IRANGE= 44,50, JRANGE=27,30, KRANGE=1,1
!INTRODUCE PANEL SEAL MATERIAL
MODIFY, MAT=PAN_SEAL, TIME_ID=1, IRANGE=43,43, JRANGE=27,30, KRANGE=1,1
MODIFY, MAT=PAN_SEAL, TIME_ID=1, IRANGE=51,51, JRANGE=27,30, KRANGE=1,1
!INTRODUCE OPERATIONS REGION MATERIAL
MODIFY, MAT=OPS_AREA, TIME_ID=1, IRANGE=52,55, JRANGE=28,29, KRANGE=1,1
!INTRODUCE EXPERIMENTAL REGION MATERIAL
MODIFY, MAT=EXP_AREA, TIME_ID=1, IRANGE=57,59, JRANGE=28,29, KRANGE=1,1
!INTRODUCE TRUE CULEBRA REGION TO ALLOW BRINE INFLOW TO SHAFT
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= HARMONIC, 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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            PCT_EXP   = PCT_EXP,     PCT_FLAG  = KPT
!
SOLID, MAT=DRZ_1,&
            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=S_MB139,&
            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=S_MB138,&
            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=CAVITY_2,&
            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=CAVITY_3,&
            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=CAVITY_4,&
            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=IMPERM_Z,&
            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=CASTILER,&
            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=WAS_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=UNNAMED,&
            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=CULEBRA,&
            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
!
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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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            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_LOW_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_L,&
            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_LOW_L,&
            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=CONC_PLG,&
            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_OPEN,&
            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_SAND,&
            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_CREEP,&
            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
!
! GET FRACTURE PROPERTIES
FRACTURE, MAT= S_MB139,  FRAC_PI  = PI_DELTA, FRAC_PF  = PF_DELTA,&
              FRAC_PHI  = PHIMAX,   FRAC_EXP = PERM_EXP,&
              FRAC_PMX  = IFRX,     FRAC_PMY = IFRY,&
              FRAC_PMZ  = IFRZ
!
FRACTURE, MAT= S_MB138,  FRAC_PI  = PI_DELTA, FRAC_PF  = PF_DELTA,&
              FRAC_PHI  = PHIMAX,   FRAC_EXP = PERM_EXP,&
              FRAC_PMX  = IFRX,     FRAC_PMY = IFRY,&
              FRAC_PMZ  = IFRZ
!
! GET FLUID (brine and gas) properties from CAMDAT file
FLUID, MAT=BRINESAL, SALINITY=WTF, DEN_BR=DNSFLUID,&
            COMPR_BR= COMP, REF_TEMP= REF_TEMP,&
            REF_PRES=REF_PRES, TABLE=INTERP, VIS_BR=VISCO
FLUID, MAT=H2,      VIS_GAS=VISCO,DGAS = OFF,&
              H2_MOLE =1.0, CO2_MOLE=0.0, CH4_MOLE=0.0,&
              N2_MOLE= 0.0, H2S_MOLE=0.0, O2_MOLE=0.0
FLUID, MAT=S_MB139,  KLINK=ON, B_KLINK=BKLINK, EXP_KLINK=EXPKLINK
!
SOLID, MAT=MORRO_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=MORRO_P2,&
            PRM_X    = PERM_X,     PRM_Y     = PERM_Y,&
            PRM_Z    = PERM_Z,     POROSITY  = POROSITY,&
            BCSOR    = SAT_RBRN,   BCSGR     = SAT_RGAS,&
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         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=MORRO_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
!
SOLID, MAT=MORRO_NP,&
         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=ATOKA_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=ATOKA_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=ATOKA_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
!
SOLID, MAT=ATOKA_NP,&
         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=STRWN_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=STRWN_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=STRWN_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
!
SOLID, MAT=STRWN_NP,&
         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=BONES_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=BONES_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=BONES_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
!
SOLID, MAT=BONES_NP,&
          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=LBRSH_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=LBRSH_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=LBRSH_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
!
SOLID, MAT=UBRSH_NP,&
          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=UBRSH_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=UBRSH_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=UBRSH_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
!
SOLID, MAT=LBELL_NP,&
          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_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=5.48919E07, 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=1.48508E07, 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=5.48919E07, 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=1.33743E07, 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
!==========================================================================
```

```
************
File N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES01.INP;2
 980            PRWELL= 22.8E6
 981
******
File N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES02.INP;1
 980            PRWELL= 18.53E6
 981
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES01.INP;2
 984            PRWELL= 22.8E6
 985
******
File N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES02.INP;1
 984            PRWELL= 18.53E6
 985
************

