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PRESSURE TRANSIENT ANALYSIS OF WELLS WITH HORIZONTAL DRAINHOLES—SUPRI TR-51

Topical Report

By
Michael D. Clonts
H. J. Ramey, Jr.

July 1986

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Supri TR-51

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TABLE OF CONTENTS

Page

LIST OF TABLES iii
LIST OF FIGURES iv
ACKNOWLEDGEMENTS v
ABSTRACT vi
1. INTRODUCTION AND LITERATURE REVIEW 01
2. DISCUSSION OF HORIZONTAL DRAINHOLE TRANSIENT PRESSURE RESPONSE 03
   2.1 Method of Solution and Validation 03
   2.2 Short Time Approximation 09
   2.3 Long Time Approximation 12
   2.4 Wellbore Pressure 15
   2.5 Extension to Multiple Drainholes 16
   2.6 Uniform Flux Vertical Fracture Similarity 18
   2.7 Extension to Infinite Conductivity Drainholes 23
   2.8 Drainhole Pseudo Skin Factor 23
3. CONCLUSIONS 27
4. REFERENCES 29
5. NOMENCLATURE 33
APPENDIX A: Computer Program 51
APPENDIX B: Tabulated Values of P_D at several x_D for various r_{Ddh} and L_D 58
APPENDIX C: Drainhole Pressure Transient Type Curves 92

LIST OF TABLES

Page

B.1 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.0005$ 59
B.2 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.001$ 61
B.3 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.005$ 63
B.4 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.01$ 64
B.5 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.05$ 66
B.6 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.25$ and $r_{Ddh} = 0.0005$ 68
B.7 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.25$ and $r_{Ddh} = 0.005$ 70
B.8 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.25$ and $r_{Ddh} = 0.05$ 72
B.9 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.5$ and $r_{Ddh} = 0.0005$ 74
B.10 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.5$ and $r_{Ddh} = 0.005$ 76
B.11 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.5$ and $r_{Ddh} = 0.05$ 78
B.12 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.732$ and $r_{Ddh} = 0.0005$ 80
B.13 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.732$ and $r_{Ddh} = 0.005$ 82
B.14 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.732$ and $r_{Ddh} = 0.05$ 84
B.15 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 1.0$ and $r_{Ddh} = 0.0005$ 86
B.16 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 1.0$ and $r_{Ddh} = 0.005$ 88
B.17 Dimensionless pressure for a uniform flux drainhole in an infinite slab reservoir for $x_D = 1.0$ and $r_{Ddh} = 0.05$ 90

LIST OF FIGURES

Page

2.1 Physical representation of single drainhole system....35
2.2 Newman product representation of single drainhole system....36
2.3 Typical pressure transient type curve for a uniform flux drainhole ($x_D = 0$ and $r_{Ddh} = 0.005$)....37
2.4 Dimensionless pressure vs. log of dimensionless time ($x_D = 0$ and $r_{Ddh} = 0.005$)....38
2.5 Comparison of drainhole solution and cinco solution for a 75° slanted wellbore....39
2.6 Comparison of short time approximation to general drainhole solution ($x_D = 0$ and $r_{Ddh} = 0.005$)....40
2.7 Comparison of short time approximation to general drainhole solution ($x_D = 0$ and $r_{Ddh} = 0.005$) - p_{wD} vs. log t_D....41
2.8 Physical representation of multiple drainhole system....42
2.9 Newman product representation of multiple drainhole system....43
2.10 Comparison of uniform flux vertical fracture solution to drainhole solution ($x_D = 0$ and $r_{Ddh} = 0.005$)....44
2.11 Comparison of uniform flux vertical fracture solution to drainhole solution ($x_D = 0$ and $r_{Ddh} = 0.005$) - p_{wD} vs. log t_D....45
2.12 Dimensionless wellbore pressure at t_{cD} vs. dimensionless drainhole half length....46
2.13 Comparison of pseudo skin factor to uniform flux vertical fracture pseudo skin factor - σ vs. x_D....47
2.14 Comparison of infinite conductivity vertical fracture solution to drainhole solution ($x_D = 0.732$ and $r_{Ddh} = 0.005$)....48
2.15 Uniform flux drainhole pseudo skin factor vs. dimensionless drainhole half length for various r_{Ddh}....49
2.16 Pseudo skin factor comparison between drainholes and hydraulic fractures....50
C.1 p_{wD} vs. t_D for a uniform flux drainhole in an Infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.0005$....93
C.2 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.001$....94
C.3 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.005$....95
C.4 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.01$....96
C.5 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0$ and $r_{Ddh} = 0.05$....97
C.6 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.25$ and $r_{Ddh} = 0.0005$....98
C.7 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.25$ and $r_{Ddh} = 0.005$....99
C.8 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.25$ and $r_{Ddh} = 0.05$....100
C.9 p_{wD} vs. t_D for a uniform flux drainhole in an Infinite slab reservoir for $x_D = 0.5$ and $r_{Ddh} = 0.0005$....101
C.10 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.5$ and $r_{Ddh} = 0.005$....102
C.11 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.5$ and $r_{Ddh} = 0.05$....103
C.12 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.732$ and $r_{Ddh} = 0.0005$....104
C.13 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.732$ and $r_{Ddh} = 0.005$....105

C.14 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 0.732$ and $r_{Ddh} = 0.05$ 106
C.15 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 1.0$ and $r_{Ddh} = 0.0005$ 107
C.16 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 1.0$ and $r_{Ddh} = 0.005$ 108
C.17 p_{wD} vs. t_D for a uniform flux drainhole in an infinite slab reservoir for $x_D = 1.0$ and $r_{Ddh} = 0.05$ 109

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ABSTRACT

Drainholes have been drilled in several areas of the world and there is a need to understand these drainage systems for accurate well test analysis. A drainhole pressure transient solution could also aid in the evaluation of production induced drainholes. Although pressure transient analyses have considered many reservoir systems, there has been no publication to date of pressure transient analysis for horizontal drainholes.

This study presents an analytical solution for the transient pressure response of a uniform flux horizontal drainhole in an anisotropic reservoir of finite thickness. The solution also applies for a reservoir with multiple drainholes in a vertical array. The analytical solution is developed using instantaneous source functions, Green's functions and the Newman product method. The solution shows that there are two possible types of transient pressure behavior depending on the length of the drainhole relative to the height of the reservoir. If the drainhole is short, flow is characterized by three flow periods: an initial radial flow perpendicular to the drainhole axis, a transition flow period, and a pseudo-radial flow period. If the drainhole length is long relative to the reservoir height, the initial radial flow period ends instantaneously for all practical purposes. The transient pressure behavior here is identical to that of a uniform flux vertical fracture and is characterized by early time linear flow followed by a transition period and late time pseudo-radial flow.

It is demonstrated that the pressure transient response for multiple drainholes is identical to the single drainhole solution if dimensionless variables are defined relative to the number of drainholes. Consequently, the pressure response of a uniform flux vertical fracture can also be approximated by several short drainholes. The solution for infinite conductivity drainholes is also suggested by analogy to the infinite conductivity vertical fracture solution.

Log-log type curves are presented for various drainhole radii and can be used in the conventional manner to determine reservoir characteristics including directional permeability or drainhole half length. Short and long time approximations are presented along with appropriate time limits. Finally, conditions for greater productivity than with vertical wells or hydraulic fractures are presented.

1. INTRODUCTION AND LITERATURE REVIEW

Drainholes are horizontal bores drilled from a vertical wellbore to increase production. Drainholes may also occur naturally as suggested by well test data from several Canadian wells. The purpose of this study is to present the means for analysis of these systems by determining the pressure transient response of a reservoir with horizontal drainholes.

Recently, many applications of horizontal drainholes have been attempted or suggested (Hyland, 1984; Holbert, 1981; Ddorel, 1983; Stamp, 1980; Wash, 1981; Monroe, 1980; Striegler, 1982; Giger *et al.*, 1984; Baturin *et al.*, 1979; Kovalenko, 1981; Bragin *et al.*, 1970; Astier *et al.*, 1981; Quinn and Meyer, 1981; Towson and Meyer, 1981; Butler and Stephens, 1982; Smith *et al.*, 1981; Allen, 1981; Levinson *et al.*, 1982; Luque *et al.*, 1979; Willman, 1983, 1981; Ware, 1982; Butler, 1978). This increased popularity is due mainly to more attractive economics and better drilling technology (Hyland, 1984). Applications for drainholes includes: productivity index increases, injectivity index increases, greater sweep efficiencies by line flooding from one drainhole to another, water and gas coning reduction (Stampe, 1980; Wash, 1981; Monroe, 1980; Striegler, 1982) penetration of narrowly missed target zones, intersection of naturally occurring vertical fractures and reduced wellbore damage (Hyland, 1984).

The available drainhole literature can be categorized into areas of operational feasibility, productivity increases, and EOR applications. The operational feasibility literature documents the development of flexible drill collars along with better directional drilling (Hyland, 1984; Holbert, 1981; Dorel, 1983). These technological advancements have greatly reduced the amount of risk involved in drilling horizontal drainholes. Areas of the world where horizontal bores have been drilled, with positive results include California (Stormont, 1953), Texas (Stamp, 1980; Wash, 1981; Monroe, 1980; Striegler, 1982), France (Dorel, 1983; Stamp, 1980; Wash, 1981; Monroe, 1980; Striegler, 1982; Giger *et al.*, 1984), Italy (Colamasi and delle Canne, 1963), and the USSR (Baturin *et al.*, 1979; Kovalenko, 1981; Bragin *et al.*, 1970).

