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# TRACR3

## A Model of Flow and Transp
## in Porous/Fractured Mea

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# TRACR3D: A Model of Flow and Transport in Porous/Fractured Media

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# TRACR3D: A MODEL OF FLOW AND TRANSPORT IN POROUS/FRACTURED MEDIA

by

B. J. Travis

ABSTRACT

This report describes the TRACR3D computer code, which solves the equations of transient two-phase flow and multi-component transport in deformable, heterogeneous, reactive porous/fractured media. Solution is obtained by an implicit finite difference scheme for flow and a semi-implicit approach for transport. This report describes the equations of the model, defines the numerical solution procedure, presents partial verification and validation of the model, and includes a user's guide. TRACR3D can be used to study radioactive waste migration from repositories in unsaturated and saturated geology, chemical waste storage, soil water movement, and tests that define hydrocarbon reservoir structure.

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## I. INTRODUCTION

The TRACR3D code was developed to model time-dependent mass flow and chemical species transport in a three-dimensional, deformable, heterogeneous, reactive porous/fractured medium. The applications are numerous--a partial list includes such environmental concerns as chemical and nuclear waste management, hydrologic and agricultural studies, tracer tests for estimating reservoir characteristics, and studies of gas reservoirs, fractured or not.

Common to all these areas is the transport of fluids (water, air, and a variety of reactive chemical species) through porous/fractured materials such as soils and some rocks. For some situations, simple models will suffice and

analytic solutions are available. For other situations, a more complex model is required. Generally, then, a numerical solution must be used.

This document discusses the physics and the numerical techniques used to solve the equations constituting the TRACR3D model. The notation used throughout this report is given in Table I. Comparisons with analytic solutions for special cases and with some experimental data are given. Finally, a user's guide is given in Appendix A, the subroutines are described in Appendix B, and a sample problem is given in Appendix C. As with any dynamic program, we anticipate that there will be alterations to enhance the physical models, numerical solution, or computational speed.

TABLE I

NOTATION USED IN TRACR3D

| Parameter | Description | Units |
|---|---|---|
| $A$ | cell interface area | $(cm^2)$ |
| $C$ | mass concentration of tracer | $(gm \cdot gm^{-1} \cdot fluid)$ |
| $C_{0\alpha}$ | solubility limit of species $\alpha$ | $(gm \cdot gm^{-1} \cdot fluid)$ |
| $\bar{\bar{D}}_{ij}$ | components of dispersion tensor | $(cm^2 \cdot s^{-1})$ |
| $D_{\alpha_i}$ | molecular diffusivity of species $\alpha$ in fluid i | $(cm^2 \cdot s^{-1})$ |
| $K_d$ | equilibrium sorption coefficient | $(cm^3 \cdot gm^{-1})$ |
| $L$ | length scale, such as typical particle size | $(cm)$ |
| $M_\alpha$ | molecular weight of species $\alpha$ | $(gm \cdot mole^{-1})$ |
| $P$ | pressure | $(dyne \cdot cm^{-2})$ |
| $P_b$ | bubbling pressure | $(dyne \cdot cm^{-2})$ |
| $P_c$ | capillary pressure | $(dyne \cdot cm^{-2})$ |
| $P_e$ | Peclet number | |
| $Q$ | kinetic sorption coefficient | $(s^{-1})$ |
| $R$ | universal gas constant | $(erg \cdot mole^{-1} \cdot {}^{\circ}C^{-1})$ |
| $\dot{S}$ | mass source or sink | $(gm \cdot cm^{-3} \cdot s^{-1})$ |
| $S_\alpha$ | concentration of species | $(gm \cdot gm^{-1})$ |
| $S_m$ | maximum adsorption limit | $(gm \cdot gm^{-1} \cdot solid)$ |
| $T$ | temperature | $({}^{\circ}C)$ |
| $a_{I,II}$ | longitudinal and transverse dispersivities | $(cm)$ |
| $\hat{g}$ | gravity acceleration | $(cm \cdot s^{-2})$ |
| $k$ | permeability | $(cm^2)$ |
| $m_{ij}$ | coordinate system metric | |

$$\partial_t(\varepsilon\rho_g\sigma_g) + \nabla \cdot (\rho_g\vec{u}_g) = \varepsilon\dot{S}_g \tag{1}$$

and for the liquid component is

$$\partial_t(\varepsilon\sigma_\ell\rho_\ell) + \nabla \cdot (\rho_\ell\vec{u}_\ell) = \varepsilon\dot{S}_\ell \ . \tag{2}$$

For isothermal systems in which water vapor is neglected, no diffusion or dispersion of water occurs. Dispersion of air has been neglected. Porosity $\varepsilon$ is allowed to vary with pressure. Dynamic changes in porosity can have a dramatic effect on flow because storage capacity and permeability are generally quite sensitive to changes in porosity. Equations (1) and (2) cover conditions of flow ranging from fully water saturated to fully air saturated.

For each tracer, the mass conservation equations are

$$\partial_t(\varepsilon\sigma_i\rho_i C_\alpha) + \nabla \cdot (\rho_i\vec{u}_i C_\alpha) = \nabla \cdot (\varepsilon\sigma_i\tau_c D_{\alpha_i}\rho_i\nabla C_\alpha) + \varepsilon C_\alpha\dot{S}_i + \nabla \cdot [\varepsilon\sigma_i\bar{D}_\alpha\nabla(\rho_i C_\alpha)] -$$

$$\varepsilon\lambda_\alpha\sigma_i\rho_i C_\alpha + \varepsilon\lambda_{\alpha-1}\sigma_i\rho_i\frac{C_{\alpha-1}}{M_{\alpha-1}}M_\alpha - \rho_i\rho_m[Q_{1\alpha}C_\alpha(S_{m\alpha}-S_\alpha) - Q_{2\alpha}S_\alpha(C_{0\alpha}-C_\alpha)] \tag{3}$$

and

$$\partial_t S_\alpha = Q_{1\alpha}C_\alpha(S_{m\alpha}-S_\alpha) - Q_{2\alpha}S_\alpha(C_{0\alpha}-C_\alpha) + \lambda_{\alpha-1}\frac{S_{\alpha-1}}{M_{\alpha-1}}M_\alpha - \lambda_\alpha S_\alpha \ . \tag{4}$$

An arbitrary number of tracer species is allowed. The tracer concentrations are assumed to be small. Mass flow caused by the Soret effect has been ignored, as has diffusion in the solid phase. Equations (3) and (4) describe the advective/diffusive/dispersive transport of tracer species that can decay (in chains) and adsorb or desorb with mineral substrates. Several types of sorption models are allowed. In their full form, Eqs. (3) and (4) model saturable, nonequilibrium sorption. The rate of adsorption is represented by $Q_{1\alpha}$, and the rate of desorption is represented by $Q_{2\alpha}$ . For equilibrium sorption, Eq. (4) is replaced with

$$Q_{1\alpha}C_\alpha(S_{m\alpha}-S_\alpha) - Q_{2\alpha}S_\alpha(C_{0\alpha}-C_\alpha) = K_{d\alpha}(\partial_t C_\alpha + \lambda_\alpha C_\alpha) - \lambda_{\alpha-1}K_{d\alpha-1}C_{\alpha-1}\frac{M_\alpha}{M_{\alpha-1}} , \qquad (5)$$

where $K_{d\alpha}$ is an equilibrium sorption coefficient. In Eq. (4), $S_{m\alpha}$ represents the maximum amount of tracer $\alpha$ that can adsorb onto a mineral substrate, whereas $C_{0\alpha}$ represents the solubility limit of tracer $\alpha$. Transport under unsaturated conditions is also handled through the appearance of saturation $\sigma_i$ in Eq. (3). By re-defining the $C_\alpha$'s and $S_\alpha$'s, colloid transport can also be modelled.

In Eq. (3), the traditional, velocity-dependent dispersion tensor is used. Dispersion is apparently a more complicated process than can be described by Eq. (3). Measurements of dispersivity in the field show time and length scale effects. Some of this is simply related to scales of heterogeneity in the field geology and could, in principle, be computed by the TRACR3D model. However, there appears to be a further effect that requires a better model.[1] Until a consensus is reached on the form of that model, the current dispersion model will remain.

The conservation equations, Eqs. (1) through (5), involve quantities that represent local volume averages. The averages are obtained by integrating the continuum conservation equations over small "representative" volumes (small compared with the scale of the problem at hand but large compared with the individual flow paths between the matrix grains). This averaging is necessary because our present mathematics cannot provide a practical means of solving the continuum equations at arbitrary points in such a complex system as a soil. Details of the averaging process can be found in Chap. 4 of Bear's text.[2] Chapter 10 of Ref. 2 reviews assumptions underlying Eqs. (1) through (5).

An implicit assumption in Eqs. (3) and (4) is that as a tracer moves into a small region of porous material from a neighboring region, the tracer is uniformly distributed throughout the pores and channels in that small region. This might not hold in all situations because fluid moves faster through the larger pores and channels. This will be a valid assumption if the characteristic diffusion time, say $t_D = L^2/D_\alpha$, is about the same size as the characteristic residence time $= \Delta x/V$, where $\Delta x$ is the scale size of the region (or a computational grid size). In other words, if $\Delta x \cdot D_\alpha/V > L^2$, then the

assumption is valid. For many soils and rocks, the characteristic pore size L will be a millimeter or less, and the condition will be satisfied for many instances.

The momenta conservation equations are solved in a reduced form known as Forchheimer's equations

$$\left[1 + \frac{1}{(1-\varepsilon)} \frac{L\rho_i|\vec{u}_i|}{85.7\mu_i}\right]\vec{u}_i = -\frac{k_i}{\mu_i}(\nabla P_i + \rho_i \vec{g}) \ , \tag{6}$$

where the subscript i refers to a gas or liquid phase. This form neglects the acceleration term and uses a phenomenological treatment of inertial terms and viscous drag. At low Reynolds number (<10), this expression reduces to the well-known Darcy equation; at higher Reynolds number, the nonlinear term in Eq. (6) becomes important. Equation (6) gives excellent agreement[3] with steady, single phase flow data for Reynolds numbers up to about 100. Reynolds numbers much higher than a few hundred are rarely encountered in most flows through porous, permeable geomedia. We assume Eq. (6) is approximately valid for transient two-phase flow.

In Eq. (6), $k_i$ is a function of the saturated permeability of the matrix and of the degree of saturation of the pore space. It represents the exchange of momentum between the fluids and the drag on the fluids by the matrix. Brooks and Corey[4] have derived expressions for $k_i$ that give good agreement to data for many materials. They express the dependence of $k_i$ on saturation with

$$k_\ell = k \cdot k_{\ell r} \ , \ k_{\ell r} = \sigma_{\ell e}^{(3+2/\tau)} \tag{7}$$

and

$$k_g = k \cdot k_{gr} \ , \ k_{gr} = (1-\sigma_{\ell e})^2\left[1-\sigma_{\ell e}^{(1+2/\tau)}\right] \ , \tag{8}$$

where $k_\ell$ is the liquid permeability, $k_g$ is the permeability of the gas phase, k is the saturated permeability, and $\sigma_{\ell e} = (\sigma_\ell - \sigma_0)/(1-\sigma_0)$. Here $\sigma_0$ is the "irreducible" wetting saturation; that is, the minimum saturation at which continuous flow of the liquid phase can be maintained. It is a material

property and depends on the soil or rock matrix pore structure and size. Alternatively, $k_i$ can be represented as a tabular function of saturation if the forms of Eqs. (7) and (8) are not convenient for a particular application, or if saturated air permeability is significantly different from saturated water permeability. Plots of $k_{gr}$ and $k_{\ell r}$ are given in Figs. 1 and 2 for different values of $\tau$. The permeability k can be anisotropic as long as the principal axes of the permeability tensor coincide with the coordinate axes. [However, for anisotropic media, the form used for the dispersion tensor may not be correct. Also, the relative permeabilities $k_{\ell r}$ and $k_{gr}$ as given in Eqs. (7) and (8) do not exhibit any directional dependence.]

An equation of state is needed. For the noncondensible gas, we assume

$$P_g = \rho_g \frac{R(T + 273.15)}{M_g} . \tag{9}$$

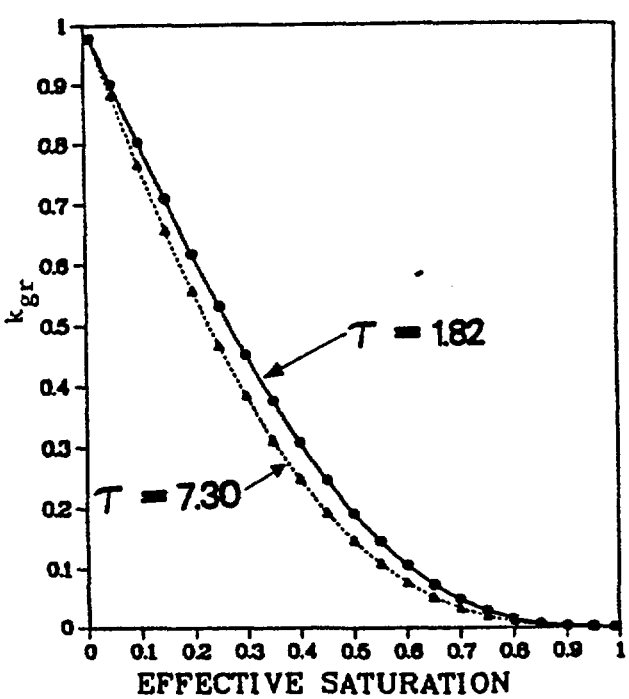


Fig. 1.
Relative air permeability for $\tau$ = 1.82 and $\tau$ = 7.30.

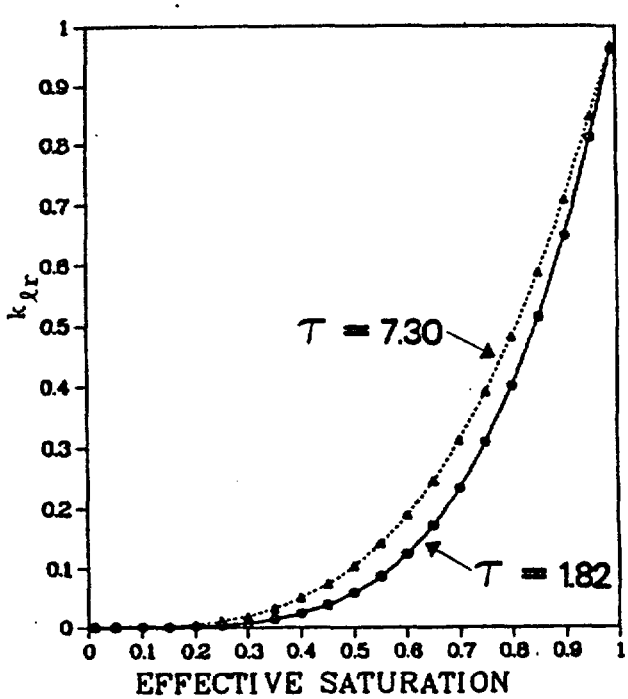


Fig. 2.
Relative water permeability for $\tau$ = 1.82 and $\tau$ = 7.30.

The liquid is considered slightly compressible for saturated conditions. In unsaturated flow, $\rho_\ell$ should usually be much less compressible than $\rho_g$, and so is treated as incompressible when $\sigma_\ell < 1$. Liquid pressure $P_\ell$ is found from

$$P_\ell = P_g - P_c(\sigma_\ell) \ . \tag{10}$$

Brooks and Corey,[4] on the basis of a large number of drainage experiments, found that capillary pressure could be represented well by the expression

$$P_c = P_b \, \sigma_{\ell e}^{-1/\tau} \quad , \text{ where } P_c > P_b \ (P_c = 0 \text{ otherwise}) \ , \tag{11}$$

and $\tau$ and $P_b$ are material constants. Our convention is that $P_c$ is $\geq 0$. $\tau$ is called the "pore-size distribution index"; $P_b$, the bubbling pressure, is the minimum value of $P_c$ on the drainage curve just before $P_c$ drops to zero. $P_c$ increases without limit as $\sigma_{\ell e} \to 0$ in Eq. (11). We limit $P_c$ by not allowing $\sigma_{\ell e}$ to decrease below $10^{-2}$; physically, this corresponds to limiting the smallest pore size that contributes to $P_c$. For $\sigma_{\ell e} < 0.01$, we artificially define $P_c$ to increase linearly to a value at $\sigma_\ell = 0$, which is two times the value of $P_c$ at $\sigma_{\ell e} = 0.01$. Table II[4] gives some typical values for the material parameters $P_b$, $\tau$, and $\sigma_0$. A tabular form of $P_c$ can be used if Eq. (11) is not convenient for a particular application. An additional relation is that

$$\sigma_g + \sigma_\ell = 1 \ . \tag{12}$$

TABLE II

TYPICAL VALUES FOR MATERIAL PROPERTIES

| | $P_b$ (bars) | $\tau$ | $\sigma_0$ |
|---|---|---|---|
| Fine sand | 0.0310 | 7.30 | 0.50 |
| "Volcanic" sand | 0.0756 | 1.82 | 0.20 |
| Glass beads | 0.0414 | 3.70 | 0.15 |
| Silt loam | 0.0162 | 2.29 | 0.60 |

The dispersion tensor[2] is given by

$$\bar{D}_{\alpha ij} = [a_{II}|\vec{V}|m_{ij} + \frac{(a_I - a_{II})V_i V_j}{|\vec{V}|}]q(P_e) \tag{13}$$

and

$$q(P_e) = \frac{P_e}{P_e + 6} \quad ,$$

where

$$P_e = \frac{L|\vec{V}|}{D_\alpha} \; .$$

Several additional relations are needed to complete the model:

$$\varepsilon = \varepsilon_0(x)[1+\beta(P-P_0)], \; \rho_\ell = \rho_{\ell_0}[1+\gamma(P-P_0)], \; k = k[1+\beta(P-P_0)]^2 \; , \tag{14}$$

$$\tau = \tau(\vec{x}), \; \sigma_0 = \sigma_0(\vec{x}), \; P_b = P_b(\vec{x}), \; k = k(\vec{x}), \; \rho_m = \rho_m(\vec{x}) \; ,$$

and

$$Q_{1\alpha} = Q_{1\alpha}(\vec{x}), \; Q_{2\alpha} = Q_{2\alpha}(\vec{x}), \; L = L(\vec{x}), \; S_{m\alpha} = S_{m\alpha}(\vec{x}), \; C_{0\alpha} = C_{0\alpha}(\vec{x}) \; . \tag{15}$$

These are all indicated and defined in Appendix A.

Equations (1) through (15) constitute the TRACR3D model. They allow calculation of transient, fully two-phase flow with tracer transport in a heterogeneous material that is nonuniform, porous, and permeable with fractures. This equation set is solved numerically as described in Sec. III.

## III. NUMERICS

The TRACR3D code was written with flexibility and ease of use in mind. Equations (1) through (15) are solved for one, two, or three dimensions using either Cartesian or cylindrical coordinates. An implicit finite difference formulation is used and is solved iteratively.

We assume a unique, well-behaved solution to Eqs. (1) through (15) exists for all physically reasonable boundary conditions and initial conditions. This confidence results from experience with many problems where the numerical solution of the difference equations matches closely one of the few analytic solutions available or agrees with experimental data. Moreover, the fact that solutions agree with experimental data gives us confidence that Eqs. (1) through (15) reasonably approximate the true physical situation for many applications.[5]

The region of interest is represented by a computational mesh of rectangular cells as shown in Fig. 3. The rows, columns, and layers of cells need not be equally spaced. Some variables (pressure, density, concentration,

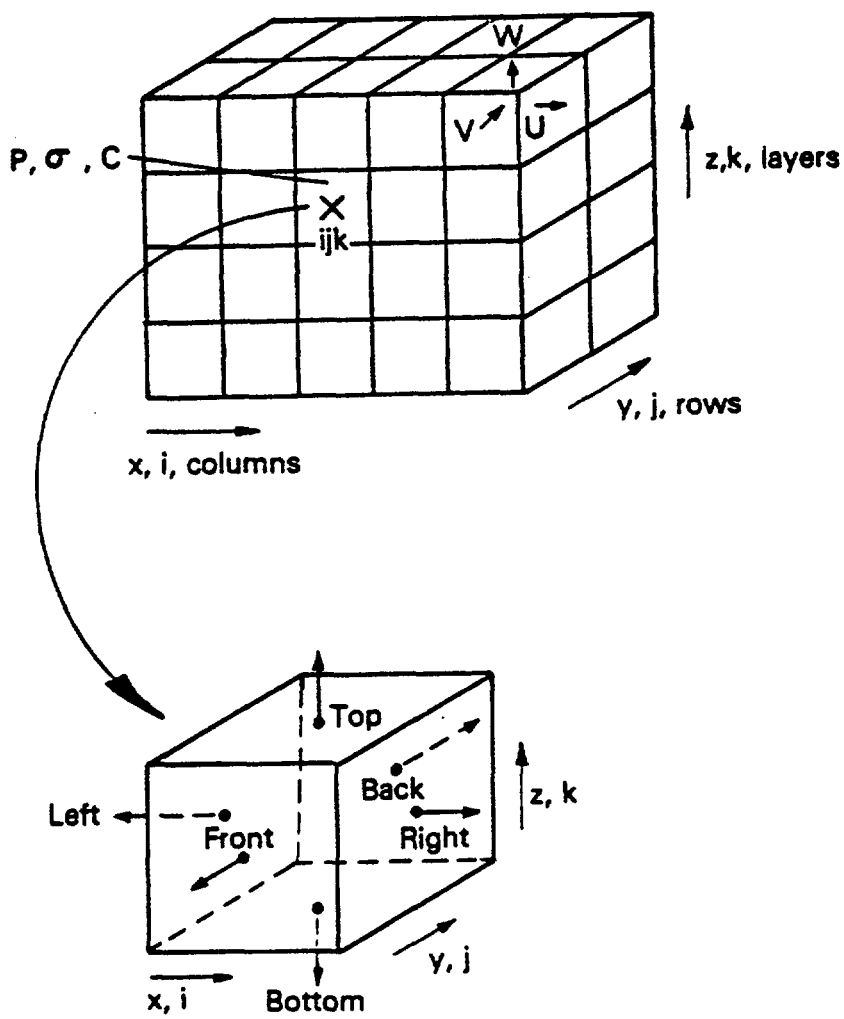


Fig. 3.
Typical computational mesh.

and saturation) are evaluated at cell centers; others (velocity components) are evaluated at cell interfaces.

The partial differential equations of the model are approximated by finite difference algebraic equations, one set for each computational cell. These difference equations relate dependent variable values at different discrete spatial locations and at different times. An approximate solution to Eqs. (1) through (15) is obtained by marching forward in time, solving the simultaneous set of difference equations for all cells at each time value.

A. Finite Difference Equations

The conservation equations of Sec. II are replaced by finite difference equations that relate dependent variable values at discrete points (cell centers). The equations are finite differenced in both space and time. The flow conservation equations are written in integral form using the divergence theorem before discretization:

$$\frac{\partial}{\partial t}\int_{\Omega} \varepsilon\rho_g\sigma_g d\Omega + \int_{B(\Omega)} \rho_g\vec{u}_g \cdot d\vec{A} = \int_{\Omega} \varepsilon\dot{S}_g d\Omega \tag{16}$$

and

$$\frac{\partial}{\partial t}\int_{\Omega} \varepsilon\rho_\ell\sigma_\ell d\Omega + \int_{B(\Omega)} \rho_\ell\vec{u}_\ell \cdot d\vec{A} = \int_{\Omega} \varepsilon\dot{S}_\ell d\Omega \ , \tag{17}$$

where integration is taken over a control volume $\Omega$ with surface $\vec{A}$. The control volumes here are the cells of the computational mesh.

In the current version of the code, Eqs. (16) and (17) are approximated by

$$\left(\varepsilon^{n+1}p^{n+1}\sigma_g^{n+1} - \varepsilon^n p^n\sigma_g^n\right)_{ijk}\frac{\Delta\Omega}{\Delta t} + \sum_{m=1}^{6}\left\langle Pu_g\right\rangle_m^{n+1}\Delta A_m(-1)^m = \left(\varepsilon^n\dot{S}_g\Delta\Omega\right)_{ijk}\cdot B \tag{18}$$

and

$$\left(\rho_\ell^{n+1}\varepsilon^{n+1}\sigma_\ell^{n+1} - \rho_\ell^n\varepsilon^n\sigma_\ell^n\right)_{ijk}\frac{\Delta\Omega}{\Delta t} + \sum_{m=1}^{6}\left\langle \rho_\ell u_\ell\right\rangle_m^{n+1}\Delta A_m(-1)^m = \left(\varepsilon^n\dot{S}_\ell\Delta\Omega\right)_{ijk}, \tag{19}$$

where B in Eq. (18) is $R \cdot (T + 273)/M$. This is known as the control-volume or

integral balance method and conserves important local properties of the model. Summation occurs in the order: left, right, bottom, top, front, and back. The symbol $\langle\ \rangle$ indicates an area-averaged value. The superscript n refers to the previous time level value, whereas superscript n+1 refers to the next time level. In Eq. (18), the density has been replaced with pressure using Eq. (9). The quantities $\Delta\Omega$ and $\Delta A_m$ are the volume and face areas of computational zone ijk.

Now velocities are replaced by Eq. (6).

In those cases for which the Reynolds number reaches a value of 10 or more, Darcy's relation is inaccurate and the nonlinear Forchheimer expression, Eq. (6), is required. The nonlinear term in the Forchheimer relation can be written as

$$(1 + d_i|u_{ij}|)\ u_{ij} = u_{Dij}\ , \tag{20}$$

where subscript i refers to a phase (liquid or gas), j refers to a coordinate direction, $u_D$ is the Darcy velocity, and u is the Forchheimer velocity. The constant $d_i$ is positive. By taking the absolute value of Eq. (20), we get

$$(1 + d_i|u_{ij}|)\ |u_{ij}| = |u_{Dij}|\ . \tag{21}$$

Then

$$d_i|u_{ij}|^2 + |u_{ij}| - |u_{Dij}| = 0, \tag{22}$$

where $d_i > 0$, and

$$|u_{ij}| = \frac{-1 \pm \sqrt{1+4d_i|u_{Dij}|}}{2d_i}\ . \tag{23}$$

The positive root is taken because $|u_{ij}| > 0$ always.

By substituting Eq. (23) into Eq. (20), we get

$$u_{ij} = \frac{u_{Dij}}{1+d_i|u_{ij}|} = \frac{u_{Dij}}{\frac{1}{2}(1 + \sqrt{1+4d_i|u_{Dij}|})} =$$

$$- \frac{k_{ij}(\nabla P_i + \rho_i \vec{g})_j}{\mu_i(\frac{1 + \sqrt{1+4d_i|u_{Dij}|}}{2})} = - \frac{\tilde{k}_{ij}}{\mu_i} (\frac{\partial P_i}{\partial x_j} + \rho_i \vec{g}_j) \ . \tag{24}$$

The term $\frac{1}{2}\left(1 + \sqrt{1+4d_i|u_{Dij}|}\right)$ is evaluated at the previous time level n and is incorporated into the effective permeability as shown in Eq. (24).

Equations (18) and (19) become

$$(\varepsilon^{n+1}p^{n+1}\sigma_g^{n+1} - \varepsilon^n p^n \sigma_g^n)_{ijk} \frac{\Delta\Omega}{\Delta t} - \sum_{m=1}^{6} \left\langle \frac{\tilde{k}_g^{n+1}}{\mu_g} p^{n+1} \left(\frac{\partial p^{n+1}}{\partial s} + \frac{p^{n+1}}{B} \vec{g}\right)\right\rangle_m \Delta A_m(-1)^m$$

$$= (\varepsilon^n \dot{S}_g \Delta\Omega) \cdot B \ . \tag{25}$$

and

$$(\rho_\ell^{n+1}\varepsilon^{n+1} - \rho_\ell^n \varepsilon^n) \frac{\Delta\Omega}{\Delta t} - (\rho_\ell^{n+1}\varepsilon^{n+1}\sigma_g^{n+1} - \rho_\ell^n \varepsilon^n \sigma_g^n) \frac{\Delta\Omega}{\Delta t}$$

$$- \sum_{m=1}^{6} \left\langle \rho_\ell \frac{\tilde{k}_g^{n+1}}{\mu_\ell} \left(\frac{\partial P_\ell^{n+1}}{\partial s} + \rho_\ell \vec{g}\right)\right\rangle_m \Delta A_m(-1)^m = \varepsilon^n \dot{S}_\ell \Delta\Omega \ . \tag{26}$$

Here the subscript ijk has been omitted, and Eq. (12) has been used in Eq. (26).

The area-averaged terms can be represented in many ways. A simple form is to use, for example,

$$\left\langle \frac{\tilde{k}_g}{\mu_g} P\left(\frac{\partial P}{\partial s} + \frac{P}{B} \vec{g}\right)\right\rangle_R = \frac{\tilde{k}_g}{\mu_g} \left[\frac{(P_R^2 - P^2)}{2\Delta x_R} + \frac{(P_R^2 + P^2)}{2B} \vec{g}\right] , \tag{27}$$

where $P_R$ is pressure in the cell to the right of zone ijk and P is pressure in zone ijk. An expression for each zone face is required. Greater accuracy (at the cost of greater computational effort) can be obtained using a form such as

$$\left\langle \frac{\tilde{k}_g}{\mu_g} \left(\frac{\partial P}{\partial s} + \frac{P}{B}\vec{g}\right)P \right\rangle_R = \frac{1}{\mu_g} \sum_{q=1}^{5} b_q \left[\frac{(P_{Rq}^2 - P^2)}{2\Delta x_q} + \frac{(P_{Rq}^2 + P_q^2)}{B}\vec{g}\right]\tilde{k}_{gq} , \tag{28}$$

where $b_q$ are weighting factors and where $P_{Rq}$ represent pressure in zones (i+1,j,k), (i+1,j+1,k), (i+1,j-1,k), (i+1,j,k+1), and (i+1,j,k-1). $P_q$ here represents pressure in cells (i,j,k), (i,j+1,k), (i,j-1,k), (i,j,k+1), and (i,j,k-1). More complicated, higher order schemes can be specified. The corresponding forms for each of the other five zone faces would also be needed. At present, only the form given in Eq. (27) is used in TRACR3D. Implementation of Eq. (28) would not change significantly the structure of the code but would require the patience to work out and code a number of lengthy algebraic expressions.

Using the scheme of Eq. (27), employing Eq. (10), and using the relations

$$\varepsilon = \varepsilon_0[1 + \beta(P - P_0)] , \tag{29}$$

$$P_c^{n+1}(\sigma_g) \approx \left[P_c^n(\sigma_g) - \sigma_g^n \frac{\partial P_c^n}{\partial \sigma_g}\right] + \left(\frac{\partial P_c^n}{\partial \sigma_g}\right)\sigma_g^{n+1} , \tag{30}$$

and

$$\tilde{k}_{im}^{n+1} \approx \tilde{k}_{im}^n + \frac{\partial \tilde{k}_{im}^n}{\partial \sigma_g}(\sigma_g^{n+1} - \sigma_g^n) , \tag{31}$$

Eqs. (25) and (26) become

$$a_1 P^{n+1}\sigma_g^{n+1} + a_2(P^2\sigma_g)^{n+1} + a_3(P^2)^{n+1} + a_4\sigma_g^{n+1} - a_5 = 0 \tag{32}$$

and

$$b_1 P^{n+1} + b_2 \sigma_g^{n+1} + b_3 P^{n+1} \sigma_g^{n+1} + b_4 (\sigma_g^2)^{n+1} - b_5 = 0 \ , \tag{33}$$

where

$$a_1 = \frac{\Delta\Omega}{\Delta t} \varepsilon_0 (1 - \beta P_0) \ , \tag{34}$$

$$a_2 = \frac{\Delta\Omega}{\Delta t} \varepsilon_0 \beta + \frac{1}{2\mu_g} \sum_m \frac{\partial \tilde{k}_{gm}^n}{\partial \sigma} \left[\frac{1}{\Delta x_m} + \frac{(-1)^{m+1}}{B} \vec{g}\right] \Delta A_m \ , \tag{35}$$

$$a_3 = \frac{1}{2\mu_g} \sum_m L_m \left[\frac{1}{\Delta x_m} + \frac{(-1)^{m+1}}{B} \vec{g}\right] \Delta A_m \ , \tag{36}$$

$$a_4 = \frac{1}{2\mu_g} \sum_m \frac{\partial \tilde{k}_{gm}^n}{\partial \sigma} \left[\frac{-1}{\Delta x_m} + \frac{(-1)^{m+1}}{B} \vec{g}\right] \Delta A_m (P_m^2)^{n+1} \ , \tag{37}$$

$$a_5 = \varepsilon^n P^n \sigma_g^n \frac{\Delta\Omega}{\Delta t} +$$

$$\varepsilon^n B \cdot \dot{S}_g \Delta\Omega - \frac{1}{2\mu_g} \sum_m L_m \left[\frac{-1}{\Delta x_m} + \frac{(-1)^{m+1}}{B} \vec{g}\right] \Delta A_m (P_m^2)^{n+1} \ , \tag{38}$$

$$b_1 = \varepsilon_0 (\beta+\gamma) \rho_{\ell_0} \frac{\Delta\Omega}{\Delta t} + \frac{\rho_\ell}{\mu_\ell} \sum_m T_m \frac{\Delta A_m}{\Delta x_m} \ , \tag{39}$$

$$b_2 = -\rho_{\ell_0} \varepsilon_0 [1 - (\beta+\gamma) P_0] \frac{\Delta\Omega}{\Delta t} + \frac{\rho_\ell}{\mu_\ell} \sum_m \Big\{ \frac{\partial \tilde{k}_{\ell m}^n}{\partial \sigma} \Big[(-1)^{m+1} \rho_\ell \vec{g}$$

$$+ \frac{W_m^n - W^n}{\Delta x_m}\Big] - T_m \frac{dP_c^n}{d\sigma} \frac{1}{\Delta x_m} \Big\} \Delta A_m \ , \tag{40}$$

$$b_3 = -\rho_{\ell_0} \varepsilon_0 (\beta+\gamma) \frac{\Delta\Omega}{\Delta t} + \frac{\rho_\ell}{\mu_\ell} \sum_m \frac{\partial \tilde{k}_{\ell m}^n}{\partial \sigma} \frac{\Delta A_m}{\Delta x_m} \ , \tag{41}$$

$$b_4 = -\frac{\rho_\ell}{\mu_\ell}\sum_m \frac{\partial \tilde{k}^n_{\ell m}}{\partial \sigma}\frac{dP^n_c}{d\sigma}\frac{\Delta A_m}{\Delta x_m} , \tag{42}$$

$$b_5 = \rho_{\ell_0}\varepsilon_0(\beta+\gamma)\ P^n\frac{\Delta\Omega}{\Delta t} - \rho^n_\ell\varepsilon^n\sigma^n_g\frac{\Delta\Omega}{\Delta t} + \varepsilon^n\dot{S}_\ell\Delta\Omega - \frac{\rho_\ell}{\mu_\ell}\sum_m T_m$$

$$\left[\frac{W^n_m - W^n}{\Delta x_m} + (-1)^{m+1}\rho_\ell\vec{g}\right]\Delta A_m , \tag{43}$$

with

$$L_m = \tilde{k}^n_{gm} - \frac{\partial \tilde{k}^n_{gm}}{\partial \sigma}\sigma^n , \tag{44}$$

$$T_m = \tilde{k}^n_{\ell m} - \frac{\partial \tilde{k}^n_{\ell m}}{\partial \sigma}\sigma^n , \tag{45}$$

$$W^n_m = -P^{n+1}_{\ell m} , \tag{46}$$

and

$$W^n = P_c(\sigma^n) - \frac{dP^n_c}{d\sigma}\cdot\sigma^n . \tag{47}$$

Finally, Eqs. (32) and (33) can be written as

$$(a_3 + a_2\sigma^{n+1}_g)(P^2)^{n+1} + (a_1\sigma^{n+1}_g)P^{n+1} + (a_4\sigma^{n+1}_g - a_5) = 0 \tag{48}$$

and

$$b_4(\sigma^2_g)^{n+1} + (b_2 + b_3P^{n+1})\sigma^{n+1}_g + (b_1P^{n+1} - b_5) = 0 . \tag{49}$$

These two equations can be solved iteratively for $P^{n+1}_g$ and $\sigma_g(P^{n+1}_\ell)$. There are

two special cases of the general solution: $\sigma_g^{n+1} \equiv 1$ and $\sigma_g^{n+1} \equiv 0$, that is, single phase flow (all air or all water).