Number of difference sections found: 2
Number of difference records found: 2

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
K2.DMS_WATERFLOOD.PREBRAG]PRE_Y1_2.DIFF;1-
    N1:[NOBACK2.DMS_WATERFLOOD.PREBRAG]PREB_WATFLD_YATES01.INP;2-
    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
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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 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
```

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  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
  1* 3.263515E+02   1* 3.263835E+02   1* 3.263954E+02   1* 3.264021E+02
  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
  1* 4.387482E+02   1* 4.387549E+02   1* 4.387668E+02   1* 4.387987E+02
  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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1* 3.668341E+02 1* 3.691746E+02 1* 3.715152E+02 1* 3.732174E+02
1* 3.741749E+02 1* 3.747600E+02 1* 3.749728E+02 1* 3.750792E+02
1* 3.752388E+02 1* 3.755580E+02 1* 3.762495E+02 1* 3.769410E+02
1* 3.772602E+02 1* 3.774057E+02 1* 3.774626E+02 1* 3.775194E+02
1* 3.776649E+02 1* 3.779841E+02 1* 3.786224E+02 1* 3.793139E+02
1* 3.796863E+02 1* 3.798459E+02 1* 3.799347E+02 1* 3.800575E+02
1* 3.804788E+02 1* 3.808565E+02 1* 3.809089E+02 1* 3.809195E+02
1* 3.809301E+02 1* 3.810086E+02 1* 3.814686E+02 1* 3.828339E+02
1* 3.847842E+02 1* 3.874813E+02 1* 3.909252E+02 1* 3.943691E+02
1* 3.972613E+02 1* 3.996018E+02 1* 4.019424E+02 1* 4.042829E+02
1* 4.066234E+02 1* 4.089640E+02 1* 4.113045E+02 1* 4.136451E+02
1* 4.159856E+02 1* 4.183261E+02 1* 4.206667E+02 1* 4.230072E+02
1* 4.253477E+02 1* 4.276883E+02 1* 4.300288E+02 1* 4.323694E+02
1* 4.347099E+02 1* 4.370505E+02 1* 4.393644E+02 1* 4.409868E+02
1* 4.415613E+02 1* 4.416810E+02 1* 4.417129E+02 1* 4.417249E+02
1* 4.417315E+02 1* 4.417382E+02 1* 4.417502E+02 1* 4.417821E+02
1* 4.419018E+02 1* 4.424763E+02 1* 4.440987E+02 1* 4.469978E+02
1* 3.252095E+02 1* 3.281086E+02 1* 3.297310E+02 1* 3.303055E+02
1* 3.304252E+02 1* 3.304571E+02 1* 3.304691E+02 1* 3.304757E+02
1* 3.304824E+02 1* 3.304944E+02 1* 3.305263E+02 1* 3.306460E+02
1* 3.312205E+02 1* 3.328429E+02 1* 3.351568E+02 1* 3.374974E+02
1* 3.398379E+02 1* 3.421784E+02 1* 3.445190E+02 1* 3.468595E+02
1* 3.492001E+02 1* 3.515406E+02 1* 3.538812E+02 1* 3.562217E+02
1* 3.585623E+02 1* 3.609028E+02 1* 3.632433E+02 1* 3.655839E+02
1* 3.679244E+02 1* 3.702650E+02 1* 3.726055E+02 1* 3.743077E+02
1* 3.752652E+02 1* 3.758504E+02 1* 3.760632E+02 1* 3.761696E+02
1* 3.763291E+02 1* 3.766483E+02 1* 3.773398E+02 1* 3.780314E+02
1* 3.783506E+02 1* 3.784960E+02 1* 3.785529E+02 1* 3.786098E+02
1* 3.787552E+02 1* 3.790744E+02 1* 3.797127E+02 1* 3.804043E+02
1* 3.807766E+02 1* 3.809362E+02 1* 3.810250E+02 1* 3.811478E+02
1* 3.815692E+02 1* 3.819468E+02 1* 3.819992E+02 1* 3.820098E+02
1* 3.820204E+02 1* 3.820990E+02 1* 3.825589E+02 1* 3.839242E+02
1* 3.858745E+02 1* 3.885716E+02 1* 3.920155E+02 1* 3.954594E+02
1* 3.983516E+02 1* 4.006922E+02 1* 4.030327E+02 1* 4.053732E+02
1* 4.077138E+02 1* 4.100543E+02 1* 4.123949E+02 1* 4.147354E+02
1* 4.170759E+02 1* 4.194165E+02 1* 4.217570E+02 1* 4.240976E+02
1* 4.264381E+02 1* 4.287786E+02 1* 4.311192E+02 1* 4.334597E+02
1* 4.358003E+02 1* 4.381408E+02 1* 4.404547E+02 1* 4.420771E+02
1* 4.426516E+02 1* 4.427713E+02 1* 4.428033E+02 1* 4.428152E+02
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 1* 1.273131E+07  1* 1.270315E+07  1* 1.267490E+07  1* 1.264675E+07
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GRID BLOCK FE CONCENTRATION INITIAL CONDITIONS