The first studies on drainhole productivity using potentiometric models were presented in the mid-1950's by Perrine (1955), Roemershauser and Hawkins (1955), and Landrum and Crawford (1955). These three studies concluded that (1) drainhole length is of primary importance to productivity, (2) additional drainhole footage is more effective on a single drainhole than as additional drainholes, and (3) increases in productivity are proportional to the combined length of all drainholes in the system until a point is reached were additional benefit per added foot begins to diminish. The conclusions of these reports are explained by the drainhole pseudo skin factor presented in this study.

Publications have been presented in the early 1980's that give analytical expressions and field results for determining expected productivity increases (Giger *et al.*, 1984; Borisov, 1964; Merkulov, 1958; Giger, 1983). The studies showed that horizontal bores were most advantageous for:

- tight reservoir especially if vertical fractures are suspected
- thin beds
- thin oil columns or a small density difference between water and oil
- soft formations such as chalk that are likely to collapse

The third area of drainhole literature is EOR applications of drainholes. The primary work in this area is from Canadian production of heavy crudes (Quinn and Meyer, 1981; Towson and Meyer, 1981; Butler and Stephens, 1982; Smith *et al.*, 1981). In general, suggested or applied uses include continuous steam injection, huff and puff techniques, production of

tight chalk formations and gravity drainage of steam heated oil through parallel drainholes (Quinn and Meyer, 1981; Towson and Meyer, 1981; Butler and Stephens, 1982; Smith *et al.*, 1981; Allen, 1981; Levinson *et al.*, 1982; Luque *et al.*, 1979; Willman, 1983; Ware, 1982; Butler, 1978; Willman, 1981).

Although no published studies on the pressure transient analysis of horizontal drainholes currently exist, several studies in the pressure transient analysis literature are applicable to this study. First is the partially penetrating uniform flux fracture solution presented analytically by Raghavan *et al.* (1976). The general vertical fracture solution presented analytically for infinite conductivity and uniform flux fractures by Gringarten *et al.* (1974) will be used to compare many similarities of the horizontal drainhole pressure transient response. A third study of interest is the pressure transient response for a slanted wellbore presented by Cinco (1974). Limiting cases of these three studies approximate the drainhole case and can be used for validation of the drainhole solution.

2. DISCUSSION OF HORIZONTAL DRAINHOLE TRANSIENT PRESSURE RESPONSE

2.1. METHOD OF SOLUTION AND VALIDATION

The solution to the pressure transient response of horizontal drainholes was derived using instantaneous source and Green's functions together with the Newman product method. The combined application of these two methods for petroleum engineering problems was first presented by Gringarten and Ramey (1973). Green's Functions are used to find the adjoint problem associated with the problem to be solved. In the process of determining the adjoint problem, a solution of the integral type to the original problem is found in terms of the Green's function, which at that point is still unknown. The solution to the adjoint problem, which is often simpler, provides the required Green's function. The Green's function can then be used to solve the original problem.

A physical description of the problem addressed by this study is illustrated in Fig. 2.1. The drainhole is represented as a constant rate line source of length $2x_f$ in a reservoir of height h with impermeable upper and lower boundaries. The reservoir is infinite in the x and y directions with directional permeabilities of k_x, k_y, and k_z. The drainhole is located at height z_w above the bottom of the reservoir. The center of the drainhole is defined by x_w and y_w, the distances from the origin in the x and y directions respectively.

The equation governing flow is the diffusivity equation as derived from the continuity equation and Darcy's Law (Matthews and Russell, 1967; Hubbert, 1956):

$$\eta_x \frac{\partial^2 p(M,t)}{\partial x^2} + \eta_y \frac{\partial^2 p(M,t)}{\partial y^2} + \eta_z \frac{\partial^2 p(M,t)}{\partial z^2} - \frac{\partial p(M,t)}{\partial t} = 0 \tag{2.1}$$

where:

$$\eta_j = \frac{k_j}{\phi \mu c} \quad j = x, y, z \ \ or \ \ r$$

The assumptions implied by the diffusivity equation are: slightly compressible fluid, homogeneous and anisotropic porous medium, constant permeabilities, porosity and fluid viscosity, small pressure gradients, and negligible gravity effects.

The instantaneous point source solution is expressed by (Gringarten and Ramey, 1973):

$$\Delta p(\overline{PM},t) = \frac{q}{8\phi c(\pi\eta t)^{3/2}} \exp\left[-\frac{\overline{PM}^2}{4\eta t}\right] \tag{2.2}$$

The equation gives the pressure drop Δp from the initial pressure created at a point M at time t by an instantaneous point source P of strength q. Equation (2.2) is a solution to Eq. (2.1). Because Eq. (2.1) is a linear partial differential equation, the principle of superposition in time and space can be used to generate the pressure response for a continuous source of any shape. The general expression defining pressure drop at time t and point M due to a continuous source

is obtained by integrating the instantaneous source function with respect to time from 0 to t. Thus, the general expression for pressure drop is:

$$\Delta p(M,t) = \frac{1}{\phi c}\int_0^t q(\tau)S(M,t-\tau)d\tau \tag{2.3}$$

In Eq. (2.3) S is the instantaneous uniform flux source function for the particular source-reservoir system.

The necessary instantaneous source function for the drainhole configuration shown in Fig 2.1 can be obtained using the Newman product method (1936). Newman has shown that for certain types of initial and boundary conditions, the solution to a three dimensional heat conduction problem is equal to the product of the solution of the three one-dimensional problems. Thus, if a source-reservoir system can be represented as the intersection of three one-dimensional source-reservoir systems, then the instantaneous uniform flux source function is defined by the product of the three one-dimensional instantaneous source functions.

The derivation for many instantaneous source functions useful in pressure transient analysis has been presented previously by Gringarten and Ramey (1973). These instantaneous source functions were used to generate the necessary instantaneous source function for the drainhole-reservoir configuration. The system shown in Fig. 2.1 can be thought of as the intersection of three one-dimensional systems as shown in Fig. 2.2. The first source is a slab source infinite in the y and z directions and of thickness $2x_f$. The instantaneous source function for an infinite slab source is given (Gringarten and Ramey, 1973) as:

$$S(x,t) = \frac{1}{2}\left[erf\frac{\frac{x_f}{2}+(x-x_w)}{2\sqrt{\eta_x t}} + erf\frac{\frac{x_f}{2}-(x-x_w)}{2\sqrt{\eta_x t}}\right] \tag{2.4}$$

The second instantaneous source is that for an infinite plane source in the $x-z$ plane. The instantaneous source function for an infinite plane source is given (Gringarten and Ramey, 1973) as:

$$S(y,t) = \frac{\exp-\frac{(y-y_w)^2}{4\eta_y t}}{2\sqrt{\pi\eta_y t}} \tag{2.5}$$

The third instantaneous source function needed to generate the drainhole solution is that for an infinite plane source in a slab reservoir. This is also presented by Gringarten and Ramey (1973) as:

$$S(z,t) = \frac{1}{h}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-\frac{n^2\pi^2\eta_z t}{h^2}\right]\cos n\pi\frac{z_w}{h}\cos n\pi\frac{z}{h}\right] \tag{2.6}$$

Figure 2.2 shows that the intersection of Eqs. (2.4), (2.5), and (2.6) is the necessary configuration describing the drainhole system. By the principle of the Newman product method the instantaneous source function for the drainhole system is given as the product of the three individual source functions. The instantaneous source function for the drainhole system is shown in Eq. (2.7).

$$S(x,y,z,t) = \frac{1}{h}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-\frac{n^2\pi^2\eta_z t}{h^2}\right]\cos n\pi\frac{z_w}{h}\cos n\pi\frac{z}{h}\right]$$
$$\cdot\frac{1}{2}\left[erf\frac{\frac{x_f}{2}+(x-x_w)}{2\sqrt{\eta_x t}} + erf\frac{\frac{x_f}{2}-(x-x_w)}{2\sqrt{\eta_x t}}\right]\frac{\exp-\frac{(y-y_w)^2}{4\eta_y t}}{2\sqrt{\pi\eta_y t}} \tag{2.7}$$

Substituting Eq. (2.7) into Eq. (2.3) yields the pressure drop at any point M due to the drainhole:

$$\Delta p(x,y,z,t) = \frac{1}{\phi c}\int_0^t q(\tau)\frac{1}{h}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-\frac{n^2\pi^2\eta_z\tau}{h^2}\right]\cos n\pi\frac{z_w}{h}\cos n\pi\frac{z}{h}\right]$$
$$\cdot\frac{1}{2}\left[erf\frac{\frac{x_f}{2}+(x-x_w)}{2\sqrt{\eta_x\tau}} + erf\frac{\frac{x_f}{2}-(x-x_w)}{2\sqrt{\eta_x\tau}}\right]\frac{\exp-\frac{(y-y_w)^2}{4\eta_y\tau}}{2\sqrt{\pi\eta_y\tau}}\,d\tau \tag{2.8}$$

where

$$q_w = 2x_f\,q$$

Total flowrate, q_w, is assumed constant and the flowrate per unit length, $q(\tau)$, can be taken out of the integral.

The relation between Δp and p_D is given by Eq. (2.9).

$$p_D = \frac{2\pi k_y\,h\Delta p}{q_w\mu} \tag{2.9}$$

Combining Eqs. (2.3) and (2.9) yields the dimensionless pressure drop at any point in the drainhole system:

$$p_D = \frac{2\pi k_y h}{q_w\mu\phi c}\int_0^t q(\tau)S(x,y,z,t-\tau)\,d\tau \tag{2.10}$$

where $S(x, y, z, t-\tau)$ is defined by Eq. (2.7).