If $\sigma_g^{n+1} = 1$ (IFLOW = 1), then Eqs. (25), (26), and (29) reduce to

$$\{[\varepsilon_0(1 - \beta P_0) + \varepsilon_0 \beta P^{n+1}]P^{n+1} - \varepsilon^n P^n\} \frac{\Delta\Omega}{\Delta t}$$

$$+ \sum_m \frac{\tilde{k}_{gm}}{\mu_g} [\frac{(P^2 - P_m^2)}{2\Delta x_m} + (-1)^{m+1}\vec{g} \frac{(P^2 + P_m^2)}{2B}]^{n+1} \Delta A_m = \varepsilon^n B \dot{S}_g \Delta\Omega \ , \tag{50}$$

which is a quadratic for $P^{n+1}$. The solution is given by

$$P_g^{n+1} = \frac{-F + \sqrt{F^2 + 4GH}}{2G} \ , \tag{51}$$

where

$$F = \varepsilon_0(1 - \beta P_0) \ ,$$

$$G = \varepsilon_0 \beta + \frac{\Delta t}{2\mu_g} \sum_m \tilde{k}_{gm} [\frac{1}{\Delta x_m} + \frac{(-1)^{m+1}}{B} \vec{g}] \frac{\Delta A_m}{\Delta\Omega} \ , \text{ and} \tag{52}$$

$$H = \varepsilon^n P^n + \varepsilon^n B \dot{S}_g \Delta t + \frac{\Delta t}{2\mu_g} \sum \tilde{k}_{gm} [\frac{1}{\Delta x_m} + \frac{(-1)^{m+1}}{B} \vec{g}] \frac{P_m^2}{\Delta\Omega} \Delta A_m \ . \tag{53}$$

If $\sigma_g^{n+1} \equiv 0$ (IFLOW = 0), then Eqs. (25), (26), and (29) reduce to

$$\rho_{\ell_0} \varepsilon_0 \ (\beta + \gamma)(P^{n+1} - P^n) \frac{\Delta\Omega}{\Delta t} + \frac{\rho_\ell}{\mu_\ell} \sum \tilde{k}_{\ell m} [\frac{P^{n+1} - P_m^{n+1}}{\Delta x_m} + (-1)^{m+1} \rho_\ell \vec{g}] \Delta A_m$$

$$= \varepsilon^n \dot{S}_\ell \Delta\Omega \ . \tag{54}$$

The solution to Eq. (54) is

$$P^{n+1} = \{\frac{\rho_\ell}{\mu_\ell} \sum_m \tilde{k}_{\ell m}[\frac{P_m^{n+1}}{\Delta x_m} + (-1)^m \rho_\ell g]\Delta A_m + \varepsilon^n \dot{S}_\ell \Delta\Omega + \rho_{\ell_0} \varepsilon_0 (\beta + \gamma) P^n \frac{\Delta\Omega}{\Delta t}\}$$

$$\div \; [\frac{\rho_\ell}{\mu_\ell} \sum_m \frac{\tilde{k}_{\ell m}}{\Delta x_m} \Delta A_m + \rho_{\ell_0} \varepsilon_0 (\beta + \gamma) \frac{\Delta\Omega}{\Delta t}] \; . \tag{55}$$

The advancing of dependent variables to the time level n+1 is described below. At the end of time step n, all dependent variables in all computational zones are known. To advance them to their proper values at time level n+1, the set of simultaneous algebraic equations [Eqs. (48) and (49), or Eq. (50) or Eq. (54) in the two special cases] that approximate the differential equations [Eqs. (1), (2), and (6)] must be solved for each computational zone. This is done in an iterative manner. A sweep through the mesh in a front-to-back, left-to-right, bottom-to-top pattern is made. At each cell, Eqs. (48) and (49) are solved [or Eq. (51) or Eq. (55), depending on input variable IFLOW], using the most recent values available for neighboring zones. Successive sweeps are made until the relative differences between $P_g^{n+1}$ and $P_\ell^{n+1}$ on two successive sweeps in each zone are less than an assigned tolerance level specified by input variable TOL. The number of sweeps, or iterations, can frequently be reduced by over- or underestimating the amount of change on each pass. This is accomplished in TRACR3D by using input variable OMEGAP (applied only in fully saturated regions). This solution technique is simply a Gauss-Seidel or SOR method for a nonlinear algebraic equation set.

The finite difference equations, Eqs. (18) to (55), involve permeabilities evaluated at interfaces between zones, whereas effective permeability is a function of the zone-centered saturation and pressure as well as of the intrinsic matrix permeability. An averaging method of some kind is required to calculate these interface permeabilities; there is a variety of methods and each has its advantages and disadvantages.

The approach used in TRACR3D is based on physical principles, namely, continuity of pressure and mass flux across interfaces. In mathematical terms, this is

$$P_{i+} = P_{i-} \tag{56}$$

and

$$(\rho\vec{u})_{i+} = (\rho\vec{u})_{i-} \ , \tag{57}$$

where i refers to a phase (liquid or gas) and where subscripts + and − refer to positions on either side of an interface at arbitrarily small separations. Density $\rho$ can be removed from Eq. (57) because, in TRACR3D, $\rho$ is a continuous function of pressure P, and P is continuous. When $\vec{u}_i$ in Eq. (57) is replaced by Eq. (24),

$$\frac{\tilde{k}_{i+}}{\mu_{i+}}\left(\frac{\partial P_i}{\partial n} + \rho_+\vec{g}\right)_+ = \frac{\tilde{k}_{i-}}{\mu_{i-}}\left(\frac{\partial P_i}{\partial n} + \rho_+\vec{g}\right)_- \ , \tag{58}$$

which is approximated by

$$-\frac{\tilde{k}_{i1}}{\mu_{i1}}\left(\frac{P_{i1} - P_{iI}}{\frac{1}{2}\Delta x_1} + \rho_{i1}g\right)_+ = -\frac{\tilde{k}_{i2}}{\mu_{i2}}\left(\frac{P_{iI} - P_{i2}}{\frac{1}{2}\Delta x_2} + \rho_{i2}g\right) \ , \tag{59}$$

where subscript I refers to interface value and where subscripts 1 and 2 refer to zone centers of neighboring cells on either side of interface I. Equation (59) can be solved for $P_{iI}$. The expression for $P_{iI}$ can then be substituted into either side of Eq. (58) to provide

$$u_i = \frac{-2\tilde{k}_{i1}\tilde{k}_{i2}}{(\tilde{k}_{i2}\mu_{i1}\Delta x_1 + \tilde{k}_{i1}\mu_{i2}\Delta x_2)}\left[P_{i2} - P_{i1} + g(\rho_{i2}\Delta x_2 + \rho_{i1}\Delta x_1)\right] \ . \tag{60}$$

If $\mu_{i1} = \mu_{i2}$ and if $\Delta x_1 = \Delta x_2$, then the effective interface permeability can be expressed as

$$\tilde{k} = \frac{2\tilde{k}_{i1}\tilde{k}_{i2}}{\tilde{k}_{i1}+\tilde{k}_{i2}} . \tag{61}$$

This formulation satisfies important physical requirements (pressure and mass flux continuity) and provides reasonably accurate numerical solutions; at the same time, it does not require continuity in saturation or continuous first derivative of pressure at an interface.

This approach does have a deficiency, namely, that it may fail to properly represent the physical situation if large pressure gradients or large saturation differences exist between adjacent zones. For example, Eq. (61) predicts a zero-valued effective permeability when the saturation of the corresponding phase in one of the cells goes to zero; for sufficiently high pressure gradients, depending on the direction of flow, this clearly is not physical.

Therefore, modified expressions have been developed for the effective cell permeabilities that reduce to the forms given in Eqs. (7) and (8) under appropriate conditions and that should be at least qualitatively reasonable for the extremes of pressure and saturation.

The direction of the flow for each phase is determined from the appropriate pressure gradient. Let a donor cell (cell from which fluid is flowing in a given direction) be indicated by the subscript 1; its acceptor cell (adjacent cell into which flow from donor cell passes), by subscript 2. The modified expressions for effective cell permeabilities follow:

If $\sigma_{e1} < \sigma_{e2}$, then

$$\bar{k}_{1\ell} = k_{1\ell}, \quad \bar{k}_{1g} = k_{1g}, \quad \bar{k}_{2\ell} = k_{2\ell}, \tag{62}$$

and

$$\bar{k}_{2g} = k_{2g} + \frac{\mu_g}{\mu_\ell} \cdot k_{2\ell} \cdot \max\left[0, \frac{P_1 - P_2 - P_{c2}}{P_1 - P_2}\right](\sigma_{e2} - \sigma_{e1}) . \tag{63}$$

If $\sigma_{e1} > \sigma_{e2}$ and $P_{\ell 1} > P_{\ell 2}$, then

$$\bar{k}_{1g} = k_{1g}, \quad \bar{k}_{1\ell} = k_{1\ell}, \quad \bar{k}_{2g} = k_{2g}, \tag{64}$$

and

$$\bar{k}_{2\ell} = k_{2\ell} \left(\frac{\sigma_1 + \sigma_2}{2}\right) . \tag{65}$$

Modified permeability is represented by $\bar{k}$; permeabilities $k_{ig,\ell}$ are given by Eqs. (7) and (8).

In Eq. (63), the first right-hand term $k_{2g}$ is just the standard, steady-state gas permeability in the acceptor cell. The second right-hand term in Eq. (63) represents additional flow when gas in cell 1 is at sufficiently high pressure to displace water in the acceptor cell. This represents an effect that is due to transient flow when pressures are not in equilibrium. This extra displacement will occur only if the gas pressure gradient is stronger than capillary pressure. The factor $\mu_g/\mu_\ell$ appears in Eq. (63) because this portion of the gas flow occurs only when water displaces the gas. Finally, $k_{2\ell}$ appears because water displaced in cell 2 will presumably continue to move through the network of pores in which it resides. In Eq. (65), the term $k_{2\ell}[(\sigma_1 + \sigma_2)/2]$ is the permeability to liquid in cell 2 but evaluated at the average saturation between cells 1 and 2.

Figures 4a and 4b show the effect of the additional terms in Eqs. (63) and (65) for a particular set of dependent variable values.

After the modified cell permeabilities are obtained from Eqs. (62) through (65), they are used in Eq. (61) to compute effective interface permeabilities.

The effect of pressure on permeability, Eq. (14), is evaluated at time level n at the beginning of time step n+1.

## B. Transport

An important feature of the TRACR3D code is its ability to compute transient, three-dimensional transport of reactive chemical species.

Currently, TRACR3D can model transport of chemical tracers with the following features: advection, molecular diffusion, mechanical dispersion, radioactive decay (an n-chain decay is allowed), and a choice of sorption models [simple $K_d$ equilibrium sorption, Eq. (5), or a nonequilibrium saturable sorption model, Eq. (4)]. The nonequilibrium model can be run in an unsaturable mode ($S_{m\alpha}$ large) and an irreversible ($Q_{2\alpha} = 0$) as well as reversible ($Q_{1\alpha} \neq 0$,

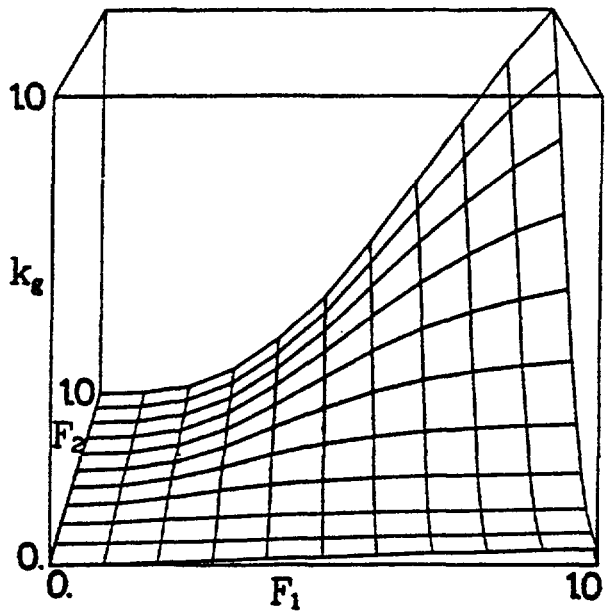


Fig. 4a.
Air permeability as a function of $F_1$ (donor-cell air saturation) and $F_2$ (acceptor-cell air saturation).

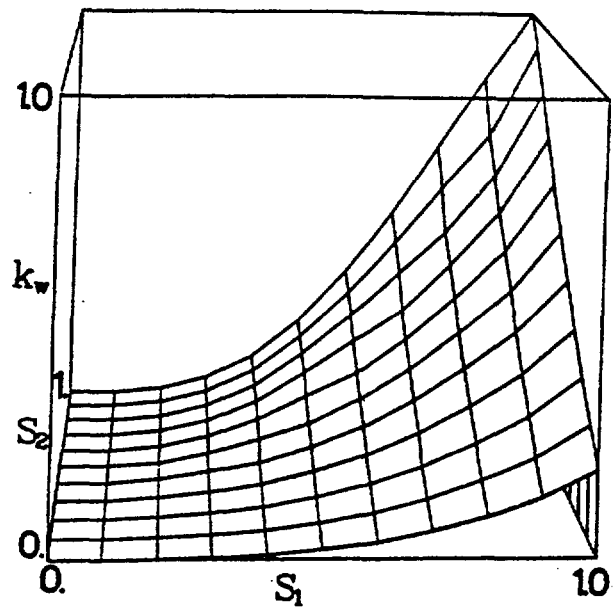


Fig. 4b.
Relative interface water permeability as a function of $S_1$ (donor-cell water saturation) and $S_2$ (acceptor-cell water saturation).

$Q_{2\alpha} \neq 0$) mode. The actual number of tracers that can be handled is restricted by CRAY computer memory size.

Updating of tracer concentrations occurs after flow variables and velocities have been advanced.

The finite difference forms of Eqs. (3) and (4) solved by TRACR3D are

$$\left[\frac{\partial S_\alpha}{\partial t} = Q_{1\alpha}C_\alpha(S_{m\alpha} - S_\alpha) - Q_{2\alpha}S_\alpha(C_{0\alpha} - C_\alpha) + \lambda_{\alpha-1}\frac{S_{\alpha-1}}{M_{\alpha-1}}M_\alpha - \lambda_\alpha S_\alpha\right]_{ijk} \tag{66}$$

and

$$\left[\frac{\partial C_\alpha}{\partial t} = \frac{J_\alpha}{\varepsilon\rho_i^{n+1/2}\sigma_i^{n+1/2}} + \lambda_{\alpha-1}\frac{C_{\alpha-1}}{M_{\alpha-1}}M_\alpha - \right.$$

$$\left.\left(\lambda_\alpha + \frac{1}{\sigma_i\rho_i}\frac{\partial\rho_i\sigma_i}{\partial t}\right)C_\alpha - \frac{\rho_m}{\varepsilon(\sigma_i\rho_i)^{n+1/2}}\frac{\partial S_\alpha}{\partial t}\right]_{ijk}, \tag{67}$$

where $\rho_i$ is density of the fluid carrying the tracer. This system of $2 \cdot NTRCR$ ordinary differential equations is easily solved by a fourth-order Runge-Kutta method to provide $S_\alpha^{n+1}$, $C_\alpha^{n+1}$, $\alpha = 1,\ldots,NTRCR$. Transport terms and chemical reaction terms are solved simultaneously.

For tracers carried in the liquid phase, Eqs. (66) and (67) should be approximately correct, even under partially saturated conditions. Water, a wetting fluid, will coat matrix particles, so that even at low liquid saturations, binding sites and particles will be in contact with liquid. For airborne tracers, Eq. (66) may require modification because the sorption terms may not reflect the degree of contact between the gas phase and matrix grains for partially saturated conditions.

In Eq. (67), the flux term $J_\alpha$ is given by

$$J_\alpha = \sum_m \varepsilon\sigma_i\{D_\alpha\rho_i \frac{\partial C_\alpha}{\partial x_m} + [\bar{D}_\alpha\nabla(\rho_i C_\alpha)]_m\}\frac{\Delta A}{\Delta\Omega}(-1)^m - \sum_m \langle\rho_i C_\alpha\rangle_m (-1)^m \frac{u_{im}^{n+1}}{\Delta\Omega}\Delta A_m \ . \qquad (68)$$

The first summation on the right side of Eq. (68) is straightforward. The last term in Eq. (68) deserves comment. First, the velocities $u_{im}$ are supplied by the flow part of the model. Second, the manner in which the tracer density at zone interfaces $\langle\rho_i C_\alpha\rangle_m$ is calculated can have a strong influence on the overall accuracy of the numerical solution. For example, a pure donor treatment of $\langle\rho_i C_\alpha\rangle_m$ would produce significant smearing of sharp concentration fronts (which typically occur for high Peclet number flows). The user has the option of specifing a donor type differencing scheme or a higher order method via input variable CDONOR.

The higher order representation used here for the $\langle\rho_i C_\alpha\rangle_m$ term at high Peclet number is fairly simple but appears to be capable of resolving sharp concentration fronts. It is similar to techniques that have recently appeared in the literature.[6,7]

The flux term $\langle\rho_i C_\alpha\rangle_m u_{im}$ is determined for each interface in three steps.

(1) From $\vec{u}_{im}$, determine $\bar{x}_m = \vec{x}_m - \frac{\vec{u}_{im}}{\varepsilon}\Delta t$ .

(2) Determine shape of the concentration front. If local Peclet number $Pe < 100$, use an approximate polynomial fit. If $Pe > 100$, use "sharp" donor approach [described in (2) below].

(3) Integrate $\int_{\bar{x}_m}^{\vec{x}_m} \frac{\rho_i C_\alpha(\vec{x}) V_i(\vec{x})}{|x_m - \bar{x}_m|} d\vec{x}$ to obtain $\langle \rho_i C_\alpha \rangle_m u_{im}$ .

For one-dimensional transport, this is easy to describe. Figure 5 shows a typical, large Peclet number concentration profile superimposed on a finite difference mesh. Consider the flux across the interface at $x_R$. The three steps for this instance are listed below.

(1) Calculate $\bar{x} = x_R - V_R \Delta t$ .

(2) Determine $Pe = \frac{LV_R}{D}$ . If $Pe < 100$, use a polynomial fit for C between $x_L$ and $x_R$. If $Pe > 100$ and if $C_L > C > C_R$ or $C_L < C < C_R$, determine $x_C$ from $C_L(x_C - x_L) + C_R(x_R - x_C) = C(x_R - x_L)$.

(3) Then integrate $\int_{\bar{x}}^{x_R} \frac{\rho_i C_\alpha(x) V_i(x)}{|x_R - \bar{x}|} dx$ to obtain $\langle \rho_i C_\alpha \rangle_R u_R$ .

If $Pe > 100$ but $C_L > C > C_R$ or $C_L < C < C_R$ is not true, just use simple donor differencing.

For two- and three-dimensional problems, steps (2) and (3) become more involved. Figure 6 shows a typical situation for two-dimensional transport. Velocities at the corners of cells are determined, and the shaded area is calculated. The shaded area is the region that will pass through interface I (shown in Fig. 6). The most difficult task here is to compute the shape of the concentration field in the shaded region. This is done by interpolating between neighboring cell values. Once again, a Peclet number is computed. If $Pe < 100$, a polynomial fit is used. If $Pe > 100$ and concentration is monotonically increasing or decreasing in the direction of flow, a "sharp" donor approach is used. Finally, the integration of step (3) is performed.

In three dimensions, the bookkeeping becomes considerable, but accuracy is the reward.

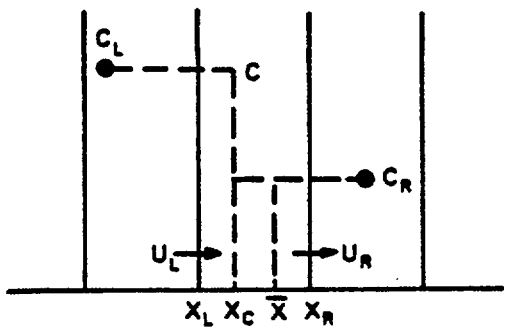


Fig. 5.
Sharp donor scheme for high Peclet number one-dimensional transport.

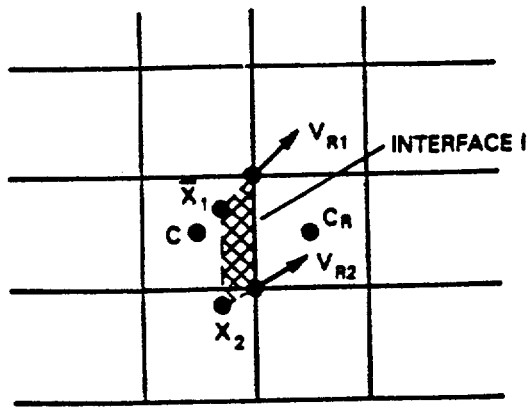


Fig. 6.
Shaded area represents two-dimensional region that will be transported through interface I.

## C. Fractures

A special feature of the TRACR3D model is its capability of handling fractures and even fracture networks running through a permeable material. There are some limitations, however. Currently, fractures can run only in the horizontal and vertical directions, and fractures at acute angles are not permitted. Because fractures can run horizontally and vertically, they can intersect; however, calculating flow and transport at crack intersections requires special numerical treatment (see below).

We assume that a fracture will have constant width, at least until it changes direction (if it does). Flow and transport variables vary only along the length of a crack; they have no structure across the width of a fracture. Leakage across crack faces into or out of the porous matrix is allowed. The nonlinear flow given by Eq. (6) can be important in fractures. Fractures run along the faces of computational zones representing porous matrix. All cracks are treated as voids between flat, smooth plates. Networks of cracks with dead ends can be constructed.

At crack intersections, the flow and transport equations (1), (2), and (3) are solved numerically in a manner different from that described earlier in Sec. III.

Tracer transport is solved for by neglecting all terms in Eq. (3) except the convective; that is,

$$\nabla \cdot \rho_i u_i C_\alpha = 0 \ . \tag{69}$$

Flow through a crack intersection is also determined by the same approach, namely, flow out = flow in. Equations (1) and (2) reduce to

$$\nabla \cdot P\vec{u}_g = 0 \tag{70}$$

and

$$\nabla \cdot \rho_\ell \vec{u}_\ell = 0 \ . \tag{71}$$

Equations (70) and (71) are solved for P and $\sigma_g$ in the crack intersection space. If the flow is single phase only, then only one of Eqs. (70) or (71) is required to determine pressure P. At an intersection, only flow in branches of the fracture radiating from the intersection is considered in Eqs. (70) and (71).

There are three options available for fracture flow. Fractures may be specified explicitly in the mesh definition (input variables RCM, YCM, and ZCM) and material properties table (input variable TABMAT). This is the case in the sample problem of Appendix C.

Alternatively, fractures may be specified implicitly through a distribution of crack widths and fracture spacing parameters (input variables FWIDTH, FSPACX, FSPACY, and FSPACZ). Fractures will be spaced at regular intervals determined by FSPACX, FSPACY, and FSPACZ for each of the three coordinate directions. If fractures are not to run in a particular direction, the corresponding spacing parameter is set to 0.0. Fracture widths are assigned on a random basis from the width distribution FWIDTH. The code determines internally the location of cell centers.

The third option allows a random network of fractures. If this option is specified (through input variable IRANDF), the code determines fracture location in the following way. First, between each column of cells, starting at the left-most column, the interface is designated as a fracture plane on a random basis. A "random" number between 0 and 1 is calculated. If the value does not exceed input variable PFCONN, a fracture is specified, otherwise not. This procedure is used for each zone interface on the y-z plane between two columns. All the fracture planes on a given y-z plane are assigned the same (randomly

chosen) fracture width. After all column interfaces have been computed, the same procedure is taken for the plane between successive rows and finally between successive layers, beginning with the interface between rows and layers 1 and 2.

The number of fractures and the complexity of connections are limited by computer memory. On a CDC 7600, networks in three dimensions cannot be very large because of memory restrictions; on a CRAY computer, considerably larger networks are possible.

D. Boundary Conditions

The computational mesh is surrounded by a shell of boundary cells; the boundary cells have zero volume and zero width, but they do have an interface area assigned to them as well as values for P, $\sigma_g$, and $C_i$ (Fig. 7).

TRACR3D allows several boundary condition types: (1) no flow, (2) ambient, (3) continuative outflow, (4) band release, and (5) time dependent.

At no-flow boundaries, effective interface permeabilities are set to 0; at the end of each time step, values for pressure, saturation, and concentration in a boundary cell are set to values in the adjacent interior cell. For the ambient boundary condition, values for pressure, saturation, and concentrations are set initially and then remain fixed at those values throughout the calculation. The continuative outflow boundary condition is approximated by applying zero gradients to concentrations and using a radiation condition for flow components P and $\sigma_\ell$ at the boundary; that is,

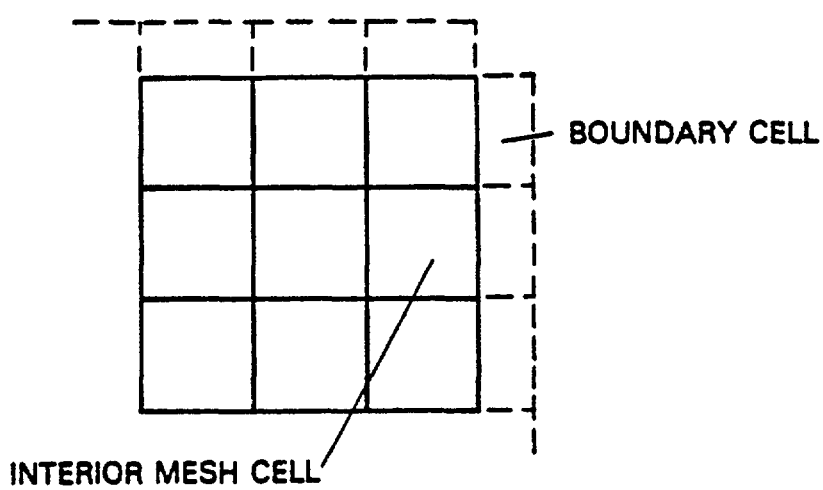


Fig. 7.
Relation of boundary cells to mesh cells.

$$\frac{\partial C_i}{\partial n} = 0, \tag{72}$$

$$P_B^{n+1} = P^n(x_B - \tilde{V}_{gB}\,\Delta t), \tag{73}$$

and

$$\sigma_{\ell B}^{n+1} = \sigma_\ell^n(x_B - \tilde{V}_{\ell B}\Delta t), \tag{74}$$

where $x_B$ is the boundary value of the coordinate normal to the boundary and $\tilde{V}_{gB}$ and $\tilde{V}_{\ell B}$ are modified gas and liquid velocity components normal to the boundary, given by

$$\tilde{V}_{gB} = \frac{1}{\varepsilon}\left[u_{gB} + \frac{\Delta u_{gB}}{\Delta(\ln P)_B}\right] \tag{75}$$

and

$$\tilde{V}_{\ell B} = \frac{1}{\varepsilon}\left[\frac{u_{\ell B}}{\sigma_\ell} + \frac{\Delta(u_\ell/\sigma_\ell)_B}{\Delta(\ln \sigma_\ell)_B}\right] . \tag{76}$$

If flow is single phase, only one of Eqs. (75) and (76) is needed. If $\sigma_\ell \equiv 0$, only Eq. (75) is needed to determine boundary pressures. If $\sigma_\ell \equiv 1$, the relation

$$P^{n+1} = P^n\left\{x_B - \left[\frac{u_\ell}{P} + \frac{\Delta(u_\ell/P)}{\Delta(\ln P)}\right]\frac{\Delta t}{\varepsilon_0\beta}\right\} \tag{77}$$

is used if $\beta \neq 0$, and

$$\frac{\partial P}{\partial x} = 0 \tag{78}$$

is used if $\beta = 0$.

The fourth type of boundary condition is used only for transport. It allows a band release of radionuclides from a leaching source. The decaying concentration of species in the boundary cells is computed from the Bateman equations.[8]

When the fifth type of boundary condition is used, boundary cell values for pressure, saturation, and concentrations are obtained by linear interpolation in tables (see the definition of TDBDY in Appendix A).

The table 20, in input variable TDBDY, is reserved for a "ponding" boundary condition. In this option, a head of water on the upper surface can be assigned. The upper boundary conditions are then

$$P = P_0 + \rho g h \ , \tag{79}$$

and

$$C_i = C_i^0, \ \sigma_g = 0 \text{ for } h > 0;$$

$$C_i = 0, \ \sigma_g = 1, \text{ for } h = 0 \ . \tag{80}$$

A periodic ponding condition can be assigned also. Details are given in the description of TDBDY in Appendix A. The water head is automatically reduced as water infiltrates.

E. Time Step Control

The flow equations are solved with a fully implicit, centered-space, backward-time finite difference scheme. Linearized stability analysis indicates that this approach is unconditionally stable. The actual nonlinear scheme may be unconditionally stable as well. Experience with the code indicates that a time step many times larger than the convective limit $\Delta t = \Delta x/V$ can be used (but usually not until the calculation has advanced several time steps). A very large time step may also lead to loss of accuracy in the numerical solution because of numerical diffusion. Additionally, the number of iterations required to relax the simultaneous finite difference equations at a time level will generally increase as the time step increases.

Several factors, then, are used to control the flow time step $\Delta t_f$.

(1) The Courant time step limit is computed from

$$\Delta t_c = \min_{\text{(active zones)}} \left[\frac{\varepsilon \Delta x^2}{u_{ij}\Delta x + 2\varepsilon\sigma_i(\max_\alpha D_\alpha)}\right] , \tag{81}$$

where subscript i refers to phase and subscript j refers to cell face. The flow time step is then computed from

$$\Delta t_f = \min(C_n \cdot \Delta t_c, \Delta t_{max}, 1.2 \cdot \Delta t) , \tag{82}$$

where $C_n$ is a multiple of the Courant time limit and is an input variable (COURNT) and $\Delta t_{max}$ is the maximum allowed time step (input variable DTMAX).

(2) If the number of iterations required to solve the simultaneous equations exceeds LGLMIN, $\Delta t_f$ is kept at the previous time step value.

(3) If the number of iterations required to solve the flow equations exceeds LGLMAX, $\Delta t_f$ is reduced by 20%.

The quantity $\Delta t_c$ in Eq. (81) is determined for all active cells in the computational mesh. The decision to activate a cell is made in the following manner. An initial set of active cells is specified through the input variable IACT. At the end of each time step, each active cell is tested to determine the amount of change in air pressure, air saturation, and tracer concentrations compared with initial values. If these changes exceed specified levels (controlled by input variables TOLP, TOLF, and TOLC), all of the cells sharing a common face with that cell are turned on. Considerable computer time can be saved by ignoring cells in which dependent variables are not changing or will not be changing until later in the calculation.

A separate time step $\Delta t_T$ is used for tracer transport. Time step limits for tracer transport are given by the Courant and flow limits $\Delta t_c$ and $\Delta t_f$. If $\Delta t_f < \Delta t_c$, $\Delta t_f$ is used.

Otherwise,

$$\Delta t_T = \frac{\Delta t_f}{I\left[\frac{\Delta t_f}{\Delta t_c}\right] + 1}, \tag{83}$$

where I[ ] denotes the integer part of the argument within [ ]. Then tracer transport is calculated for $I[\Delta t_f/\Delta t_c] + 1$ subcycles before the flow variables are updated again.

The steps involved in the numerical procedure are summarized below.

(1) Set initial values of dependent variables; set time and material properties.

(2) Sweep through the mesh. At each cell, solve the nonlinear algebraic set of finite difference equations. After each sweep, test $P_g$ and $P_\ell$ for convergence. If not converged, make another sweep through the mesh. In each cell, latest values are used for neighboring cell-dependent variables.

(3) After cell-centered variables have been updated in step (2), cell air and liquid interface velocities are calculated.

(4) Updating of tracer movement is accomplished next, if tracers have been specified. Tracers can move with one phase or the other but not both simultaneously.

(5) Boundary conditions and time are updated.

(6) Print-outs and plotting dumps are checked.

(7) Problem end time is checked. If the calculation has not reached the end time, return to step (2) for the next time level.

A number of features are used in TRACR3D to minimize run time. For one- or two-dimensional problems, only fluxes in the active dimensions are calculated. For low Reynolds number flow, the nonlinear term in Eq. (6) can be omitted. If only single phase flow (all water or all air) is being calculated, various quantities needed only for two-phase flows are not calculated. An active zone calculator is used to limit computations to those mesh cells that are experiencing significant changes in dependent variables.

## IV. VERIFICATION AND VALIDATION

There are various ways in which a mathematical model can be tested. First, the numerical solution of the model must be compared to analytic solutions to establish its accuracy. Some people call this process verification. Additional useful information concerns the behavior of a numerical solution when cell size and time step size are changed. Although verification is an important part of model testing, it does not establish that the model is a reasonable appproximation to physical reality. This is accomplished in the validation step in which model calculations are compared with results of controlled experiments. Good laboratory experiments allow quantification of the effect of various physical processes on flow and transport. Also, laboratory experiments, when performed on relevant materials and under appropriate initial and boundary conditions, can indicate whether a particular process is important for some application and may reveal the presence of other processes that were not initially anticipated. Successful comparison of a model with experimental data indicates that the model is a reasonable description of the actual physical situation and accurately calculates the interrelationships between the various processes.

Comparison of a model with field experiments is not so clear-cut. In the field, unlike the laboratory, one can never be sure that material properties (such as porosity) are distributed smoothly between the points at which measurements were made. One is also uncertain whether additional processes, not

included in a model, may be acting. It is a matter of logic. If A (which represents a model and an assumed distribution of material properties and boundary and initial conditions) is true (exactly describes the actual situation), then B (the set of calculations made of flow and transport) is true (matches observed data and would match any other data that could be taken, assuming perfect data were taken). Logic tells us: if not B, then not A. That is, if our model plus assumptions cannot reproduce the observed data, then it is faulty in some way (usually one assumes that the error is in the assumed distribution of material properties). Further, logic tells us that even if B is true (if calculations match observations), we cannot assume that A is true without some additional information or constraints. That is, we have no assurances that a unique solution A exists for the data given. In fact, we cannot even be sure that the true A is close to the assumed A. (There is yet another difficulty--the truth of B cannot really be established because all possible measurements cannot be made in practice.) A stochastic or parameter study approach is probably most appropriate for large-scale field applications. This is just another way of stating the inverse problem. This problem is resolved by assuming that the "smoothest" solution A for which B is true is the actual solution. This is an application of the parsimony principle.

In practice, if we can use a model to match a set of field data, even if one or a few reasonable adjustable parameters are used (which in principle could be measured), we acquire a sense of confidence in the model. This is justified because the model can find at least one or more members of the set of possible solutions, which is certainly better than not being able to find any reasonable solution at all. Small- to medium-size field tests can usually be "taken apart" sufficiently to greatly reduce any uncertainty about the distribution of material properties, allowing a true field validation of a model.

## A. Verification of Flow

Three tests of the flow model in TRACR3D have been made: comparison with the solution for water infiltration into a partially saturated column of soil, comparison with the solution for two-dimensional steady potential flow with a sink and a source, and steady flow with pressure-dependent permeability.

The first test involves two-phase flow. However, the air phase is not considered; only water movement is calculated. A one-dimensional downward flow of water (from a body of water such as a rainpond) into an initially partially saturated porous soil is considered. The equation solved is

$$\varepsilon \frac{\partial \sigma_\ell}{\partial t} = \frac{\partial}{\partial z} \left\{ \frac{k_\ell(\sigma_\ell)}{\mu_\ell} \frac{\partial}{\partial z} \left[ P_c(\sigma_\ell) + \rho_\ell g z \right] \right\}, \quad z < 0 \ , \tag{84}$$

with $\sigma_\ell = 0.48$ for $t < 0$, $z < 0$; $\sigma_\ell = 1$ at $z = 0$ for $t > 0$ . This is the well-known Richards equation.

The analytic solution[8] and the numerical solution produced by TRACR3D are compared in Fig. 8 and agreement is good.