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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
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
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_WASTE1  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 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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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*-3.080865E+03
 96*-2.766568E+03
 96*-2.717876E+03
 96*-2.672156E+03
 96*-2.576068E+03
 96*-2.519132E+03
 96*-2.479568E+03
 96*-2.023297E+03
 96*-1.552317E+03
 96*-1.496574E+03
 96*-1.440832E+03
 96*-1.209677E+03
 96*-9.987171E+02
 96*-9.651889E+02
 96*-9.316609E+02
 96*-6.954409E+02
 96*-4.668409E+02
 96*-4.416949E+02
 96*-4.165489E+02
 96*-2.641489E+02
 96*-1.329886E+01
 96* 1.642461E+02
  1* 1.827523E+02   1* 1.856515E+02   1* 1.872739E+02   1* 1.878484E+02
  1* 1.879681E+02   1* 1.880000E+02   1* 1.880119E+02   1* 1.880186E+02
  1* 1.880253E+02   1* 1.880372E+02   1* 1.880691E+02   1* 1.881888E+02
  1* 1.887633E+02   1* 1.903857E+02   1* 1.926997E+02   1* 1.950402E+02
  1* 1.973808E+02   1* 1.997213E+02   1* 2.020618E+02   1* 2.044024E+02
  1* 2.067429E+02   1* 2.090835E+02   1* 2.114240E+02   1* 2.137645E+02
  1* 2.161051E+02   1* 2.184456E+02   1* 2.207862E+02   1* 2.231267E+02
  1* 2.254673E+02   1* 2.278078E+02   1* 2.301484E+02   1* 2.318506E+02
  1* 2.328081E+02   1* 2.333932E+02   1* 2.336060E+02   1* 2.337124E+02
  1* 2.338720E+02   1* 2.341912E+02   1* 2.348827E+02   1* 2.355742E+02
  1* 2.358934E+02   1* 2.360389E+02   1* 2.360957E+02   1* 2.361526E+02
  1* 2.362981E+02   1* 2.366173E+02   1* 2.372556E+02   1* 2.379471E+02
  1* 2.383195E+02   1* 2.384791E+02   1* 2.385678E+02   1* 2.386907E+02
  1* 2.391120E+02   1* 2.394897E+02   1* 2.395421E+02   1* 2.395527E+02
  1* 2.395633E+02   1* 2.396418E+02   1* 2.401018E+02   1* 2.414671E+02
  1* 2.434174E+02   1* 2.461145E+02   1* 2.495584E+02   1* 2.530023E+02
  1* 2.558945E+02   1* 2.582350E+02   1* 2.605756E+02   1* 2.629161E+02
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GRID BLOCK BRINE PRESSURE INITIAL CONDITIONS
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1* 1.164721E+07
1* 1.311241E+07  1* 1.307756E+07  1* 1.305793E+07  1* 1.305113E+07
1* 1.304989E+07  1* 1.304951E+07  1* 1.304922E+07  1* 1.304912E+07
1* 1.304903E+07  1* 1.304883E+07  1* 1.304836E+07  1* 1.304692E+07
1* 1.304012E+07  1* 1.302059E+07  1* 1.299273E+07  1* 1.296467E+07
1* 1.293661E+07  1* 1.290846E+07  1* 1.288040E+07  1* 1.285235E+07
1* 1.282420E+07  1* 1.279614E+07  1* 1.276798E+07  1* 1.273973E+07
1* 1.271168E+07  1* 1.268362E+07  1* 1.265546E+07  1* 1.262741E+07
1* 1.259944E+07  1* 1.257138E+07  1* 1.254323E+07  1* 1.252264E+07
1* 1.251105E+07  1* 1.250406E+07  1* 1.250147E+07  16* 1.013250E+05
1* 1.244047E+07  1* 1.243539E+07  1* 1.243099E+07  1* 1.243041E+07
1* 1.013250E+05  1* 1.243013E+07  1* 1.242907E+07  1* 1.242361E+07
1* 1.240724E+07  1* 1.238377E+07  1* 1.235150E+07  1* 1.231003E+07
1* 1.226846E+07  1* 1.223370E+07  1* 1.220563E+07  1* 1.217757E+07
1* 1.214951E+07  1* 1.212145E+07  1* 1.209329E+07  1* 1.206513E+07
1* 1.203716E+07  1* 1.200910E+07  1* 1.198094E+07  1* 1.195278E+07
1* 1.192461E+07  1* 1.189664E+07  1* 1.186858E+07  1* 1.184042E+07
1* 1.181235E+07  1* 1.178429E+07  1* 1.175612E+07  1* 1.172834E+07
1* 1.170890E+07  1* 1.170200E+07  1* 1.170047E+07  1* 1.170009E+07
1* 1.169999E+07  1* 1.169990E+07  1* 1.169980E+07  1* 1.169951E+07
1* 1.169923E+07  1* 1.169798E+07  1* 1.169089E+07  1* 1.167125E+07
1* 1.163658E+07
1* 1.223770E+07  1* 1.220274E+07  1* 1.218320E+07  1* 1.217640E+07
1* 1.217506E+07  1* 1.217477E+07  1* 1.217458E+07  2* 1.217448E+07