To facilitate the analysis of the solution to the drainhole source, Eq. (2.10) should be expressed using dimensionless variables. The solution suggests the following definitions of dimensionless variables.

$$x_D = (1 + \frac{x - x_w}{x_f})\sqrt{\frac{k_y}{k_x}} - 1 \tag{2.11}$$

$$y_D = \frac{y - y_w}{x_f} \tag{2.12}$$

$$z_D = \frac{z - z_w}{x_f}\sqrt{\frac{k_y}{k_z}} \tag{2.13}$$

$$z_{wD} = \frac{z_w}{h} \tag{2.14}$$

$$L_D = \frac{x_f}{h}\sqrt{\frac{k_z}{k_y}} \tag{2.15}$$

$$t_D = \frac{k_y t}{\mu\phi c x_f^2} \tag{2.16}$$

Substituting the definitions of x_D, y_D, z_D and t_D into Eq. (2.10) yields:

$$p_D = \frac{\pi k_y h}{\mu\phi c x_f}\int_0^{t_D}\frac{x_f^2\mu\phi c}{k_y h} \tag{2.17}$$

$$\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-\frac{n^2\pi^2\eta_z x_f^2 t'_D}{\eta_y h^2}\right]\cos n\pi\frac{z_w}{h}\cos n\pi\left[z_D\frac{x_f}{h}\sqrt{\frac{\eta_z}{\eta_y}} + \frac{z_w}{h}\right]\right]$$

$$\cdot\frac{1}{2}\left[erf\frac{x_f(1 + x_D)}{2\sqrt{t'_D x_f^2}} + erf\frac{x_f(1 - x_D)}{2\sqrt{t'_D x_f^2}}\right]$$

$$\cdot\frac{\exp\left[-\frac{y_D^2 x_f^2}{4t'_D x_f^2}\right]}{2\sqrt{\pi x_f^2 t'_D}}dt'_D$$

Substituting for the remaining dimensionless variables and simplifying yields the following general expression for the dimensionless pressure as a function of space, time and system geometry:

$$p_D(x_D, y_D, z_D, z_{wD}, L_D, t_D) = \frac{\sqrt{\pi}}{4}\int_0^{t_D}[1 + 2\sum_{n=1}^{\infty}\exp\left[-n^2\pi^2L_D^2t'_D\right]\cos n\pi z_{wD}$$

$$\cos n\pi(z_DL_D + z_{wD})]\left[erf\frac{(1+x_D)}{2\sqrt{t'_D}} + erf\frac{(1-x_D)}{2\sqrt{t'_D}}\right]\left[\frac{\exp\left[-\frac{y_D^2}{4t'_D}\right]}{\sqrt{t'_D}}\right]dt'_D \qquad (2.18)$$

Equation (2.18) is the basic solution to the drainhole problem considered in this study. The analytical solution shown in Eq. (2.18) cannot be expressed by known functions except for some limiting cases. To obtain solutions for any desired location or system configuration it was necessary to evaluate the solution using Simpson's Rule. A program was obtained from Roland Horne which was used previously by Horne and Temeng (1981) to determine pinchout locations from pressure transient analysis. The program uses Simpson's Rule to evaluate definite integrals given the instantaneous function. The program was modified to solve the definite integral of the drainhole instantaneous source function (Appendix A). Tabulated results of dimensionless pressure are shown in Appendix B for various points along the drainhole and various dimensionless drainhole lengths and radii.

As an example of the tabulated data, Figs. 2.3 and 2.4 show P_D as a function of dimensionless time for various dimensionless drainhole lengths at $x_D = z_D = 0$ and $y_D = 0.005$. Note that these figures correspond to the pressure response at the center of a drainhole having a radius r_{dh}=0.005x_f. Type curves for the tabulated results in Appendix B are given in Appendix C.

Three cases found in the literature were considered for validation of the derived solution. These are (Raghavan *et al.*, 1976; Gringarten *et al.*, Cinco-Lay, 1974):

1. Partially Penetrating Uniform Fracture
   - (Raghavan et al., 1976)
   let $h_f/x_f \rightarrow 0$

2. General Uniform Flux Fracture Solution
   - (Gringarten et al., 1974)
   let $L_D \rightarrow >10$

3. Slanted Wellbore
   - (Cinco, 1974)
   let $\theta_w \rightarrow 90^o$

The partially penetrating uniform fracture should approach the drainhole solution when the completion interval, h_f, relative to the fracture half length, x_f, approaches 0. The values of h_f/x_f presented by Raghavan were not small enough for the drainhole solution to approximate the partially penetrating uniform flux fracture.

The second study used to verify the analytical drainhole solution is the uniform flux fully penetrating vertical fracture, first solved analytically by Gringarten and Ramey. Comparison of these results are covered in Section 2.7. The analysis in that section shows that the solution to a multiple vertical array of drainholes does approach the uniform flux vertical fracture solution as the number of drainholes in the reservoir increases.

Validation was obtained from the slanted wellbore solution although solutions were only presented for deviations from vertical up to 75°. Cinco defined the variable θ_w as the well deviation from vertical and plotted p_{wD} vs. t_D for various $h_D = h/r_w$. To match with the drainhole solution, the slanted wellbore was approximated as a horizontal drainhole with the same horizontal projection as a well slanted at 75°. Trigonometry implies that θ_w is related to L_D by Eq. (2.19).

$$\tan \theta_w = \frac{L_D}{2} \tag{2.19}$$

The drainhole pressure point corresponding to the slanted wellbore pressure point is $x_D = z_D = 0$ and $y_D = r_{dh}/x_f$. Given h_D, a y_D can be determined from Eq. (2.20).

$$y_D = \frac{r_{dh}}{x_f} = \frac{r_w}{h} \cdot \frac{h}{x_f} = \frac{1}{h_D L_D} \tag{2.20}$$

Cinco defined p_{wD} as shown in Eq. (2.9) but defined dimensionless time with respect to r_w. The relation between the two dimensionless times is shown below.

$$t_D = t_{Dw} \cdot \left[\frac{r_w^2}{x_f^2}\right] \tag{2.21}$$

and from Eq. (2.20):

$$\left[\frac{r_w^2}{x_f^2}\right] = \frac{1}{(h_D L_D)^2} \tag{2.22}$$

Cinco's results for $h_D = 100$, $\theta_w = 75°$ were used to verify the drainhole solution. The conversion of these values to drainhole dimensionless definitions using Eqs. (2.19) and (2.20) yields $y_D = 0.0054$ and $L_D = 1.866$ and $t_D = 2.872 \times 10^{-5}\ t_{Dw}$. Figure 2.5 shows the results of the match. The two solutions are within 1% at all times. The error that is present is probably due to the approximation of the slanted wellbore as horizontal. The results verify the drainhole solution and suggest that small variations from the horizontal do not significantly effect the pressure transient response.

Additionally, the drainhole solution is equivalent to the pressure transient response for the partially penetrating well solution (Gringarten and Ramey. 1974; Hantush, 1957) if the x and z coordinates are switched and the reservoir height in both cases approaches infinity. This case was not considered due to the validation provided by the three cases above. The limiting cases of the published studies do validate the analytical solution presented here for the uniform flux horizontal fracture. The following sections discuss the observations and results derived from the analytical solution.

2.2. SHORT TIME APPROXIMATION

The purpose of this section is to describe the flow into a drainhole during early time. The proper short-time approximation for dimensionless pressure is derived along with the appropriate time limits. The short time approximation will be derived by approximating the instantaneous source function for each of the three component systems.

For small values of t_D the expression:

$$erf\left[\frac{x}{2\sqrt{t_D}}\right] \rightarrow \pm\ 1 \tag{2.23}$$

approaches one for positive values of x and approaches negative one for negative values of x. Thus, the instantaneous source function given by Eq. (2.4) is unity at early time. The proper time limit for this approximation is presented by Gringarten and Ramey (1973) as:

$$t \leq \frac{\delta^2}{20\eta_x} \qquad \text{for } |x| < x_f \tag{2.24}$$

where δ is defined as the minimum distance to the nearest source boundary. For the drainhole problem this minimum distance is the distance from x to x_f.

$$\delta = |x - x_f| \tag{2.25}$$

From Eq. (2.24) the short time approximation for the dimensionless instantaneous source function is given by Eqs. (2.26), (2.27), and (2.28) for points between the tips of the drainhole, on the tips and beyond the drainhole respectively.

$$S(x,t) = 1 \tag{2.26}$$

$$S(x,t) = \frac{1}{2} \tag{2.27}$$

$$S(x,t) = 0 \tag{2.28}$$

At early times there is no flow in the reservoir beyond the edges of the drainhole from Eq. (2.28). The appropriate time limit is obtained by combining Eqs. (2.24) and (2.25). This maximum time is the end of the short time flow period, t_{sD}, and is given in Eqs. (2.29) and (2.30).

$$t_{sD} \leq \frac{(1 - x_D)^2}{20} \qquad x_D \neq 1 \tag{2.29}$$

$$t_{sD} \leq \frac{1}{20} \qquad x_D = 1 \tag{2.30}$$

The instantaneous source function for an infinite plane in a slab reservoir, Eq. (2.6), can be approximated at short time by Eq. (2.31) (Gringarten and Ramey, 1973; Gringarten, 1971).

$$S(z,t) = \frac{1}{2\sqrt{\pi\eta_z t}}\exp\left[-\frac{(z-z_w)^2}{4\eta_z t}\right] \tag{2.31}$$

when

$$\max\left\{\begin{array}{c}\dfrac{\eta_z t}{(z+z_w)^2}\\ \dfrac{\eta_z t}{(z+z_w-2h)^2}\end{array}\right. \leq \frac{1}{20} \tag{2.32}$$