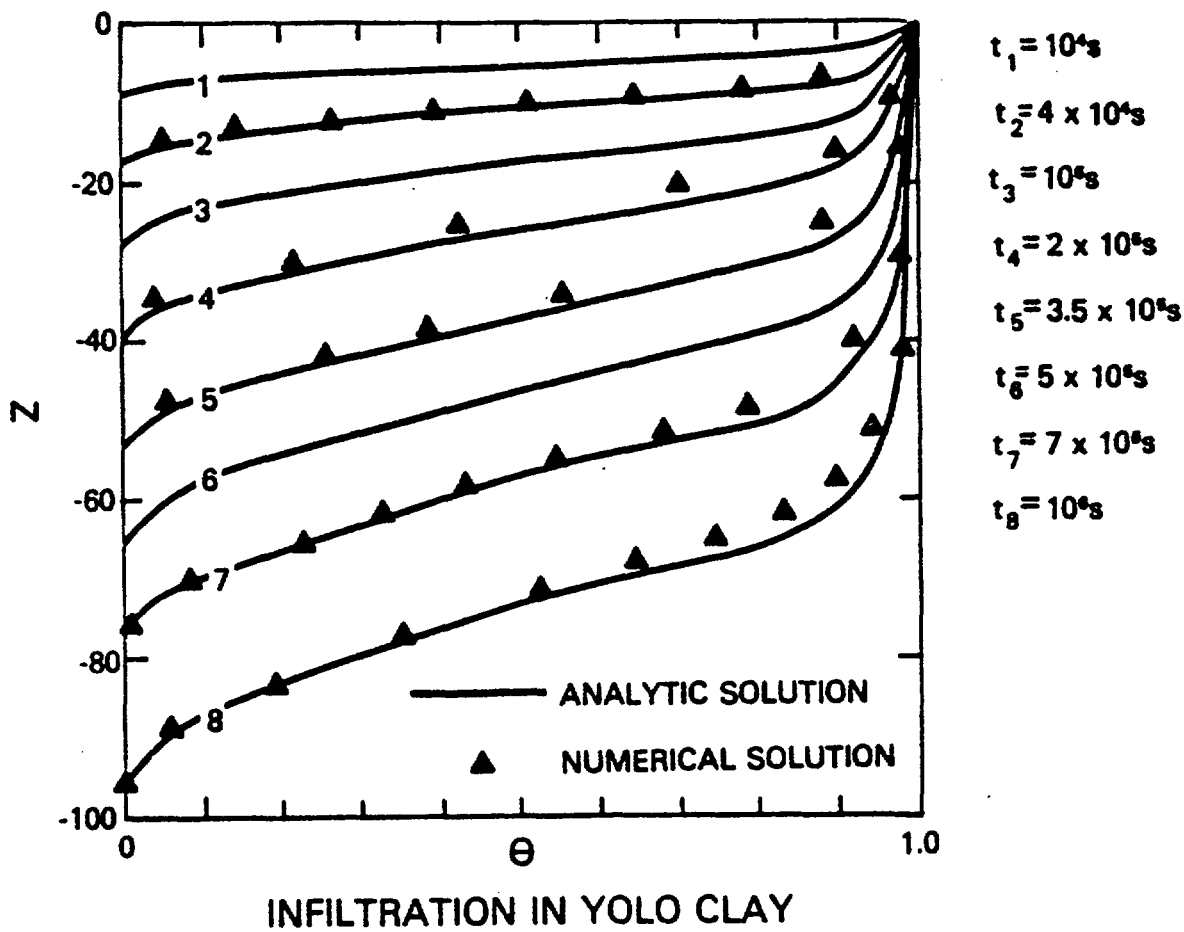


Fig. 8.
Comparison of numerical solutions (solid triangles) with analytic solution (solid line) for water infiltration in Yolo clay.

The second test compares the analytic solution[2] for steady, two-dimensional potential flow in a confined square region containing a point source and a point sink with the numerical solution obtained with TRACR3D. The equation solved in this case is

$$\nabla^2 P = 0, \quad 0 < x < 1, \quad 0 < y < 1, \tag{85}$$

with

$$\frac{\partial P}{\partial n} = 0 \text{ on the boundaries,}$$

and $P(0,0) = 2$ bars, $P(1,1) = 1$ bar.

For the numerical solution, a nonuniform mesh of cells is used. The corner pressure conditions are approximated by applying those pressures to very small cells located at the respective corners. Zone widths in the horizontal direction are a sequence of 0.01 cm, 0.04 cm, 18 zones of 0.05 cm, 0.04 cm, and 0.01 cm. An identical zone spacing was used in the vertical direction. Figure 9 compares pressure contours for the two solutions. Agreement is good.

The third test compares TRACR3D with the analytic solution for steady, one-dimensional saturated flow with pressure-dependent permeability. The equation solved here is

$$\frac{\partial}{\partial x}\left\{\frac{k_0}{\mu}\left[1 + \beta(P-P_0)\right]^2 \frac{\partial P}{\partial x}\right\} = 0, \; P(x_L) = P_L, \; P(x_R) = P_R \; . \tag{86}$$

For this example, $x_L = 0.0$, $x_R = 1$ cm, $P_L = 11.0$ bars, $P_R = 1.0$ bar, $P_0 = 1.0$ bar, and $\beta = 0.05$ bar$^{-1}$. Ten zones of length 0.1 cm were used in the computation. Figure 10 shows the excellent agreement between the code and the easily obtained analytic solution.

B. Verification of Transport

Five comparisons of TRACR3D with analytic solutions to problems involving tracer transport are included here to verify the numerical solution of the TRACR3D transport model.

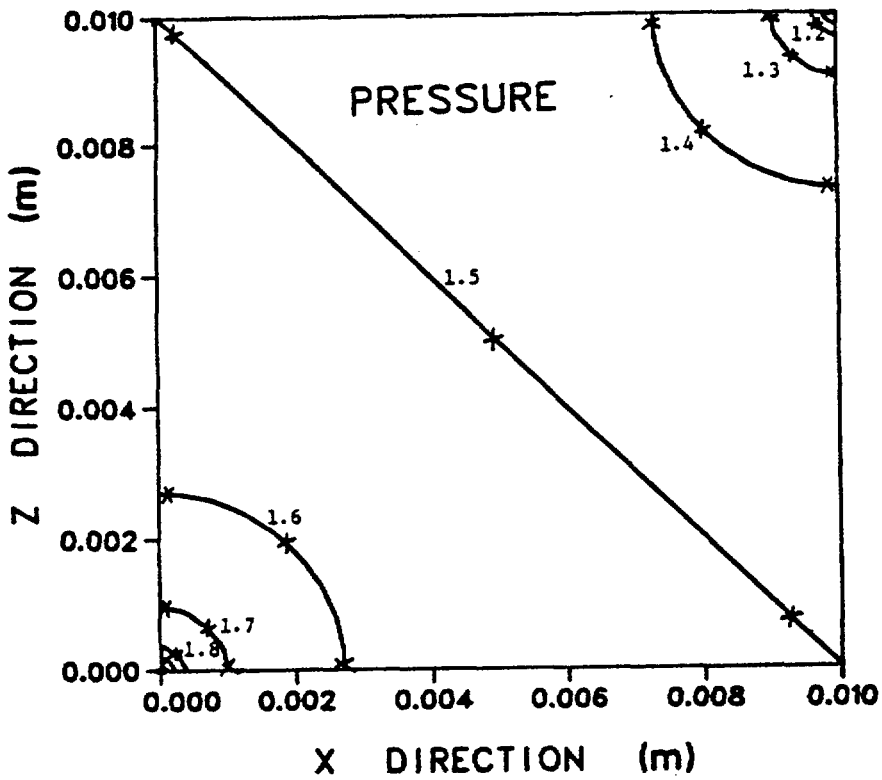


Fig. 9.
Comparison of analytic solution (X) with numerical solution (solid line) for two-dimensional potential flow with a source and a sink.

In the first example, TRACR3D is compared with the analytic solution for one-dimensional transport in a steady velocity field at large Peclet number for a nonsorbing, stable tracer. Under these conditions, the transport equation is written

$$\frac{\partial C}{\partial t} + V \frac{\partial C}{\partial x} = D \frac{\partial^2 C}{\partial x^2}, \quad t > 0, \; x > 0, \tag{87}$$

with initial condition $C(x,0) = 0$ and boundary condition $C(0,t) = 1$ and $C(\infty,t) = 0$. The Peclet number is defined by

$$P_e = \frac{LV}{D}, \tag{88}$$

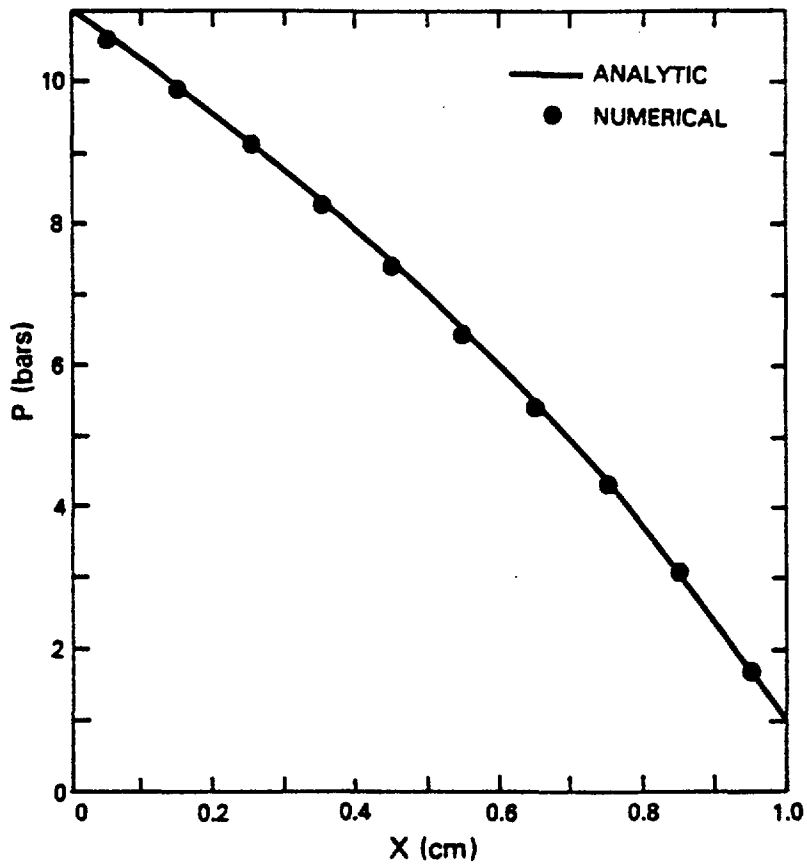


Fig. 10.
Comparison of analytic solution (solid line) with numerical solution (dots) for steady, one-dimensional flow with pressure-dependent permeability.

where L is a length scale. Accurate solution of Eq. (87) for large Peclet is difficult for numerical schemes because of artificial diffusion. In TRACR3D this troublesome behavior is minimal, as seen in Fig. 11. For this example, $D = 0.001\ cm^2 \cdot s^{-1}$ and $V = 0.01411\ cm \cdot s^{-1}$. A constant time step of 100.0 s and a constant cell size of 3.658 cm (also the value of L) were used. A second calculation using $D = 10^{-5}\ cm^2 \cdot s^{-1}$ is also shown in Fig. 11. The analytic solution is given in Ref. 9.

In the second example, TRACR3D is compared to the analytic solution for transport of a radioactive, sorbing tracer in a steady, one-dimensional velocity field with diffusion and nonconstant boundary conditions. The transport equation has the form

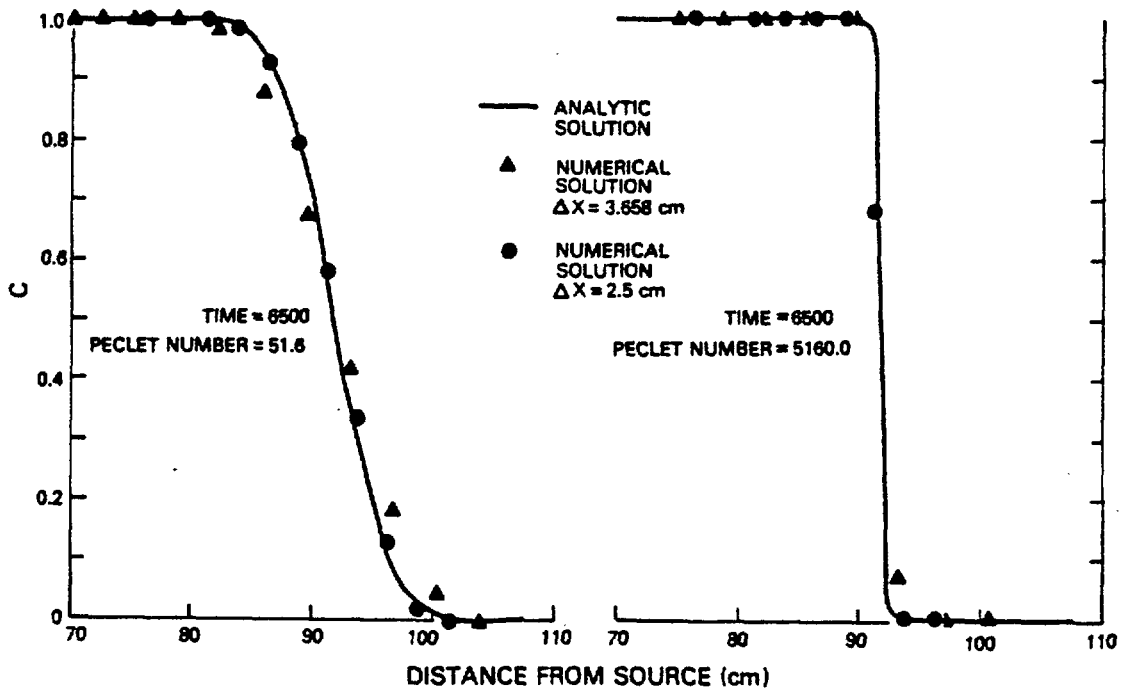


Fig. 11.
Comparison of numerical solution with analytic solution for large Peclet number transport.

$$R \frac{\partial C}{\partial t} + V \frac{\partial C}{\partial x} = D \frac{\partial^2 C}{\partial x^2} - \lambda C \ , \ t > 0, \ x > 0, \tag{89}$$

with initial condition $C(x,0) = 0$ and boundary condition $C(0,t) = 1.0$. For $t < 5$, $C(0,t) = 0$ and for $t > 5$, $C(\infty,t) = 0$.

The solution of Eq. (89) is given in Ref. 10. Figure 12 shows how TRACR3D compares for the case of $R = 3$, $D = 37.5\ cm^2 \cdot day^{-1}$, $V = 25\ cm \cdot day^{-1}$, and $\lambda = 0.25\ day^{-1}$. In this example, a constant computational zone size of 2.5 cm and a constant time step of 0.1 days were used. Good agreement is achieved with this zoning. Better agreement could be obtained with finer zoning.

In the third example, TRACR3D is compared with the analytic solution for one-dimensional diffusion of a sorbing tracer that follows the reversible nonequilibrium sorption model. Diffusion occurs between a finite, well-stirred source and a thin cylinder of porous material. The governing equations are

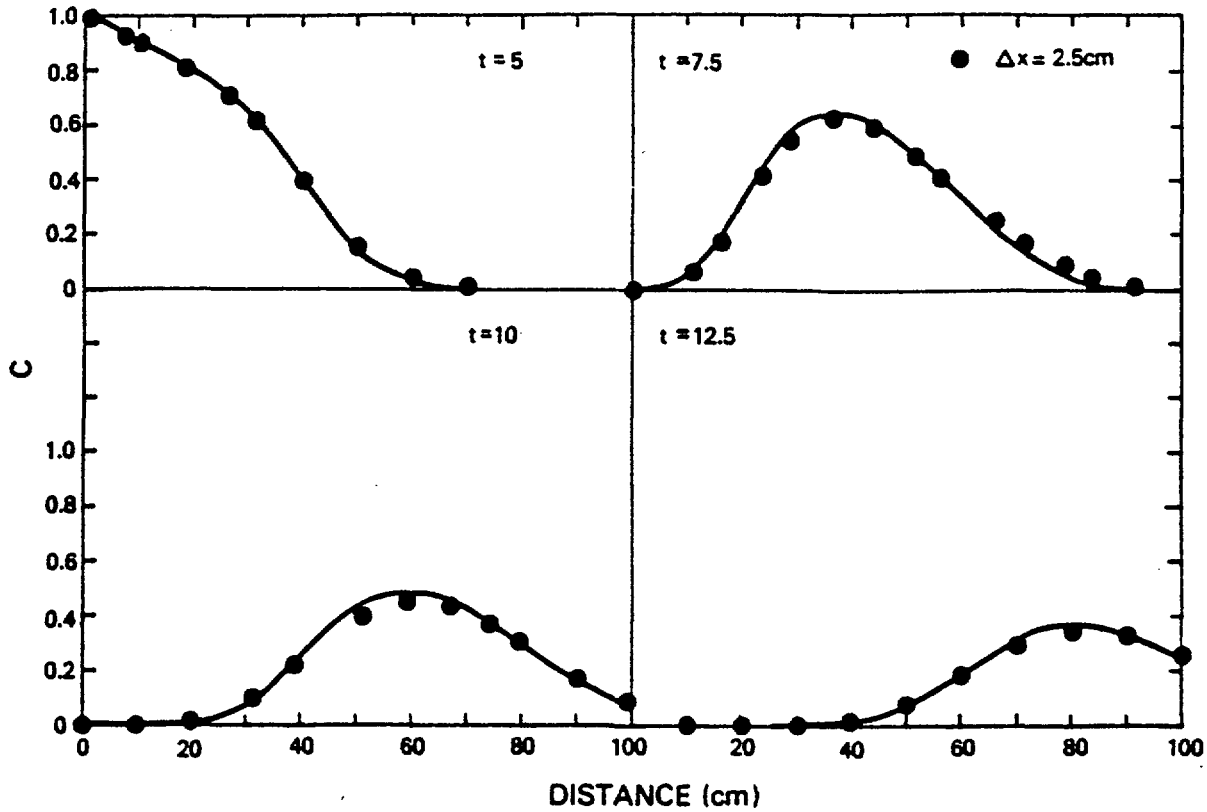


Fig. 12.
Comparison of numerical solution (dots) with analytic (solid line) for transport of decaying, absorbing tracer.

$$\varepsilon \frac{\partial C}{\partial t} = \varepsilon D \frac{\partial^2 C}{\partial x^2} - K_1 \rho_b C(S_m - S) + K_2 \rho_b S(C_0 - C), \; t > 0, \; 0 < x < H \; , \tag{90}$$

and

$$\rho_b \frac{\partial S}{\partial t} = K_1 \rho_b C(S_m - S) - K_2 \rho_b S(C_0 - C) \; , \tag{91}$$

with initial conditions

$$C(x,0) = 0, \; S(x,0) = 0, \tag{92}$$

and boundary conditions

$$C_i = C_i^0 - \int \frac{D}{\ell} \frac{\partial C}{\partial x}(0,t)dt, \; S(0,t) = 0, \; C(0,t) = C_i \; , \tag{93}$$

and

$$\frac{\partial C}{\partial x}(H,t) = \frac{\partial S}{\partial x}(H,t) = 0 \ . \tag{94}$$

For this example, $C_i^0 = 8.5 \times 10^{-8}$ gm • cm$^{-3}$, $D = 7.36 \times 10^{-6}$ cm$^2$ • s$^{-1}$, $K_1 = 0.750686$, $K_2 = 1.0667$, $S_m = 2.55 \times 10^{-3}$ gm • gm$^{-1}$, $\rho_b = 1.65$ gm • cm$^{-3}$, $C_0 = 6.9 \times 10^{-5}$ gm • cm$^{-3}$, $\varepsilon = 0.34$, $H = 0.1$ cm, and $\ell = 3.28$ cm. In the numerical simulation, the interval from 0 to H was divided into 20 equal zones and a time step of 1.25 s was used. Figure 13 shows the comparison between analytic solution[11] and TRACR3D. Agreement is very good.

In the fourth example, TRACR3D is compared with an analytic solution for transport of a tracer down a crack with diffusion into the adjacent porous medium. Reversible equilibrium sorption is allowed in the porous medium. A separate but parallel velocity is also allowed in the porous material. The equations being solved here are

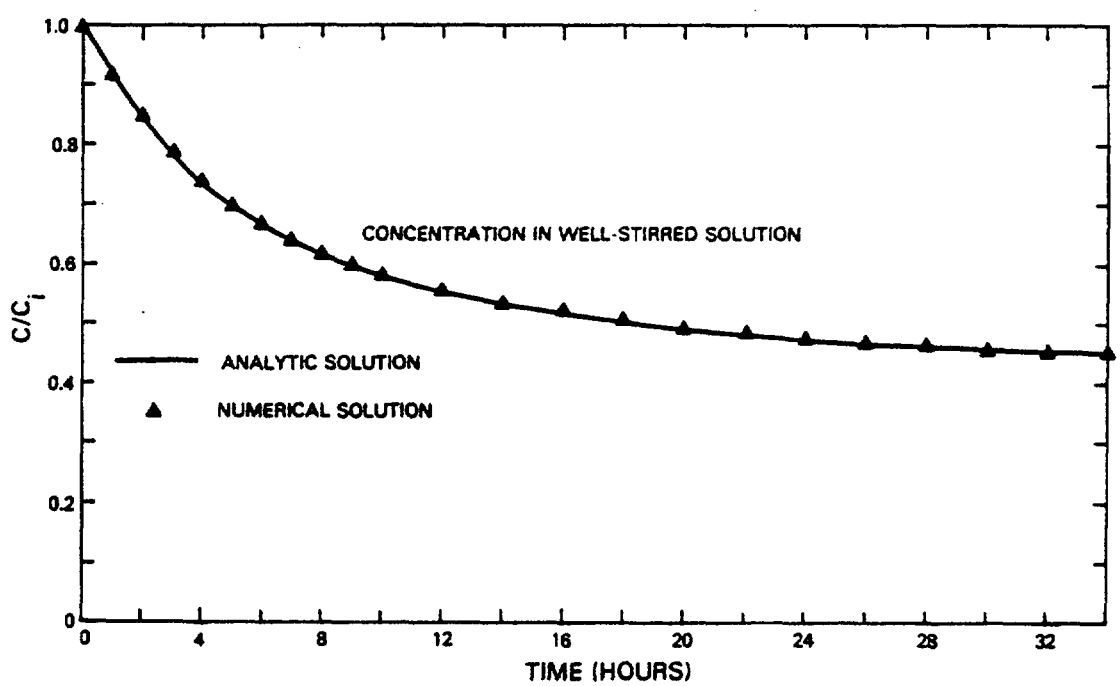


Fig. 13.
Comparison of numerical solution (dots) with analytic (solid line) for diffusion of a tracer from a well-stirred solution into a matrix under nonequilibrium sorption conditions.

$$\frac{\partial C}{\partial t} + V_1 \frac{\partial C}{\partial x} = D\nabla^2 C \ , \ t > 0, \ x > 0 \ , \ 0 < y < \omega \tag{95}$$

and

$$R \frac{\partial C}{\partial t} + V_2 \frac{\partial C}{\partial x} = D\nabla^2 C \ , \ t > 0, \ x > 0, \ y > \omega \ , \tag{96}$$

where $\omega$ is the crack half-width, initial conditions are

$$C(0,0,0) = C_0 \ , \tag{97}$$

and boundary conditions are

$$C(\infty,\infty,t) = 0 \text{ and } C(x,\omega,t)_- = C(x,\omega,t)_+ \ . \tag{98}$$

This last condition simply states that concentration is continuous across the crack interface. In this example, $\omega = 10^{-2}$ cm, $V_2 = 0.05$ m $\cdot$ yr$^{-1}$, $V_1 = 10^2$ m $\cdot$ yr$^{-1}$, $D = 10^{-5}$ cm$^2$ $\cdot$ s$^{-1}$, $R = 16$, and $C_0 = 10^{-6}$ gm $\cdot$ cm$^{-3}$. A time step of 0.01 years was chosen, and zone spacing of 200 cm in the direction parallel to the crack and a variable spacing in the perpendicular direction were used. Figure 14 compares the analytic with the numerical solution. The analytic solution is given in Ref. 12.

In the fifth example, TRACR3D is compared to the analytic solution for one-dimensional constant velocity transport of a chain of three decaying, sorbing tracers in a uniform material. In this case the equations solved are

$$K_\alpha \frac{\partial(C_\alpha)}{\partial t} + \frac{\partial(uC_\alpha)}{\partial x} = \frac{\partial}{\partial x}\left(D \frac{\partial}{\partial x} C_\alpha\right) - \lambda_\alpha K_\alpha C_\alpha + \lambda_{\alpha-1} K_{\alpha-1} C_{\alpha-1} \ , \tag{99}$$

for $\alpha = 1, 2, 3$ .

The tracers form a decay chain; that is, tracer A decays to B, which decays to C, which also decays. In this example, $D_1 = D_2 = D_3 = 1.76 \times 10^3$ m$^2$ $\cdot$ yr$^{-1}$, $u = 110$ m $\cdot$ yr$^{-1}$, $h_1 = 2.4 \times 10^5$ yr, $h_2 = 7.7 \times 10^4$ yr, $h_3 = 1.6 \times 10^3$ yr, $K_1 = 1.43 \times 10^4$, $K_2 = 5 \times 10^4$, and $K_3 = 5 \times 10^2$, where h is half-life. The decay chain source is allowed to leach for $3.33 \times 10^4$ yr. A constant zone size of

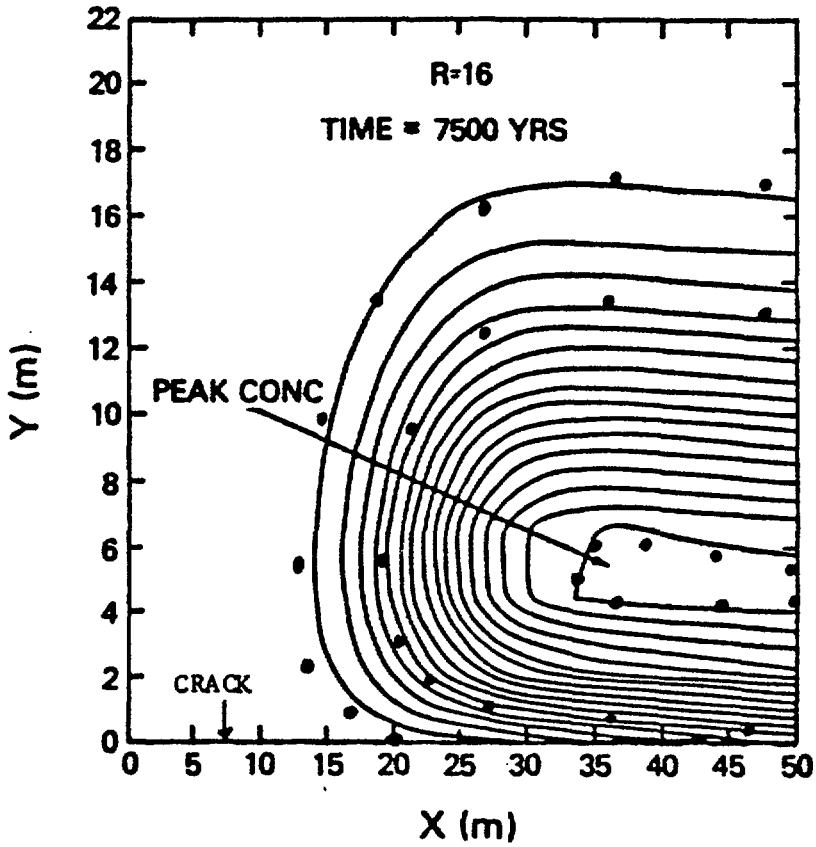


Fig. 14.
Comparison of numerical solution (dots) with analytic solution (solid lines) for diffusion and transport from a fracture in a porous matrix.

10 m and a time step of 15 years were used. The analytic solution can be found in Ref. 13. Figure 15 compares the numerical solution with the analytic.

Not all possible situations can be verified. Analytic solutions are not known to the author for general two-dimensional and three-dimensional transient two-phase flow and transport problems or for two-phase flow in a fractured medium, or for flows in nonuniform media. The verification described herein should be satisfactory to insure that TRACR3D can accurately solve the model equations. Additional verification efforts are under way.

The full capabilities and flexibility of TRACR3D become more apparent through the description of input variables given in Appendix A.

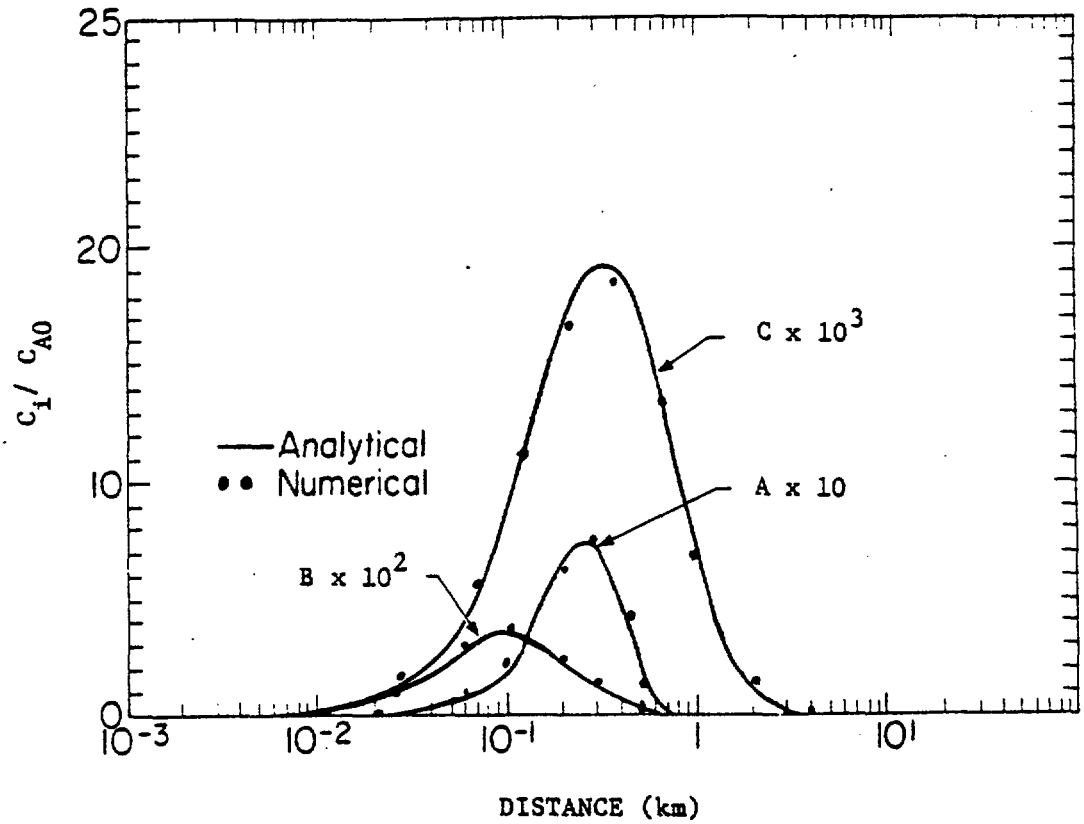


Fig. 15.
Comparison of numerical solution (dots) with analytic (solid lines) for three-chain decay transport verification at 50,000 years.

## C. Validation

Several experiments that validate the TRACR3D code have been conducted. These are (1) water pulse in a partially saturated column of crushed tuff, (2) diffusion of a sorbing tracer into a thin wafer of tuff from a well-stirred solution, and (3) migration of radioactive tracers from an underground nuclear test to a nearby well as a result of pumping in the well.

The first experiment was conducted in a large caisson sunk into one of the mesas in Los Alamos. Figure 16 shows the experimental facility that is operated by Group LS-6 at the Los Alamos National Laboratory. For one series of experiments, one of the caissons shown in Fig. 16 was filled with crushed tuff (with a 6-in. sand layer at the bottom on top of a 6-in. layer of gravel). Water was added until the column was saturated; then it was allowed to drain.

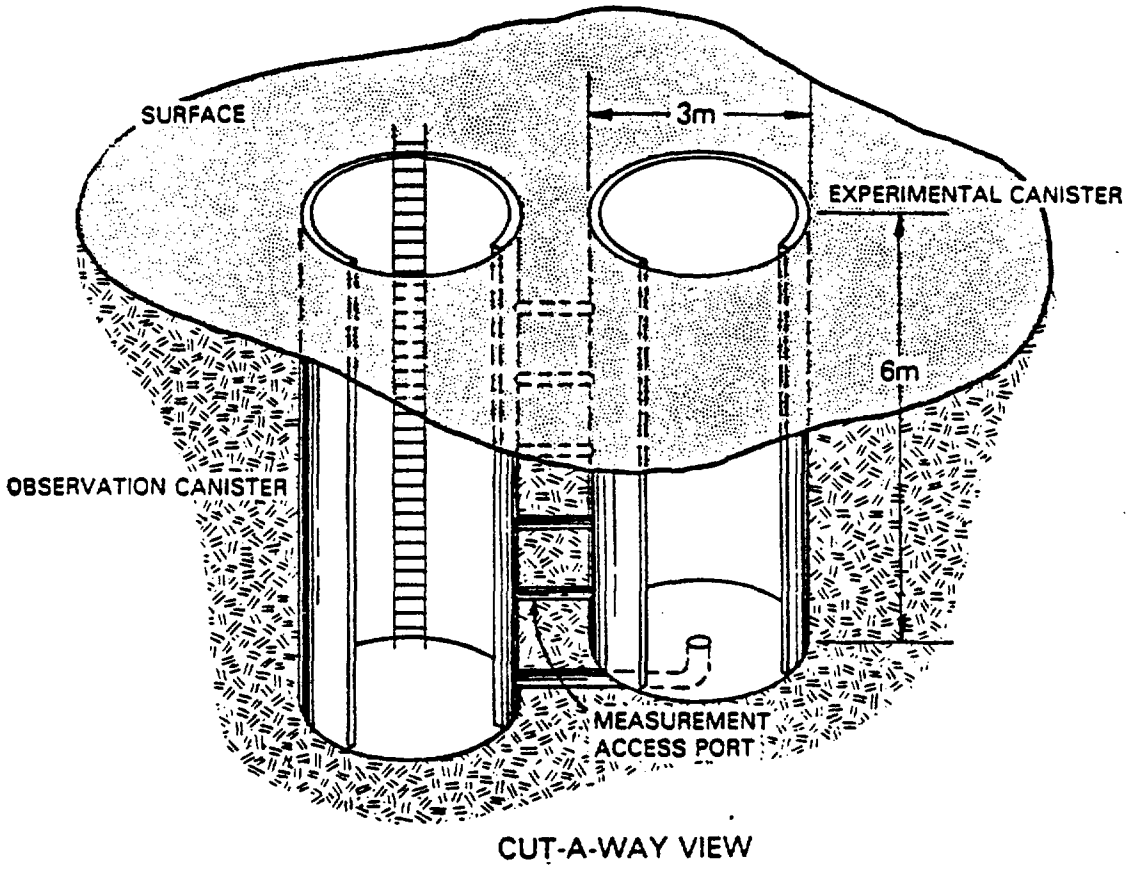


Fig. 16.
Setup for partially saturated flow experiments.

Then a 13-cm layer of water was added to the surface of the column. Saturations at various levels were monitored as the flow proceeded.

Relevant material properties and initial conditions were used in a TRACR3D calculation of this experiment. Details of the experiment can be found in Ref. 14. Results of the calculation are compared to experimental data in Figs. 17, 18a, and 18b. Additional tests are in progress to provide data in the lowest region of the caisson where calculations show high saturation near the tuff/sand interface. The agreement between calculation and experiment is reasonably good.

The second experiment was designed to test the nonequilibrium sorption model in TRACR3D. A thin wafer of tuff 0.1 cm thick was placed in contact with a water solution containing a tracer ($^{90}Sr$) at low concentration. The solution was kept in a well-stirred condition. The tracer diffused into the wafer over 1-2 days. Concentration in the solution was monitored as a function of time.