1* 1.217420E+07  1* 1.217362E+07  1* 1.217228E+07  1* 1.216539E+07
1* 1.214594E+07  1* 1.211826E+07  1* 1.209010E+07  1* 1.206194E+07
1* 1.203378E+07  1* 1.200562E+07  1* 1.197756E+07  1* 1.194940E+07
1* 1.192124E+07  1* 1.189327E+07  1* 1.186521E+07  1* 1.183704E+07
1* 1.180888E+07  1* 1.178081E+07  1* 1.175275E+07  1* 1.172468E+07
1* 1.169661E+07  1* 1.166855E+07  1* 1.164805E+07  1* 1.163646E+07
1* 1.162946E+07  1* 1.162707E+07  1* 1.162573E+07  1* 1.162372E+07
1* 1.161998E+07  1* 1.161155E+07  1* 1.160322E+07  1* 1.159967E+07
1* 1.159785E+07  1* 1.159690E+07  1* 1.159632E+07  1* 1.159469E+07
1* 1.159086E+07  1* 1.158320E+07  1* 1.157496E+07  1* 1.157036E+07
1* 1.156844E+07  1* 1.156749E+07  1* 1.156586E+07  1* 1.156078E+07
1* 1.155637E+07  1* 1.155580E+07  1* 1.013250E+05  1* 1.155551E+07
1* 1.155446E+07  1* 1.154909E+07  1* 1.153262E+07  1* 1.150905E+07
1* 1.147686E+07  1* 1.143557E+07  1* 1.139409E+07  1* 1.135941E+07
1* 1.133144E+07  1* 1.130327E+07  1* 1.127510E+07  1* 1.124694E+07
1* 1.121877E+07  1* 1.119061E+07  1* 1.116263E+07  1* 1.113456E+07
1* 1.110639E+07  1* 1.107832E+07  1* 1.105025E+07  1* 1.102217E+07
1* 1.099400E+07  1* 1.096584E+07  1* 1.093776E+07  1* 1.090969E+07
1* 1.088161E+07  1* 1.085383E+07  1* 1.083447E+07  1* 1.082757E+07
1* 1.082604E+07  1* 1.082575E+07  1* 1.082556E+07  2* 1.082547E+07
1* 1.082527E+07  1* 1.082489E+07  1* 1.082355E+07  1* 1.081665E+07
1* 1.079720E+07  1* 1.076242E+07
1* 9.865862E+06  1* 9.830879E+06  1* 9.811422E+06  1* 9.804616E+06
1* 9.803178E+06  1* 9.802795E+06  3* 9.802700E+06  1* 9.802412E+06
1* 9.801837E+06  1* 9.800590E+06  1* 9.793786E+06  1* 9.774232E+06
1* 9.746532E+06  1* 9.718449E+06  1* 9.690364E+06  1* 9.662183E+06
1* 9.633906E+06  1* 9.605918E+06  1* 9.577833E+06  1* 9.549651E+06
1* 9.521758E+06  1* 9.493768E+06  1* 9.465585E+06  1* 9.437499E+06
1* 9.409507E+06  1* 9.381421E+06  1* 9.353238E+06  1* 9.325150E+06
1* 9.297159E+06  1* 9.276644E+06  1* 9.265044E+06  1* 9.258046E+06
1* 9.255746E+06  1* 9.254404E+06  1* 9.252294E+06  1* 9.248651E+06
1* 9.240216E+06  1* 9.231779E+06  1* 9.228232E+06  1* 9.226411E+06
1* 9.225548E+06  1* 9.224974E+06  1* 9.223248E+06  1* 9.219509E+06
1* 9.211840E+06  1* 9.203499E+06  1* 9.198898E+06  1* 9.197076E+06
1* 9.196213E+06  1* 9.194487E+06  1* 9.189311E+06  1* 9.184997E+06
1* 9.184422E+06  1* 1.013250E+05  1* 9.184038E+06  1* 9.183080E+06
1* 9.177711E+06  1* 9.161222E+06  1* 9.137735E+06  1* 9.105523E+06
1* 9.064299E+06  1* 9.022979E+06  1* 8.988370E+06  1* 8.960375E+06
1* 8.932188E+06  1* 8.904001E+06  1* 8.875910E+06  1* 8.847818E+06
1* 8.819631E+06  1* 8.791538E+06  1* 8.763542E+06  1* 8.735450E+06
1* 8.707356E+06  1* 8.679360E+06  1* 8.651266E+06  1* 8.623173E+06
1* 8.594983E+06  1* 8.566793E+06  1* 8.538698E+06  1* 8.510796E+06
1* 8.483085E+06  1* 8.463619E+06  1* 8.456812E+06  1* 8.455277E+06
1* 8.454894E+06  1* 8.454702E+06  2* 8.454606E+06  1* 8.454510E+06
1* 8.454127E+06  1* 8.452688E+06  1* 8.445784E+06  1* 8.426415E+06
1* 8.391607E+06
55* 8.220000E+05  1* 1.013250E+05  40* 8.220000E+05
55* 8.220000E+05  1* 1.013250E+05  40* 8.220000E+05
```

```
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
 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
 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
 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* 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
```

```
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
```

```
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 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 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
```