Substituting the definitions for dimensionless variables from Eqs. (2.13) through Eq. (2.16) into Eq. (2.31) yields the following dimensionless short time approximation of Eq. (2.6):

$$S(z_D,\, t_D) = \sqrt{\frac{k_y}{k_z}}\cdot\frac{1}{2x_f\sqrt{\pi t_D}}\exp\left[-\frac{z_D^2}{4t_D}\right] \tag{2.33}$$

when

$$t_{sD} \leq \min\left\{\begin{array}{c}\dfrac{\left[z_D + \dfrac{2}{L_D}(z_{wD}-1)\right]^2}{20}\\ \dfrac{\left[z_D + 2\dfrac{z_{wD}}{L_D}\right]^2}{20}\end{array}\right. \tag{2.34}$$

The short time approximation for the drainhole system is the product of the three short time instantaneous short time approximations, Eqs. (2.33), (2.26) and (2.5). The result is Eq. (2.35):

$$S(x_D,y_D,z_D,t_D) = \sqrt{\frac{k_y}{k_z}}\frac{1}{2x_f\sqrt{\pi t_D}}\exp\left[-\frac{z_D^2}{4t_D}\right]\;1$$

$$\frac{1}{2x_f\sqrt{\pi t_D}}\exp\left[-\frac{y_D^2}{4t_D}\right] \tag{2.35}$$

Substituting Eq.(2.35) into Eq. (2.10) yields:

$$p_D(y_D,z_D,t_D) = \frac{h}{4x_f}\sqrt{\frac{k_y}{k_z}}\int_0^{t_D}\frac{\exp\left[-\dfrac{z_D^2+y_D^2}{4t'_D}\right]}{t'_D}dt'_D \tag{2.36}$$

Equation (2.36) can be expressed in terms of the exponential integral as shown in Eq. (2.37).

$$p_D = -\frac{1}{4L_D} Ei\left[-\frac{z_D^2 + y_D^2}{4t_D}\right] \tag{2.37}$$

The form of the short time approximation is similar to the expression for radial flow when $x_D^2 + y_D^2$ is replaced by r_D^2 (Earlougher, 1977). That dimensionless pressure can be expressed as a function of time and radius from the source suggests that flow toward a drainhole at early times is radial. The end of this radial flow period is given by Eqs. (2.29) and (2.34).

The exponential integral can be approximated by a natural log expression when the argument of the exponential integral is less than 0.0025 (Earlougher, 1977).

$$-Ei(-x) = \ln\left[\frac{1}{x}\right] - 0.5772 \tag{2.38}$$

$$\text{for } x < 0.0025$$

For the drainhole case:

$$x = \frac{z_D^2 + y_D^2}{4t_D} \tag{2.39}$$

From Eqs. (2.38) and (2.39) the short time exponential integral can be represented within 1% using the natural log function as shown in Eq. (2.40a). This natural log function is applicable if t_D is adequately large as defined by Eq. (2.41).

$$p_D = \frac{1}{4L_D}\left[\ln\frac{t_D}{z_D^2 + y_D^2} + 0.80907\right] \tag{2.40a}$$

or

$$p_D = \frac{0.5756}{L_D}\left[\log\frac{t_D}{z_D^2 + y_D^2} + 0.351375\right] \tag{2.40b}$$

when

$$t_D > 100(z_D^2 + y_D^2) \tag{2.41}$$

Combining Eqs. (2.29), (2.34) and (2.41) defines the conditions that must be present for a plot of short time dimensionless pressure drop against the log of dimensionless time to be a straight line:

$$100(z_D^2 + y_D^2) < \min \begin{cases} \dfrac{(1 - x_D)^2}{20} \\ \dfrac{\left[z_D + 2\dfrac{z_{wD}}{L_D}\right]^2}{20} \\ \dfrac{\left[z_D + \dfrac{2}{L_D}(z_{wD} - 1)\right]^2}{20} \end{cases} \tag{2.42}$$

If Eq. (2.42) is satisfied, a semilog straight line will begin at a t_D defined by Eq. (2.41) and end at a t_D defined by the minimum of Eqs. (2.29) and (2.34). Note that the above conditions define when the semilog straight line occurs within 1%, but if Eq. (2.42) is almost satisfied than the short time approximation will appear nearly straight for practical purposes.

Figures 2.6 and 2.7 compare the short time approximation given by Eq. (2.37) to the dimensionless pressure drop shown in Figs. 2.1 and 2.2. The figures show that the short time approximations are accurate for the defined time limits.

Two observations can be made from Figs. 2.6, 2.7 and Eq. (2.40b). First, the short time approximation has a slope of $0.5756/L_D$ when plotted on semilog graph paper. The significance of this short time slope is that the drainhole half length can be determined if skin and storage effects become negligible before the end of the short time flow period. The second observation is that initial radial flow ends quickly if the dimensionless fracture length is sufficiently large as defined by Eq. (2.34).

The solution obtained in this study is for a drainhole of uniform flux represented by a line source. Drainholes that have been drilled and cased will most likely be infinite-conductivity acting. Pressure along an infinite conductivity source is by definition uniform. Since the short time approximation is not a function of x_D, the pressure is uniform along the drainhole and the uniform flux short time approximation is also the short time solution for the infinite conductivity drainhole.

It was stated previously that the short time approximation in Eq. (2.37) is not accurate even at reasonably small times if L_D is large. Figure 2.6 shows that for such cases the early time log-log plot of P_D vs t_D is a straight line of slope 1/2. Such behavior indicates that early flow is linear for large L_D. A further comparison of the drainhole solution to vertical fractures is presented in Section 2.7.

2.3. LONG TIME APPROXIMATION

The purpose of this section is to show that after a period of time flow, into a drainhole is pseudoradial. The long time approximation for the dimensionless pressure response is presented and the beginning of the pseudoradial flow period is defined.

The long time behavior of the pressure transient response due to a uniform flux drainhole can be determined by referring to the instantaneous source functions for each of the three component systems used to generate the problem, Eqs. (2.4), (2.5), and (2.6). The instantaneous source function for an infinite plane source in an infinite slab reservoir, Eq. (2.6), can be approximated (Gringarten and Ramey, 1973) within 1% by $1/h$ in Eq. (2.43).

$$S(z,t) = \frac{1}{h}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-\frac{n^2\pi^2\eta_z t}{h^2}\right]\cos n\pi\frac{z_w}{h}\cos n\pi\frac{z}{h}\right] \rightarrow \frac{1}{h} \tag{2.43}$$

when

$$t \geq \frac{5h^2}{\pi^2\eta_z} \tag{2.44a}$$

or

$$t_D \geq \frac{5}{\pi^2 L_D^2} \tag{2.44b}$$

The instantaneous source function for an infinite plane source, Eq. (2.5), can be approximated by expanding the exponential term (Handbook of Mathematical Functions, 1964) as in Eq. (2.45):

$$S(y,t) = \frac{\exp-\dfrac{(y-y_w)^2}{4\eta_y t}}{2\sqrt{\pi\eta_y t}} = \frac{1}{2x_f\sqrt{\pi t_D}}\left[1 - \frac{y_D^2}{4t_D} + \frac{y_D^2}{32t_D^2} + O\left[\frac{1}{t_D^3}\right]\right] \tag{2.45}$$

The left hand side of Eq. (2.45) can be approximated by the first term in the expansion when:

$$\frac{1}{2x_f\sqrt{\pi t_D}} \geq \frac{100y_D^2}{4t_D \cdot 2x_f\sqrt{\pi t_D}} \tag{2.46}$$

or:

$$t_D \geq 25y_D^2 \tag{2.47}$$

The third instantaneous source function, Eq. (2.4), can be approximated by expansion of the error function (Abramowitz and Stegun, 1964).

$$erf\left[\frac{\frac{1}{2} + x_D}{2\sqrt{t_D}}\right] = \frac{2}{\sqrt{\pi}}\sum_{n=0}^{\infty}\frac{(-1)^n\left[\dfrac{\frac{1}{2} + x_D}{2\sqrt{t_D}}\right]^{2n+1}}{n!(2n+1)} \tag{2.48}$$

$$= \frac{\frac{1}{2} + x_D}{\sqrt{\pi t_D}} - \frac{(\frac{1}{2} + x_D)^3}{12\sqrt{\pi t_D^3}} + O\left[\frac{1}{t_D^{5/2}}\right]$$

The first term is an accurate expression of the error function within 1% when:

$$\frac{\frac{1}{2} + x_D}{\sqrt{\pi t_D}} \geq \frac{100(\frac{1}{2} + x_D)^3}{12\sqrt{\pi t_D^3}} \tag{2.49}$$

or

$$t_D \geq \frac{25}{3}\left[\frac{1}{2} + x_D\right]^2 \tag{2.50}$$

Similarly the second error function is approximated by one percent as:

$$erf\left[\frac{\frac{1}{2} - x_D}{2\sqrt{t_D}}\right] = \frac{\frac{1}{2} - x_D}{\sqrt{\pi t_D}} \tag{2.51}$$

when

$$t_D \geq \frac{25}{3}\left[\frac{1}{2} - x_D\right]^2 \tag{2.52}$$

The instantaneous source function for a drainhole is determined by substituting Eqs. (2.43), (2.45), (2.48), and (2.51) into the general expression for the drainhole instantaneous source function, Eq. (2.7):

$$S(x_D, y_D, z_D, z_{wD}, L_D, t_D) = \frac{1}{h} \cdot \frac{1}{2x_f\sqrt{\pi t_D}} \cdot \frac{1}{2}\left[\frac{\frac{1}{2} + x_D}{\sqrt{\pi t_D}} + \frac{\frac{1}{2} - x_D}{\sqrt{\pi t_D}}\right] \tag{2.53}$$