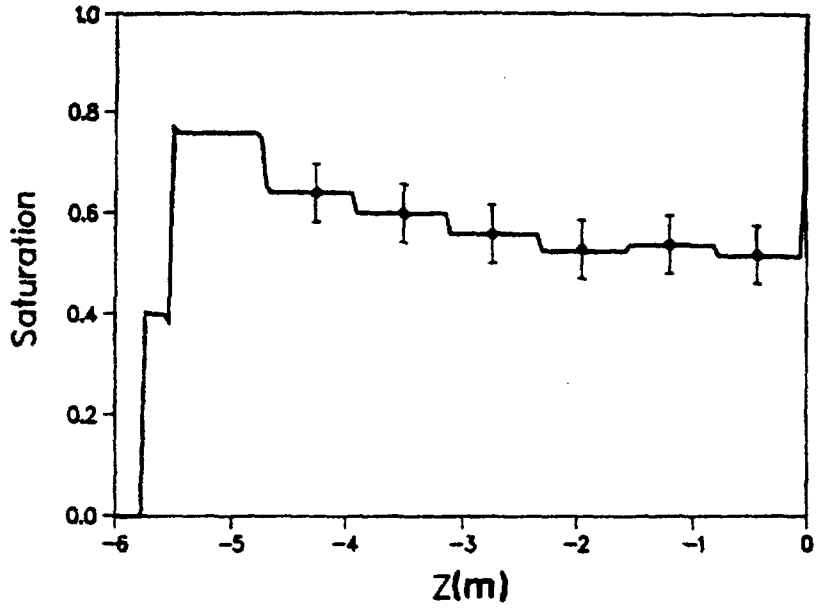


Fig. 17.
Initial saturation profile for unsaturated flow experiment. (Calculated is solid line; observed is points with error bars).

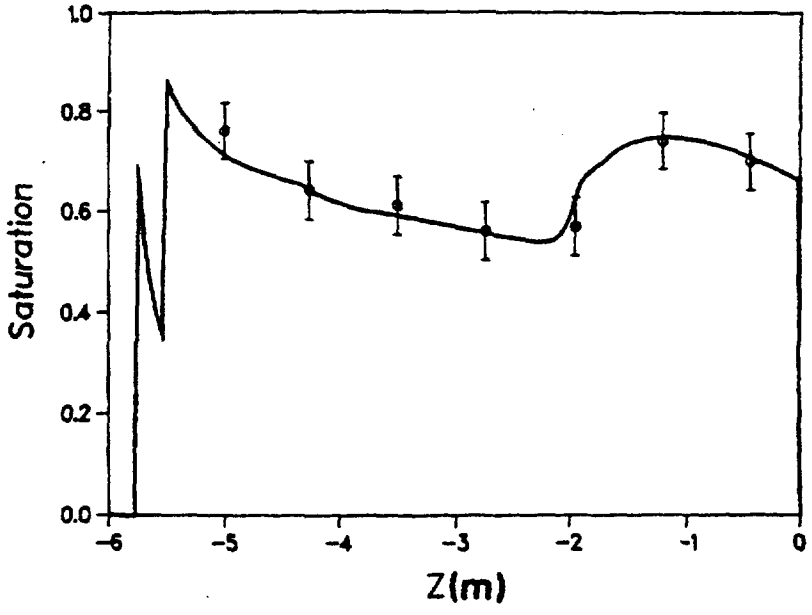


Fig. 18a.
Comparison between calculated and observed saturation profile after 2 days. (Calculated is solid line; observed is points with error bars).

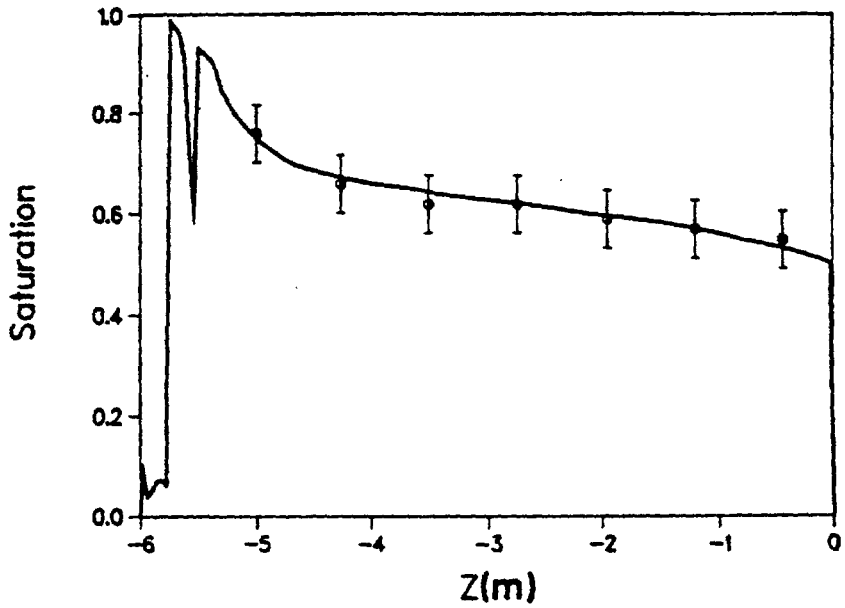


Fig. 18b.
Comparison between calculated and observed water content profile after 22 days. (Calculated is solid line; observed is points with error bars).

The sorptive behavior was clearly nonequilibrium in character. The nonequilibrium model gave a very good match with observed concentrations. Example 3 in Sec. IV.B of this report describes the TRACR3D calculation of this experiment.

The third experiment is a radionuclide migration test[15] (designated RNM) carried out over a period of several years at the Nevada Test Site. Figure 19 shows a cross section through the test region.

The RNM experiment was designed to study the rate of contaminant migration from the cavity. To enhance this migration phenomenon, water was pumped continuously from borehole RNM-2S, beginning in October 1975, at a rate of 250-300 g.p.m. (0.95-1.14 $m^3 \cdot min^{-1}$) until October 1977; then the rate was increased to 600 g.p.m. (2.27 $m^3 \cdot min^{-1}$) and has continued at this higher rate. The radionuclides released from the 0.75-kt nuclear test Cambric, detonated May 14, 1965, were drawn by the radial water flow toward the borehole located 91 m from the cavity.

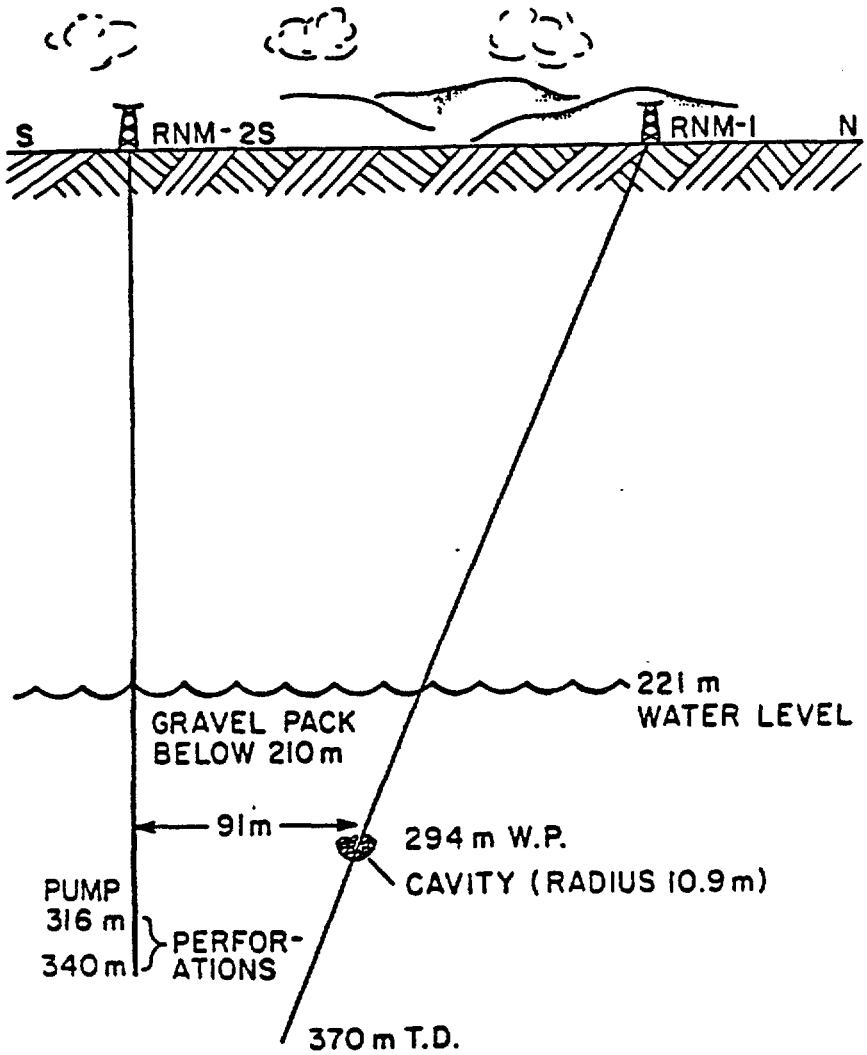


Fig. 19.
Cambric RNM experiment site.

The physical system modeled in this report is shown in Fig. 20. In the simulation, a cylindrical coordinate system was chosen with the axis of rotation coincident with Well RNM-2S. Calculations were performed for flow and tritium transport in a vertical wedge whose top coincided with the water table level and whose bottom surface was 300 m lower than its top. The wedge radius was set at 220 m, and its wedge angle was 14°. This was sufficient to model the flow and tracer transport. Because of the radially converging flow and small diffusivity, little azimuthal dispersion was expected (or calculated). Pressure

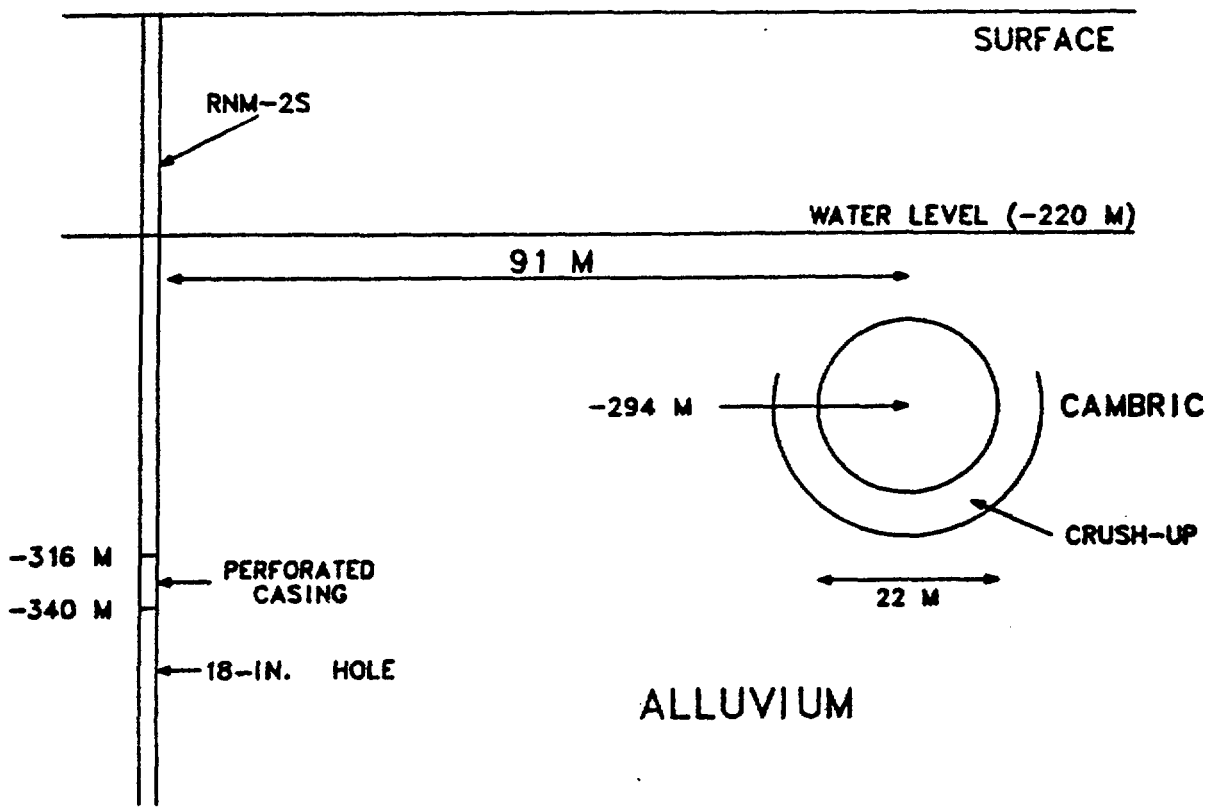


Fig. 20.
Geometry used in TRACR3D calculation of the RNM experiment.

boundary conditions were maintained at hydrostatic values along the lower and outer boundaries of the wedge. The upper boundary was a no-flow surface.

The alluvium was assumed uniform and isotropic. A thin (0.10-m) annular gravel pack is present around the RNM-2S hole and was included in the calculation. Finally, a crush-up region was included around the old Cambric cavity. Alluvium is highly porous and crushes when subjected to the high stresses generated by the Cambric test. The lost porosity approximates the cavity volume. A hemispherical shell 5 m thick and of reduced porosity and permeability was used to approximate this effect. Tritium does not adsorb onto alluvium. However, it may move not only through the intergrain void space but also through pores of some mineral constituents of alluvium. The transport of $^{36}Cl^{-}$ was also monitored. Its arrival time occurred before that of tritium,

suggesting that it was excluded (because of its charge) from some pore space. Differences in arrival times allow estimation of this intragrain porosity. The apparent diffusivity of a species in a porous medium is generally less than its diffusivity in a water-only volume. This is due to the tortuous, constricted path that a tracer must follow in moving through a porous medium. This reduction is termed constrictivity or tortuosity and has been measured for alluvium.

Values of material properties and initial tritium concentrations in and around the Cambric cavity and other details of the TRACR3D simulation of the RNM experiment are available in Ref. 16.

Arrival at RNM-2S of the low-concentration leading front occurred at about 1.45 mcm (million cubic meters pumped). This agrees very well with observation.[15] The observed and computed breakthrough curves are shown in Fig. 21. The main body of the concentration wave arrives at about 1.8-2.0 mcm, which also agrees well with observation. Concentration quickly rises thereafter. The peak of observed tritium concentration reached about

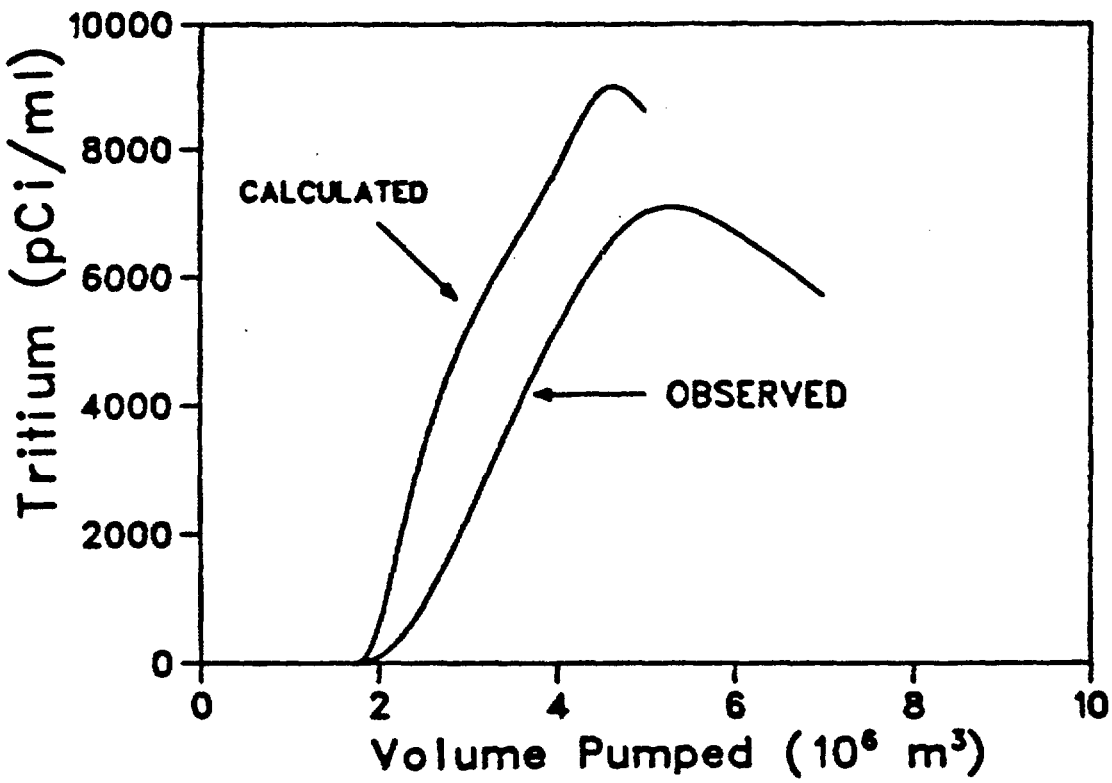


Fig. 21.
Calculated and observed tritium concentration history at Well RNM-2S.

7000 pCi•mℓ$^{-1}$, whereas the calculated value was larger (about 9200 pCi•mℓ$^{-1}$) and arrived somewhat earlier.

The difference between calculated and observed breakthrough curves is approximately equal to the margin of error in the observations.

D. Effect of Zone Size and Time Step Size

Finite difference numerical schemes generally exhibit a relationship between mesh cell size, time step size, and accuracy of solution. The TRACR3D model is no exception. Error is greatest for very coarse mesh zoning and very large time steps. As time step size and mesh cell size decrease, accuracy increases. At some point, further refinement results in little if any change in accuracy.

To illustrate the effect of zone and time step size, the second example in Sec. IV.B has been recalculated with different zoning. Figure 22 shows the results. For zones of reasonable size compared to the scale of the width of the concentration profile, accuracy is not greatly dependent on zone size.

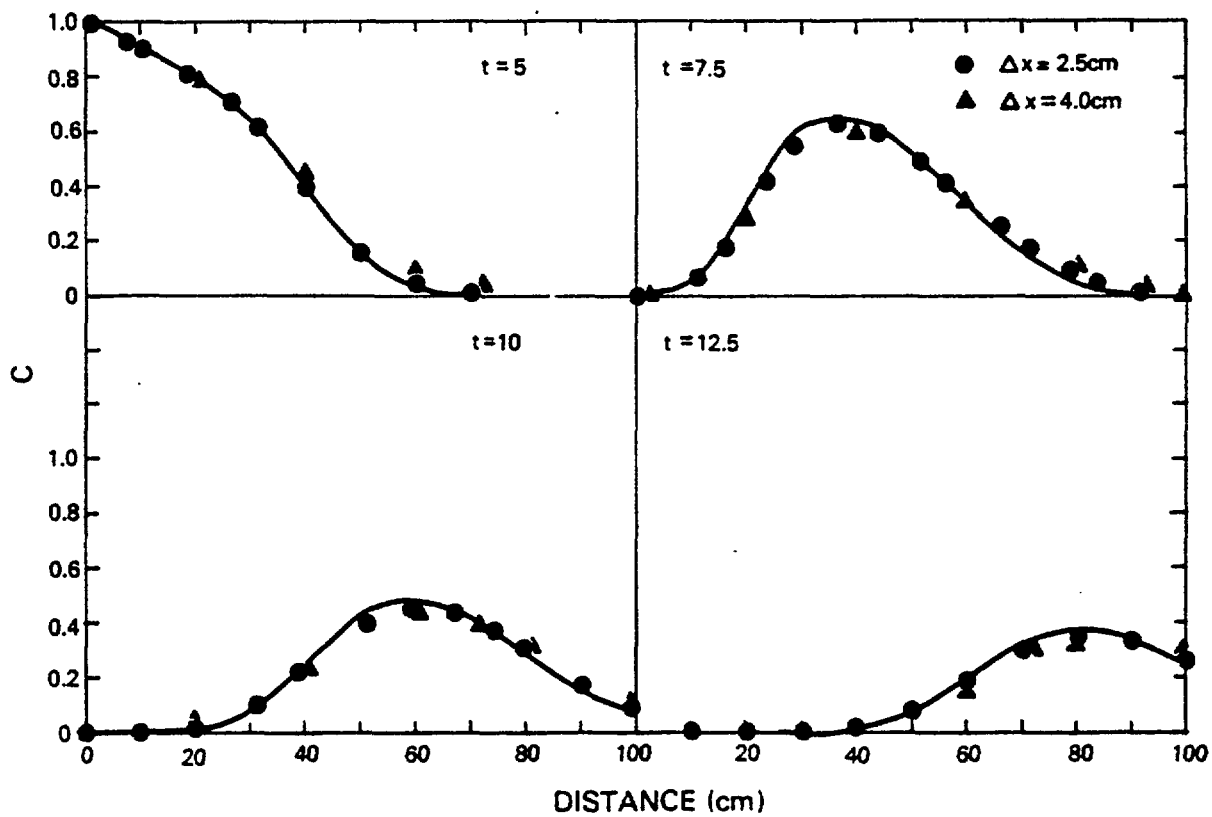


Fig. 22.
Effect of zone size on accuracy of numerical solution for transport of decaying, sorbing tracer.

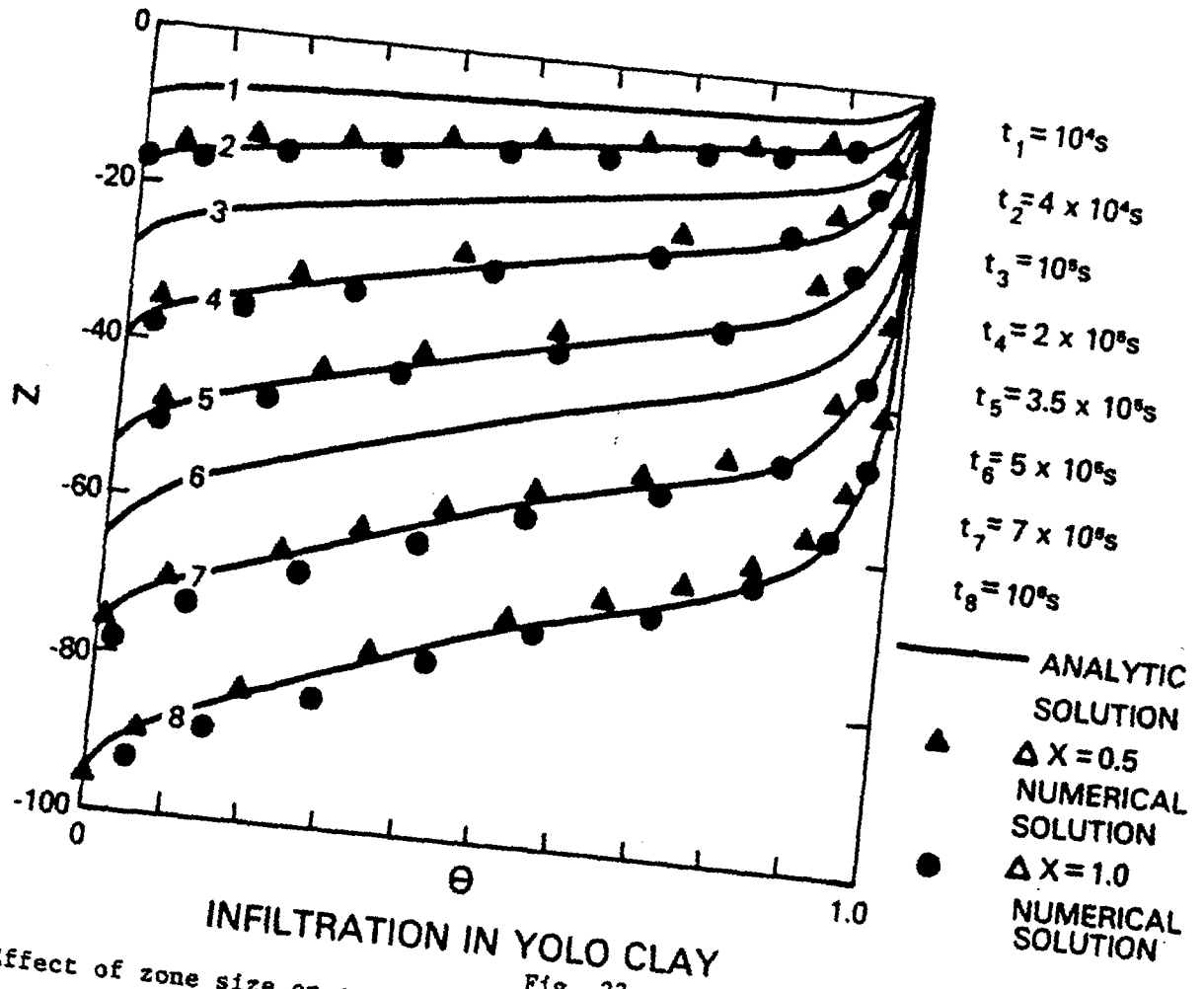


Fig. 23

Effect of zone size on accuracy of numerical solution for water infiltration.

The effect of zone and time step size on flow is shown in Fig. 23. Here, the first example given in Sec. IV.A is repeated with different zoning. Resolution of sharp fronts can be degraded when zoning becomes coarse.

## V. CODE AVAILABILITY

Arrangements to obtain a copy of the TRACR3D code or to use the code on the Los Alamos computers can be made by contacting the author at the address given below.

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## APPENDIX A

## USER'S GUIDE TO THE OPERATION OF THE TRACR3D CODE

### I. INTRODUCTION

The TRACR3D code is currently designed to run on the CTSS system installed on the Los Alamos CRAY computers. TRACR3D is written in FORTRAN 77, with the exception of the SHIFT commands used for bit manipulations: GETTR, which returns code execution time remaining; SETIO and SKIPF, used for input/output file manipulation; and the LOCF function, which returns the absolute address of a variable. Conversion to any large core system, which supports 15 significant-figure, single-precision words and several user-assigned logical units, should be relatively straightforward.

Currently only one file (INPUT) is required to construct a problem. The requirements of this file are given at the end of this appendix. The output files are as follows:

(1) TAPE1 - restart tape, which includes common block images and copies of TAPE7, TAPE8, TAPE9, and TAPE10;

(2) OUTPUT - output file, which (with the current system) may be sent to the printer, microfiche, etc.;

(3) TAPE7 - time history plot data for selected computational zones;

(4) TAPE8 - plot data for selected variables along specified horizontal or vertical lines;

(5) TAPE9 - contour plot data at selected times; and

(6) TAPE10 - data for three-dimensional dot density or vector plots at selected times.

Files (3)-(6) are used with postprocessing programs to produce the appropriate plots. Most plotting capability is very machine dependent. Ours is no exception and the postprocessors can be used only on systems that have the DISSPLA graphics package. For this reason, these programs are not included here, but copies may be obtained from the author.

### II. SETUP OF INPUT FILE (INPUT)

Preparing an input file is a fairly simple matter. The first line of INPUT contains two variables, RESTART and CHANGE, in a 2F10.2 format. If RESTART = 0, this is an initial run of a problem; if RESTART ≠ 0, this is a continuation run

of a problem and a TAPE1 must be available. The variable CHANGE, if CHANGE ≠ 0, allows changes in the input list (only if RESTART ≠ 0). Making changes in physical variables during a problem can only be done at risk, and the primary intent is to allow changes in a few variables such as problem end-time. The second line of INPUT is reserved for a title up to 80 characters long. This title appears on print-outs and on plots.

The remainder of the input file consists of a FORTRAN NAMELIST input called SETUP. A brief description of each NAMELIST variable follows. Dimensions are given in the left column, default values are given in parentheses on the right, and all units are centimeters-gram-second (cgs) unless otherwise indicated.

Some dimensions are set with symbolic names in PARAMETER statements when the code is compiled. These symbolic names are NMX (maximum number of cells in the x-direction + 3), NQX (maximum number of cells in the y-direction + 3), NNX (maximum number of cells in the z-direction + 3), and NTRC (maximum number of tracers). The minimum value for NMX, NQX, and NNX is 4, and the minimum value for NTRC is 1, even if no tracers are calculated.

A. Specification of Geometry

ICOORD = 1 for Cartesian coordinates.
= 2 for cylindrical coordinates.
(Default is 1).

IDIM = 1 for one-dimensional run (assumes flow in z-coordinate).
= -1 for radial flow.
= 2 for two-dimensional run (assumes flow in x-z plane).
= 3 for three-dimensional run.
(Default is 3).

IJPT(400) Specifies blocks of mesh zones having specified time history. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $n_a$,.... It means that zones contained in columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$ will have a time history specified by table number $n_a$ in TDBDY.

IJSS(200) Specifies zone blocks having sources or sinks of mass. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $n_1$,..., indicating that zones in columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$ have sources or sinks given by table $n_1$ of SSTABL.

MATCEL(400) Indicates blocks of zones having specified material types. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $n_1$, $i_3$, $i_4$, $j_3$, $j_4$, $k_3$, $k_4$, $n_2$,..., indicating material from columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$ is material type $n_1$ specified in TABMAT,.... Overlapping blocks can be specified to build up irregular regions. Care must be taken at boundary cells. If not specified, material type 1 is assigned to boundary cells. At an earth-air or earth-water interface, a separate material type should be assigned for the boundary cell to allow for no capillary suction.

NOFLOW(400) Specifies internal no-flow planes. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $f_1$,.... If $f_1 = 1$, zone interfaces from rows $i_1$ to $i_2$ and layers $j_1$ to $j_2$ between columns $k_1$ and $k_1 + 1$ are no flow. If $f_1 = 2$, zone interfaces from columns $i_1$ to $i_2$ and layers $j_1$ to $j_2$ between rows $k_1$ and $k_1 + 1$ are no flow. If $f_1 = 3$, zone interfaces from columns $i_1$ to $i_2$ and rows $j_1$ to $j_2$ between layers $k_1$ and $k_1 + 1$ are no flow.

RCM(NMX) Sets up zoning in x-direction. Form is $r_1$, $n_1$, $r_2$, $n_2$, $r_3$,..., indicating that the left-hand boundary is at $r_1$ and that there are $n_1$ equally spaced zones between $r_1$ and $r_2$, $n_2$ equally spaced zones between $r_2$ and $r_3$, etc.

YCM(NQX) Sets up zoning in y-direction. Form is $y_1$, $q_1$, $y_2$, $q_2$, $y_3$,..., indicating that the front boundary is at $y_1$ and that there are $q_1$ equally spaced zones between $y_1$ and $y_2$, $q_2$ equally spaced zones between $y_2$ and $y_3$, etc. If ICOORD = 2, the $y_i$'s are angles in degrees with the constraint $0 < y_i < 360$.

ZCM(NNX) Specifies vertical spacing. Form is $z_1$, $n_1$, $z_2$, $n_2$, $z_3$,..., indicating that the bottom boundary is at $z_1$ and that there are $n_1$ equally spaced zones between $z_1$ and $z_2$, $n_2$ equally spaced zones between $z_2$ and $z_3$, etc.

IRANDF = 0; fractures, if any, are specified explicitly in definition of RCM, YCM, ZCM, and TABMAT.

= 1; fracture width is determined from FWIDTH and fracture spacing defined by FSPACX, FSPACY, and FSPACZ.

= 2; fractures are assigned on a random basis using PFCONN and FWIDTH.

(Default is 0).

PFCONN — Probability used to determine fracture extension. If random number < PFCONN, fracture is extended. 0 < PFCONN < 1. Used only for IRANDF = 2.
(Default is 0.67).

FSPACX — Used for IRANDF = 1. Value is distance between fractures in the x-direction.
(Default is 0.0).

FSPACY — Used for IRANDF = 1. Value is distance between fractures in the y-direction.
(Default is 0.0).

FSPACZ — Used for IRANDF = 1. Value is distance between fractures in the z-direction.
(Default is 0.0).

FWIDTH(20) — Used for IRANDF = 1 or 2. Form is $P_1$, $W_1$, $P_2$, $W_2$,..., where $P_i$ is the percentage of fractures having width $W_i$.

B. Boundary Conditions

IBB(60) — Bottom boundary condition indicator. Form is $i_1$, $i_2$, $j_1$, $j_2$, $t_1$, $i_3$, $i_4$, $j_3$, $j_4$, $t_2$,.... On the bottom boundary, zones from columns $i_1$ through $i_2$ and rows $j_1$ through $j_2$ have boundary type $t_1$, etc. Overlapping regions can be specified to build up nonrectangular boundary type areas.
(Default is 1).

IBBK(60) — Back-face boundary condition indicator. Form is $i_1$, $i_2$, $k_1$, $k_2$, $t_1$, $i_3$, $i_4$, $k_3$, $k_4$, $t_2$,.... On the back boundary, zones from columns $i_1$ through $i_2$ and layers $k_1$ through $k_2$ have boundary type $t_1$, etc. Overlapping regions can be specified to build up nonrectangular boundary type areas.
(Default is 2).

IBF(60) — Front-face boundary condition indicator. Form is same as that described for IBBK.
(Default is 1).

IBL(60) — Left-hand boundary condition indicator. Form is $j_1$, $j_2$, $k_1$, $k_2$, $t_1$, $j_3$, $j_4$, $k_3$, $k_4$, $t_2$,.... On the left boundary, zones from rows $j_1$ through $j_2$ and layers $k_1$ through $k_2$ have boundary type $t_1$, etc.

Overlapping regions can be specified to build up nonrectangular boundary type areas.

(Default is 1).

IBR(60) Right-hand boundary condition indicator. Form is same as that described for IBL.

(Default is 2).

IBT(60) Top boundary condition indicator. Form is same as that described for IBB. Permissible boundary condition indicators are

(1) No flow (impermeable boundary).

(2) Boundary values fixed at ambient.

(3) Continuative outflow. Values of $C_i$ are set to the values in the adjacent interior zone. Pressure and saturation are set from radiation conditions on velocity components. Mass inflow condition can be achieved by using SSTAB at zones next to inflow boundary and assigning type 1 to the boundary.

(4) Band release. Option (4) should be used only when decay chain transport is to be computed. Under this option, tracer concentrations in the boundary zone are determined from the Bateman equations for band release. The initial values for the decay chain are given in variable CBIN. Leach time (time duration of constant rate leak of solutes) is given by TLEACH.

($10 < IBT < 99$) Specified time-dependent boundary conditions. The value given here indicates table number in TDBDY.

(Default is 2).

NOTE: In IBB, IBBK, IBF, IBL, IBR, and IBT, the delimiters i, j, and k can have fractional values to specify that only a portion of a cell's interface area is available for flow. Only one cell at a time can be so designated. For example, IBL = 1, 1.2, 1, 1, 2, would result in flow through the interface between cell (1,1,1) and (0,1,1), through that portion between R(2) and R(2) + 0.2 × [R(3) - R(2)], and Z(2) and Z(3).

TDBDY(500) Time-dependent tables for boundary conditions (and zones given by IJPT). Form is $n_1$, $k_1$, $t_1$, $P_1$, $f_1$, $C_{11}$, $C_{21}$, $C_{q1}$,..., $t_{k1}$, $P_{k1}$, $f_{k1}$, $C_{1k1}$, $C_{2k1}$, $C_{qk1}$, $n_2$, $k_2$,..., where n gives the table number and k gives the number of data set entries for a given table. Each data set consists of t the time, P the pressure, f the gas

saturation, and $C_i$ the concentrations for each of the specified q tracers. If $f > 0$, P is air pressure. If $f = 0$, P is water pressure. If q is 0, no entries are made for the $C_i$'s. Linear interpolation between entries is used to determine pressure, saturation, and concentration. Table 20 is reserved for a "ponding" upper boundary. The form is 20, n, 0.0, $P_1$, 1.0, 0.0, 0.0,...,0.0, 0.0, $t_1$, $h_1$, 0.0,..., $C_{11}$,..., $C_{q1}$,..., where h represents the depth of water above the boundary, $P_1$ is the pressure that is added to the water head $\rho_\ell$ g h, and $C_{11}$,..., $C_{q1}$ are the concentrations of tracers in the ponded water. The ponded water will decrease automatically by the amount of fluid that enters the material mesh. When all the water has infiltrated, air pressure at the upper boundary is set to $P_1$, air saturation is set to 1.0, and all concentrations are set to 0.0 . If $n = 2$ and $t_1 < 0$, a periodic ponding condition is established. An additional h cm of water is added every abs($t_1$) seconds to the surface.

CBIN(40) Initial concentrations for boundary cells of type 4.
(Default is 0.0).

TLEACH Duration of leach period. Used with boundary type 4. Leaching is assumed to begin at the initial problem time.
(Default is 0.0).