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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
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************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
   6    16:19:04    = PROGRAM RUN TIME
   7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
   6    17:53:41    = PROGRAM RUN TIME
   7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
 1310    29 3.162278E-23 3.162278E-23 3.162278E-23  1.000000E-02  9.750000E-09
 1311    30 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
 1312    31 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
 1313    32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
 1310    29 1.778279E-25 1.778279E-25 1.778279E-25  1.000000E-02  9.750000E-09
 1311    30 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
 1312    31 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
 1313    32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
 1325    44 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.960000E-09
 1326    45 5.966457E-19 5.966457E-19 5.966457E-19  2.400000E-01  1.590000E-09
 1327    46 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.590000E-09
 1328    47 1.808153E-15 1.808153E-15 1.808153E-15  5.000000E-02  1.600000E-09
 1329    48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
 1325    44 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.960000E-09
 1326    45 5.525260E-18 5.525260E-18 5.525260E-18  2.400000E-01  1.590000E-09
 1327    46 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.590000E-09
 1328    47 1.771256E-15 1.771256E-15 1.771256E-15  5.000000E-02  1.600000E-09
 1329    48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
 1332    51 3.162278E-13 6.454208E-13 3.162278E-13  3.200000E-01  0.000000E+00
 1333    52 3.162278E-13 3.162278E-13 3.162278E-13  3.200000E-01  0.000000E+00
 1334    53 3.162278E-13 1.210204E-13 3.162278E-13  3.200000E-01  0.000000E+00
 1335    54 3.162278E-13 7.586304E-14 3.162278E-13  3.200000E-01  0.000000E+00
 1336    55 3.162278E-13 3.320391E-14 3.162278E-13  3.200000E-01  0.000000E+00
 1337    56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
 1338    57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
 1339    58 3.162278E-14 3.162278E-14 3.162278E-14  3.200000E-01  0.000000E+00
 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
 1332    51 1.000000E-11 2.041000E-11 1.000000E-11  3.200000E-01  0.000000E+00
 1333    52 1.000000E-11 1.000000E-11 1.000000E-11  3.200000E-01  0.000000E+00
 1334    53 1.000000E-11 3.827000E-12 1.000000E-11  3.200000E-01  0.000000E+00
 1335    54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
 1336    55 1.000000E-11 1.050000E-12 1.000000E-11  3.200000E-01  0.000000E+00
 1337    56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
 1338    57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
 1339    58 1.000000E-12 1.000000E-12 1.000000E-12  3.200000E-01  0.000000E+00
 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
 1345    30 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01    1    1    0
 1346    31 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01    1    1    0
 1347    KLINKENBERG EFFECT TO BE USED? True or False
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
 1345    30 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01    1    1    0
 1346    31 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01    1    1    0
 1347    KLINKENBERG EFFECT TO BE USED? True or False
************