The dimensionless pressure long time approximation is then found by combining Eq. (2.53) with Eq. (2.10) to obtain:

$$\begin{aligned} p_D(x_D, y_D, z_D, z_{wD}, L_D, t_D) = \frac{\sqrt{\pi}}{4}\int_0^{t_{lD}} & [1 + 2\sum_{n=1}^{\infty}\exp\left[-n^2\pi^2 L_D^2 t'_D\right]\cos n\pi z_{wD} \\ & \cdot\cos n\pi(z_D L_D + z_{wD})]\left[erf\frac{(1 + x_D)}{2\sqrt{t'_D}} + erf\frac{(1 - x_D)}{2\sqrt{t'_D}}\right]\left[\frac{\exp\left[-\frac{y_D^2}{4t'_D}\right]}{\sqrt{t'_D}}\right]dt'_D \\ & + \pi h x_f\int_{t_{lD}}^{t_D}\frac{1}{2hx_f\pi t_D}dt_D \end{aligned} \tag{2.54}$$

The above equation holds when the conditions prescribed by Eqs. (2.44b), (2.47), (2.50) and (2.52) are satisfied, namely when t_D is greater than the beginning of the pseudoradial flow period, t_{lD}, as defined by:

$$t_{lD} = \max\begin{cases} \frac{5}{\pi^2 L_D^2} \\ 25y_D^2 \\ \frac{25}{3}\left[\frac{1}{2} + x_D\right]^2 \\ \frac{25}{3}\left[\frac{1}{2} - x_D\right]^2 \end{cases} \tag{2.55}$$

Letting p_{lD} equal the first term in Eq. (2.54) then the long term approximation can be simplified to:

$$p_D = p_{lD} + \frac{1}{2} \ln \frac{t_D}{t_{lD}} \tag{2.56}$$

That late time pressure drop is a constant plus 1/2 $\ln t_D$ indicates that flow is pseudoradial after t_{lD} is reached. This is expected since all wellbore configurations in an infinite reservoir system should eventually reach a pseudoradial flow period indicated by a 1.1515 semilog slope. Equation (2.55) can be used with type curve matching to determine if the appropriate semilog straight line was reached during a well test.

2.4. WELLBORE PRESSURE

The purpose of this section will be to present type curves for the pressure transient response of a well with a uniform flux horizontal drainhole producing at constant rate. To evaluate the typical wellbore response, the wellbore location must first be defined. In this study the pressure transient response at the longitudinal center of the drainhole was considered as the location of the wellbore (Fig. 2.1), p_{wD} at $x_D = 0$. To determine the effect of drainhole radius , r_{dh}, the pressure point was evaluated a distance r_{dh} away from the line source. The validity of this procedure can be drawn from analogy to the vertical well solution. The line source approximation for vertical wells has been shown (Earlougher, 1977) to approximate a finite radius wellbore within 1% for values of t_D/r_D^2 greater than 25.0 or for all reasonable times if r_D is greater than 20. Representation of a finite drainhole radius by a line source is acceptable, by analogy, if:

$$\sqrt{y_D^2 + z_D^2}\,\frac{x_f}{r_{dh}} \geq 20.0 \tag{2.57}$$

or

$$\frac{t_D}{y_D^2 + z_D^2} \geq 25.0 \tag{2.58}$$

The above criteria are satisfied over practical ranges of drainhole radii and time.

Cinco (1974) suggested that the wellbore pressure for a slanted well be evaluated at a point on the circumference of the wellbore radius corresponding to the average pressure around that given circumference. His study suggested that for the drainhole case, the pressure drop should be evaluated a points of $z_D = 0$ and $y_D = r_{dh}/x_f$. Evaluation of dimensionless pressure along the circumference of the wellbore defined by $r_{dh} = \sqrt{(y - y_w)^2 + (z - z_w)^2}$ for several values of t_D showed that the point $(0, r_{dh}/xf, 0)$ is a valid location for defining average wellbore pressure since p_D along the circumference never varied more than 0.005.

Log-log type curves of dimensionless wellbore pressure ($x_D = z_D = 0$ and $y_D = r_{dh}/x_f$), for various dimensionless drainhole lengths, L_D, are presented in Appendix B for various dimensionless drainhole radii and locations. The log-log type curves for theses results are provided in Appendix C.

The analysis of well test data for horizontal drainholes can be conducted with the type curves using conventional type curve matching procedures presented in the literature (Ramey, 1976). The definitions of dimensionless variables given in the first section suggest that the permeabilities in all

in the first section suggest that the permeabilities in all three directions can be evaluated through the match point technique if all the other variables in the respective dimensionless group are known. The L_D match point yields the ratio of k_z to k_y. The p_D match point yields k_y and the x_D match point yields k_y/kx. Thus, it is possible to determine the permeability in all three directions. The $\phi\mu c$ constant can be determined by the time match similar to conventional type curve matching. Note that k_z can not be determined from well test data if $L_D > 10$ because flow in the vertical direction is no longer significant enough to influence pressure drop. The pressure response lines converge to a single envelope of curves for $L_D > 10$.

The well test data can also be used with semilog straight line techniques to determine the skin factor for the well (Ramey, 1976). The conditions for the start of the long time flow approximations define the beginning of the appropriate semilog straight line. The magnitude of drainhole damage can be determined by subtracting the pseudo skin factor, to be presented in Section 2.8, from the total skin factor. The result yields the mechanical skin factor which is positive for a damaged drainhole and negative for a stimulated drainhole.

2.5. EXTENSION TO MULTIPLE DRAINHOLES

The previous sections have described the solution for a single drainhole in an infinite anisotropic reservoir of height h. One hypothesis for the pressure transient response of some wells is that multiple drainholes may be induced by production of reservoir fluids (White, 1982). Multiple drainholes have also been drilled in some reservoirs (Hyland, 1984; Stormont, 1953). The pressure transient solution for a multiple drainhole system will be investigated in this section.

A physical representation of the multiple drainhole system is given in Fig. 2.8. The system is identical to the single drainhole system in all respects except that several drainholes are present in a vertical array. In the figure, the number of drainholes is three although the solution is completely general for any number of m drainholes.

The general solution for a single drainhole was obtained by multipling together the instantaneous source functions for each of the three component systems:

$$S(x_D, y_D, z_D, t_D) = S(x_D, t_D) \cdot S(y_D, t_D) \cdot S(z_D, t_D) \tag{2.7}$$

Note that the instantaneous source function in the z-direction was obtained by the method of images as described by Matthews *et al* (1954). The configuration of the drainhole system in Fig. 2.1 is represented mathematically as an infinite array of drainholes stacked vertically a distance h apart as shown on the left side of Fig. 2.9. The solid lines between the drainholes are generate by the infinite array of drainholes and represent no flow boundaries in the reservoir. A no flow boundary exists between each drainhole and the choice of which two to represent the upper and lower reservoir boundaries defines the number of drainholes in the reservoir.

The solution for the multiple drainhole case can be considered as m identical solutions to the single drainhole case stacked on top of each other where m is the number of drainholes. The multiple drainhole solution requires only redefinition of the dimensionless variables with respect to the number of drainholes in the reservoir.

The dimensionless pressure drop can be defined in terms of the total height of the reservoir, h, and the total flowrate from all the drainholes, q_w.

$$p_D \equiv \frac{2\pi k_y h \Delta p}{q_w \mu} \tag{2.59}$$

where

$$h = z_e\, m \tag{2.60}$$

$$q_w = 2\, x_f\, m\, q \tag{2.61}$$

Substituting Eqs. (2.60) and (2.61) into Eq. (2.59) shows that the m's cancel and the dimensionless pressure, as defined above, is equal to the definition for dimensionless pressure in Eq. (2.9).

The pressure transient response is given by replacing h with z_e in Eq.(2.18):

$$\Delta p(x, y, z, t) = \frac{1}{\phi c}\int_0^t q(\tau)\frac{1}{z_e}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-\frac{n^2\pi^2\eta_z\tau}{z_e^2}\right]\cos n\pi\frac{z_w}{z_e}\cos n\pi\frac{z}{z_e}\right] \tag{2.62}$$

$$\frac{1}{2}\left[erf\frac{\frac{x_f}{2} + (x - x_w)}{2\sqrt{\eta_x\tau}} + erf\frac{\frac{x_f}{2} - (x - x_w)}{2\sqrt{\eta_x\tau}}\right]\frac{\exp-\frac{(y-y_w)^2}{4\eta_y\tau}}{2\sqrt{\pi\eta_y\tau}}\, d\tau$$

Substituting Eqs.(2.59) - (2.61) into Eq.(2.62) yields:

$$p_D = \frac{2\pi k_y h m}{m\mu\phi c x_f h}\int_0^t\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-\frac{n^2\pi^2\eta_z\tau m^2}{h^2}\right]\cos n\pi\frac{z_w m}{h}\cos n\pi\frac{zm}{h}\right]$$

$$\cdot\frac{1}{2}\left[erf\frac{\frac{x_f}{2} + (x - x_w)}{2\sqrt{\eta_x\tau}} + erf\frac{\frac{x_f}{2} - (x - x_w)}{2\sqrt{\eta_x\tau}}\right]\frac{\exp-\frac{(y-y_w)^2}{4\eta_y\tau}}{2\sqrt{\pi\eta_y\tau}}\, d\tau \tag{2.63}$$

Equation (2.63) suggests that the dimensionless variables x_D, y_D, z_D, and t_D should still be defined as in Section 2.1. Thus:

$$p_D = \frac{\sqrt{\pi}}{4}\int_0^{t_D}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-\frac{n^2\pi^2\eta_z t'_D x_f^2 m^2}{\eta_y h^2}\right]\cos n\pi\frac{z_w m}{h}\cos n\pi\frac{zm}{h}\right] \tag{2.64}$$

$$\left[erf\frac{1 + x_D}{2\sqrt{t'_D}} + erf\frac{1 - x_D}{2\sqrt{t'}}\right]\left[\frac{\exp\left[-\frac{y_D^2}{4t'_D}\right]}{\sqrt{t'_D}}\right] dt'_D$$