C. Material, Fluid, and Tracer Properties

ATM Initial ambient air pressure.
(Default is $1.0 \times 10^6$).

FO Initial default air saturation.
(Default is 0.0).

DIFC(10) Molecular diffusivity of tracers in host fluid.
(Default is 0.0).

HAFLIF(10) Half-life of tracers (in seconds) if radioactive; otherwise = 0.
(Default is 0.0).

MOLC(10) Molecular weights of tracers.
(Default is 1.0).

IJV(300) Initializes velocity field. Used when ITRACR = -1. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $u_1$, $v_1$, $w_1$, $u_{\ell 1}$, $v_{\ell 1}$, $w_{\ell 1}$,.... For zones from columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through

$k_2$, $u_1$, $v_1$, and $w_1$ are the gas velocities for the right, back, and top faces of the zones, whereas $u_{\ell 1}$, $v_{\ell 1}$, and $w_{\ell 1}$ are the liquid velocities for the right, back, and top faces of each zone. Up to 25 blocks can be specified to define spatially varying velocity field.

MOLWT(2) Molecular weight of fluids involved in flow.
MOLWT(1) = molecular weight of gas component.
(Default is 29.0).
MOLWT(2) = molecular weight of liquid component.
(Default is 18.0).

NTRCR Number of tracers.
(Default is 0).

FIN(400) Initial air-saturation distribution. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $f_1$, $i_3$, $i_4$, $j_3$, $j_4$, $k_3$, $k_4$, $f_2$,.... Cells in zones from columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$ are assigned air-saturation values of $f_1$, and so on. Overlapping of blocks is permitted.
(Default is 0.0).

PIN(400) Initial pressure distribution. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $P_1$, $i_3$, $i_4$, $j_3$, $j_4$, $k_3$, $k_4$, $P_2$,.... Cells in zones from columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$ are assigned gas pressure values of $P_1$, and so on. Overlapping of blocks is permitted.
(Default is 0.0).

CIN(400) Initial tracer concentration distribution. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $C_1$,..., $C_{NTRCR}$,.... Cells in zones from columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$ are assigned tracer concentration values of $C_1$,..., $C_{NTRCR}$, etc. Overlapping of blocks is permitted.
(Default is 0.0).

VISL Viscosity of liquid component.
(Default is 0.01).

VISG Viscosity of gas component.
(Default is $1.7 \times 10^{-4}$).

RHOL — Density of liquid.
(Default is 1.0).

COMPRL — Compressibility of liquid.
(Default is 0.0).

TMPRTR — Temperature.
(Default is 30.0).

SSTAB(500) — Source/sink tables. Form is $n_1$, $k_1$, $t_1$, $\dot{S}_{g_1}$, $\dot{S}_{\ell v_1}$, $C_{11}$,..., $C_{NTRCR,1}$, $t_2$, $\dot{S}_{g_2}$, $\dot{S}_{\ell v_2}$, $C_{12}$,..., $C_{NTRCR,2}$,..., $t_{k_1}$, $\dot{S}_{g_{k1}}$,..., $C_{NTRCR,k1}$,..., $n_2$, $k_2$, $t_1$, $\dot{S}_{g_1}$,..., where n refers to the table number and k refers to the number of data sets corresponding to a given table number. A data set is composed of the time t, gas mass source/sink rate ($\dot{S}_g$), total water mass source/sink rate ($\dot{S}_{\ell v}$), and tracer concentrations $C_i$ in mass added.

TABMAT(400) — Material property table. Form is $n_1$, $k_{x1}$, $k_{y1}$, $k_{z1}$, $\varepsilon_1$, $L_1$, $\beta_1$, $S_{wi1}$, $\tau_1$, $P_{b1}$, $\rho_b$, $\tau_c$, f, n2,..., where $n_i$ is the material number; $k_{xi}$, $k_{yi}$, and $k_{zi}$ are the saturated permeabilities (in darcys) in the horizontal (x and y) and vertical directions; $\varepsilon_i$ is the porosity; $L_i$ is the average particle size (used in calculating dispersion); $\beta_i$ is the compressibility of the matrix; $S_{wii}$ is the irreducible water saturation; $\tau_i$ is the pore-size distribution index; $P_{bi}$ is the bubbling pressure (in bars); $\rho_b$ is bulk matrix density; $\tau_c$ is the constrictivity coefficient; and f indicates that this material is for a fracture (value of 1) or porous matrix (value of 0). If $P_b = 0$, matric potential is not calculated. If $P_b < 0$, matric potential is determined from tables that must appear in PCTB. If $k_{z1} < 0$, relative permeabilities are given in table form in RELKTB.

PCTB(2040) — Tables for matric potential if analytic expression (11) is not desired. Form is PCTB = $i_1$, $n_1$, $f_{11}$, $Pc_{11}$, $f_{21}$, $Pc_{21}$,..., $f_{n_1 1}$, $Pc_{n_1 1}$, $i_2$, $n_2$, $f_{12}$, $Pc_{12}$,..., where i is a table number and corresponds to a TABMAT table number in which $P_b < 0$, and n is the number of data pairs in table i. Each data pair consists of air saturation f and matric potential $P_c$, which is assumed positive for $f > 0$. Each table must cover the range of f from 0.0 to 1.0, inclusive.

RELKTB(3050) Tables for air and water relative permeabilities if analytic expressions (7) and (8) are not desired. Form is RELKTB = $i_1$, $n_1$, $f_{11}$, $k_{gr_{11}}$, $k_{\ell r_{11}}$, $f_{21}$, $k_{gr_{21}}$, $k_{\ell r_{21}}$,..., $f_{n11}$, $k_{gr_{n11}}$, $k_{\ell r_{n11}}$, $i_2$, $n_2$, $f_{21}$,..., where i is a table number that must correspond to a TABMAT table number for which $k_z < 0$ and n is the number of data triplets in table i. Each data triplet consists of air saturation f, relative air permeability $k_{gr}$, and relative water permeability $k_{\ell r}$. If IRICH = 1, set $k_{gr_{ji}}$ values to zero. If saturated gas permeability is not equal to saturated water permeability, set intrinsic permeability in TABMAT to 1.0 and use RELKTB to input actual gas and liquid permeabilities as function of gas saturation.

SNIN(400) Initial values of adsorbed species. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $S_{11}$, $S_{21}$,..., $S_{NTRCR1}$, $i_3$, $i_4$,....
Cells in zones from columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$ are assigned tracer concentrations in the adsorbed state of $S_{11}$, $S_{21}$, up to $S_{NTRCR1}$, etc. Overlapping of regions is allowed.

EQUILK(40,10) Specifies, for ICHMOD = 2, adsorption coefficient $Q_{1\alpha}$ in Eq. (4) for each tracer on each matrix material type. For example, EQUILK(5,2) will contain $Q_1$ for the second tracer on material type 5 defined in TABMAT. If ICHMOD = 1, this array contains the $K_D$ equilibrium sorption value.

POWERN(40,10) Specifies, for ICHMOD = 2, the desorption coefficient $Q_{2\alpha}$ in Eq. (4) for each tracer on each material type. For example, POWERN(2,1) will contain $Q_2$ for tracer 1 on material type 2 defined in TABMAT. For ICHMOD = 1, a value of 0.0 is assigned.

SLIM(40,10) Specifies, for ICHMOD = 2, the maximum amount of tracer that can be adsorbed on each material type [$S_{m\alpha}$ in Eq. (4)]. For example, SLIM(3,2) will contain the value of $S_m$ for tracer 2 on material type 3.

CO(40,10) The solubility limit of each tracer in the presence of each material type. Used for ICHMOD = 2.
(Default is 0.0).

## D. Time Parameters

COURNT — Indicates time step size in terms of multiples of the Courant limit.
(Default is 1.0).

DT — Initial time step size.
(Default is $10^{-5}$ s).

DTMAX — Maximum allowed time step.
(Default is $1.0 \times 10^{100}$ s).

POSTIM — Postprocessing time...code will run until remaining computer time is < POSTIM. This allows time for taking the final dump, etc.
(Default is 60.0 s).

TEND — Final problem time in seconds.

TIME — Initial problem time in seconds.
(Default is 0.0).

NPASST — Number of passes made in solution of transport equations. For some problems, a single-pass explicit solution is adequate. If ICHMOD = 0, use NPASST = 1. Otherwise, the value assigned must be 4.
(Default is 4).

DTCHNG(40) — Allows user to specify times at which time step will be set to given value. This is used primarily in conjunction with time dependent boundary conditions. Form is DTCHNG = $t_1$, $\Delta t_1$, $\Delta T_1$, $t_2$, $\Delta t_2$, $\Delta T_2$,..., where $t_1$ is the time at which the time step is to be set to $\Delta t_1$. Every $\Delta T_1$ seconds after $t_1$, this action will be taken, until time $t_2$ is reached, etc.

## E. Flow Parameters

IACT(200) — Indicates cells initially active. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $f_1$, $C_1$,...., $C_{NTRCR}$,... Cells in columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$ will be turned on for flow calculations if $f_1 = 1$ and for the $i^{th}$ tracer calculation if $C_i = 1$. Irregular regions can be built up.

TOLP — Indicates change from initial pressure required to extend active mesh region.
(Default is 1000.0).

| | |
|---|---|
| TOLF | Indicates change from initial air saturation required to extend active mesh region.<br>(Default is 0.01). |
| TOLC(10) | Indicates changes from initial concentrations required to extend active mesh regions.<br>(Default is $1.0 \times 10^{-7}$). |
| TOL | Convergence absolute tolerance on gas pressure and water pressure for solution of flow equations.<br>(Default is 10.). |
| TOL1 | Convergence absolute tolerance on iterative solution of Eq. (49) for water pressure. Only needed if IRICH = 1.<br>(Default is 0.1). |
| OMEGAP | Over- or under-relaxation parameter. Can be used to speed convergence of flow equations. Range is 0.0 to 2.0, exclusive. It is only applied to pressure in fully saturated regions.<br>(Default is 1.0). |
| CMIN | Any concentration value less than CMIN will be set to 0.0. This prevents unphysically small concentration.<br>(Default is $10^{-15}$). |
| FMIN | Any air-saturation value less than FMIN will be set to 0.0.<br>(Default is $10^{-15}$). |
| GRAV | Gravitational acceleration. A value of 980 is used for the earth. A value of 0.0 means gravity is turned off.<br>(Default is 980.0). |
| ICNVEC | A value of 1 allows calculation of advective transport; a value of 0 causes advective transport to be skipped. This is used to reduce computational time for cases involving only diffusive transport.<br>(Default is 1). |
| IDSPSN | = 0; skip dispersion tensor calculation.<br>= 1; calculate dispersion tensor.<br>= 2; only calculate terms on tensor diagonal.<br>(Default is 0). |
| IFLOW | = 0; means flow is water only (single phase).<br>= 1; means flow is gas only (single phase). |

= 2; means flow is both water and gas (two-phase). In this case, saturation can range from 0 to 1, inclusive.
(Default is 2).

ISTEDY = 0; flow is not steady.
= 1; flow is steady.
(Default is 0).

IPRSDP = 0; permeabilities are not pressure dependent.
= 1; permeabilities are pressure dependent.
(Default is 0).

IFORCH = 1; calculate nonlinear term in Forchheimer relation.
= 0; do not calculate nonlinear term.
(Default is 0).

ICONS = 0, means one or more variables are spatially nonuniform.
= 1, means all material and fluid properties and velocities are spatially uniform, and the problem is one-dimensional. This variable allows faster execution time.
(Default is 0).

LLMIN Minimum number of iterations for pressure iteration. Run time can be significantly reduced by fortunate choice of this parameter.
(Default is 1).

LGLMIN Minimum number of iterations at which to freeze time step size. This is used to prevent the number of iterations in the solution of the flow equations from becoming too large. If the number of iterations exceeds LGLMIN, the time step is not allowed to increase until the number of iterations drops below this limit. This scheme appears to work well.
(Default is 30).

LGLMAX Maximum number of iterations allowed before time step is reduced. If the number iterations required for solution of the flow equations in a time step exceeds LGLMAX, the time step is reduced by 20%.
(Default is 50).

CDONOR No action if CDONOR < 0.
If CDONOR > 0., donor differencing is used for tracer transport. CDONOR = 0 gives pure donor differencing. CDONOR = 0.5 would give

space-centered differencing. Numerical stability requires $0. \leq CDONOR < 0.5$.
(Default is 0.0).

ICHMOD = 0; no sorption and no decay.
= 1; equilibrium sorption.
= 2; saturable, kinetic sorption model.
(Default value is 0).

ITRACR = -1; calculate transport only.
= 0; calculate flow only.
= 1; calculate flow and transport.
(Default is 1).

ITRACF Indicates fluid carrying the tracers.
=1; tracers in air phase.
=2; tracers in liquid phase.
(Default is 2).

IRICH =0; no action.
=1; only the Richards' equation is solved [Eq. (49) with constant gas pressure P].
(Default is 0).

IDONR Provides smoothing needed to provide a stable flow solution. For certain problems, such as flow in a crack with diffusion into the surrounding matrix, oscillations can sometimes develop behind a saturation front. A value of 1 for IDONR will cause donor differencing to be used only in cells experiencing such oscillations. Usually, this option is not needed.
(Default is 0).

ITHETA(80) Indicates cells that are sloping and for which a horizontal component of gravity must be assigned. Form is $i_1$, $i_2$, $j_1$, $j_2$, $k_1$, $k_2$, $\theta_x$, $\theta_y$,..., etc. For cells in the region from columns $i_1$ through $i_2$, rows $j_1$ through $j_2$, and layers $k_1$ through $k_2$, the slope in the x-direction is $\theta_x$ degrees and in the y-direction is $\theta_y$. Angles are measured from the horizontal, either in the positive or negative (clockwise) direction.
(Default is 0).

## F. Print-Out Control

DELCY — Number of computational cycles between print dumps. If printing frequency is to be controlled by TABTP, DELCY should be a large number.
(Default is $10^5$).

IPRNT(21) — Controls columns included in print-out. Form is $i_1$, $\Delta i_1$, $i_2$, $\Delta i_2$, $i_3$,..., indicating that print-out will include results for column $i_1$ and every $\Delta i_1{}^{th}$ column to $i_2$,..., then every $\Delta i_2{}^{th}$ column to $i_3$, etc.
(Default is 3*1).

JPRNT(21) — Controls rows included in print-out. Form is $j_1$, $\Delta j_1$, $j_2$, $\Delta j_2$,..., indicating that print-out will include results for rows $j_1$ and every $\Delta j_1{}^{th}$ row to row $j_2$, etc.
(Default is 3*1).

KPRNT(21) — Controls layers included in print-out. Form is $k_1$, $\Delta k_1$, $k_2$, $\Delta k_2$,..., indicating that print-out will include results for layers $k_1$ and every $\Delta k_1{}^{th}$ layer to layer $k_2$, etc.
(Default is 3*1).

TABTP(100) — Indicates print times. Form is $t_1$, $\Delta t_1$, $t_2$, $\Delta t_2$, $t_3$,..., meaning print dumps (TAPE6) are taken at $t_1$ and every $\Delta t_1$ seconds until $t_2$, then every $\Delta t_2$ seconds until $t_3$, etc.

IPROD(60) — Indicates cells for which cumulative air and water fluxes will be tabulated and printed at the end of each time print. Form is $i_1$, $j_1$, $k_1$, $i_2$, $j_2$, $k_2$,..., where i, j, and k are the column, row, and layer number of a cell for which air and water fluxes will be tabulated.

IPRODN — Number of cells specified in IPROD.

## G. Contour Plot Controls

IVELP — Control velocity vector plots.
= 1; write only gas-phase velocity (TAPE9) for vector plots.
= 2; write only liquid-phase velocity for vector plots.
= 3; write both velocities.
= 0; no action.
(Default is 0).

NXPCON Indicates which variables will be contour plotted. NXPCON is written as an integer number in which each digit's value determines a variable to be written to TAPE9. Form is NXPCON = $d_n \ldots d_4 d_3 d_2 d_1$, where $d_i$ = 0 means variable will not be contour plotted; $d_i$ = 1 means the variable will be contour plotted. The digits correspond to $d_1$, pressure (both air and water); $d_2$, liquid saturation; $d_3$, first tracer fluid concentration; $d_4$, first tracer solid concentration; $d_5$, second tracer fluid concentration; $d_6$, second tracer solid concentration; $d_7$, third tracer fluid concentration; $d_8$, third tracer solid concentration; etc. For example, 111111 means that pressure, liquid saturation, and fluid and solid concentration for first and second tracers will be written to TAPE9 for contour plots. In a second example, 1001 would cause pressure and the first tracer solid concentration values to be written on TAPE9.
(Default is 0).

ICPLAN(40) Specifies planes from which variables to be contour plotted are taken and written to TAPE9. Form is $P_1$, $\ell_1$, $P_2$, $\ell_2$,..., where $P_1$ indicates the coordinate axis that is normal to the plane desired, whereas $\ell_1$ indicates the row, column, or layer number in the $P_1$ coordinate axis direction. $P_i$ = 1 for x-axis, $P_i$ = 2 for y-axis, and $P_i$ = 3 for z-axis. For example, ICPLAN = 3,5, would cause data from the fifth layer of zones to be written onto TAPE9.

PLOTT(50) Determination of times when contour plots are made. Form is $t_1$, $\Delta t_1$, $t_2$, $\Delta t_2$,..., indicating that contour plots will be made at $t_1$ and every $\Delta t_1$ seconds until $t_2$ is reached, etc.

PRTLEV(10,3) Specifies the reference levels for determining the digits used in digit plots. PRTLEV(I,1), I = 1 to 10, are reserved for pressure; PRTLEV(I,2), I = 1 to 10 are reserved for air saturation; PRTLEV(I,3), I = 1 to 10, are reserved for concentrations.
(Default values are $1.0\times10^6$, $1.1\times10^6$, ...,$1.9\times10^6$, 0.0, 0.1, 0.2, ..., 0.9, $1.0\times10^{-9}$, $1.0\times10^{-8}$, ..., 0.1, 1.0).

H. Line Plots

IPICK(20) Indicates which variables will be written onto TAPE8 for line plots and how they are grouped. The following variables can be written at times specified in RZTIME to file TAPE8 for graphics

postprocessing for lines identified in LINER, LINEY, LINEZ: pressure, liquid saturation, tracer fluid, and solid concentrations. Form is $i_1$, $i_2$,..., $i_m$, 0, $i_n$,..., $i_q$, 0, $i_r$,..., $i_s$, 0,.... Each number $i_\ell$ represents a dependent variable. All variables specified between 0's will appear on the same plot. Code is IPICK(i) = 1, gas and water pressure; 2, liquid saturation; 3, first tracer liquid concentration; 4, first tracer solid concentration; 5, second tracer liquid concentration; 6, second tracer solid concentration; 7, third tracer liquid concentration; 8, third tracer solid concentration; etc.

LINER(20) Indicates lines for horizontal profile plots in x-direction. Form is $j_1$, $k_1$, $j_2$, $k_2$,..., where $j_1$ represents row number and $k_1$ represents layer number; together they identify a line of cells in the x-direction for which dependent variables are written to TAPE8.

LINEY(20) Indicates lines for horizontal profile plots in y-direction. Form is $i_1$, $k_1$, $i_2$, $k_2$,..., where $i_1$ represents column number and $k_1$ represents layer number; together they identify a line of cells in the y-direction for which dependent variables are written to TAPE8.

LINEZ(20) Indicates lines for horizontal profile plots in z(vertical)-direction. Form is $i_1$, $j_1$, $i_2$, $j_2$,..., where $i_1$ represents column number and $j_1$ represents row number; together they identify a line of cells in the vertical (z) direction for which dependent variables are written to TAPE8.

RZTIME(51) Controls times when data will be written onto TAPE8 for line plots. Form is $t_1$, $\Delta t_1$, $t_2$, $\Delta t_2$,..., indicating writing will be done at $t_1$ and every $\Delta t_1$ seconds until $t_2$,..., etc.

## I. Time History Plots

IJTH(60) Specifies zones for which time history plot data are saved. Form is $i_1$, $j_1$, $k_1$, $i_2$, $j_2$, $k_2$,..., so that data are saved for zones ($i_1$, $j_1$ ,$k_1$), ($i_2$, $j_2$ ,$k_2$),....

THDT Data for time plots are written to TAPE7 every THDT seconds. The following quantities can be written: time step size, total gas mass flow across each boundary, total liquid mass flow across each of the six boundaries, pressure, gas fraction, first tracer fluid

and solid concentrations, second tracer fluid and solid concentrations, and third tracer fluid and solid concentrations.

A value of 1 for any of the following variables results in that quantity being written to TAPE7.

| | |
|---|---|
| THDTPT | Time step size. |
| THP | Pressure (air pressure if THP = 1, water pressure if THP = -1). |
| THF | Liquid saturation. |
| THC1 | First tracer fluid concentration. |
| THC2 | Second tracer fluid concentration. |
| THC3 | Third tracer fluid concentration. |
| | . |
| | . |
| | . |
| THC10 | Tenth tracer fluid concentration. |
| THS1 | First tracer solid concentration. |
| THS2 | Second tracer solid concentration. |
| THS3 | Third tracer solid concentration. |
| | . |
| | . |
| | . |
| THS10 | Tenth tracer solid concentration. |
| THSMLL | Liquid flux through left boundary. |
| THSMRL | Liquid flux through right boundary. |
| THSMBL | Liquid flux through bottom boundary. |
| THSMTL | Liquid flux through top boundary. |
| THSMFL | Liquid flux through front boundary. |
| THSMKL | Liquid flux through back boundary. |
| THSMLG | Gas flux through left boundary. |
| THSMRG | Gas flux through right boundary. |
| THSMBG | Gas flux through bottom boundary. |
| THSMTG | Gas flux through top boundary. |
| THSMFG | Gas flux through front boundary. |
| THSMKG | Gas flux through back boundary. |

## J. Three-Dimensional Dot Density or Vector Plots

IVELP3 ≠ 0; gas and liquid velocity components for each zone are written to TAPE10 at times specified by TPLT3D.

= 0; no action is taken.

(Default is 0).

IDOT3 If IDOT3 = 0, no action is taken. Form is the same as NXPCON. That is, IDOT3 is an integer number whose digits control which variables are written to TAPE10. Form is IDOT3 = $d_8d_7d_6d_5d_4d_3d_2d_1$.

If $d_1$ = 1, write full three-dimensional pressure field.

If $d_2$ = 1, write three-dimensional air-saturation field.

If $d_3$ = 1, write three-dimensional fluid concentration field for tracer 1.

If $d_4$ = 1, write three-dimensional solid concentration field for tracer 1.

If $d_5$ = 1, write three-dimensional fluid concentration field for tracer 2.

If $d_6$ = 1, write three-dimensional solid concentration field for tracer 2.

If $d_7$ = 1, write three-dimensional fluid concentration field for tracer 3.

If $d_8$ = 1, write three-dimensional solid concentration field for tracer 3.

.
.
.

TPLT3D(21) Indicates times at which pressure, air saturation, concentrations, and velocities are written on TAPE10. Form is $t_1$, $\Delta t_1$, $t_2$, $\Delta t_2$, $t_3$,.... Writing occurs at time $t_1$ and every $\Delta t_1$ seconds until time $t_2$, then every $\Delta t_2$ seconds until $t_3$, etc.

## APPENDIX B

## SUBPROGRAM DESCRIPTION

| | |
|---|---|
| MAIN | Read RESTART and CHANGE,<br>call RRSTRT, or<br>call INPUT to get input parameters and initialize variables.<br>Find zone number for each cell and neighboring cells; check to see if cell is active.<br>Interpolate in tables for source or sink terms in subroutine VALUE.<br>Solve finite difference equations for cell using latest values in neighboring zones.<br>Calculate new velocities.<br>Call MOVIT to determine tracer transport.<br>Calculate fluxes through boundaries.<br>Evaluate time step limits.<br>Check for print and plot dumps.<br>Check various constraints for terminating run, and dump a restart tape if required. |
| APRINT | Print at selected points at specified times. |
| ASELCT | Store elements to be printed into a temporary consecutive array. |
| BONDRY | Set boundary cells to new values. |
| CNVTIM | Convert time from one unit to another. |
| DMDU | Calculate a component of dispersion tensor. |
| DSPRSN | Calculate dispersion tensor for faces of cell ijk. |
| EFPERM | Calculate interface air and water conductivities. |

| | |
|---|---|
| FCSET | Calculate gas saturation from analytic expression or from tables. |
| GAUSS | Solve simultaneous linear algebraic equations with Gaussian elimination method. |
| INPUT | Set default values; read input (TAPE50); write header records on TAPES 7, 8, 9, and 10; and initialize dependent variables and material properties. |
| INTERP | Perform linear table interpolation. |
| MOVIT | Compute tracer transport for cells. |
| NUMG | Separate the digits of an integer. |
| PCSET | Compute capillary pressure from analytic expression or table look-up. |
| PERME | Compute cell interface liquid and gas conductivities. |
| PLTSAV | Write data for contour plots onto TAPE9, data for line plots onto TAPE8, and data for time plots onto TAPE7. |
| PLT3DV | Write data onto TAPE10 for three-dimensional vector and dot density plots. |
| PMESH | Print digit plots of variables specified by NXPCON on planes indicated by ICPLAN. |
| PRESSR | Solve finite difference flow equations for cell ijk. |
| RELPRM | Compute relative permeabilities for cell ijk from analytic expression or by referring to table. |
| RRSTRT | Read restart tape (TAPE1) and copy images to TAPE7, 8, 9, and 10. |

| | |
|---|---|
| SLOPE | Compute horizontal gravity components for cells with small slope. |
| SSRCH | Determine representative digit for each cell for digit plot prints. |
| VELOCT | Calculate liquid- and gas-phase velocity components. |
| WRSTRT | Write restart tape (TAPE1), which contains common block images plus images of TAPE7, TAPE8, TAPE9, and TAPE10. |
| ZEROIN | Find root of a monotonic increasing function of water pressure. Used in solution of Eq. (49) when IRICH = 1. |

APPENDIX C

SAMPLE PROBLEM

This appendix presents a sample problem to aid users in learning how to properly construct an input file for a TRACR3D application. An input file is provided as well as the print output file generated by the input file. Graphics are produced by a postprocessor called XPLT, and some of the plots generated by the input file are also included.

The example given here calculates injection of water into a fracture in a partially saturated, low-permeability material. Injection occurs from a packed-off section of a small diameter borehole (see Fig. C-1) that intersects a

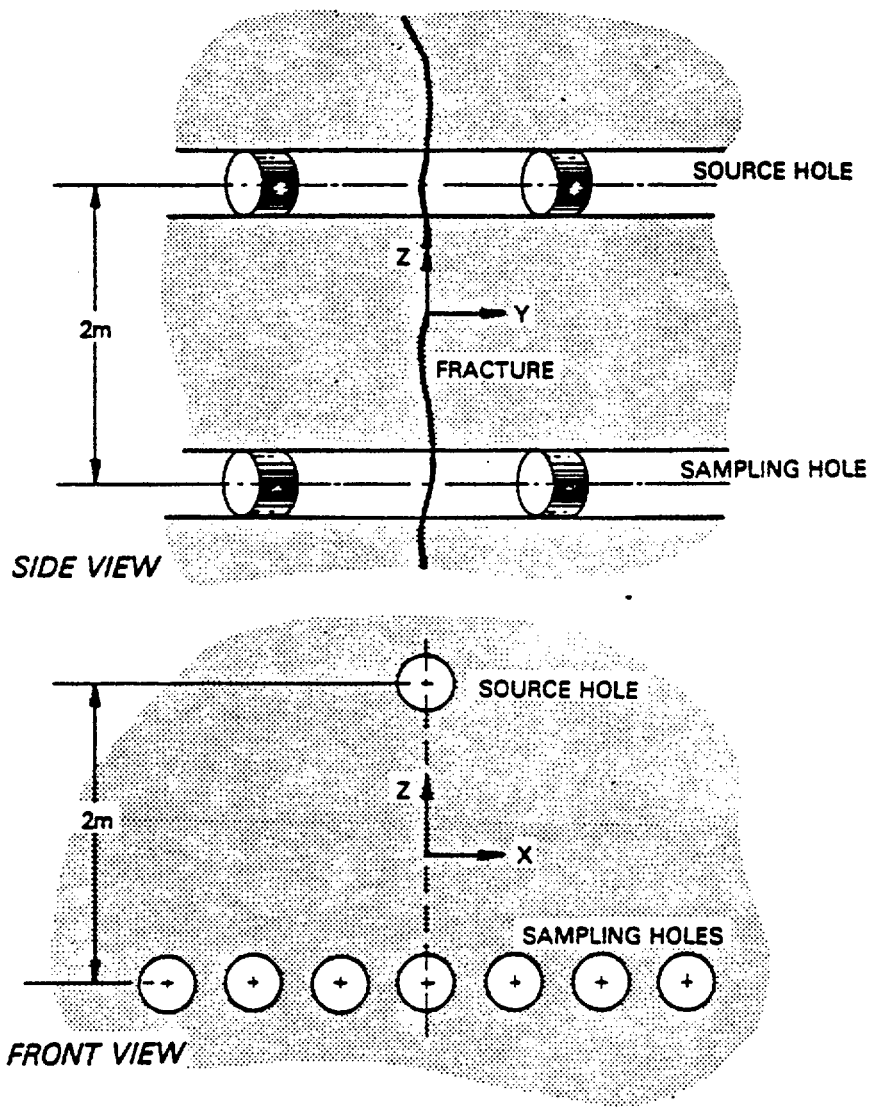


Fig. C-1.
Geometry used in sample calculations.

vertical planar crack. After water injection has continued for a time to establish an approximately steady flow in the crack, a short pulse of a tracer is injected and its subsequent transport is calculated.

The input file is duplicated in Table C-I. A Cartesian coordinate system is used. The size of the computational mesh is reduced by taking advantage of symmetries in the problem. Only the half-spaces in the positive x- and y-directions (see Fig. C-1) are modeled. The source borehole is approximated with a square, water-filled, constant pressure region. Mesh cells are 10 cm on a side in both the x- and z-directions. Cell size in the y-direction is variable, starting with 0.01 cm for the fracture half-width and increasing to 5 cm for the last cell row. Permeability of the fracture[17] is assumed given by $h^2/3$, where h is crack half-width. Initially the porous matrix and fracture are assumed to be at partially saturated equilibrium with no movement of fluids. Gravity is acting.

Leakage of water from the source borehole is monitored through use of the input variable IPROD and IPRODN. Capillary suction is enabled. Over a period of time, water will be drawn into the porous matrix from the fracture as a result of capillary suction. The tracer is a simple, nonadsorbing species. The left, right, front, and back boundaries are treated as no-flow boundaries. The top boundary is the no-flow type; whereas the bottom is of the fixed value type.

Contour plots and point history plots have been specified. Print-outs will occur for selected layers. Only cells in the source borehole and in the fracture and immediately adjacent cells are initially active.

The print output file (Appendix D) consists of two parts. In the first, various messages from the INPUT subroutine appear. The second part contains information printed by subroutine APRINT and controlled by input variables TABTP, IPRNT, JPRNT, and KPRNT. For each time specified by TABTP, air and water pressure, air saturation, and tracer fluid and solid concentrations are printed for cells determined by IPRNT, JPRNT, and KPRNT. For each level in KPRNT, the following information format is produced.

The title appears at the top of a page (from the second line of the input file) along with the z-level number and the value of the z-coordinate that corresponds to the midpoint of that z-level or layer. On the next line appears the time, cycle number, and current time step size (DT). Below that, the code prints the cumulative air mass that has crossed each of the six boundaries and then the cumulative water mass through the boundaries.

TABLE C-I

INPUT FILE FOR SAMPLE CALCULATION

```
 exploratory shaft tracer experiment - 1
;setup
 rcm=0.,10,100., ycm=0.,1,.0017,1,.2,2,1.,1,2.,4,10.,1,15.,
 zcm=-400.,40,0.,
 matcel=1,10,1,10,1,40,1, 1,10,1,1,1,40,2, 1,1,1,10,30,30,3,
 tabmat=1,1.e-6,1.e-6,1.e-6,.20,.1,0.,.50,2.,.05e6,2.5,1.,0.,
        2,1.e2,1.e2,1.e2,.95,.01,0.,.50,5.,.01e6,0.,1.,1.,
        3,1.e6,1.e6,1.e6,.20,0.,0.,0.,10.,0.,0.,1.,0.,
 time=0., dt=1., dtmax=100., tend=1800., cournt=1., omegap=1.,
 ibl=1,10,1,40,1, ibr=1,10,1,40,1, ibf=1,10,1,40,1, ibbk=1,10,1,40,1,
 ibb=1,10,1,10,2, ibt=1,10,1,10,1,   ijpt=1,1,1,10,30,30,10,
 tdbdy=10,6, 0.,1.1e6,0.,0., 900.,1.1e6,0.,0.,
      900.001,1.1e6,0.,1.e-3, 1020.,1.1e6,0.,1.e-3,
      1020.001,1.1e6,0.,0., 1.e7,1.1e6,0.,0.,
 pin=1,10,1,10,1,40,1.e6,   cin=1,10,1,10,1,40,0.,
 fin=1,10,1,10,0,41,.50, 1,10,1,1,1,40,.50,
     1,1,1,10,30,30,0., 1,10,1,1,0,0,0.,
 iact=1,2,1,10,29,31,1,1, tolc=1.e-9, fmin=1.e-6,
 iflow=2, itracf=2, ichmod=0, icoord=1, idim=3, difc=1.e-5,
 iforch=0, istedy=0, itracr=1, haflif=0., ntrcr=1, cdonor=0.25,
 icnvec=1, grav=980., idspsn=0, iprsdp=0, irich=0,
 tol=10., atm=1.e6,  tolp=1.e3, tolf=.01, comprl=0., postim=300.,
 npasst=1, iprnt=1,1,10, jprnt=1,1,7, kprnt=1,14,15,5,35,
 tabtp=540.,540.,1080.,360.,1800., lglmin=30, lglmax=200,
 nxpcon=111, ivelp=3, plott=0.,180.,1.e7,   icplan=2,1, 3,20,
 ijth=1,1,10, 5,1,10, 10,1,10, 1,5,10, 1,10,10,
 thdt=30., thp=1, thf=1, thcl=1,
 iprod=1,1,30, 1,2,30, 1,3,30, 1,4,30, 1,5,30, 1,6,30, 1,7,30,
      1,8,30, 1,9,30, 1,10,30,  iprodn=10,
            $
```

Down the left side of the page are listed the row number, the y-coordinate alue corresponding to the row center, and the boundary condition type (0 means ıe cell is interior, not on the boundary). Down the right side, the same ıformation is given in reverse order.

Along the top (but below the header information) appear the row numbers; elow those are the x-coordinate values for the row centers, below which are isted the boundary type indicators. This same information appears at the ottom of the page in reverse order. In the main body of the print there appear alues for air and water pressure, air saturation, fluid tracer concentration or tracer 1, solid tracer concentration for tracer 1, and then fluid and solid racer concentrations for additional tracers if specified (that is, if

NTRCR > 1). Also printed are the material table number, an indication of whether the cell is active or not (00 = off, 01 = flow on, 10 = tracer on, 11 = flow and tracer on), and then the mass source/sink table number (0 if none specified) and the pressure/saturation/concentration table (0 if none specified). For example, in the print-out included below, at time 24.35 minutes for layer 20, row 1, and column 2, the following values are listed.

| | |
|---|---|
| gas pressure | $1.01 \times 10^6$ |
| water pressure | $1.01 \times 10^6$ |
| air saturation | 0.0 |
| fluid tracer concentration | $1.83 \times 10^{-5}$ |
| solid tracer concentration | 0. |
| material table number | 2 |
| active cell indicator | 11 |
| source table number | 0 |
| pressure table number | 0 |

If input variable IPRODN ≠ 0, an additional print is included. After dependent variable values are printed for all layers at a print time, a short table is printed, listing the cumulative air and water mass production for each cell specified by input variable IPROD. The sign convention used is that positive flux means mass is entering a cell.

Between these print-outs of variables, information about each cycle is printed, one line for each time step. On these lines appear the time step number, the time, time step size, the number of iterations needed in solution of the flow equation, the maximum difference in air pressure between the last two iterations, the maximum difference in water pressure between the last two iterations, the mass conservation ratio (ratio of total fluid mass to the sum of the initial total fluid mass plus cumulative source/sink terms plus boundary fluxes), and the computer time used for the time step.