Number of difference sections found: 5
Number of difference records found: 18

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
K2.DMS_WATERFLOOD.BRAGFLO]BRA_B1_2.DIFF;1-
    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1-
    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R002.INP;1
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File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
  5   06/17/96   = PROGRAM RUN DATE
  6   16:19:04   = PROGRAM RUN TIME
  7   1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
  5   09/09/96   = PROGRAM RUN DATE
  6   12:05:00   = PROGRAM RUN TIME
  7   1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
1310   29 3.162278E-23 3.162278E-23 3.162278E-23  1.000000E-02  9.750000E-09
1311   30 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
1312   31 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
1310   29 1.778279E-25 1.778279E-25 1.778279E-25  1.000000E-02  9.750000E-09
1311   30 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
1312   31 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
1325   44 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.960000E-09
1326   45 5.966457E-19 5.966457E-19 5.966457E-19  2.400000E-01  1.590000E-09
1327   46 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.590000E-09
1328   47 1.808153E-15 1.808153E-15 1.808153E-15  5.000000E-02  1.600000E-09
1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
1325   44 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.960000E-09
1326   45 5.525260E-18 5.525260E-18 5.525260E-18  2.400000E-01  1.590000E-09
1327   46 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.590000E-09
1328   47 1.771256E-15 1.771256E-15 1.771256E-15  5.000000E-02  1.600000E-09
1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
1332   51 3.162278E-13 6.454208E-13 3.162278E-13  3.200000E-01  0.000000E+00
1333   52 3.162278E-13 3.162278E-13 3.162278E-13  3.200000E-01  0.000000E+00
1334   53 3.162278E-13 1.210204E-13 3.162278E-13  3.200000E-01  0.000000E+00
1335   54 3.162278E-13 7.586304E-14 3.162278E-13  3.200000E-01  0.000000E+00
1336   55 3.162278E-13 3.320391E-14 3.162278E-13  3.200000E-01  0.000000E+00
1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
1339   58 3.162278E-14 3.162278E-14 3.162278E-14  3.200000E-01  0.000000E+00
1340   FRACTURE MODEL DATA TO FOLLOW :T OR F
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
1332   51 1.000000E-11 2.041000E-11 1.000000E-11  3.200000E-01  0.000000E+00
1333   52 1.000000E-11 1.000000E-11 1.000000E-11  3.200000E-01  0.000000E+00
1334   53 1.000000E-03 3.827000E-04 1.000000E-03  3.200000E-01  0.000000E+00
1335   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
1336   55 1.000000E-03 1.050000E-04 1.000000E-03  3.200000E-01  0.000000E+00
1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
1339   58 1.000000E-12 1.000000E-12 1.000000E-12  3.200000E-01  0.000000E+00
1340   FRACTURE MODEL DATA TO FOLLOW :T OR F
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
1345   30 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
1346   31 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
1347   KLINKENBERG EFFECT TO BE USED? True or False
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
1345   30 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
1346   31 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01   1   1   0
1347   KLINKENBERG EFFECT TO BE USED? True or False
************