If L_D and z_{wD} are defined by Eqs. (2.65) and (2.66) then the dimensionless pressure for any point in the reservoir is given by Eq. (2.67).

$$L_D \equiv \frac{mx_f}{h}\sqrt{\frac{k_z}{k_y}} \tag{2.65}$$

$$z_{wD} \equiv \frac{z_w m}{h} \tag{2.66}$$

$$p_D(x_D, y_D, z_D, z_{wD}, L_D, t_D) = \frac{\sqrt{\pi}}{4}\int_0^{t_D}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-n^2\pi^2 L_D^2 t'_D\right]\cos n\pi z_{wD}\right. \tag{2.67}$$

$$\left.\cdot\cos n\pi(z_D L_D + z_{wD})\right]\left[erf\frac{(1+x_D)}{2\sqrt{t'_D}} + erf\frac{(1-x_D)}{2\sqrt{t'_D}}\right]\left[\frac{\exp\left[-\frac{y_D^2}{4t'_D}\right]}{\sqrt{t'_D}}\right]dt'_D$$

Note that Eq. (2.67) is exactly the same equation as the single drainhole solution, Eq. (2.18). Also note that the definitions for dimensionless variables are also equivalent to the single drainhole case when $m = 1$. The only adaptation necessary is to use the definitions of L_D and z_{wD} from Eqs. (2.66) and (2.67).

Because the solution is the same as for a single drainhole, all the results presented in the previous sections are also valid for the multiple drainhole solution. The results of this section suggest that L_D is not only increased by longer drainholes but also by the addition of more drainholes. The implications of this observation are discussed in the next section.

2.6. UNIFORM FLUX VERTICAL FRACTURE SIMILARITY

As the number of drainholes in a vertical array in a reservoir increase, the pressure transient solution to the problem should approach the solution for the uniform flux vertical fracture case. An infinite number of drainholes of length x_f would exactly represent the flow into a vertical fracture of length x_f. The previous section showed that increasing the number of drainholes is equivalent to increasing L_D. Since L_D is also a function of drainhole length, the uniform vertical fracture solution is approached if the dimensionless drainhole length is large. This section will explain intuitively and show mathematically why the drainhole solution does represent the vertical fracture solution for large values of L_D.

It was noted in Section 2.2 that early flow into the drainhole is linear toward the drainhole if the dimensionless length of the drainhole is greater than 5 to 10. An equivalent statement for this case is that the height of the reservoir relative to the drainhole length is too small for much fluid to flow into the drainhole from above or below so flow appears linear. This behavior at short time is similar to a vertical fracture where flow is also linear in the y-direction. Intuitively, one would expect that later flow periods also represent the vertical fracture case.

The uniform flux vertical fracture solution was first solved analytically by Gringarten and Ramey (1974). It is compared graphically to the uniform flux drainhole solution in Figs. 2.10 and 2.11. Note that the fracture solution appears similar to the drainhole solution for large L_D. The solutions past very early time are identical to the vertical fracture case for $L_D > 10$.

The reason for the similarity can be seen mathematically by referring to the derivation of the drainhole solution. The drainhole system was represented by the Newman product method by multiplying three component systems together. The three component systems were (1) an infinite plane source in the x and z directions, (2) an infinite slab source in the y and z directions, and (3) an infinite plane source in an infinite slab reservoir in the x and y direction. The basic form of the solution was given by Eq. (2.18).

$$p_D(x_D, y_D, z_D, z_{wD}, L_D, t_D) = \frac{\sqrt{\pi}}{4}\int_0^{t_D}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-n^2\pi^2L_D^2t'_D\right]\cos n\pi z_{wD}\right. \tag{2.18}$$

$$\left.\cos n\pi(z_DL_D + z_{wD})\right]\left[erf\frac{(1+x_D)}{2\sqrt{t'_D}} + erf\frac{(1-x_D)}{2\sqrt{t'_D}}\right]\left[\frac{\exp\left[-\frac{y_D^2}{4t'_D}\right]}{\sqrt{t'_D}}\right]dt'_D$$

The uniform vertical flux solution can be represented as a product of two component systems, (1) an infinite plane source in the x and z directions and (2) an infinite slab source in the y and z directions (Gringarten *et al.*, 1974):

$$p_D(x_D, y_D, z_D, z_{wD}, L_D, t_D) = \frac{\sqrt{\pi}}{4}\int_0^{t_D}\left[erf\frac{(1+x_D)}{2\sqrt{t'_D}} + erf\frac{(1-x_D)}{2\sqrt{t'_D}}\right] \tag{2.68}$$

$$\left[\frac{\exp\left[-\frac{y_D^2}{4t'_D}\right]}{\sqrt{t'_D}}\right]dt'_D$$

In Eq. (2.68) the two instantaneous source functions are identical to the last two shown in Eq. (2.18). This observation indicates that the two solutions will be identical if the Z function term in Eq. (2.18) is equal to 1.0 for the drainhole case. The conditions for equivalence of the two solutions can be defined by evaluating the behavior of this Z function term.

The Z function term is equal to 1.0 within 1% when the summation term is less than 0.01:

$$2\sum_{n=1}^{\infty}\exp(-n^2\pi^2L_D^2t_D) \le 0.01 \tag{2.69}$$

For large values of L_D the summation term can be represented within 1% by its first term only.

$$\sum_{n=1}^{\infty} \exp\left(-n^2\pi^2 L_D^2 t_D\right) = \exp\left(-\pi^2 L_D^2 t_D\right) \tag{2.70}$$

when

$$\exp\left(-\pi^2 L_D^2 t_D\right) \geq 100\exp\left(-4\pi^2 L_D^2 t_D\right) \tag{2.71}$$

or

$$L_D \geq \frac{0.3943}{\sqrt{t_D}} \tag{2.72}$$

Substituting Eq. (2.70) into Eq. (2.69):

$$2\exp\left(-\pi^2 L_D^2 t_D\right) \leq 0.01 \tag{2.73}$$

or

$$L_D \geq \frac{0.7327}{\sqrt{t_D}} \tag{2.74}$$

Therefore the Z function term is equal to 1.0 after a critical t_D defined as t_{cD}:

$$t_{cD} \geq \frac{0.7327^2}{L_D^2} \tag{2.75}$$

The general expression for dimensionless pressure drop, Eq. (2.18) can then be written as:

$$p_D = \frac{\sqrt{\pi}}{4}\int_0^{t_{cD}} Z(z_D, t'_D) \cdot Y(y_D, t'_D) \cdot X(x_D, t'_D)\, dt'_D \tag{2.76}$$

$$+ \frac{\sqrt{\pi}}{4}\int_{t_{cD}}^{t_D} Y(y_D, t'_D) \cdot X(x_D, t'_D)\, dt'_D$$

Note that the second integral is equal to the general expression for pressure drop due to a uniform flux fracture. Therefore, the drainhole solution is equivalent to the uniform flux fracture solution if the first integral is negligible.

The first integral can be represented by the short time approximation given by Eq. (2.37).

$$p_{cD} = -\frac{1}{4L_D} Ei\left[-\frac{z_D^2 + y_D^2}{4t_{cD}}\right] \tag{2.77}$$

if

$$t_{sD} \leq \frac{(1 - x_D)^2}{20} \tag{2.78}$$

Comparing Eq. (2.78) to Eq. (2.75) shows that the short time approximation may not apply for t_D between t_{sD} and t_{cD}. However, Fig. 2.6 shows that when the short time approximation does not hold, it overestimates p_D.

$$p_{cD} = -\frac{1}{4L_D} Ei\left[-\frac{z_D^2+y_D^2}{4t_{cD}}\right] > p_D(x_D, y_D, z_D, t_{cD}, L_D, z_{wD}) \tag{2.79}$$

If the short time approximation at t_{cD} is negligible then p_D at t_{cD} is also negligible by Eq. (2.79). A plot of the short time dimensionless pressure at $t_D = t_{cD}$ as a function of L_D is shown in Fig. 2.12. The dimensionless pressure is less than 0.01 for L_D less than 10.0. Thus the first term in Eq. (2.76) is negligible for L_D greater than 10.0 and Eq. (2.76) becomes:

$$p_D(x_D, y_D, z_D, z_{wD}, L_D, t_D) = \frac{\sqrt{\pi}}{4}\int_0^{t_D}\left[erf\frac{(1 + x_D)}{2\sqrt{t'_D}} + erf\frac{(1 - x_D)}{2\sqrt{t'_D}}\right] \cdot \left[\frac{\exp\left[-\frac{y_D^2}{4t'_D}\right]}{\sqrt{t'_D}}\right] dt'_D \tag{2.80}$$

when

$$\frac{m\, x_f}{h}\sqrt{\frac{k_z}{k_y}} > 10 \tag{2.81}$$

Eq. (2.80) is identical to the general expression for the uniform flux vertical fracture as presented by Gringarten and Ramey (1974). It is concluded that the pressure transient response due to a drainhole of dimensionless length greater than 10.0 is identical for all times to the pressure transient response of a uniform vertical flux fracture of the same length. Section 2.4 has shown that L_D is also the effective dimensionless drainhole length for a vertical array of drainholes. Hence, if the total of the dimensionless drainhole lengths for all drainholes in the reservoir is greater than 10.0, the pressure transient response is identical to the pressure transient response of a uniform flux vertical fracture.