Finally, digit plots are printed, corresponding to the times indicated in PLOTT, for variables specified in NXPCON and on planes determined by ICPLAN. These digit plot prints correspond to contour plots. The digits appearing in the prints are determined from PRTLEV. Also included are a few of the contour plots and velocity vector plots (see Figs. C-2 through C-6) specified by NXPCON and IVELP. The plots are generated by the XPLT code, which uses the DISSPLA plotting package.

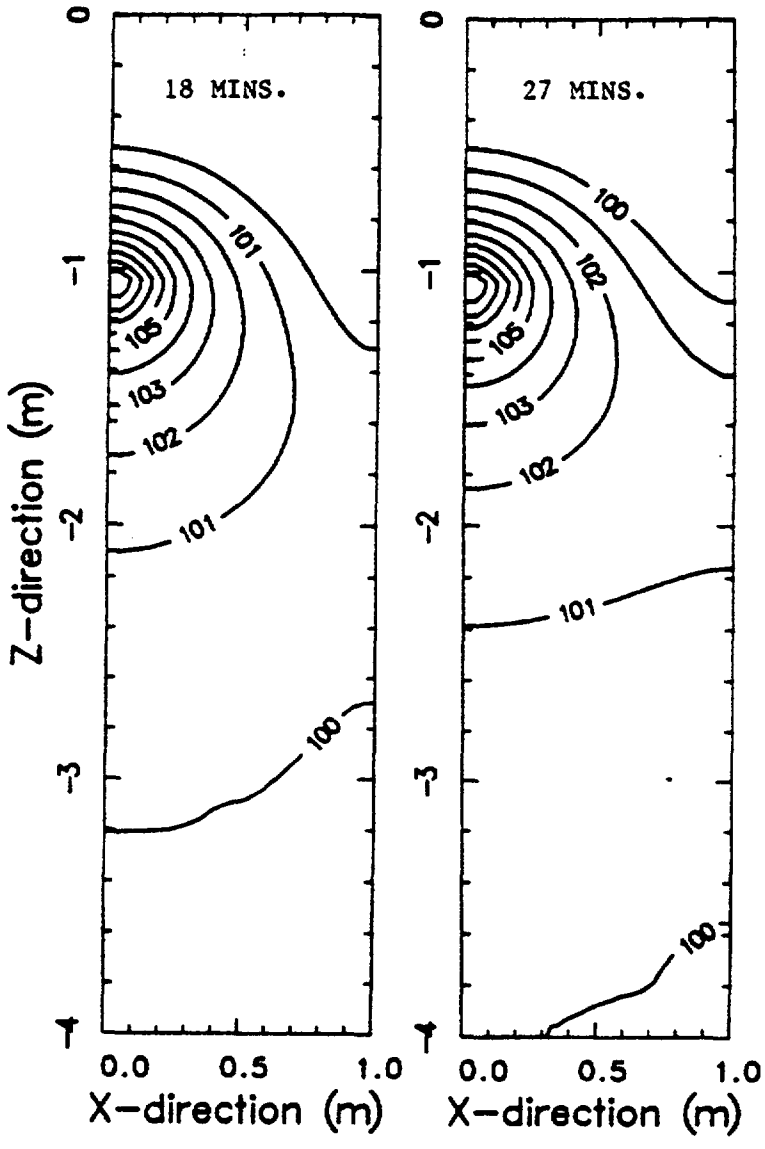


Fig. C-2.
Liquid pressure contours at indicated times on X-Z plane of crack for sample problem. Pressure unit is $10^4$ dyne/cm$^2$.

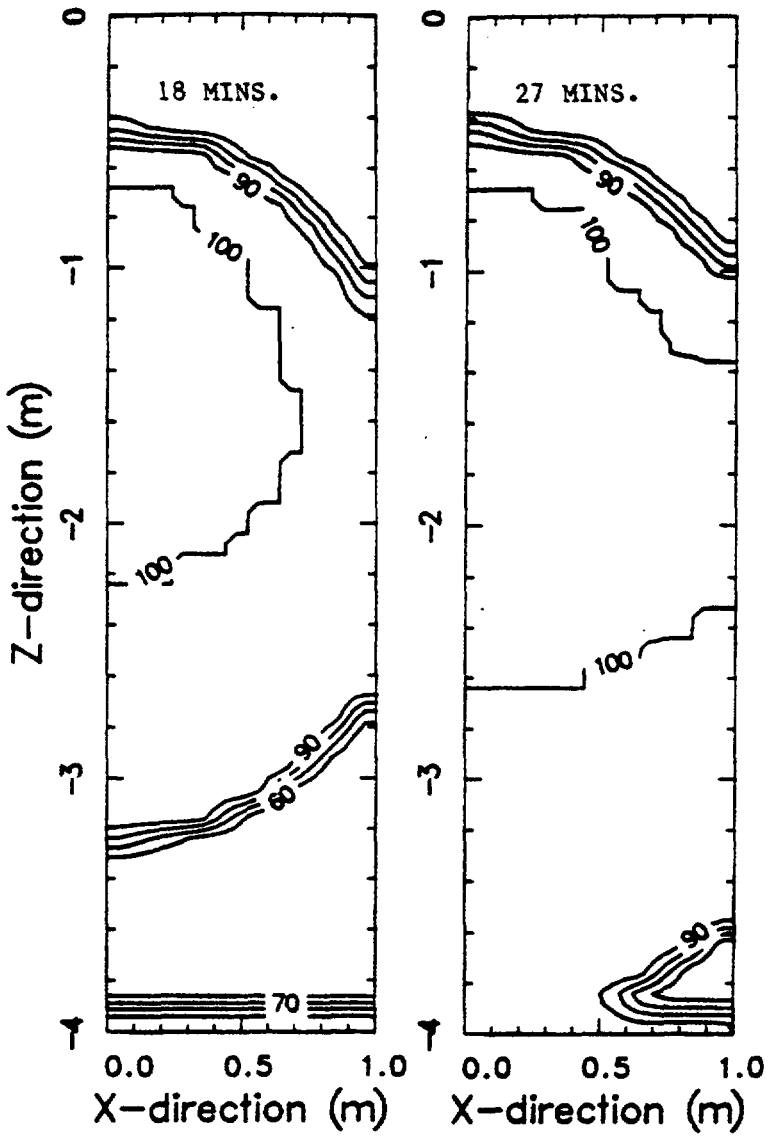


Fig. C-3.
Liquid saturation contours at indicated times on X-Z plane of crack for sample problem. Saturation unit is percent.

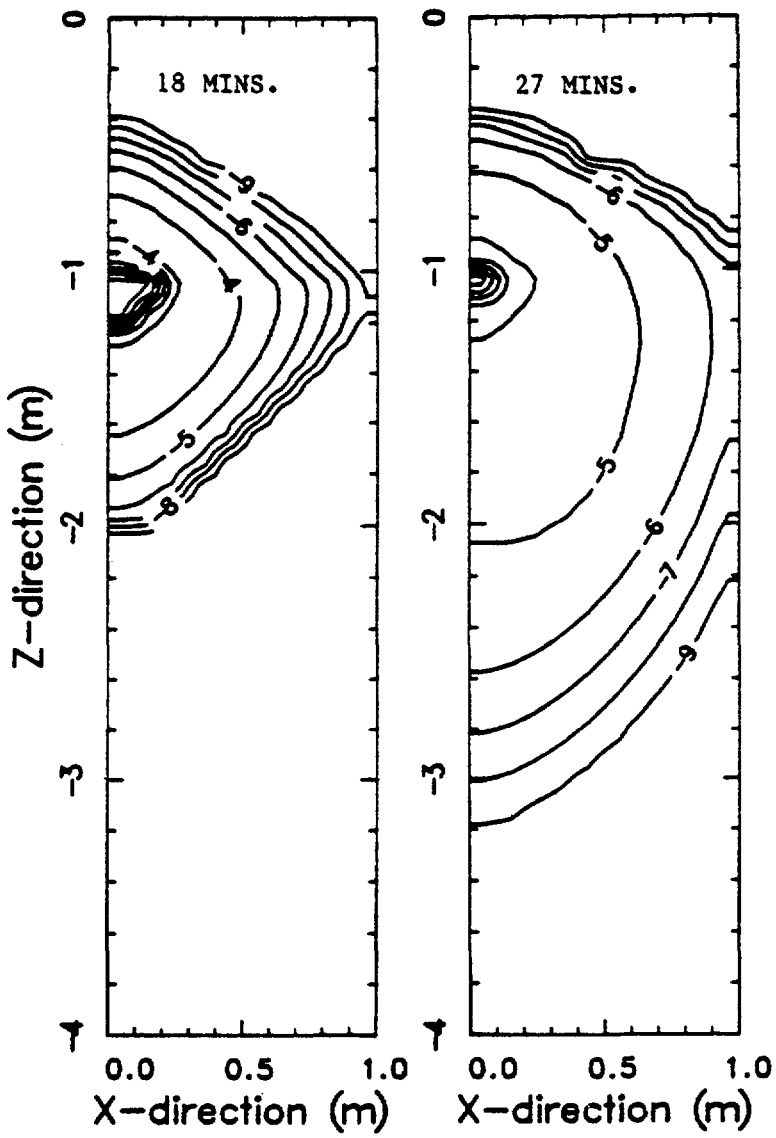


Fig. C-4.
Tracer concentration contours at indicated times on X-Z plane of crack for sample problem gm/cm$^3$. Concentration unit is $\log_{10}$ gm/cm$^3$.

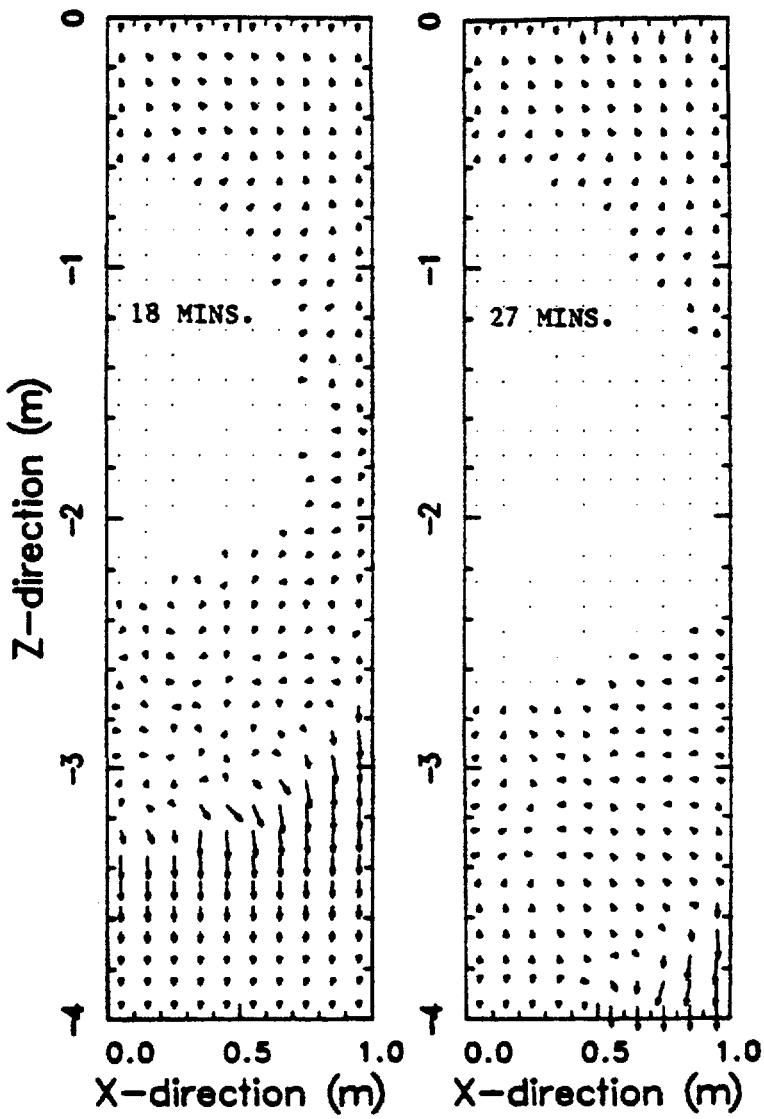


Fig. C-5.
Gas velocity vectors at indicated times on X-Z plane of crack for sample problem. Length of arrows scaled to maximum velocity occurring at indicated time.

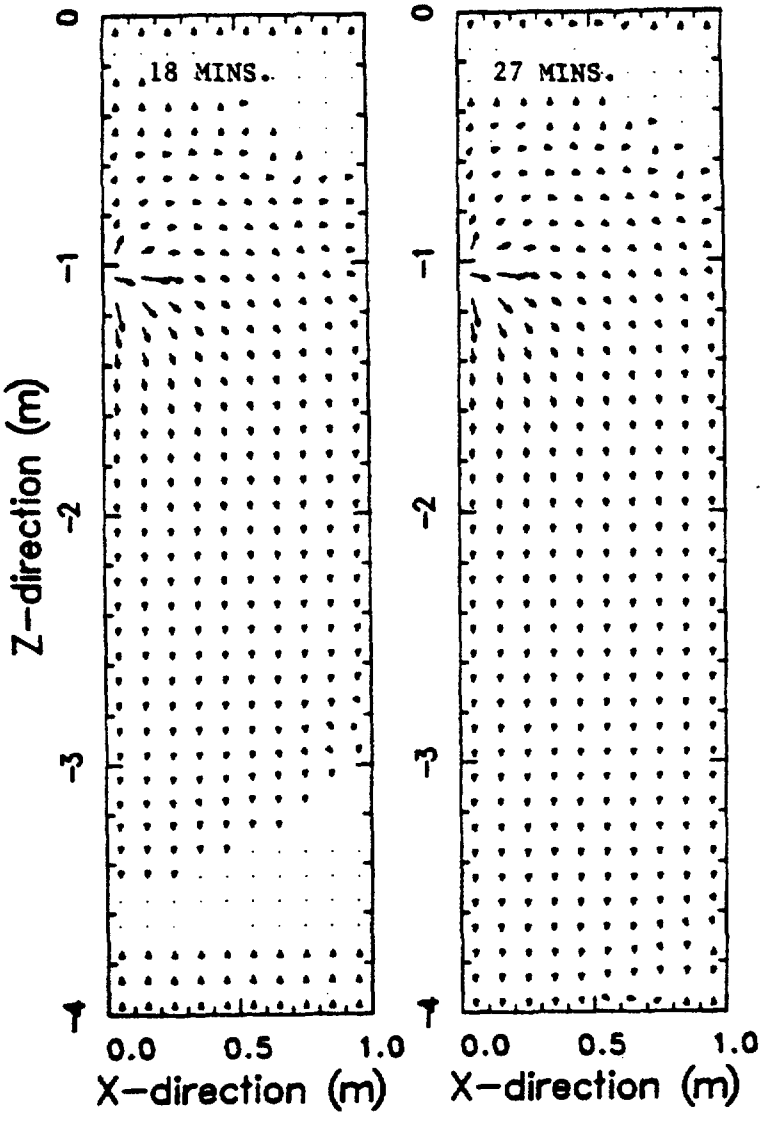


Fig. C-6.
Liquid velocity vectors at indicated times on X-Z plane of crack for sample problem. Length of arrows scaled to maximum velocity occurring at indicated time.

```
N= 10  X INPUT FOLLOWS
   0.0     10.0    100.0
 X IN CM FOLLOWS
   0.0     0.0     10.0    20.0    30.0    40.0    50.0    60.0    70.0    80.0    90.0    100.0   100.0
 Q=  10  Y INPUT FOLLOWS
   0.0     1.0     0.0     1.0     0.2     2.0     1.0     1.0     2.0     4.0     10.0    1.0     15.0
 Y IN CM FOLLOWS
   0.0     0.0     0.0     0.2     0.6     1.0     2.0     4.0     6.0     8.0     10.0    15.0    15.0
 N=  40  ZCM INPUT FOLLOWS
 -400.0    40.0    0.0
 Z IN CM FOLLOWS
 -400.0  -400.0  -390.0  -380.0  -370.0  -360.0  -350.0  -340.0  -330.0  -320.0  -310.0  -300.0  -290.0  -280.0  -270.0
 -260.0  -250.0  -240.0  -230.0  -220.0  -210.0  -200.0  -190.0  -180.0  -170.0  -160.0  -150.0  -140.0  -130.0  -120.0
 -110.0  -100.0   -90.0   -80.0   -70.0   -60.0   -50.0   -40.0   -30.0   -20.0   -10.0     0.0     0.0
MATERIAL TABLE FOLLOWS
    1.   0.100E-05   0.100E-05   0.100E-05 0.2000 0.1000 0.0000 0.5000 2.0000  0.500E+05  2.500  1.000  0.000
    2.   0.100E+03   0.100E+03   0.100E+03 0.9500 0.0100 0.0000 0.5000 5.0000  0.100E+05  0.000  1.000  1.000
    3.   0.100E+07   0.100E+07   0.100E+07 0.2000 0.0000 0.0000 0.000010.0000  0.000E+00  0.000  1.000  0.000

 CELL MATERIAL DATA FOLLOWS
     1  10   1  10   1  40  1       1  10   1   1   1  40  2       1   1   1  10  30  30  3
 CHANGES TO INITIAL TRACER CONCENTRATION (GM/CC)
   1. 10.  1. 10.  1. 40. 0.00000E+00
 CHANGES TO INITIAL ADSORBED CONCENTRATION (GM/GM)

 CHANGES TO INITIAL GAS SATURATION
   1. 10.  1. 10.  0. 41. 0.50000E+00    1. 10.  1.  1.  1. 40. 0.50000E+00    1.  1.  1. 10. 30. 30. 0.00000E+00

   1. 10.  1.  1.  0.  0. 0.00000E+00    0.
 CHANGES TO INITIAL PRESSURE (P=ATM) DISTRIBUTION
   1. 10.  1. 10.  1. 40. 0.10000E+07    0.
 TIME DEPENDENT BOUNDARY NUMBER AND LOCATION
 10     3
 PRESSURE VS TIME CELLS AND TABLE NUMBER FOLLOWS
    1  1  1 10 30 30  10
HAVE  5 POINTS FOR TIME HISTORY.  THDT=    30.000     SEC. I,J,K FOR POINTS FOLLOWS
    1,  1, 10     5,  1, 10    10,  1, 10     1,  5, 10     1, 10, 10
    LEFT BOUNDARY SET UP FOLLOWS

  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
  1   1   1   1   1   1   1   1   1   1
```

```
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
 RIGHT BOUNDARY SET UP FOLLOWS

1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
1    1    1    1    1    1    1    1    1    1
BOTTOM BOUNDARY SET UP FOLLOWS

2    2    2    2    2    2    2    2    2    2
2    2    2    2    2    2    2    2    2    2
2    2    2    2    2    2    2    2    2    2
2    2    2    2    2    2    2    2    2    2
2    2    2    2    2    2    2    2    2    2
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

TOP BOUNDARY SET UP FOLLOWS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

FRONT BOUNDARY SET UP FOLLOWS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

BACK BOUNDARY SET UP FOLLOWS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 1 Z = -395.000

TIME 0.00 SECS CYCLE 0 DT 0.10E+01

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 15 Z = -255.000

TIME 0.00 SECS CYCLE 0 DT 0.10E+01

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01 0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 2 LEVEL 20 2 - 205.000

TIME 0.00 SECS CYCLE 0 DT 0.10E+01

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P C | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SIMULATION CONTROL

TIME 0.00 SECS CYCLE 0 DT 0.10E+01

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 30 Z = -105.000

TIME 0.00 SECS CYCLE 0 DT 0.10E+01

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | 1.10E+06 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | 1.10E+06 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | 1.10E+06 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | 1.10E+06 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | 1.10E+06 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | 1.10E+06 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 1.10E+06 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 02,0011 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1

TIME 0.00 SECS CYCLE 0 DT 0.10E+01

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | 9.24E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | 02,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

PRODUCTION (GM) AT CELL

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 2 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 3 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 4 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 5 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 6 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 7 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 8 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 9 | 30 | 0.00000E+00 | 0.00000E+00 |
| 1 | 10 | 30 | 0.00000E+00 | 0.00000E+00 |

```
CYCLE      1 TIME  0.10000E+01 DT=  0.10000E+01 P-ITER=  175 P-TOL=   9.83 PCL-TOL=   9.80  MASS BAL.=1.000000 CT= 3.183
```

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--------------------------------------------------------------------------------------------------------------------------------
GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =      1.000 SECS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)       X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =      1.000 SECS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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----------------------------------------------------------------------------------------------------------------------------------
LIQUID SATURATION                  X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =     1.000 SECS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =     1.000 SECS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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GAS PRESSURE (DYNE/CM2)           X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =     1.000 SECS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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--------------------------------------------------------------------------------
LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =     1.000 SECS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =     1.000 SECS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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--------------------------------------------------------------------------------
TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =     1.000 SECS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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CYCLE      2 TIME  0.20000E+01 DT=  0.10000E+01 P-ITER=  200 P-TOL=  12.05 PCL-TOL=  12.05  MASS BAL.=1.000000 CT= 1.787
CYCLE      3 TIME  0.30000E+01 DT=  0.10000E+01 P-ITER=  128 P-TOL=   9.92 PCL-TOL=   9.92  MASS BAL.=1.000001 CT= 1.313
CYCLE      4 TIME  0.40000E+01 DT=  0.10000E+01 P-ITER=   84 P-TOL=   9.91 PCL-TOL=   9.91  MASS BAL.=1.000001 CT= 1.018
CYCLE      5 TIME  0.50000E+01 DT=  0.10000E+01 P-ITER=   86 P-TOL=   9.98 PCL-TOL=   9.98  MASS BAL.=1.000001 CT= 1.127
CYCLE      6 TIME  0.60000E+01 DT=  0.10000E+01 P-ITER=   84 P-TOL=   9.93 PCL-TOL=   9.93  MASS BAL.=1.000002 CT= 1.208
CYCLE      7 TIME  0.70000E+01 DT=  0.10000E+01 P-ITER=   72 P-TOL=   9.88 PCL-TOL=   9.88  MASS BAL.=1.000002 CT= 1.178
CYCLE      8 TIME  0.80000E+01 DT=  0.10000E+01 P-ITER=   73 P-TOL=   9.84 PCL-TOL=   9.84  MASS BAL.=1.000003 CT= 1.325
CYCLE      9 TIME  0.90000E+01 DT=  0.10000E+01 P-ITER=   65 P-TOL=   9.98 PCL-TOL=   9.98  MASS BAL.=1.000003 CT= 1.346
CYCLE     10 TIME  0.10000E+02 DT=  0.10000E+01 P-ITER=   32 P-TOL=   9.97 PCL-TOL=   9.93  MASS BAL.=1.000004 CT= 0.870
CYCLE     11 TIME  0.11000E+02 DT=  0.10000E+01 P-ITER=   37 P-TOL=   9.67 PCL-TOL=   9.67  MASS BAL.=1.000004 CT= 1.036
CYCLE     12 TIME  0.12000E+02 DT=  0.10000E+01 P-ITER=   33 P-TOL=   9.79 PCL-TOL=   9.76  MASS BAL.=1.000005 CT= 1.017
CYCLE     13 TIME  0.13000E+02 DT=  0.10000E+01 P-ITER=   29 P-TOL=   9.66 PCL-TOL=   9.55  MASS BAL.=1.000005 CT= 0.990
CYCLE     14 TIME  0.14200E+02 DT=  0.12000E+01 P-ITER=   25 P-TOL=  10.00 PCL-TOL=   9.88  MASS BAL.=1.000006 CT= 0.926
CYCLE     15 TIME  0.15640E+02 DT=  0.14400E+01 P-ITER=   21 P-TOL=   9.97 PCL-TOL=   9.97  MASS BAL.=1.000007 CT= 0.869
CYCLE     16 TIME  0.17368E+02 DT=  0.17280E+01 P-ITER=   22 P-TOL=   9.26 PCL-TOL=   9.26  MASS BAL.=1.000008 CT= 0.929
CYCLE     17 TIME  0.19442E+02 DT=  0.20736E+01 P-ITER=   22 P-TOL=   9.52 PCL-TOL=   9.52  MASS BAL.=1.000009 CT= 0.969
CYCLE     18 TIME  0.21930E+02 DT=  0.24883E+01 P-ITER=   21 P-TOL=   9.90 PCL-TOL=   9.90  MASS BAL.=1.000010 CT= 0.983
CYCLE     19 TIME  0.24916E+02 DT=  0.29860E+01 P-ITER=   21 P-TOL=   9.84 PCL-TOL=   9.84  MASS BAL.=1.000011 CT= 1.028
CYCLE     20 TIME  0.28499E+02 DT=  0.35832E+01 P-ITER=   21 P-TOL=   9.65 PCL-TOL=   9.65  MASS BAL.=1.000013 CT= 1.076
CYCLE     21 TIME  0.32799E+02 DT=  0.42998E+01 P-ITER=   20 P-TOL=   9.89 PCL-TOL=   9.89  MASS BAL.=1.000015 CT= 1.086
CYCLE     22 TIME  0.37959E+02 DT=  0.51598E+01 P-ITER=   20 P-TOL=   9.87 PCL-TOL=   9.87  MASS BAL.=1.000018 CT= 1.123
CYCLE     23 TIME  0.44150E+02 DT=  0.61917E+01 P-ITER=   20 P-TOL=   9.82 PCL-TOL=   9.82  MASS BAL.=1.000020 CT= 1.159
CYCLE     24 TIME  0.51581E+02 DT=  0.74301E+01 P-ITER=   20 P-TOL=   9.72 PCL-TOL=   9.72  MASS BAL.=1.000024 CT= 1.238
CYCLE     25 TIME  0.60497E+02 DT=  0.89161E+01 P-ITER=   22 P-TOL=   8.96 PCL-TOL=   8.96  MASS BAL.=1.000027 CT= 1.359
CYCLE     26 TIME  0.71196E+02 DT=  0.10699E+02 P-ITER=   20 P-TOL=   9.33 PCL-TOL=   9.33  MASS BAL.=1.000032 CT= 1.303
CYCLE     27 TIME  0.84035E+02 DT=  0.12839E+02 P-ITER=   23 P-TOL=   9.73 PCL-TOL=   9.73  MASS BAL.=1.000037 CT= 1.530
CYCLE     28 TIME  0.99442E+02 DT=  0.15407E+02 P-ITER=   35 P-TOL=   8.77 PCL-TOL=   8.77  MASS BAL.=1.000043 CT= 2.174
CYCLE     29 TIME  0.11485E+03 DT=  0.15407E+02 P-ITER=   24 P-TOL=   8.63 PCL-TOL=   8.63  MASS BAL.=1.000049 CT= 1.948
CYCLE     30 TIME  0.13334E+03 DT=  0.18488E+02 P-ITER=   32 P-TOL=   9.58 PCL-TOL=   9.58  MASS BAL.=1.000056 CT= 2.151
CYCLE     31 TIME  0.15183E+03 DT=  0.18488E+02 P-ITER=   35 P-TOL=   9.30 PCL-TOL=   9.30  MASS BAL.=1.000063 CT= 2.456
CYCLE     32 TIME  0.17031E+03 DT=  0.18488E+02 P-ITER=   19 P-TOL=   8.28 PCL-TOL=   8.28  MASS BAL.=1.000070 CT= 1 604
CYCLE     33 TIME  0.19111E+03 DT=  0.20791E+02 P-ITER=   37 P-TOL=   9.28 PCL-TOL=   9.28  MASS BAL.=1.000078 CT= 2.815
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GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =     3.185 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)       X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =     3.185 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION              X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =    3.185 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =     3.185 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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GAS PRESSURE (DYNE/CM2)           X-Y PLANE AT Z-LEVEL =  -205.000 CM       TIME =     3.185 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    3.185 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    3.185 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    3.185 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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CYCLE    34 TIME  0.21190E+03 DT=  0.20791E+02 P-ITER=  34 P-TOL=   9.49 PCL-TOL=   9.49  MASS BAL.=1.000086 CT= 2.627
CYCLE    35 TIME  0.23269E+03 DT=  0.20791E+02 P-ITER=  55 P-TOL=   9.92 PCL-TOL=   9.92  MASS BAL.=1.000094 CT= 4.050
CYCLE    36 TIME  0.25348E+03 DT=  0.20791E+02 P-ITER=  46 P-TOL=   9.35 PCL-TOL=   9.35  MASS BAL.=1.000103 CT= 3.507
CYCLE    37 TIME  0.27427E+03 DT=  0.20791E+02 P-ITER=  18 P-TOL=   9.09 PCL-TOL=   9.09  MASS BAL.=1.000111 CT= 1.666
CYCLE    38 TIME  0.29528E+03 DT=  0.21009E+02 P-ITER=  37 P-TOL=   9.99 PCL-TOL=   9.99  MASS BAL.=1.000119 CT= 3.038
CYCLE    39 TIME  0.31629E+03 DT=  0.21009E+02 P-ITER=  43 P-TOL=   9.78 PCL-TOL=   9.78  MASS BAL.=1.000127 CT= 3.458
CYCLE    40 TIME  0.33729E+03 DT=  0.21009E+02 P-ITER=  35 P-TOL=   9.90 PCL-TOL=   9.90  MASS BAL.=1.000135 CT= 2.941
CYCLE    41 TIME  0.35830E+03 DT=  0.21009E+02 P-ITER=  31 P-TOL=   9.73 PCL-TOL=   9.73  MASS BAL.=1.000144 CT= 2.686
CYCLE    42 TIME  0.37931E+03 DT=  0.21009E+02 P-ITER=  33 P-TOL=   9.92 PCL-TOL=   9.92  MASS BAL.=1.000152 CT= 2.867
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GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =    6.322 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)       X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =    6.322 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =    6.322 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =    6.322 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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GAS PRESSURE (DYNE/CM2)           X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    6.322 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    6.322 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    6.322 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    6.322 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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CYCLE     43 TIME  0.40032E+03 DT=  0.21009E+02 P-ITER=   16 P-TOL=   9.04 PCL-TOL=   9.04  MASS BAL.=1.000160 CT= 1.644
CYCLE     44 TIME  0.42162E+03 DT=  0.21305E+02 P-ITER=   53 P-TOL=   9.86 PCL-TOL=   9.86  MASS BAL.=1.000169 CT= 4.582
CYCLE     45 TIME  0.44293E+03 DT=  0.21305E+02 P-ITER=   48 P-TOL=   9.50 PCL-TOL=   9.50  MASS BAL.=1.000177 CT= 4.281
CYCLE     46 TIME  0.46423E+03 DT=  0.21305E+02 P-ITER=   55 P-TOL=   9.81 PCL-TOL=   9.81  MASS BAL.=1.000186 CT= 5.165
CYCLE     47 TIME  0.48554E+03 DT=  0.21305E+02 P-ITER=   52 P-TOL=   9.59 PCL-TOL=   9.59  MASS BAL.=1.000194 CT= 4.684
CYCLE     48 TIME  0.50684E+03 DT=  0.21305E+02 P-ITER=   47 P-TOL=   9.85 PCL-TOL=   9.85  MASS BAL.=1.000203 CT= 4.312
CYCLE     49 TIME  0.52815E+03 DT=  0.21305E+02 P-ITER=   12 P-TOL=   9.71 PCL-TOL=   9.71  MASS BAL.=1.000211 CT= 1.466
CYCLE     50 TIME  0.54963E+03 DT=  0.21484E+02 P-ITER=   29 P-TOL=   9.77 PCL-TOL=   9.77  MASS BAL.=1.000220 CT= 2.941
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GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =    9.161 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1:700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)       X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =    9.161 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =    9.161 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =    9.161 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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GAS PRESSURE (DYNE/CM2)          X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    9.161 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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--------------------------------------------------------------------------------
LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    9.161 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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--------------------------------------------------------------------------------
LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    9.161 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
--------------------------------------------------------------------------------
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--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =    9.161 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
--------------------------------------------------------------------------------
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EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 1 Z = -395.000

TIME 9.16 MINS CYCLE 50 DT 0.21E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.3712E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.9451E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 | 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 | 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 | 5 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 | 4 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.05E+05 | | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 | 3 |
| | | | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | | |
| 2 | 0.10 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 | 2 |
| | | | 2.54E+04 | 2.49E+04 | 7.05E+03 | -1.97E+04 | -4.75E+04 | -7.61E+04 | -1.07E+05 | -1.40E+05 | -1.74E+05 | -2.09E+05 | | | |
| | | | 4.95E-01 | 4.95E-01 | 4.96E-01 | 4.96E-01 | 4.96E-01 | 4.96E-01 | 4.97E-01 | 4.97E-01 | 4.97E-01 | 4.97E-01 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | | |
| 1 | 0.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 | 1 |
| | | | 9.95E+05 | 9.95E+05 | 9.95E+05 | 9.95E+05 | 9.95E+05 | 9.95E+05 | 9.95E+05 | 9.95E+05 | 9.95E+05 | 9.95E+05 | | | |
| | | | 3.66E-02 | 3.65E-02 | 3.65E-02 | 3.66E-02 | 3.66E-02 | 3.66E-02 | 3.66E-02 | 3.65E-02 | 3.65E-02 | 3.64E-02 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | |
| | | | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |

```
     EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL     15  Z =      -255.000
TIME      9.16  MINS   CYCLE      50 DT  0.21E+02
                   MASS (GM)-GAS-     L,R,B,T,F,BK    0.0000E+00    0.0000E+00    -0.3712E-02    0.0000E+00    0.0000E+00    0.0000E+00
                   MASS (GM)-LIQUID-  L,R,B,T,F,BK    0.0000E+00    0.0000E+00     0.9451E+00    0.0000E+00    0.0000E+00    0.0000E+00
                        1          2          3          4          5          6          7          8          9         10
                     5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7      5.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
                 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
                 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
                 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
                 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.40  3
                 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.10  2
                 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.00  1
                  9.28E+05  9.28E+05  9.28E+05  9.28E+05  9.28E+05  9.28E+05  9.28E+05  9.28E+05  9.28E+05  9.28E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                        1         1         1         1         1         1         1         1         1         1
                     5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                        1         2         3         4         5         6         7         8         9        10
```

```
EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL    20  Z =     -205.000
TIME      9.16  MINS   CYCLE      50 DT  0.21E+02
                 MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.3712E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.9451E+00    0.0000E+00    0.0000E+00    0.0000E+00
                      1             2             3             4             5             6             7             8             9            10
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
  7      5.00  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      5.00  7
                 -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05
                  5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000
                   S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  6      3.00  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      3.00  6
                 -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05
                  5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000
                   S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  5      1.50  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      1.50  5
                 -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05
                  5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                   S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  4      0.80  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      0.80  4
                 -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05
                  5.00E-01    5:00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                   S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  3      0.40  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      0.40  3
                 -5.01E+05   -5.02E+05   -5.02E+05   -5.02E+05   -5.02E+05   -5.02E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05
                  5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                   S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  2      0.10  1  1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      0.10  2
                 -7.14E+04   -9.15E+04   -1.32E+05   -1.82E+05   -2.50E+05   -3.51E+05   -4.87E+05   -5.01E+05   -5.01E+05   -5.01E+05
                  4.96E-01    4.97E-01    4.97E-01    4.97E-01    4.98E-01    4.99E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                   S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  1      0.00  1  1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      0.00  1
                  1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.00E+06    9.86E+05    9.28E+05    9.28E+05
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    6.92E-03    4.76E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   02,0001     02,0001     02,0001     02,0001     02,0001     02,0001     02,0001     02,0001     02,0001     02,0001
                   S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
                      1           1           1           1           1           1           1           1           1           1
                   5.00        15.00        25.00        35.00        45.00        55.00        65.00        75.00        85.00        95.00
                      1           2           3           4           5           6           7           8           9          10
```

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 25 Z = -155.000

TIME 9.16 MINS CYCLE 50 DT 0.21E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.3712E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.9451E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.00E+05 | -5.00E+05 | -5.00E+05 | -5.00E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | 3.51E+05 | 3.33E+05 | 3.02E+05 | 2.60E+05 | 1.97E+05 | 1.10E+05 | -1.11E+04 | -2.00E+05 | -4.54E+05 | -5.01E+05 | | |
| | | | 4.93E-01 | 4.93E-01 | 4.93E-01 | 4.94E-01 | 4.94E-01 | 4.95E-01 | 4.96E-01 | 4.97E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.01E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 9.98E+05 | 9.88E+05 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.62E-03 | 2.07E-02 | 3.90E-02 | 4.57E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