Number of difference sections found: 5
Number of difference records found: 19

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
K2.DMS_WATERFLOOD.BRAGFLO]BRA_B1_4.DIFF;1-
    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1-
    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R004.INP;1
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File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
  5    06/17/96    = PROGRAM RUN DATE
  6    16:19:04    = PROGRAM RUN TIME
  7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
  5    09/12/96    = PROGRAM RUN DATE
  6    09:36:39    = PROGRAM RUN TIME
  7    1996 FEPS: PRESENT DAY EFFECTS OF OIL AND GAS DEVELOPMENT
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
 1310   29 3.162278E-23 3.162278E-23 3.162278E-23  1.000000E-02  9.750000E-09
 1311   30 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
 1312   31 1.288251E-19 1.288251E-19 1.288251E-19  1.100000E-02  7.511818E-09
 1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
 1310   29 1.778279E-25 1.778279E-25 1.778279E-25  1.000000E-02  9.750000E-09
 1311   30 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
 1312   31 7.943276E-18 7.943276E-18 7.943276E-18  1.100000E-02  7.511818E-09
 1313   32 9.999999E-36 9.999999E-36 9.999999E-36  1.810000E-01  0.000000E+00
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
 1325   44 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.960000E-09
 1326   45 5.966457E-19 5.966457E-19 5.966457E-19  2.400000E-01  1.590000E-09
 1327   46 5.000338E-19 5.000338E-19 5.000338E-19  2.400000E-01  1.590000E-09
 1328   47 1.808153E-15 1.808153E-15 1.808153E-15  5.000000E-02  1.600000E-09
 1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
 1325   44 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.960000E-09
 1326   45 5.525260E-18 5.525260E-18 5.525260E-18  2.400000E-01  1.590000E-09
 1327   46 5.000000E-18 5.000000E-18 5.000000E-18  2.400000E-01  1.590000E-09
 1328   47 1.771256E-15 1.771256E-15 1.771256E-15  5.000000E-02  1.600000E-09
 1329   48 6.829677E-18 6.829677E-18 6.829677E-18  5.000000E-02  1.600000E-09
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
 1332   51 3.162278E-13 6.454208E-13 3.162278E-13  3.200000E-01  0.000000E+00
 1333   52 3.162278E-13 3.162278E-13 3.162278E-13  3.200000E-01  0.000000E+00
 1334   53 3.162278E-13 1.210204E-13 3.162278E-13  3.200000E-01  0.000000E+00
 1335   54 3.162278E-13 7.586304E-14 3.162278E-13  3.200000E-01  0.000000E+00
 1336   55 3.162278E-13 3.320391E-14 3.162278E-13  3.200000E-01  0.000000E+00
 1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
 1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
 1339   58 3.162278E-14 3.162278E-14 3.162278E-14  3.200000E-01  0.000000E+00
 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
 1332   51 1.000000E-11 2.041000E-11 1.000000E-11  3.200000E-01  0.000000E+00
 1333   52 1.000000E-11 1.000000E-11 1.000000E-11  3.200000E-01  0.000000E+00
 1334   53 1.000000E-03 3.827000E-04 1.000000E-03  3.200000E-01  0.000000E+00
 1335   54 1.000000E-11 2.399000E-12 1.000000E-11  3.200000E-01  0.000000E+00
 1336   55 1.000000E-03 1.050000E-04 1.000000E-03  3.200000E-01  0.000000E+00
 1337   56 5.000339E-17 5.000339E-17 5.000339E-17  3.200000E-01  1.200000E-09
 1338   57 1.000000E-09 1.000000E-09 1.000000E-09  3.200000E-01  0.000000E+00
 1339   58 1.000000E-12 1.000000E-12 1.000000E-12  3.200000E-01  0.000000E+00
 1340    FRACTURE MODEL DATA TO FOLLOW :T OR F
************
************
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1
 1345   30 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
 1346   31 2.000000E+05 3.800000E+06 5.000000E-02 1.505499E+01   1   1   0
 1347    KLINKENBERG EFFECT TO BE USED? True or False
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
 1345   30 2.000000E+05 3.800000E+06 5.000000E-02 2.146364E+01   1   1   0
 1346   31 2.000000E+05 3.800000E+06 5.000000E-02 2.146364E+01   1   1   0
 1347    KLINKENBERG EFFECT TO BE USED? True or False
************

Number of difference sections found: 5
Number of difference records found: 19

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
K2.DMS_WATERFLOOD.BRAGFLO]BRA_B1_5.DIFF;1-
    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R001.INP;1-
    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_BASE01_R005.INP;1
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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
```

```
************
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_R004.INP;1
  5    09/09/96    = PROGRAM RUN DATE
  6    12:05:31    = 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_R004.INP;1
 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_R004.INP;1
 1333    53 1.000000E-03 3.827000E-04 1.000000E-03  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-03 1.050000E-04 1.000000E-03  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_4.DIFF;1-
   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2-
   N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R004.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_R005.INP;1
  5    09/12/96    = PROGRAM RUN DATE
  6    09:37:09    = 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_R005.INP;1
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_R005.INP;1
1333    53 1.000000E-03 3.827000E-04 1.000000E-03  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-03 1.050000E-04 1.000000E-03  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_R002.INP;2
1344    30 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01    1   1   0
1345    31 2.000000E+05 3.800000E+06 5.000000E-02 1.233018E+01    1   1   0
1346    KLINKENBERG EFFECT TO BE USED? True or False
******
File N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R005.INP;1
1344    30 2.000000E+05 3.800000E+06 5.000000E-02 2.146364E+01    1   1   0
1345    31 2.000000E+05 3.800000E+06 5.000000E-02 2.146364E+01    1   1   0
1346    KLINKENBERG EFFECT TO BE USED? True or False
************