Since the drainhole solution is identical to Gringarten and Ramey's solution for the vertical fracture, several special solutions can be directly inferred from that study. The expression for dimensionless pressure along the plane of a vertical fracture ($y_D = 0$) is also the dimensionless pressure drop along the drainhole and is given by Eq. (2.82):

$$p_D(x_D, z_D, z_{wD}, L_D, t_D) = \frac{\sqrt{\pi}}{4}\int_0^{t_D}\frac{1}{\sqrt{t'_D}}\left[erf\,\frac{(1 + x_D)}{2\sqrt{t'_D}} + erf\,\frac{(1 - x_D)}{2\sqrt{t'_D}}\right] dt'_D \tag{2.82}$$

From the vertical fracture solution, the dimensionless pressure drop at $y_D = 0$ and $z_D = 0$ for a drainhole is given as:

$$p_D(x_D, t_D) = \frac{1}{2}(\pi t_D)^{\frac{1}{2}}\left[erf\,\frac{(1+x_D)}{2\sqrt{t_D}} + erf\,\frac{(1-x_D)}{2\sqrt{t_D}}\right] \tag{2.83}$$

$$-\frac{(1-x_D)}{4}\,Ei\left[-\frac{(1-x_D)^2}{4t_D}\right] - \frac{(1+x_D)}{4}\,Ei\left[-\frac{(1+x_D)^2}{4t_D}\right]$$

The short time approximation for large L_D can be defined directly from the vertical fracture solution as:

$$p_D(x_D, y_D, t_D) = \sqrt{\pi t_D}\exp\left[-\frac{y_D^2}{4t_D}\right] - |y_D| erfc\left[\frac{|y_D|}{2\sqrt{t_D}}\right] \tag{2.84}$$

and along the drainhole ($y_D = 0$) :

$$p_D(x_D, t_D) = \sqrt{\pi t_D} \tag{2.85}$$

To simplify the long time approximation, Gringarten and Ramey defined a pseudo skin function, $\sigma(x_D, y_D)$, for a vertical fracture from the equation:

$$p_D(x_D, y_D, t_D) = \frac{1}{2}(\ln t_D + 2.80907) + \sigma(x_D, y_D) \tag{2.86}$$

When defined by Eq. (2.86), the pseudo skin function for the drainhole is obtained directly from the vertical fracture solution as:

$$\sigma(x_D, y_D) = \frac{1}{4}(x_D - 1)\ln\,[y_D^2 + (x_D - 1)^2] \tag{2.87}$$

$$-(x_D + 1)\ln\,[y_D^2 + (x_D + 1)^2] - 2y_D arctan\frac{2y_D}{r_D^2 - 1}$$

Along the length of the drainhole ($y_D = 0$), Eq. (2.87) simplifies to:

$$\sigma(x_D) = -\frac{1}{2}[(1 - x_D)\ln|1 - x_D| + (1 + x_D)\ln|1 + x_D|] \tag{2.88}$$

The pseudo skin function, σ, was determined using the general drainhole solution and plotted for various values of L_D along with Eq. (2.88). The results in Fig. 2.13 show that the vertical fracture pseudo skin factor provides further validation for the drainhole solution presented in this study. In general, the flow behavior for a drainhole system of $L_D > 10$ is equivalent to that of a uniform flux vertical fracture.

2.7. EXTENSION TO INFINITE CONDUCTIVITY DRAINHOLES

The similarity between the drainhole and the vertical fracture cases suggests that other properties of the vertical fracture solution may be applicable to the drainhole solution. It is the objective in this section to investigate the solution for infinite conductivity horizontal drainholes by considering the solution for the infinite conductivity vertical fracture. This case is most applicable for drilled and cased drainholes, where the resistance to flow in the drainholes is negligible.

The infinite conductivity solution for the fully penetrating vertical fracture has been solved by several methods in the literature (Russell and Truit, 1964; van Everdingen and Meyer, 1971). The analytical solution was first presented by Gringarten *et al.* (1974). In that study, the infinite conductivity fracture was represented by dividing the fracture into 100 segments and maintaining equal pressure at the center of all the segments. This would represent a vertical fracture with no resistance to flow inside the fracture.

It is beyond the scope of this study to develop such a solution for the drainhole problem; however, the work by Gringarten and Ramey showed that the pressure drop along the infinite conductivity vertical fracture can be obtained from the uniform flux solution by calculating P_D for $y_D = 0.0$ and $x_D = 0.732$. The result was given by Eq. (2.89) (Gringarten *et al.*, 1974).

$$p_{wD}(t_D) = \frac{1}{2}\sqrt{\pi t_D}\left[erf\left[\frac{0.134}{\sqrt{t_D}}\right] + erf\left(\frac{0.866}{\sqrt{t_D}}\right)\right] - 0.067Ei\left[-\frac{0.018}{t_D}\right] - 0.433Ei\left[-\frac{0.759}{t_D}\right] \tag{2.89}$$

This equation was correct for all points along the infinite conductivity vertical fracture for late and early times and was assumed correct for all time. A similar result ($x_D = 0.75$) has been obtained by Muskat (1946) for a well with partial penetration at steady state.

Eq. (2.89) was derived by Gringarten and Ramey directly from the uniform vertical fracture solution, Eq. (2.68). Consequently, Eq. (2.89) also holds for infinite conductivity drainholes with $L_D > 10.0$.

Fig. 2.14 shows a plot of the infinite conductivity fracture solution and the drainhole solution for various L_D. The dimensionless pressure at $x_D = 0.732$ for $L_D > 10$ does match the infinite conductivity vertical fracture solution. This property is a direct result of the equality of the uniform flux long drainhole solution and the uniform flux vertical fracture solution. It is suggested by analogy that the uniform flux drainhole solution evaluated at $x_D = 0.732$ also represents the dimensionless pressure along an infinite conductivity drainholes for L_D less than 10. This speculation is one of several topics recommended for further work.

2.8. DRAINHOLE PSEUDO SKIN FACTOR

In this section a pseudo skin function for drainholes is introduced. It is shown that for late time the pseudo skin function becomes constant and the pressure transient response can be expressed as the vertical well line source solution plus a constant defined as the pseudo skin factor. Finally, the pseudo skin factor for drainholes is used to compare drainhole productivity to that of vertical wells and hydraulic fractures.

A pseudo skin function can be defined such that the function plus the dimensionless pressure due to a line source well describes the dimensionless pressure at any point in the system. The dimensionless pressure drop due to a uniform flux horizontal drainhole can then be expressed mathematically as:

$$p_D = p_D(r_D, t_D) + \sigma(x_D, y_D, z_D, z_{wD}, L_D, t_D) \tag{2.90}$$

where $\sigma(x_D, y_D, z_D, z_{wD}, L_D, t_D)$ is the pseudo skin function and $p_D(r_D, t_D)$ is the line source solution for a single vertical well. The pseudo skin function for the drainhole case can be derived from the general expression for dimensionless pressure given in Eq. (2.18). The equation for the line source solution is given by Eq. (2.91) (Earlougher, 1977).

$$p_D(r_D, t_D) = -\frac{1}{2}Ei\left[-\frac{x_D^2 + y_D^2}{4t_D}\right] \tag{2.91}$$

The definitions of dimensionless variables for the line source solution vary from the drainhole case and are defined by the following:

$$x_D = \frac{(x - x_w)}{r_w} \tag{2.92}$$

$$y_D = \frac{(y - y_w)}{r_w} \tag{2.93}$$

$$t_D = \frac{kt}{\phi\mu c r_w^2} \tag{2.94}$$

The above differences in definition can be ignored since the r_w terms cancel once substituted into Eq. (2.91). Thus, dimensionless variables as previously defined with respect to x_f can be used directly in Eq. (2.91).

A pseudo skin function for the drainhole case can be described by subtracting the line source solution, Eq. (2.91), from the general expression for the dimensionless pressure, Eq. (2.18), yielding:

$$\sigma(x_D, y_D, z_D, z_{wD}, L_D, t_D) = \frac{\sqrt{\pi}}{4}\int_0^{t_D}\left[1 + 2\sum_{n=1}^{\infty}\exp\left[-n^2\pi^2 L_D^2 t'_D\right]\cos n\pi z_{wD}\right. \tag{2.95}$$

$$\left[\cos n\pi(z_D L_D + z_{wD})\right]\left[erf\frac{(1 + x_D)}{2\sqrt{t'_D}} + erf\frac{(1 - x_D)}{2\sqrt{t'_D}}\right]\left[\frac{\exp\left[-\frac{y_D^2}{4t'_D}\right]}{\sqrt{t'_D}}\right]dt'_D - \left[-\frac{1}{2}Ei\left[-\frac{x_D^2+y_D^2}{4t_D}\right]\right]$$

Since the long time flow for a drainhole has been shown to be pseudoradial, it would be expected that the pseudo skin function should become constant at late time. The constant value reached by the pseudo skin function at late time has been defined by the literature (Brons

and Marting, 1961) as the pseudo skin factor, s, and is a function of space and system geometry but not time. The pseudo skin factor for a uniform flux drainhole system can be derived by analyzing the appropriate long time approximations.

During late time the line source solution can be expressed as (Earlougher, 1977):

$$p_D = \frac{1}{2}\left[\ln \frac{t_D}{x_D^2 + y_D^2} + 0.80907\right] \tag{2.96}$$

The dimensionless variables are again defined by Eqs. (2.92) through (2.94); however, the r_w terms still cancel and the dimensionless variables with respect to the drainhole half length can still be used. The long term approximation for the dimensionless pressure in Eq. (2.56) can be substituted along with Eq. (2.96) into the general expression for σ, Eq. (2.95), to obtain:

$$\sigma = p_{lD} + \frac{1}{2}\ln\frac{t_D}{t_{lD}} - \frac{1}{2}\left[\ln\frac{t_D}{x_D^2 + y_D^2} + 0.80907\right] \tag{2.97}$$

Which simplifies to the drainhole pseudo skin factor:

$$s = p_{lD} - \frac{1}{2}\ln t_{lD} + \ln\frac{r_w}{x_f} - 0.4045 \tag{2.98}$$

Where p_{lD} and t_{lD} are given by Eqs. (2.54) and (2.55).