```
EXPLORATORY SHAFT TRACER EXPERIMENT - 1                    Z LEVEL    30  Z =     -105.000
TIME      9.16  MINS   CYCLE      50 DT  0.21E+02
                 MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.3712E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.9451E+00    0.0000E+00    0.0000E+00    0.0000E+00
                      1             2             3             4             5             6             7             8             9            10
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
  7      5.00  1  1.10E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1     5.00  7
                  1.10E+06   -5.04E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05
                  0.00E+00    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   03,0011     01,0011     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000
                   S 0,P10     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  6      3.00  1  1.10E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1     3.00  6
                  1.10E+06   -5.04E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05
                  0.00E+00    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   03,0011     01,0011     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000
                   S 0,P10     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  5      1.50  1  1.10E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1     1.50  5
                  1.10E+06   -5.03E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05
                  0.00E+00    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   03,0011     01,0011     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                   S 0,P10     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  4      0.80  1  1.10E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1     0.80  4
                  1.10E+06   -5.01E+05   -5.02E+05   -5.02E+05   -5.02E+05   -5.02E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05
                  0.00E+00    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   03,0011     01,0011     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                   S 0,P10     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  3      0.40  1  1.10E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1     0.40  3
                  1.10E+06   -4.99E+05   -5.00E+05   -5.00E+05   -5.00E+05   -5.00E+05   -5.01E+05   -5.02E+05   -5.02E+05   -5.02E+05
                  0.00E+00    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   03,0011     01,0011     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                   S 0,P10     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  2      0.10  1  1.10E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.00E+06    1.00E+06    1.00E+06  1     0.10  2
                  1.10E+06    5.02E+05    4.65E+05    4.17E+05    3.45E+05    2.38E+05    9.19E+03   -3.22E+05   -5.01E+05   -5.01E+05
                  0.00E+00    4.91E-01    4.92E-01    4.92E-01    4.93E-01    4.94E-01    4.96E-01    4.98E-01    5.00E-01    5.00E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   03,0011     01,0011     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                   S 0,P10     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  1      0.00  1  1.10E+06    1.07E+06    1.05E+06    1.03E+06    1.02E+06    1.01E+06    1.01E+06    1.00E+06    1.00E+06    1.00E+06  1     0.00  1
                  1.10E+06    1.07E+06    1.05E+06    1.03E+06    1.02E+06    1.01E+06    1.00E+06    9.96E+05    9.91E+05    9.36E+05
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    1.85E-02    4.20E-02    3.78E-01    4.99E-01
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                  0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                   03,0011     02,0011     02,0001     02,0001     02,0001     02,0001     02,0001     02,0001     02,0001     02,0001
                   S 0,P10     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
                      1           1           1           1           1           1           1           1           1           1
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
                      1           2           3           4           5           6           7           8           9          10
```

```
     EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL    35  Z =       -55.000
TIME      9.16  MINS   CYCLE      50 DT  0.21E+02
                 MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.3712E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.9451E+00    0.0000E+00    0.0000E+00    0.0000E+00
                      1         2         3         4         5         6         7         8         9        10
                   5.00     15.00     25.00     35.00     45.00     55.00     65.00     75.00     85.00     95.00
  7      5.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
                 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
                 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
                 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
                 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.40  3
                 -5.01E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10  1  1.01E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.10  2
                 -1.18E+05 -2.21E+05 -4.51E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05
                  4.97E-01  4.98E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00  1  1.01E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.00  1
                  9.99E+05  9.98E+05  9.94E+05  9.90E+05  9.84E+05  9.29E+05  9.28E+05  9.28E+05  9.28E+05  9.28E+05
                  2.97E-02  3.61E-02  7.17E-02  4.19E-01  4.85E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                      1         1         1         1         1         1         1         1         1         1
                   5.00     15.00     25.00     35.00     45.00     55.00     65.00     75.00     85.00     95.00
                      1         2         3         4         5         6         7         8         9        10
```

PRODUCTION (GM) AT CELL

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 30 | 0.00000E+00 | -0.14167E+02 |
| 1 | 2 | 30 | 0.00000E+00 | -0.42248E-04 |
| 1 | 3 | 30 | 0.00000E+00 | -0.13029E-03 |
| 1 | 4 | 30 | 0.00000E+00 | -0.13044E-03 |
| 1 | 5 | 30 | 0.00000E+00 | -0.32632E-03 |
| 1 | 6 | 30 | 0.00000E+00 | -0.65271E-03 |
| 1 | 7 | 30 | 0.00000E+00 | -0.65271E-03 |
| 1 | 8 | 30 | 0.00000E+00 | -0.65271E-03 |
| 1 | 9 | 30 | 0.00000E+00 | -0.65271E-03 |
| 1 | 10 | 30 | 0.00000E+00 | -0.16318E-02 |

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CYCLE     51 TIME  0.57113E+03 DT=  0.21502E+02 P-ITER=   46 P-TOL=   9.90 PCL-TOL=   9.90  MASS BAL.=1.000228 CT= 4.402
CYCLE     52 TIME  0.59264E+03 DT=  0.21502E+02 P-ITER=   43 P-TOL=   9.95 PCL-TOL=   9.95  MASS BAL.=1.000237 CT= 4.142
CYCLE     53 TIME  0.61414E+03 DT=  0.21502E+02 P-ITER=   40 P-TOL=   9.66 PCL-TOL=   9.66  MASS BAL.=1.000245 CT= 3.904
CYCLE     54 TIME  0.63564E+03 DT=  0.21502E+02 P-ITER=   30 P-TOL=   9.84 PCL-TOL=   9.84  MASS BAL.=1.000254 CT= 3.064
CYCLE     55 TIME  0.65732E+03 DT=  0.21683E+02 P-ITER=   26 P-TOL=   9.54 PCL-TOL=   9.54  MASS BAL.=1.000262 CT= 2.781
CYCLE     56 TIME  0.67904E+03 DT=  0.21714E+02 P-ITER=   21 P-TOL=   9.39 PCL-TOL=   9.39  MASS BAL.=1.000271 CT= 2.355
CYCLE     57 TIME  0.70077E+03 DT=  0.21735E+02 P-ITER=   20 P-TOL=   9.15 PCL-TOL=   9.56  MASS BAL.=1.000280 CT= 2.278
CYCLE     58 TIME  0.72254E+03 DT=  0.21766E+02 P-ITER=   17 P-TOL=   8.32 PCL-TOL=   9.65  MASS BAL.=1.000288 CT= 2.021
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GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    12.042 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1,700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)       X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    12.042 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION              X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =   12.042 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION       X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    12.042 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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GAS PRESSURE (DYNE/CM2)            X-Y PLANE AT Z-LEVEL =  -205.000 CM       TIME =    12.042 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   12.042 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   12.042 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   12.042 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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CYCLE    59 TIME  0.74432E+03 DT=  0.21786E+02 P-ITER=   12 P-TOL=   9.60 PCL-TOL=   9.60  MASS BAL.=1.000297 CT= 1.592
CYCLE    60 TIME  0.76613E+03 DT=  0.21807E+02 P-ITER=   18 P-TOL=   8.89 PCL-TOL=   9.32  MASS BAL.=1.000305 CT= 2.130
CYCLE    61 TIME  0.78798E+03 DT=  0.21847E+02 P-ITER=   19 P-TOL=   9.97 PCL-TOL=   9.97  MASS BAL.=1.000314 CT= 2.230
CYCLE    62 TIME  0.80987E+03 DT=  0.21887E+02 P-ITER=   23 P-TOL=   9.99 PCL-TOL=   9.99  MASS BAL.=1.000322 CT= 2.600
CYCLE    63 TIME  0.83180E+03 DT=  0.21936E+02 P-ITER=   23 P-TOL=   9.95 PCL-TOL=   9.95  MASS BAL.=1.000331 CT= 2.615
CYCLE    64 TIME  0.85379E+03 DT=  0.21984E+02 P-ITER=   30 P-TOL=   9.84 PCL-TOL=   9.84  MASS BAL.=1.000339 CT= 3.261
CYCLE    65 TIME  0.87583E+03 DT=  0.22044E+02 P-ITER=   23 P-TOL=   9.87 PCL-TOL=   9.87  MASS BAL.=1.000348 CT= 2.651
CYCLE    66 TIME  0.89791E+03 DT=  0.22084E+02 P-ITER=   24 P-TOL=   9.99 PCL-TOL=   9.99  MASS BAL.=1.000356 CT= 2.756
CYCLE    67 TIME  0.92004E+03 DT=  0.22128E+02 P-ITER=   33 P-TOL=   9.96 PCL-TOL=   9.96  MASS BAL.=1.000365 CT= 3.603
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GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =     0.001 CM       TIME =    15.334 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)       X-Z PLANE AT Y-LEVEL =     0.001 CM       TIME =    15.334 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    15.334 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =   15.334 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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GAS PRESSURE (DYNE/CM2)           X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   15.334 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   15.334 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   15.334 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   15.334 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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CYCLE     68 TIME  0.94217E+03 DT=  0.22128E+02 P-ITER=   18 P-TOL=   9.57 PCL-TOL=   9.57  MASS BAL.=1.000373 CT= 2.192
CYCLE     69 TIME  0.96439E+03 DT=  0.22218E+02 P-ITER=   36 P-TOL=   9.94 PCL-TOL=   9.94  MASS BAL.=1.000382 CT= 3.939
CYCLE     70 TIME  0.98661E+03 DT=  0.22218E+02 P-ITER=   20 P-TOL=   8.39 PCL-TOL=   8.59  MASS BAL.=1.000396 CT= 2.425
CYCLE     71 TIME  0.10089E+04 DT=  0.22307E+02 P-ITER=   20 P-TOL=   9.69 PCL-TOL=   9.69  MASS BAL.=1.000399 CT= 2.528
CYCLE     72 TIME  0.10312E+04 DT=  0.22336E+02 P-ITER=   28 P-TOL=   9.88 PCL-TOL=   9.88  MASS BAL.=1.000407 CT= 3.318
CYCLE     73 TIME  0.10536E+04 DT=  0.22382E+02 P-ITER=   23 P-TOL=   8.69 PCL-TOL=   8.96  MASS BAL.=1.000416 CT= 2.890
CYCLE     74 TIME  0.10760E+04 DT=  0.22416E+02 P-ITER=   18 P-TOL=   9.10 PCL-TOL=   9.96  MASS BAL.=1.000424 CT= 2.450
CYCLE     75 TIME  0.10985E+04 DT=  0.22441E+02 P-ITER=   31 P-TOL=   9.94 PCL-TOL=   9.94  MASS BAL.=1.000433 CT= 3.720
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GAS PRESSURE (DYNE/CM2)            X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    18.308 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)         X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    18.308 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =    18.308 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION  X-Z PLANE AT Y-LEVEL =  0.001 CM  TIME =  18.308 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00

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GAS PRESSURE (DYNE/CM2)  X-Y PLANE AT Z-LEVEL =  -205.000 CM  TIME =  18.308 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06

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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   18.308 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   18.308 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   18.308 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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EXPLORATORY SHAFT TRACER EXPERIMENT - 1                                    Z LEVEL     1  Z =     -395.000
TIME     18.31  MINS   CYCLE      75 DT  0.22E+02
                 MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.3904E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.1135E+01    0.0000E+00    0.0000E+00    0.0000E+00
                      1             2             3             4             5             6             7             8             9            10
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
  7      5.00  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1     5.00  7
               -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05
                5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                 01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000
                 S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  6      3.00  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1     3.00  6
               -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05
                5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                 01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000
                 S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  5      1.50  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1     1.50  5
               -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05
                5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                 01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001
                 S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  4      0.80  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1     0.80  4
               -5.03E+05    -5.03E+05    -5.03E+05    -5.03E+05    -5.03E+05    -5.03E+05    -5.03E+05    -5.03E+05    -5.03E+05    -5.03E+05
                5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                 01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001
                 S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  3      0.40  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1     0.40  3
               -5.02E+05    -5.02E+05    -5.02E+05    -5.02E+05    -5.02E+05    -5.02E+05    -5.02E+05    -5.02E+05    -5.02E+05    -5.02E+05
                5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                 01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001
                 S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  2      0.10  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1     0.10  2
                5.48E+05     5.47E+05     5.39E+05     5.26E+05     5.12E+05     4.98E+05     4.83E+05     4.67E+05     4.50E+05     4.33E+05
                4.91E-01     4.91E-01     4.91E-01     4.91E-01     4.91E-01     4.91E-01     4.92E-01     4.92E-01     4.92E-01     4.92E-01
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                 01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001
                 S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  1      0.00  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1     0.00  1
                9.95E+05     9.95E+05     9.95E+05     9.95E+05     9.95E+05     9.95E+05     9.95E+05     9.95E+05     9.95E+05     9.95E+05
                3.84E-02     3.84E-02     3.84E-02     3.85E-02     3.86E-02     3.86E-02     3.87E-02     3.88E-02     3.89E-02     3.90E-02
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                 02,0001      02,0001      02,0001      02,0001      02,0001      02,0001      02,0001      02,0001      02,0001      02,0001
                 S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
                      1            1            1            1            1            1            1            1            1            1
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
                      1            2            3            4            5            6            7            8            9           10
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     EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL     15  Z =      -255.000
TIME     18.31  MINS   CYCLE      75 DT  0.22E+02
                     MASS (GM)-GAS-     L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.3904E-02    0.0000E+00    0.0000E+00    0.0000E+00
                     MASS (GM)-LIQUID-  L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.1135E+01    0.0000E+00    0.0000E+00    0.0000E+00
                         1          2          3          4          5          6          7          8          9         10
                      5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7      5.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
                 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
                 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
                 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
                 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.03E+05 -5.03E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.40  3
                 -5.00E+05 -5.00E+05 -5.00E+05 -5.00E+05 -5.00E+05 -5.00E+05 -5.00E+05 -5.01E+05 -5.01E+05 -5.01E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10  1  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.10  2
                  3.04E+05  2.88E+05  2.68E+05  2.35E+05  1.91E+05  1.31E+05  4.35E+04 -6.32E+04 -1.93E+05 -3.47E+05
                  4.93E-01  4.93E-01  4.93E-01  4.94E-01  4.94E-01  4.95E-01  4.95E-01  4.96E-01  4.97E-01  4.99E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00  1  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.00  1
                  1.01E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.01E+06
                  8.82E-03  1.01E-02  9.47E-03  1.05E-02  1.21E-02  1.29E-02  1.45E-02  1.52E-02  1.35E-02  1.17E-02
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                       1         1         1         1         1         1         1         1         1         1
                      5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                       1         2         3         4         5         6         7         8         9        10
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EXPLORATORY SHAFT TRACER EXPERIMENT - 1                    Z LEVEL    20  Z =     -205.000
TIME     18.31  MINS   CYCLE      75 DT  0.22E+02
                 MASS (GM)-GAS-     L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.3904E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID-  L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.1135E+01    0.0000E+00    0.0000E+00    0.0000E+00
                      1             2             3             4             5             6             7             8             9            10
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
  7      5.00  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1      5.00  7
                 -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05
                  5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                   01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000
                   S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  6      3.00  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1      3.00  6
                 -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05    -5.05E+05
                  5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                   01,0001      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000      01,0000
                   S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  5      1.50  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1      1.50  5
                 -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05    -5.04E+05
                  5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                   01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001
                   S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  4      0.80  1  1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1      0.80  4
                 -5.01E+05    -5.02E+05    -5.02E+05    -5.02E+05    -5.01E+05    -5.01E+05    -5.02E+05    -5.02E+05    -5.02E+05    -5.02E+05
                  5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                   01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001
                   S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  3      0.40  1  1.01E+06     1.00E+06     1.00E+06     1.00E+06     1.01E+06     1.01E+06     1.00E+06     1.00E+06     1.00E+06     1.00E+06  1      0.40  3
                 -4.99E+05    -5.00E+05    -5.00E+05    -5.00E+05    -4.99E+05    -4.99E+05    -5.00E+05    -5.00E+05    -5.00E+05    -5.00E+05
                  5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01     5.00E-01
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                   01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001
                   S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  2      0.10  1  1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06  1      0.10  2
                  6.29E+05     6.21E+05     6.06E+05     5.86E+05     5.46E+05     4.98E+05     4.29E+05     3.33E+05     2.07E+05     2.65E+04
                  4.90E-01     4.90E-01     4.91E-01     4.91E-01     4.91E-01     4.91E-01     4.92E-01     4.93E-01     4.94E-01     4.96E-01
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                   01,0011      01,0011      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001      01,0001
                   S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
  1      0.00  1  1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06  1      0.00  1
                  1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06     1.01E+06
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     1.35E-03     5.82E-03     1.04E-02     1.38E-02
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                  0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00     0.00E+00
                   02,0011      02,0011      02,0001      02,0001      02,0001      02,0001      02,0001      02,0001      02,0001      02,0001
                   S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0      S 0,P 0
                      1            1            1            1            1            1            1            1            1            1
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
                      1            2            3            4            5            6            7            8            9           10
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     EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL     25  Z =      -155.000
TIME      18.31  MINS   CYCLE      75 DT  0.22E+02
                    MASS (GM)-GAS-     L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.3904E-02    0.0000E+00    0.0000E+00    0.0000E+00
                    MASS (GM)-LIQUID-  L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.1135E+01    0.0000E+00    0.0000E+00    0.0000E+00
                        1          2          3          4          5          6          7          8          9         10
                     5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7      5.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
                 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
                 -5.05E+05 -5.04E+05 -5.05E+05 -5.04E+05 -5.04E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0000   01,0000   01,0000
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
                 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
                 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.02E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  2.20E-11  1.04E-11  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40  1  1.00E+06  1.01E+06  1.00E+06  1.01E+06  1.01E+06  1.00E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.40  3
                 -5.00E+05 -4.99E+05 -5.00E+05 -4.99E+05 -4.99E+05 -5.00E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05
                  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  1.71E-08  8.65E-09  2.31E-09  3.54E-10  2.52E-11  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10  1  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.10  2
                  6.83E+05  6.83E+05  6.81E+05  6.80E+05  6.77E+05  6.73E+05  6.44E+05  5.38E+05  3.71E+05  1.03E+05
                  4.89E-01  4.89E-01  4.89E-01  4.89E-01  4.89E-01  4.90E-01  4.90E-01  4.91E-01  4.93E-01  4.95E-01
                  6.34E-06  3.62E-06  1.26E-06  2.72E-07  3.31E-08  1.47E-09  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00  1  1.03E+06  1.03E+06  1.02E+06  1.02E+06  1.02E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.00  1
                  1.03E+06  1.03E+06  1.02E+06  1.02E+06  1.02E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  8.07E-03  1.70E-02
                  2.32E-04  1.64E-04  7.72E-05  2.33E-05  4.30E-06  4.30E-07  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0001   02,0001   02,0001
                   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                        1         1         1         1         1         1         1         1         1         1
                     5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                        1         2         3         4         5         6         7         8         9        10
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EXPLORATORY SHAFT TRACER EXPERIMENT - 1                                    Z LEVEL    30  Z =      -105.000
TIME     18.31  MINS   CYCLE      75 DT  0.22E+02
                 MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.3904E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.1135E+01    0.0000E+00    0.0000E+00    0.0000E+00
                      1             2             3             4             5             6             7             8             9            10
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
  7      5.00  1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
                  1.10E+06 -5.03E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  1.73E-08  2.30E-13  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   03,0011   01,0011   01,0010   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                   S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00  1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
                  1.10E+06 -5.03E+05 -5.05E+05 -5.04E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                  0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  1.73E-08  2.30E-13  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   03,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001   01,0000   01,0000   01,0000
                   S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50  1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
                  1.10E+06 -5.02E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.04E+05 -5.04E+05 -5.04E+05
                  0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  1.73E-08  6.68E-13  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   03,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                   S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80  1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
                  1.10E+06 -5.00E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.02E+05 -5.02E+05 -5.03E+05
                  0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  1.93E-08  8.93E-10  2.26E-10  3.41E-11  2.37E-12  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   03,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001
                   S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40  1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.01E+06  1.01E+06  1.01E+06  1.00E+06  1.00E+06  1.00E+06  1      0.40  3
                  1.10E+06 -4.98E+05 -5.00E+05 -5.00E+05 -4.99E+05 -4.99E+05 -4.99E+05 -5.00E+05 -5.01E+05 -5.02E+05
                  0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                  0.00E+00  5.57E-07  2.95E-07  9.77E-08  2.00E-08  2.66E-09  2.28E-10  9.38E-12  0.00E+00  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   03,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001   01,0001
                   S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10  1  1.10E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.00E+06  1      0.10  2
                  1.10E+06  6.95E+05  6.91E+05  6.87E+05  6.83E+05  6.78E+05  6.26E+05  4.01E+05 -1.50E+05 -4.98E+05
                  0.00E+00  4.88E-01  4.88E-01  4.88E-01  4.89E-01  4.89E-01  4.90E-01  4.92E-01  4.97E-01  5.00E-01
                  0.00E+00  5.36E-05  4.14E-05  2.01E-05  5.82E-06  1.06E-06  1.24E-07  9.19E-09  3.39E-10  0.00E+00
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   03,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001
                   S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00  1  1.10E+06  1.07E+06  1.05E+06  1.03E+06  1.02E+06  1.01E+06  1.01E+06  1.01E+06  1.00E+06  1.00E+06  1      0.00  1
                  1.10E+06  1.07E+06  1.05E+06  1.03E+06  1.02E+06  1.01E+06  1.01E+06  1.00E+06  9.95E+05  9.92E+05
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  1.46E-03  2.52E-02  4.71E-02  3.11E-01
                  0.00E+00  0.00E+00  1.37E-04  2.68E-04  1.54E-04  4.42E-05  7.55E-06  8.02E-07  5.30E-08  7.25E-10
                  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   03,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011
                   S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                      1         1         1         1         1         1         1         1         1         1
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
                      1             2             3             4             5             6             7             8             9            10
```

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 35 Z = -55.000

TIME 18.31 MINS CYCLE 75 DT 0.22E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.3904E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.1135E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.00E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.20E-10 | 1.63E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | 5.31E+05 | 4.62E+05 | 3.01E+05 | -1.15E+05 | -4.96E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | | |
| | | | 4.91E-01 | 4.92E-01 | 4.93E-01 | 4.97E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 5.70E-08 | 9.67E-09 | 4.60E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 1.00E+06 | 1.00E+06 | 9.98E+05 | 9.95E+05 | 9.92E+05 | 9.85E+05 | 9.43E+05 | 9.28E+05 | 9.28E+05 | 9.28E+05 | | |
| | | | 1.77E-02 | 2.40E-02 | 3.57E-02 | 4.88E-02 | 3.00E-01 | 4.81E-01 | 4.97E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 3.09E-06 | 6.38E-07 | 3.94E-08 | 3.39E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | 02,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

PRODUCTION (GM) AT CELL

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 30 | 0.00000E+00 | -0.27185E+02 |
| 1 | 2 | 30 | 0.00000E+00 | -0.61660E-04 |
| 1 | 3 | 30 | 0.00000E+00 | -0.26021E-03 |
| 1 | 4 | 30 | 0.00000E+00 | -0.26050E-03 |
| 1 | 5 | 30 | 0.00000E+00 | -0.65192E-03 |
| 1 | 6 | 30 | 0.00000E+00 | -0.13042E-02 |
| 1 | 7 | 30 | 0.00000E+00 | -0.13043E-02 |
| 1 | 8 | 30 | 0.00000E+00 | -0.13043E-02 |
| 1 | 9 | 30 | 0.00000E+00 | -0.13043E-02 |
| 1 | 10 | 30 | 0.00000E+00 | -0.32607E-02 |

```
CYCLE     76 TIME  0.11209E+04 DT=  0.22441E+02 P-ITER=   25 P-TOL=   8.25 PCL-TOL=   9.94  MASS BAL.=1.000441 CT= 4.762
CYCLE     77 TIME  0.11435E+04 DT=  0.22527E+02 P-ITER=   27 P-TOL=   8.27 PCL-TOL=   9.33  MASS BAL.=1.000450 CT= 3.412
CYCLE     78 TIME  0.11660E+04 DT=  0.22560E+02 P-ITER=   18 P-TOL=   9.65 PCL-TOL=   9.65  MASS BAL.=1.000458 CT= 2.588
CYCLE     79 TIME  0.11886E+04 DT=  0.22582E+02 P-ITER=   23 P-TOL=   8.51 PCL-TOL=   9.44  MASS BAL.=1.000467 CT= 3.100
CYCLE     80 TIME  0.12112E+04 DT=  0.22615E+02 P-ITER=   27 P-TOL=   8.85 PCL-TOL=   9.32  MASS BAL.=1.000475 CT= 3.528
CYCLE     81 TIME  0.12339E+04 DT=  0.22651E+02 P-ITER=   19 P-TOL=   9.88 PCL-TOL=   9.87  MASS BAL.=1.000484 CT= 2.793
CYCLE     82 TIME  0.12565E+04 DT=  0.22676E+02 P-ITER=   21 P-TOL=   9.66 PCL-TOL=   9.65  MASS BAL.=1.000492 CT= 3.013
CYCLE     83 TIME  0.12792E+04 DT=  0.22705E+02 P-ITER=   22 P-TOL=   9.77 PCL-TOL=   9.77  MASS BAL.=1.000501 CT= 3.141
```

```
GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =   21.321 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =   21.321 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION              X-Z PLANE AT Y-LEVEL =     0.001 CM     TIME =   21.321 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
-----------------------------------------------------------------------------------------------------------
955555555559
555555555555
555555555555
555555555555
555555555555
776555555555
999997555555
999999965555
999999996555
999999999655
999999999855
999999999977
999999999999
999999999999
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999999999999
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999999999977
999999999755
999999996555
999999955555
999976555555
665555555555
555555555555
555555555555
555555555555
999999999999
999999999999
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-----------------------------------------------------------------------------------------------------------------------
TRACER 1 FLUID CONCENTRATION      X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =   21.321 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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444443210000
444444332000
333444433200
003444443211
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444444443322
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444444433200
444444432100
444444321000
444443321000
444433210000
443332100000
333321100000
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GAS PRESSURE (DYNE/CM2)           X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   21.321 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   21.321 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   21.321 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   21.321 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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CYCLE     84 TIME  0.13020E+04 DT=  0.22735E+02 P-ITER=   34 P-TOL=   9.95 PCL-TOL=   9.95  MASS BAL.=1.000509 CT= 4.345
CYCLE     85 TIME  0.13247E+04 DT=  0.22735E+02 P-ITER=   42 P-TOL=  10.00 PCL-TOL=   9.99  MASS BAL.=1.000518 CT= 4.993
CYCLE     86 TIME  0.13474E+04 DT=  0.22735E+02 P-ITER=   41 P-TOL=  10.00 PCL-TOL=  10.00  MASS BAL.=1.000526 CT= 4.927
CYCLE     87 TIME  0.13702E+04 DT=  0.22735E+02 P-ITER=   60 P-TOL=   9.98 PCL-TOL=   9.98  MASS BAL.=1.000535 CT= 6.830
CYCLE     88 TIME  0.13929E+04 DT=  0.22735E+02 P-ITER=   63 P-TOL=   9.99 PCL-TOL=   9.98  MASS BAL.=1.000543 CT= 7.167
CYCLE     89 TIME  0.14157E+04 DT=  0.22735E+02 P-ITER=   87 P-TOL=  10.00 PCL-TOL=   9.99  MASS BAL.=1.000552 CT= 9.888
CYCLE     90 TIME  0.14384E+04 DT=  0.22735E+02 P-ITER=   64 P-TOL=   9.97 PCL-TOL=   9.96  MASS BAL.=1.000560 CT= 7.365
CYCLE     91 TIME  0.14611E+04 DT=  0.22735E+02 P-ITER=   92 P-TOL=   9.98 PCL-TOL=   9.98  MASS BAL.=1.000569 CT=10.603
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GAS PRESSURE (DYNE/CM2)           X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =   24.352 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)        X-Z PLANE AT Y-LEVEL =      0.001 CM      TIME =   24.352 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION              X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    24.352 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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999999999655
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999999655555
998755555555
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TRACER 1 FLUID CONCENTRATION  X-Z PLANE AT Y-LEVEL =  0.001 CM  TIME =  24.352 MINS

0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00

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333444443322
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444444443322
444444443211
444444433211
444444433211
444444332100
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444333221000
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GAS PRESSURE (DYNE/CM2)  X-Y PLANE AT Z-LEVEL =  -205.000 CM  TIME =  24.352 MINS

0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06

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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   24.352 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   24.352 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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--------------------------------------------------------------------------------
TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   24.352 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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    EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL     1  Z =      -395.000
TIME     24.35  MINS    CYCLE      91 DT  0.23E+02
                     MASS (GM)-GAS-     L,R,B,T,F,BK    0.0000E+00    0.0000E+00    -0.4123E-02    0.0000E+00    0.0000E+00    0.0000E+00
                     MASS (GM)-LIQUID-  L,R,B,T,F,BK    0.0000E+00    0.0000E+00     0.1187E+01    0.0000E+00    0.0000E+00    0.0000E+00
                          1          2          3          4          5          6          7          8          9         10
                       5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7      5.00   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06   1      5.00  7
                  -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                   5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                    S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06   1      3.00  6
                  -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                   5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                    S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06   1      1.50  5
                  -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                   5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                    S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06   1      0.80  4
                  -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05
                   5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                    S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06   1      0.40  3
                  -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05
                   5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                    S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06   1      0.10  2
                   6.74E+05  6.74E+05  6.74E+05  6.73E+05  6.72E+05  6.71E+05  6.70E+05  6.69E+05  6.67E+05  6.56E+05
                   4.89E-01  4.89E-01  4.90E-01  4.90E-01  4.90E-01  4.90E-01  4.90E-01  4.90E-01  4.90E-01  4.90E-01
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                    S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06   1      0.00  1
                   9.95E+05  9.95E+05  9.95E+05  9.95E+05  9.95E+05  9.95E+05  9.95E+05  9.95E+05  9.95E+05  9.95E+05
                   4.83E-02  4.83E-02  4.82E-02  4.81E-02  4.80E-02  4.79E-02  4.79E-02  4.79E-02  4.79E-02  4.79E-02
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001
                    S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                          1         1         1         1         1         1         1         1         1         1
                       5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                          1         2         3         4         5         6         7         8         9        10
```

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 15 Z = -255.000

TIME 24.35 MINS CYCLE 91 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.4123E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.1187E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.40 3 |
| | | | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 3.26E-11 | 1.79E-11 | 3.72E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.10 2 |
| | | | 6.48E+05 | 6.38E+05 | 6.29E+05 | 6.09E+05 | 5.82E+05 | 5.47E+05 | 4.94E+05 | 4.30E+05 | 3.55E+05 | 2.64E+05 | | |
| | | | 4.90E-01 | 4.90E-01 | 4.90E-01 | 4.91E-01 | 4.91E-01 | 4.91E-01 | 4.92E-01 | 4.92E-01 | 4.93E-01 | 4.93E-01 | | |
| | | | 9.67E-09 | 6.13E-09 | 2.65E-09 | 8.42E-10 | 1.96E-10 | 2.25E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.00 1 |
| | | | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.17E-03 | 3.35E-03 | 5.47E-03 | 7.09E-03 | 9.14E-03 | | |
| | | | 3.43E-07 | 2.32E-07 | 1.12E-07 | 4.05E-08 | 1.10E-08 | 2.53E-09 | 2.83E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0001 | 02,0001 | 02,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 20 Z = -205.000

TIME 24.35 MINS CYCLE 91 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.4123E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | 0.1187E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 7.30E-11 | 4.85E-11 | 2.19E-11 | 5.28E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.40 3 |
| | | | -4.99E+05 | -5.00E+05 | -5.00E+05 | -5.00E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.98E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.62E-08 | 1.17E-08 | 6.38E-09 | 2.68E-09 | 8.62E-10 | 2.07E-10 | 3.37E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.10 2 |
| | | | 6.88E+05 | 6.87E+05 | 6.86E+05 | 6.85E+05 | 6.82E+05 | 6.79E+05 | 6.76E+05 | 6.70E+05 | 6.00E+05 | 4.98E+05 | | |
| | | | 4.88E-01 | 4.88E-01 | 4.88E-01 | 4.89E-01 | 4.89E-01 | 4.89E-01 | 4.90E-01 | 4.90E-01 | 4.91E-01 | 4.91E-01 | | |
| | | | 1.82E-06 | 1.44E-06 | 9.11E-07 | 4.51E-07 | 1.71E-07 | 4.84E-08 | 9.97E-09 | 1.45E-09 | 1.36E-10 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.00 1 |
| | | | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 1.83E-05 | 1.71E-05 | 1.37E-05 | 8.67E-06 | 4.13E-06 | 1.43E-06 | 3.53E-07 | 6.03E-08 | 6.68E-09 | 5.74E-10 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

```
EXPLORATORY SHAFT TRACER EXPERIMENT - 1                                    Z LEVEL    25  Z =     -155.000
TIME     24.35  MINS   CYCLE     91 DT  0.23E+02
                 MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.4123E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.1187E+01    0.0000E+00    0.0000E+00    0.0000E+00
                      1             2             3             4             5             6             7             8             9            10
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
  7      5.00  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      5.00  7
               -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05   -5.05E+05
                5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                 01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000     01,0000
                 S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  6      3.00  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      3.00  6
               -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05   -5.04E+05
                5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                 01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                 S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  5      1.50  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      1.50  5
               -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05   -5.03E+05
                5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                7.65E-12    5.42E-12    2.36E-12    3.85E-13    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                 01,0011     01,0011     01,0011     01,0011     01,0001     01,0001     01,0001     01,0001     01,0001     01,0001
                 S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  4      0.80  1  1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06    1.00E+06  1      0.80  4
               -5.01E+05   -5.01E+05   -5.01E+05   -5.00E+05   -5.00E+05   -5.01E+05   -5.01E+05   -5.01E+05   -5.01E+05   -5.00E+05
                5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                5.37E-09    4.19E-09    2.63E-09    1.35E-09    5.46E-10    1.71E-10    3.72E-11    3.79E-12    0.00E+00    0.00E+00
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                 01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0001     01,0001
                 S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  3      0.40  1  1.00E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06  1      0.40  3
               -5.00E+05   -4.99E+05   -4.99E+05   -4.99E+05   -4.99E+05   -4.99E+05   -4.99E+05   -4.99E+05   -4.99E+05   -4.98E+05
                5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01    5.00E-01
                5.16E-07    4.32E-07    3.05E-07    1.82E-07    8.80E-08    3.29E-08    9.19E-09    1.85E-09    2.45E-10    1.21E-11
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                 01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011
                 S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  2      0.10  1  1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06    1.01E+06  1      0.10  2
                7.04E+05    7.03E+05    7.02E+05    7.00E+05    6.97E+05    6.93E+05    6.89E+05    6.82E+05    6.73E+05    5.36E+05
                4.87E-01    4.87E-01    4.87E-01    4.87E-01    4.87E-01    4.88E-01    4.88E-01    4.89E-01    4.90E-01    4.91E-01
                1.87E-05    1.71E-05    1.40E-05    1.04E-05    6.44E-06    3.11E-06    1.10E-06    2.73E-07    4.38E-08    3.50E-09
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                 01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011     01,0011
                 S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
  1      0.00  1  1.03E+06    1.03E+06    1.03E+06    1.02E+06    1.02E+06    1.02E+06    1.02E+06    1.01E+06    1.01E+06    1.01E+06  1      0.00  1
                1.03E+06    1.03E+06    1.03E+06    1.02E+06    1.02E+06    1.02E+06    1.02E+06    1.01E+06    1.01E+06    1.01E+06
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                1.80E-05    1.82E-05    1.64E-05    1.91E-05    2.48E-05    2.24E-05    1.26E-05    4.42E-06    9.32E-07    9.40E-08
                0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00    0.00E+00
                 02,0011     02,0011     02,0011     02,0011     02,0011     02,0011     02,0011     02,0011     02,0011     02,0011
                 S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0     S 0,P 0
                      1           1           1           1           1           1           1           1           1           1
                   5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
                      1           2           3           4           5           6           7           8           9          10
```