Number of difference sections found: 4
Number of difference records found: 11

DIFFERENCES
/IGNORE=(COMMENTS)/COMMENT_DELIMITERS=(EXCLAMATION)/MERGED=1/OUTPUT=N1:[NOBAC
K2.DMS_WATERFLOOD.BRAGFLO]BRA_Y2_5.DIFF;1-
    N1:[NOBACK2.DMS_WATERFLOOD.BRAGFLO]BRAGFLO_WATFLD_YATES01_R002.INP;2-
    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
!
```

```
brnd    = h0310010
mb138ou2 = intright(brnd)
delete brnd
!
TOT_OUT = mb139ou1 + mb138ou1 + mb139ou2 + mb138ou2
!
c1      = flowbry[e:3067]
cul_well = intright(c1)
delete c1
!
c2      = flowbry[e:3147]
cul_wel2 = intright(c2)
delete c2
!
tot_cul = cul_well + cul_wel2
!
!
limit block 34
tot_vol1 = sum(del_x*del_y*thick)
avg_pres = sum(presbrin*(del_x*del_y*thick)/tot_vol1)
avg_bsat = sum((1-satgas)*(del_x*del_y*thick)/tot_vol1)
delete tot_vol1
!
limit block 37
tot_vol2 = sum(del_x*del_y*thick)
pres_drz = sum(presbrin*(del_x*del_y*thick)/tot_vol2)
bsat_drz = sum((1-satgas)*(del_x*del_y*thick)/tot_vol2)
delete tot_vol2
!
limit block 30
tot_vol3 = sum(del_x*del_y*thick)
pres_139 = sum(presbrin*(del_x*del_y*thick)/tot_vol3)
bsat_139 = sum((1-satgas)*(del_x*del_y*thick)/tot_vol3)
delete tot_vol3
!
exit
```

```
!==========================================================================
!
! ANALYST: D. M. STOELZEL
! DATE:   6/20/96
! WATERFLOOD ANALYSIS
!==========================================================================
!
*INPUT FILE
TEMPLATE = &
N1:[NOBACK2.DMS_WATERFLOOD.POSTALG]POSTALG_WATFLD_BASE01_R###.CDB
!
*VECTORS
        ID="#"
        VECTORS=1, 2, 4, 5
!
*TIMES
        READ=SECONDS
        INPUT=YEARS
        OUTPUT=YEARS
        INTERPOLATE= 0 TO 10 BY 2, 10 TO 50 BY 5, 50 TO 1250 BY 50,&
        1250 TO 10000 BY 250
        ORDER=FIRST
!
*ITEMS
        TYPE=HISTORY
!
        NAMES= TOT_INJ,TOT_WELL,TOT_REPO,TOT_OUT
!
        TYPE= GLOBAL
!
        NAMES= BELL_TOT,TOT_FLUP,MB_AWAY,TOT_CUL,AVG_PRES,AVG_BSAT,PRES_DRZ,&
               BSAT_DRZ,PRES_139,BSAT_139
!
*OUTPUT FILE
        DRIVER=EXCEL
        WRITE=TIME VS ITEM
        MULTIPLE FILES
        NAME=BAS01%%%.EXT
        ID="%"
        EXTENSION=TXT
!
*END
```

```
!========================================================================
!
! ANALYST: D. M. STOELZEL
! DATE:    6/20/96
! WATERFLOOD ANALYSIS
!========================================================================
!
*INPUT FILE
TEMPLATE = &
N1:[NOBACK2.DMS_WATERFLOOD.POSTALG]POSTALG_WATFLD_YATES01_R###.CDB
!
*VECTORS
          ID="#"
          VECTORS=2 TO 5
!
*TIMES
          READ=SECONDS
          INPUT=YEARS
          OUTPUT=YEARS
          INTERPOLATE= 0 TO 10 BY 2, 10 TO 50 BY 5, 50 TO 1250 BY 50,&
          1250 TO 10000 BY 250
          ORDER=FIRST
!
*ITEMS
          TYPE=HISTORY
!
          NAMES= TOT_INJ,TOT_WELL,TOT_REPO,TOT_OUT
!
          TYPE= GLOBAL
!
          NAMES= BELL_TOT,TOT_FLUP,MB_AWAY,TOT_CUL,AVG_PRES,AVG_BSAT,PRES_DRZ,&
                   BSAT_DRZ,PRES_139,BSAT_139
!
*OUTPUT FILE
          DRIVER=EXCEL
          WRITE=TIME VS ITEM
          MULTIPLE FILES
          NAME=YAT01%%%.EXT
          ID="%"
          EXTENSION=TXT
!
*END
```