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 30 Z = -105.000

TIME 24.35 MINS CYCLE 91 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | | | 0.0000E+00 | 0.0000E+00 | -0.4123E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | | | 0.0000E+00 | 0.0000E+00 | 0.1187E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | 1.10E+06 | -5.03E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 1.73E-08 | 8.56E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0010 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | 1.10E+06 | -5.03E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 1.73E-08 | 8.72E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | 1.10E+06 | -5.01E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 1.73E-08 | 4.50E-11 | 1.95E-11 | 6.07E-12 | 3.71E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | 1.10E+06 | -4.99E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.02E+05 | -5.02E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 4.74E-08 | 2.06E-08 | 1.06E-08 | 4.18E-09 | 1.27E-09 | 2.99E-10 | 5.33E-11 | 3.67E-12 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.10E+06 | 1.01E+06 | 1.00E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | 1.10E+06 | -4.98E+05 | -5.00E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -5.00E+05 | -5.00E+05 | -5.01E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 1.95E-06 | 1.45E-06 | 8.55E-07 | 3.94E-07 | 1.41E-07 | 3.94E-08 | 8.68E-09 | 1.59E-09 | 1.29E-10 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.10E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | 1.10E+06 | 7.18E+05 | 7.12E+05 | 7.08E+05 | 7.03E+05 | 6.98E+05 | 6.87E+05 | 6.71E+05 | 2.92E+05 | -3.89E+05 | | |
| | | | 0.00E+00 | 4.85E-01 | 4.86E-01 | 4.86E-01 | 4.87E-01 | 4.87E-01 | 4.88E-01 | 4.90E-01 | 4.93E-01 | 4.99E-01 | | |
| | | | 0.00E+00 | 4.25E-05 | 3.56E-05 | 2.54E-05 | 1.48E-05 | 6.78E-06 | 2.41E-06 | 6.62E-07 | 1.50E-07 | 1.75E-08 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,C011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.10E+06 | 1.07E+06 | 1.05E+06 | 1.03E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 1.10E+06 | 1.07E+06 | 1.05E+06 | 1.03E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.00E+06 | 9.98E+05 | 9.94E+05 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.37E-02 | 3.40E-02 | 1.13E-01 | | |
| | | | 0.00E+00 | 4.06E-06 | 1.12E-05 | 1.64E-05 | 1.96E-05 | 1.76E-05 | 1.07E-05 | 4.44E-06 | 1.37E-06 | 2.67E-07 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

```
      EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL    35  Z =       -55.000
TIME    24.35  MINS   CYCLE      91 DT  0.23E+02
                      MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.4123E-02    0.0000E+00    0.0000E+00    0.0000E+00
                      MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00    0.1187E+01    0.0000E+00    0.0000E+00    0.0000E+00
                          1             2             3             4             5             6             7             8             9            10
                       5.00         15.00         25.00         35.00         45.00         55.00         65.00         75.00         85.00         95.00
  7      5.00   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
                   -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                    5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                     01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                     S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S C,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
                   -5.04E+05 -5.04E+05 -5.04E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                    5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                     01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                     S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
                   -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                    5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                     01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                     S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
                   -5.01E+05 -5.01E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05
                    5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                    1.39E-10  4.11E-11  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                     01,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                     S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40   1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.40  3
                   -5.00E+05 -5.00E+05 -5.01E+05 -5.01E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05
                    5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                    1.94E-08  7.12E-09  1.06E-09  3.44E-11  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                     01,0011   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                     S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10   1  1.01E+06  1.01E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.10  2
                    6.78E+05  6.73E+05  5.89E+05  2.97E+05 -4.37E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05
                    4.89E-01  4.90E-01  4.91E-01  4.93E-01  4.99E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                    1.29E-06  5.71E-07  1.09E-07  5.66E-09  6.63E-13  1.48E-14  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                     01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001
                     S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00   1  1.01E+06  1.01E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.00  1
                    1.00E+06  1.00E+06  9.99E+05  9.95E+05  9.93E+05  9.89E+05  9.82E+05  9.28E+05  9.28E+05  9.28E+05
                    1.29E-02  1.91E-02  3.08E-02  4.46E-02  2.23E-01  4.37E-01  4.90E-01  5.00E-01  5.00E-01  5.00E-01
                    6.72E-06  4.16E-06  1.19E-06  9.97E-08  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    0 00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                     02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0001   02,0001   02,0001   02,0001
                     S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                         1         1         1         1         1         1         1         1         1         1
                       5.00         15.00         25.00         35.00         45.00         55.00         65.00         75 00         85.00         95.00
                         1         2         3         4         5         6         7         8         9        10
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PRODUCTION (GM) AT CELL

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 30 | 0.00000E+00 | -0.35498E+02 |
| 1 | 2 | 30 | 0.00000E+00 | -0.73300E-04 |
| 1 | 3 | 30 | 0.00000E+00 | -0.34601E-03 |
| 1 | 4 | 30 | 0.00000E+00 | -0.34638E-03 |
| 1 | 5 | 30 | 0.00000E+00 | -0.86690E-03 |
| 1 | 6 | 30 | 0.00000E+00 | -0.17346E-02 |
| 1 | 7 | 30 | 0.00000E+00 | -0.17346E-02 |
| 1 | 8 | 30 | 0.00000E+00 | -0.17346E-02 |
| 1 | 9 | 30 | 0.00000E+00 | -0.17346E-02 |
| 1 | 10 | 30 | 0.00000E+00 | -0.43366E-02 |

```
CYCLE     92 TIME  0.14839E+04 DT=  0.22735E+02 P-ITER=  106 P-TOL=   9.99 PCL-TOL=   9.99  MASS BAL.=1.000577 CT=11.931
CYCLE     93 TIME  0.15066E+04 DT=  0.22735E+02 P-ITER=   58 P-TOL=   9.96 PCL-TOL=   9.95  MASS BAL.=1.000586 CT= 6.986
CYCLE     94 TIME  0.15293E+04 DT=  0.22735E+02 P-ITER=   28 P-TOL=  10.00 PCL-TOL=  10.00  MASS BAL.=1.000594 CT= 3.891
CYCLE     95 TIME  0.15525E+04 DT=  0.23142E+02 P-ITER=   24 P-TOL=   5.56 PCL-TOL=   9.56  MASS BAL.=1.000603 CT= 3.691
CYCLE     96 TIME  0.15756E+04 DT=  0.23158E+02 P-ITER=   28 P-TOL=   9.31 PCL-TOL=   9.31  MASS BAL.=1.000611 CT= 4.131
CYCLE     97 TIME  0.15988E+04 DT=  0.23181E+02 P-ITER=  115 P-TOL=   9.94 PCL-TOL=   9.93  MASS BAL.=1.000620 CT=13.312
CYCLE     98 TIME  0.16220E+04 DT=  0.23181E+02 P-ITER=   24 P-TOL=   7.69 PCL-TOL=   9.68  MASS BAL.=1.000629 CT= 3.552
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GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =   27.033 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)       X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =   27.033 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION              X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =   27.033 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Z PLANE AT Y-LEVEL =     0.001 CM      TIME =   27.033 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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444444433222
444444333211
444444333211
444443332211
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GAS PRESSURE (DYNE/CM2)           X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   27.033 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   27.033 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   27.033 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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--------------------------------------------------------------------------------
TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM .    TIME =   27.033 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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CYCLE     99 TIME  0.16452E+04 DT=  0.23258E+02 P-ITER=   27 P-TOL=   9.88 PCL-TOL=   9.87  MASS BAL.=1.000637 CT= 4.111
CYCLE    100 TIME  0.16685E+04 DT=  0.23275E+02 P-ITER=   12 P-TOL=   8.44 PCL-TOL=   8.60  MASS BAL.=1.000646 CT= 2.543
CYCLE    101 TIME  0.16918E+04 DT=  0.23282E+02 P-ITER=   27 P-TOL=   9.87 PCL-TOL=   9.86  MASS BAL.=1.000655 CT= 4.187
CYCLE    102 TIME  0.17151E+04 DT=  0.23304E+02 P-ITER=   11 P-TOL=   7.34 PCL-TOL=   9.47  MASS BAL.=1.000663 CT= 2.463
CYCLE    103 TIME  0.17384E+04 DT=  0.23314E+02 P-ITER=   12 P-TOL=   7.51 PCL-TOL=   8.60  MASS BAL.=1.000672 CT= 2.584
CYCLE    104 TIME  0.17617E+04 DT=  0.23324E+02 P-ITER=   37 P-TOL=   9.89 PCL-TOL=   9.67  MASS BAL.=1.000680 CT= 5.302
CYCLE    105 TIME  0.17851E+04 DT=  0.23324E+02 P-ITER=   22 P-TOL=   9.41 PCL-TOL=   8.90  MASS BAL.=1.000689 CT= 3.459
CYCLE    106 TIME  0.18084E+04 DT=  0.23374E+02 P-ITER=   11 P-TOL=   6.18 PCL-TOL=   8.81  MASS BAL.=1.000697 CT= 2.507
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GAS PRESSURE (DYNE/CM2)          X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    30.141 MINS
O= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID PRESSURE (DYNE/CM2)       X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    30.141 MINS
O= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION             X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    30.141 MINS
0= 0.0C)E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION  X-Z PLANE AT Y-LEVEL =  0.001 CM  TIME =  30.141 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00

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3333333322100
333333221100
333332221000
333322211000
332222110000
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GAS PRESSURE (DYNE/CM2)  X-Y PLANE AT Z-LEVEL =  -205.000 CM  TIME =  30.141 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06

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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   30.141 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   30.141 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   30.141 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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```
EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL     1  Z =     -395.000
TIME     30.14  MINS   CYCLE     106 DT  0.23E+02
                MASS (GM)-GAS-     L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.5583E-02    0.0000E+00    0.0000E+00    0.0000E+00
                MASS (GM)-LIQUID-  L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.1073E+01    0.0000E+00    0.0000E+00    0.0000E+00
                     1          2          3          4          5          6          7          8          9         10
                  5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7     5.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     5.00  7
                -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                 5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                  S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6     3.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     3.00  6
                -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                 5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                  S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5     1.50  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     1.50  5
                -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                 5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                  S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4     0.80  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     0.80  4
                -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05
                 5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                  S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3     0.40  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     0.40  3
                -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05
                 5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                  S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2     0.10  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1     0.10  2
                 6.89E+05  6.89E+05  6.88E+05  6.87E+05  6.86E+05  6.84E+05  6.83E+05  6.81E+05  6.80E+05  6.78E+05
                 4.88E-01  4.88E-01  4.88E-01  4.88E-01  4.88E-01  4.88E-01  4.89E-01  4.89E-01  4.89E-01  4.89E-01
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                  S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1     0.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1     0.00  1
                 1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  9.98E+05  9.96E+05
                 2.44E-02  2.45E-02  2.47E-02  2.47E-02  2.48E-02  2.53E-02  2.65E-02  2.99E-02  3.80E-02  6.74E-02
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                  02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001
                  S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                     1          1          1          1          1          1          1          1          1          1
                  5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                     1          2          3          4          5          6          7          8          9         10
```

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 15 Z = -255.000

TIME 30.14 MINS CYCLE 106 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.5583E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.1073E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.00E+05 | -5.00E+05 | -5.00E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.02E-11 | 6.31E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.40 3 |
| | | | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.98E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 2.47E-09 | 1.90E-09 | 1.17E-09 | 5.85E-10 | 2.32E-10 | 7.05E-11 | 1.14E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.10 2 |
| | | | 6.88E+05 | 6.88E+05 | 6.87E+05 | 6.85E+05 | 6.84E+05 | 6.81E+05 | 6.79E+05 | 6.75E+05 | 6.69E+05 | 6.17E+05 | | |
| | | | 4.88E-01 | 4.88E-01 | 4.88E-01 | 4.89E-01 | 4.89E-01 | 4.89E-01 | 4.89E-01 | 4.90E-01 | 4.90E-01 | 4.90E-01 | | |
| | | | 2.00E-07 | 1.64E-07 | 1.12E-07 | 6.33E-08 | 2.90E-08 | 1.04E-08 | 2.85E-09 | 5.66E-10 | 7.08E-11 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.00 1 |
| | | | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.16E-05 | | |
| | | | 1.68E-06 | 1.51E-06 | 1.19E-06 | 8.04E-07 | 4.40E-07 | 1.88E-07 | 5.98E-08 | 1.36E-08 | 2.16E-09 | 5.59E-10 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

```
     EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL    20  Z =     -205.000
TIME     30.14  MINS   CYCLE     106 DT  0.23E+02
                 MASS (GM)-GAS-     L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.5583E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID-  L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.1073E+01    0.0000E+00    0.0000E+00    0.0000E+00
                      1          2          3          4          5          6          7          8          9         10
                   5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7      5.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
               -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
               -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
               -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                3.61E-13  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0011   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
               -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.00E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.00E+05 -5.00E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                1.16E-09  9.33E-10  6.17E-10  3.41E-10  1.55E-10  5.44E-11  1.20E-11  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40  1  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.40  3
               -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.98E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                9.23E-08  7.79E-08  5.61E-08  3.48E-08  1.81E-08  7.64E-09  2.50E-09  6.04E-10  9.40E-11  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10  1  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.10  2
                7.07E+05  7.06E+05  7.05E+05  7.04E+05  7.01E+05  6.98E+05  6.95E+05  6.90E+05  6.85E+05  6.80E+05
                4.86E-01  4.86E-01  4.87E-01  4.87E-01  4.87E-01  4.87E-01  4.88E-01  4.88E-01  4.89E-01  4.89E-01
                3.19E-06  2.86E-06  2.28E-06  1.63E-06  1.01E-06  5.10E-07  2.00E-07  5.75E-08  1.09E-08  1.07E-09
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00  1  1.02E+06  1.02E+06  1.02E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.00  1
                1.02E+06  1.02E+06  1.02E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                7.47E-06  7.12E-06  6.32E-06  5.41E-06  4.40E-06  3.07E-06  1.65E-06  6.20E-07  1.48E-07  1.76E-08
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                      1         1         1         1         1         1         1         1         1         1
                   5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                      1         2         3         4         5         6         7         8         9        10
```

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 25 Z = -155.000

TIME 30.14 MINS CYCLE 106 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.5583E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.1073E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.03E+05 | -5.02E+05 | -5.03E+05 | -5.02E+05 | -5.02E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.02E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 6.92E-11 | 5.62E-11 | 3.76E-11 | 2.14E-11 | 9.46E-12 | 2.51E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.01E+05 | -5.00E+05 | -5.01E+05 | -5.00E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.00E+05 | -5.00E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 2.15E-08 | 1.82E-08 | 1.31E-08 | 8.28E-09 | 4.46E-09 | 2.00E-09 | 7.15E-10 | 1.94E-10 | 3.20E-11 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.40 3 |
| | | | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.98E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.01E-06 | 8.89E-07 | 6.88E-07 | 4.75E-07 | 2.86E-07 | 1.45E-07 | 5.95E-08 | 1.88E-08 | 4.17E-09 | 4.98E-10 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.10 2 |
| | | | 7.23E+05 | 7.23E+05 | 7.21E+05 | 7.19E+05 | 7.16E+05 | 7.12E+05 | 7.08E+05 | 7.01E+05 | 6.92E+05 | 6.82E+05 | | |
| | | | 4.85E-01 | 4.85E-01 | 4.85E-01 | 4.85E-01 | 4.85E-01 | 4.86E-01 | 4.86E-01 | 4.87E-01 | 4.88E-01 | 4.89E-01 | | |
| | | | 1.76E-05 | 1.64E-05 | 1.39E-05 | 1.07E-05 | 7.42E-06 | 4.45E-06 | 2.20E-06 | 8.48E-07 | 2.30E-07 | 3.35E-08 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.03E+06 | 1.03E+06 | 1.03E+06 | 1.03E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.00 1 |
| | | | 1.03E+06 | 1.03E+06 | 1.03E+06 | 1.03E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 1.66E-05 | 1.73E-05 | 1.70E-05 | 1.56E-05 | 1.28E-05 | 9.22E-06 | 5.78E-06 | 3.01E-06 | 1.13E-06 | 2.28E-07 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

```
     EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL    30  Z =      -105.000
TIME     30.14  MINS   CYCLE     106 DT  0.23E+02
                    MASS (GM)-GAS-     L,R,B,T,F,BK    0.0000E+00    0.0000E+00    -0.5583E-02    0.0000E+00    0.0000E+00    0.0000E+00
                    MASS (GM)-LIQUID-  L,R,B,T,F,BK    0.0000E+00    0.0000E+00    -0.1073E+01    0.0000E+00    0.0000E+00    0.0000E+00
                        1          2          3          4          5          6          7          8          9         10
                     5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7      5.00   1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
                   1.10E+06 -5.02E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                   0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  1.73E-08  1.46E-12  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    03,0011   01,0011   01,0010   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                    S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00   1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
                   1.10E+06 -5.02E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                   0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  1.73E-08  1.61E-12  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    03,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                    S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50   1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
                   1.10E+06 -5.00E+05 -5.03E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05
                   0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  1.76E-08  2.36E-10  1.27E-10  5.38E-11  1.72E-11  2.93E-12  0.00E+00  0.00E+00  0.00E+00
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    03,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001
                    S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80   1  1.10E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
                   1.10E+06 -4.98E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.00E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.02E+05
                   0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  9.87E-08  6.03E-08  3.55E-08  1.67E-08  6.31E-09  1.94E-09  4.87E-10  1.02E-10  3.48E-12
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    03,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011
                    S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40   1  1.10E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.00E+06  1.00E+06  1      0.40  3
                   1.10E+06 -4.97E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -5.00E+05 -5.00E+05 -5.00E+05
                   0.00E+00  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                   0.00E+00  2.95E-06  2.31E-06  1.50E-06  7.91E-07  3.39E-07  1.19E-07  3.40E-08  8.40E-09  1.33E-09
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    03,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011
                    S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10   1  1.10E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.10  2
                   1.10E+06  7.39E+05  7.32E+05  7.27E+05  7.22E+05  7.16E+05  7.06E+05  6.89E+05  5.84E+05  7.37E+04
                   0.00E+00  4.83E-01  4.84E-01  4.84E-01  4.85E-01  4.85E-01  4.86E-01  4.88E-01  4.91E-01  4.95E-01
                   0.00E+00  3.42E-05  2.98E-05  2.25E-05  1.43E-05  7.39E-06  3.13E-06  1.09E-06  3.20E-07  6.70E-08
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    03,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011
                    S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00   1  1.10E+06  1.07E+06  1.05E+06  1.04E+06  1.03E+06  1.02E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.00  1
                   1.10E+06  1.07E+06  1.05E+06  1.04E+06  1.03E+06  1.02E+06  1.01E+06  1.01E+06  1.00E+06  9.98E+05
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  3.85E-03  2.28E-02  3.78E-02
                   0.00E+00  3.28E-06  9.40E-06  1.46E-05  1.48E-05  1.09E-05  6.21E-06  2.89E-06  1.11E-06  3.19E-07
                   0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                    03,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011
                    S 0,P10   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                        1          1          1          1          1          1          1          1          1          1
                     5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                        1          2          3          4          5          6          7          8          9         10
```

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 35 Z = -55.000

TIME 30.14 MINS CYCLE 106 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.5583E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.1073E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.01E+05 | -5.01E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.00E-09 | 4.12E-10 | 7.31E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.00E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 6.40E-08 | 2.96E-08 | 6.59E-09 | 5.23E-10 | 1.47E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | 6.95E+05 | 6.89E+05 | 6.78E+05 | 5.59E+05 | -3.24E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | | |
| | | | 4.87E-01 | 4.88E-01 | 4.89E-01 | 4.91E-01 | 4.98E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.81E-06 | 9.73E-07 | 2.73E-07 | 3.07E-08 | 5.82E-12 | 4.91E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 1.00E+06 | 1.00E+06 | 9.99E+05 | 9.96E+05 | 9.93E+05 | 9.91E+05 | 9.83E+05 | 9.30E+05 | 9.28E+05 | 9.28E+05 | | |
| | | | 1.08E-02 | 1.64E-02 | 2.73E-02 | 4.14E-02 | 1.80E-01 | 3.88E-01 | 4.88E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 4.13E-06 | 2.71E-06 | 1.08E-06 | 2.03E-07 | 0.00E+00 | 0.00E+00 | 6.30E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0001 | 02,0001 | 02,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

PRODUCTION (GM) AT CELL

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 30 | 0.00000E+00 | -0.43304E+02 |
| 1 | 2 | 30 | 0.00000E+00 | -0.83996E-04 |
| 1 | 3 | 30 | 0.00000E+00 | -0.42815E-03 |
| 1 | 4 | 30 | 0.00000E+00 | -0.42859E-03 |
| 1 | 5 | 30 | 0.00000E+00 | -0.10727E-02 |
| 1 | 6 | 30 | 0.00000E+00 | -0.21466E-02 |
| 1 | 7 | 30 | 0.00000E+00 | -0.21467E-02 |
| 1 | 8 | 30 | 0.00000E+00 | -0.21467E-02 |
| 1 | 9 | 30 | 0.00000E+00 | -0.21467E-02 |
| 1 | 10 | 30 | 0.00000E+00 | -0.53668E-02 |

```
GAS PRESSURE (DYNE/CM2)           X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    30.141 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06

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LIQUID PRESSURE (DYNE/CM2)        X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =    30.141 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06

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LIQUID SATURATION                X-Z PLANE AT Y-LEVEL =      0.001 CM       TIME =   30.141 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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955555555559
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999998655555
999999975555
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TRACER 1 FLUID CONCENTRATION X-Z PLANE AT Y-LEVEL = 0.001 CM TIME = 30.141 MINS

0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00

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221000000000
333320000000
443333200000
444433321000
444443332200
334444333211
003344433322
333444433322
334444433322
444444433322
444444433322
444444333322
444444333222
444443333222
444433333211
333333332211
333333332211
333333332100
333333322100
333333221100
333332221000
333322211000
332222110000
222221100000
222211100000
221111000000
111100000000
111000000000
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GAS PRESSURE (DYNE/CM2) X-Y PLANE AT Z-LEVEL = -205.000 CM TIME = 30.141 MINS

0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06

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LIQUID PRESSURE (DYNE/CM2)        X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   30.141 MINS
0= 1.000E+06 1= 1.100E+06 2= 1.200E+06 3= 1.300E+06 4= 1.400E+06 5= 1.500E+06 6= 1.600E+06 7= 1.700E+06 8= 1.800E+06 9= 1.900E+06
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LIQUID SATURATION                 X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   30.141 MINS
0= 0.000E+00 1= 1.000E-01 2= 2.000E-01 3= 3.000E-01 4= 4.000E-01 5= 5.000E-01 6= 6.000E-01 7= 7.000E-01 8= 8.000E-01 9= 9.000E-01
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955555555559
555555555555
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555555555555
999999999999
999999999999
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```
TRACER 1 FLUID CONCENTRATION      X-Y PLANE AT Z-LEVEL =  -205.000 CM      TIME =   30.141 MINS
0= 1.000E-09 1= 1.000E-08 2= 1.000E-07 3= 1.000E-06 4= 1.000E-05 5= 1.000E-04 6= 1.000E-03 7= 1.000E-02 8= 1.000E-01 9= 1.000E+00
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000000000000
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111111000000
333333221100
333333332211
033333332210
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     EXPLORATORY SHAFT TRACER EXPERIMENT - 1                          Z LEVEL      1  Z =      -395.000
TIME     30.14  MINS   CYCLE     106 DT  0.23E+02
                 MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00    -0.5583E-02    0.0000E+00    0.0000E+00    0.0000E+00
                 MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00    -0.1073E+01    0.0000E+00    0.0000E+00    0.0000E+00
                      1          2          3          4          5          6          7          8          9         10
                   5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7      5.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      5.00  7
               -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6      3.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      3.00  6
               -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5      1.50  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      1.50  5
               -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4      0.80  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.80  4
               -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05 -5.02E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3      0.40  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1      0.40  3
               -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05
                5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2      0.10  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.10  2
                6.89E+05  6.89E+05  6.88E+05  6.87E+05  6.86E+05  6.84E+05  6.83E+05  6.81E+05  6.80E+05  6.78E+05
                4.88E-01  4.88E-01  4.88E-01  4.88E-01  4.88E-01  4.88E-01  4.89E-01  4.89E-01  4.89E-01  4.89E-01
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1      0.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1      0.00  1
                1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  9.98E+05  9.96E+05
                2.44E-02  2.45E-02  2.47E-02  2.47E-02  2.48E-02  2.53E-02  2.65E-02  2.99E-02  3.80E-02  6.74E-02
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                 02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001   02,0001
                 S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                      1         1         1         1         1         1         1         1         1         1
                   5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                      1         2         3         4         5         6         7         8         9        10
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```
EXPLORATORY SHAFT TRACER EXPERIMENT - 1                    Z LEVEL    15  Z =     -255.000
TIME    30.14  MINS   CYCLE    106 DT  0.23E+02
                MASS (GM)-GAS-    L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.5583E-02    0.0000E+00    0.0000E+00    0.0000E+00
                MASS (GM)-LIQUID- L,R,B,T,F,BK    0.0000E+00    0.0000E+00   -0.1073E+01    0.0000E+00    0.0000E+00    0.0000E+00
                     1          2          3          4          5          6          7          8          9         10
                  5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
  7     5.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     5.00  7
              -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05 -5.05E+05
               5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000   01,0000
                S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  6     3.00  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     3.00  6
              -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05 -5.04E+05
               5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  5     1.50  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     1.50  5
              -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05 -5.03E+05
               5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  4     0.80  1  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1.00E+06  1     0.80  4
              -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.01E+05 -5.00E+05 -5.00E+05 -5.00E+05
               5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
               1.02E-11  6.31E-12  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                01,0011   01,0011   01,0011   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001   01,0001
                S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  3     0.40  1  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1     0.40  3
              -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.99E+05 -4.98E+05
               5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01  5.00E-01
               2.47E-09  1.90E-09  1.17E-09  5.85E-10  2.32E-10  7.05E-11  1.14E-11  0.00E+00  0.00E+00  0.00E+00
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001   01,0001   01,0001
                S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  2     0.10  1  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1     0.10  2
               6.88E+05  6.88E+05  6.87E+05  6.85E+05  6.84E+05  6.81E+05  6.79E+05  6.75E+05  6.69E+05  6.17E+05
               4.88E-01  4.88E-01  4.88E-01  4.89E-01  4.89E-01  4.89E-01  4.89E-01  4.90E-01  4.90E-01  4.90E-01
               2.00E-07  1.64E-07  1.12E-07  6.33E-08  2.90E-08  1.04E-08  2.85E-09  5.66E-10  7.08E-11  0.00E+00
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0011   01,0001
                S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
  1     0.00  1  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1     0.00  1
               1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06  1.01E+06
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  5.16E-05
               1.68E-06  1.51E-06  1.19E-06  8.04E-07  4.40E-07  1.88E-07  5.98E-08  1.36E-08  2.16E-09  5.59E-10
               0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
                02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011   02,0011
                S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0   S 0,P 0
                     1          1          1          1          1          1          1          1          1          1
                  5.00      15.00      25.00      35.00      45.00      55.00      65.00      75.00      85.00      95.00
                     1          2          3          4          5          6          7          8          9         10
```

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 20 Z = -205.000

TIME 30.14 MINS CYCLE 106 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.5583E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.1073E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 3.61E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.00E+05 | -5.00E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.16E-09 | 9.33E-10 | 6.17E-10 | 3.41E-10 | 1.55E-10 | 5.44E-11 | 1.20E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.40 3 |
| | | | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.98E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 9.23E-08 | 7.79E-08 | 5.61E-08 | 3.48E-08 | 1.81E-08 | 7.64E-09 | 2.50E-09 | 6.04E-10 | 9.40E-11 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.10 2 |
| | | | 7.07E+05 | 7.06E+05 | 7.05E+05 | 7.04E+05 | 7.01E+05 | 6.98E+05 | 6.95E+05 | 6.90E+05 | 6.85E+05 | 6.80E+05 | | |
| | | | 4.86E-01 | 4.86E-01 | 4.87E-01 | 4.87E-01 | 4.87E-01 | 4.87E-01 | 4.88E-01 | 4.88E-01 | 4.89E-01 | 4.89E-01 | | |
| | | | 3.19E-06 | 2.86E-06 | 2.28E-06 | 1.63E-06 | 1.01E-06 | 5.10E-07 | 2.00E-07 | 5.75E-08 | 1.09E-08 | 1.07E-09 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.00 1 |
| | | | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 7.47E-06 | 7.12E-06 | 6.32E-06 | 5.41E-06 | 4.40E-06 | 3.07E-06 | 1.65E-06 | 6.20E-07 | 1.48E-07 | 1.76E-08 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 25 Z = -155.000

TIME 30.14 MINS CYCLE 106 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.5583E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.1073E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.03E+05 | -5.02E+05 | -5.03E+05 | -5.02E+05 | -5.02E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.02E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 6.92E-11 | 5.62E-11 | 3.76E-11 | 2.14E-11 | 9.46E-12 | 2.51E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.01E+05 | -5.00E+05 | -5.01E+05 | -5.00E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.00E+05 | -5.00E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 2.15E-08 | 1.82E-08 | 1.31E-08 | 8.28E-09 | 4.46E-09 | 2.00E-09 | 7.15E-10 | 1.94E-10 | 3.20E-11 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.40 3 |
| | | | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.98E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.01E-06 | 8.89E-07 | 6.88E-07 | 4.75E-07 | 2.86E-07 | 1.45E-07 | 5.95E-08 | 1.88E-08 | 4.17E-09 | 4.98E-10 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.10 2 |
| | | | 7.23E+05 | 7.23E+05 | 7.21E+05 | 7.19E+05 | 7.16E+05 | 7.12E+05 | 7.08E+05 | 7.01E+05 | 6.92E+05 | 6.82E+05 | | |
| | | | 4.85E-01 | 4.85E-01 | 4.85E-01 | 4.85E-01 | 4.85E-01 | 4.86E-01 | 4.86E-01 | 4.87E-01 | 4.88E-01 | 4.89E-01 | | |
| | | | 1.76E-05 | 1.64E-05 | 1.39E-05 | 1.07E-05 | 7.42E-06 | 4.45E-06 | 2.20E-06 | 8.48E-07 | 2.30E-07 | 3.35E-08 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.03E+06 | 1.03E+06 | 1.03E+06 | 1.03E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.00 1 |
| | | | 1.03E+06 | 1.03E+06 | 1.03E+06 | 1.03E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 1.66E-05 | 1.73E-05 | 1.70E-05 | 1.56E-05 | 1.28E-05 | 9.22E-06 | 5.78E-06 | 3.01E-06 | 1.13E-06 | 2.28E-07 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 30 Z = -105.000

TIME 30.14 MINS CYCLE 106 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.5583E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.1073E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | 1.10E+06 | -5.02E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 1.73E-08 | 1.46E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0010 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | 1.10E+06 | -5.02E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 1.73E-08 | 1.61E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | 1.10E+06 | -5.00E+05 | -5.03E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 1.76E-08 | 2.36E-10 | 1.27E-10 | 5.38E-11 | 1.72E-11 | 2.93E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.10E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | 1.10E+06 | -4.98E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.02E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 9.87E-08 | 6.03E-08 | 3.55E-08 | 1.67E-08 | 6.31E-09 | 1.94E-09 | 4.87E-10 | 1.02E-10 | 3.48E-12 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.10E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | 1.10E+06 | -4.97E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -4.99E+05 | -5.00E+05 | -5.00E+05 | -5.00E+05 | | |
| | | | 0.00E+00 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 2.95E-06 | 2.31E-06 | 1.50E-06 | 7.91E-07 | 3.39E-07 | 1.19E-07 | 3.40E-08 | 8.40E-09 | 1.33E-09 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.10E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.10 2 |
| | | | 1.10E+06 | 7.39E+05 | 7.32E+05 | 7.27E+05 | 7.22E+05 | 7.16E+05 | 7.06E+05 | 6.89E+05 | 5.84E+05 | 7.37E+04 | | |
| | | | 0.00E+00 | 4.83E-01 | 4.84E-01 | 4.84E-01 | 4.85E-01 | 4.85E-01 | 4.86E-01 | 4.88E-01 | 4.91E-01 | 4.95E-01 | | |
| | | | 0.00E+00 | 3.42E-05 | 2.98E-05 | 2.25E-05 | 1.43E-05 | 7.39E-06 | 3.13E-06 | 1.09E-06 | 3.20E-07 | 6.70E-08 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.10E+06 | 1.07E+06 | 1.05E+06 | 1.04E+06 | 1.03E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1.01E+06 | 1 | 0.00 1 |
| | | | 1.10E+06 | 1.07E+06 | 1.05E+06 | 1.04E+06 | 1.03E+06 | 1.02E+06 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 9.98E+05 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.85E-03 | 2.28E-02 | 3.78E-02 | | |
| | | | 0.00E+00 | 3.28E-06 | 9.40E-06 | 1.46E-05 | 1.48E-05 | 1.09E-05 | 6.21E-06 | 2.89E-06 | 1.11E-06 | 3.19E-07 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 03,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | | |
| | | | S 0,P10 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

EXPLORATORY SHAFT TRACER EXPERIMENT - 1 Z LEVEL 35 Z = -55.000

TIME 30.14 MINS CYCLE 106 DT 0.23E+02

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MASS (GM)-GAS- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.5583E-02 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | MASS (GM)-LIQUID- L,R,B,T,F,BK | 0.0000E+00 | 0.0000E+00 | -0.1073E+01 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| 7 | 5.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 5.00 7 |
| | | | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | -5.05E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | 01,0000 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 6 | 3.00 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 3.00 6 |
| | | | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | -5.04E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 5 | 1.50 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 1.50 5 |
| | | | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | -5.03E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 4 | 0.80 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.80 4 |
| | | | -5.01E+05 | -5.01E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.00E-09 | 4.12E-10 | 7.31E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 3 | 0.40 | 1 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.40 3 |
| | | | -5.00E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | -5.02E+05 | | |
| | | | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 6.40E-08 | 2.96E-08 | 6.59E-09 | 5.23E-10 | 1.47E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 2 | 0.10 | 1 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.10 2 |
| | | | 6.95E+05 | 6.89E+05 | 6.78E+05 | 5.59E+05 | -3.24E+05 | -5.00E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | -5.01E+05 | | |
| | | | 4.87E-01 | 4.88E-01 | 4.89E-01 | 4.91E-01 | 4.98E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 1.81E-06 | 9.73E-07 | 2.73E-07 | 3.07E-08 | 5.82E-12 | 4.91E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0011 | 01,0001 | 01,0001 | 01,0001 | 01,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| 1 | 0.00 | 1 | 1.01E+06 | 1.01E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1.00E+06 | 1 | 0.00 1 |
| | | | 1.00E+06 | 1.00E+06 | 9.99E+05 | 9.96E+05 | 9.93E+05 | 9.91E+05 | 9.83E+05 | 9.30E+05 | 9.28E+05 | 9.28E+05 | | |
| | | | 1.08E-02 | 1.64E-02 | 2.73E-02 | 4.14E-02 | 1.80E-01 | 3.88E-01 | 4.88E-01 | 5.00E-01 | 5.00E-01 | 5.00E-01 | | |
| | | | 4.13E-06 | 2.71E-06 | 1.08E-06 | 2.03E-07 | 0.00E+00 | 0.00E+00 | 6.30E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| | | | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0011 | 02,0001 | 02,0001 | 02,0001 | | |
| | | | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | S 0,P 0 | | |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | 5.00 | 15.00 | 25.00 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 85.00 | 95.00 | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

PRODUCTION (GM) AT CELL

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 30 | 0.00000E+00 | -0.43304E+02 |
| 1 | 2 | 30 | 0.00000E+00 | -0.83996E-04 |
| 1 | 3 | 30 | 0.00000E+00 | -0.42815E-03 |
| 1 | 4 | 30 | 0.00000E+00 | -0.42859E-03 |
| 1 | 5 | 30 | 0.00000E+00 | -0.10727E-02 |
| 1 | 6 | 30 | 0.00000E+00 | -0.21466E-02 |
| 1 | 7 | 30 | 0.00000E+00 | -0.21467E-02 |
| 1 | 8 | 30 | 0.00000E+00 | -0.21467E-02 |
| 1 | 9 | 30 | 0.00000E+00 | -0.21467E-02 |
| 1 | 10 | 30 | 0.00000E+00 | -0.53668E-02 |

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PROBLEM HAS REACHED END TIME.  FINISHED.
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