Figure 2.15 shows the pseudo skin factor at the wellbore plotted against L_D for various dimensionless drainhole radii, r_{dh}/xf. The pseudo skin factor was obtained by evaluating Eq. (2.98) for $x_D = z_D = 0$, $z_{wD} = 0.5$, and $y_D = r_{dh}/xf$.

The condition for negative pseudo skin factors is suggested by the following observation from Fig. 2.15:

$$\left[s + \ln\frac{x_f}{r_w}\right]_{at L_D = 1/2} = \ln\frac{r_{dh}}{x_f} \tag{2.99}$$

Eq. (2.99) states that if $r_w = r_{dh}$ then the pseudo skin factor for a drainhole is 0 when $L_D = 1/2$. In general, the pseudo skin factor is negative if:

$$\frac{m\, x_f}{h}\sqrt{\frac{k_z}{k_y}} > \frac{1}{2} \tag{2.100}$$

Eq. (2.100) defines several circumstances for greater drainhole productivity than with vertical wells. In isotropic reservoirs the pseudo skin factor is negative when the drainhole is longer than the reservoir height. If k_z is large, defined by Eq. (2.100), then drainholes will be more productive than vertical wells. Such is the case for reservoirs with natural fractures. Eq. (2.100) also shows that reservoirs with thin beds would benefit more from drainholes. Field results from France as reported by Giger *et al.* (1984) support these conclusions.

The three potentiometric studies (Perrine, 1955; Roemershauser and Hawkins, 1955; Landrum and Crawford, 1955) of drainholes expressed results in terms of productivity increases. One of the principle observations from the studies was that increases in productivity are proportional to the combined length of all drainholes in the system until a point is reached were additional benefit per added foot begins to diminish (Roemershauser and Hawkins, 1955). The negative unit slope in Fig. 2.15 confirms that productivity increases are directly proportional to the combined length of the drainholes. It also shows that the benefit to productivity does gradually decrease for each added foot beyond a certain amount. The potentiometric studies also observed that increases in drainhole length were more important than drainhole radius increases (Landrum and Crawford, 1955). Figure 2.15 illustrates this observation since productivity is not a function of drainhole radius for $L_D > 10$. A third observation from the potentiometric studies was that additional drainhole length was better than increasing the number of drainholes (Perrine, 1955). Figure 2.15 shows that for $L_D>10$ the pseudo skin factor would remain the same if another drainhole of the same length was drilled. The only means for decreasing the pseudo skin factor for $L_D > 10$ is to increase the drainhole half length, x_f.

Figure 2.15 shows that for $L_D > 10$, we can write:

$$s = 1 + \ln\left[\frac{r_w}{x_f}\right] \tag{2.101}$$

This expression for the pseudo skin factor is equivalent to the pseudo skin factor for a uniform flux vertical fracture (Gringarten *et al.*, 1974). The apparent conclusion from Eq. (2.101) is that productivity increases from a drainhole will only be as great as a uniform flux vertical fracture of the same length. Figure 2.16 illustrates three exceptions to this conclusion. First, it is possible to obtain much greater drainhole half lengths (Giger *et al.*, 1984) than with vertical fractures. Second, if $k_y > k_x$ then fracture orientation is most likely in only the high permeability direction while drainholes could be oriented in the direction of low permeability for higher productivity. The orientation of a hydraulic fracture most likely occurs perpendicular to the principal axis of stress. If the reservoir contains naturally occurring fractures, hydraulic fracturing would be expected to form parallel to natural fractures and not enhance flow potential. Third, most hydraulic fractures have a finite conductivity that limits the effective wellbore radius (Cinco-Ley *et al.*,, 1976). A drilled and cased drainhole will behave with infinite conductivity and therefore have a lower pseudo skin factor than the hydraulic fracture. Since one of the above three conditions will usually be true, drainhole productivity should generally be greater than the productivity of hydraulic fractures.

3. CONCLUSIONS

The analytical solution for the transient pressure response was presented for single or multiple uniform flux drainholes in an anisotropic infinite reservoir. The analytical solution was developed using instantaneous source functions, Green's functions and the Newman product method. The solution showed that there are two possible types of transient pressure behavior depending on the value of L_D. If $L_D < 10$, flow is characterized by three flow periods: an initial radial flow perpendicular to the drainhole axis, a transition flow period, and a pseudo-radial flow period. If $L_D > 10$, the initial radial flow period ends instantaneously for all practical purposes. Flow is then characterized by early time linear flow followed by a transition period and late time pseudo-radial flow.

Short and long time approximations are also presented defining the flow behavior during the early and late flow periods. Expressions were also presented that define the beginning and end of these flow periods.

Log-log type curves are presented for various drainhole radii. Through type curve matches of p_D, t_D, L_D and x_D, permeability in three directions and $\phi\mu c$ can be determined. The conditions for the start of the long time flow approximations define the beginning of the appropriate semilog straight line. Analysis of the semilog straight line will yield a skin factor which can be used with the drainhole pseudo skin factor to determine whether a drainhole is damaged or stimulated.

For cases where $L_D > 10$, the uniform flux drainhole solution matches the uniform flux vertical fracture solution. From the definition of L_D, the similarity between drainholes and vertical fractures is directly proportional to the ratios x_f/h and $\sqrt{k_z/ky}$.

The study demonstrated that the pressure transient response for multiple drainholes is identical to the single drainhole solution if dimensionless variables are defined relative to the number of drainholes. Consequently, a drainhole system will also approximate a vertical fracture if several drainholes are present.

Evaluation of the uniform flux drainhole solution for $x_D = 0.732$ showed that the drainhole pressure transient response for $L_D > 10$ was equivalent to the infinite conductivity vertical fracture. This result indicates that the pressure transient response for *infinite conductivity* drainholes is defined by the uniform flux drainhole solution at $x_D = 0.732$. The early time solution for the infinite conductivity drainhole is given by the early time solution for the uniform flux case. The definitions for the end of short time flow and the beginning of pseudoradial are the same as those for the uniform flux case with $x_D = 0.732$. The type curves presented can be used to determine reservoir characteristics and mechanical conditions similarly to the uniform flux drainhole case.

A drainhole pseudo skin factor was presented to define the difference between the line source well dimensionless pressure and the drainhole dimensionless pressure. The drainhole pseudo skin factor defines situations were drainholes will be more productive than vertical wells. Drainholes are preferable to a vertical well if $x_f/h > 1/2$. The performance of drainholes compared to vertical wells is further enhanced if $k_z > k_y$ or if the reservoir contains more than one drainhole.

The drainhole pseudo skin factor for $L_D > 10$ is identical to the pseudo skin factor for a uniform flux vertical fracture. This suggests that productivity for long drainholes will only be as great as the productivity of a vertical fracture of the same length. In practice however,

drainholes will have higher productivities than hydraulic fractures because (1) drainholes can be drilled to greater lengths than hydraulic fractures, (2) they can provide maximum productivity in reservoirs where $k_x \neq k_y$ through directional drainhole orientation while hydraulic fracturing in the same reservoir would most likely provide minimal productivity increases, and (3) cased drainholes will be infinite conductivity acting while a fracture of the same length will have some finite conductivity.

Recommendations for future work in this subject can be directed in several areas. An infinite conductivity drainhole solution with storage and skin would provide a more rigorous basis for analyizing drilled and cased drainhole well tests. The drainhole can be represented by a finite source to validate the assumption of a line source drainhole. The drainhole solution could be evaluated for a constant pressure upper boundary to approximate a gas cap reservoir. Multiple drainholes could be drilled in a radial array and a pressure transient solution may provide valuable clues about this configuration. The many possibilities for EOR applications of drainholes can be further explored. The method presented in this study for determining directional permeabilities could be modified for drill stem testing of horizontal bores in exploratory wells and used to make corrections in drainhole orientation while drilling to maximize productivity. Finally, the economic benefits of drainholes and fractures should be evaluated in terms of productivity increases versus additional completion costs.

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4. NOMENCLATURE*

c = Total reservoir compressibility

h = Reservoir height

h_D = Dimensionless reservoir height based on r_w

h_f = Fracture height

k_i = Permeability in the i direction

L_D = Dimensionless drainhole half length

M = Pressure point

m = Number of drainholes in reservoir

P = Source point

p = Pressure

p_D = Dimensionless pressure

p_i = Initial reservoir pressure

p_{wD} = Dimensionless Wellbore Pressure

q = Flow rate per unit length of source

q_w = Total flow rate

r = radius

S = Instantaneous source function

s = Pseudo skin factor

t = Time

t_D = Dimensionless time using x_f

t_{Dw} = Dimensionless time using r_w

x,y,z = Space coordinates

x_w,y_w,z_w = Drainhole center space coordinates

x_f = Drainhole or Fracture half length

z_e = Vertical distance between drainhole no-flow boundaries

GREEK SYMBOLS

Δp = Pressure change from initial

δ = Horizontal distance from the pressure point to the nearest drainhole tip

η_i = Diffusivity constant in the i direction

θ_w = Angle of well inclination from vertical

μ = Viscosity

ϕ = Porosity

σ = Pseudo skin function

τ = Integration variable

* c-g-s units are used

SUBSCRIPTS

c = Critical

D = Dimensionless

dh = Drainhole

f = Fracture

l = Beginning of late time flow period

s = End of short time flow period

w = Well

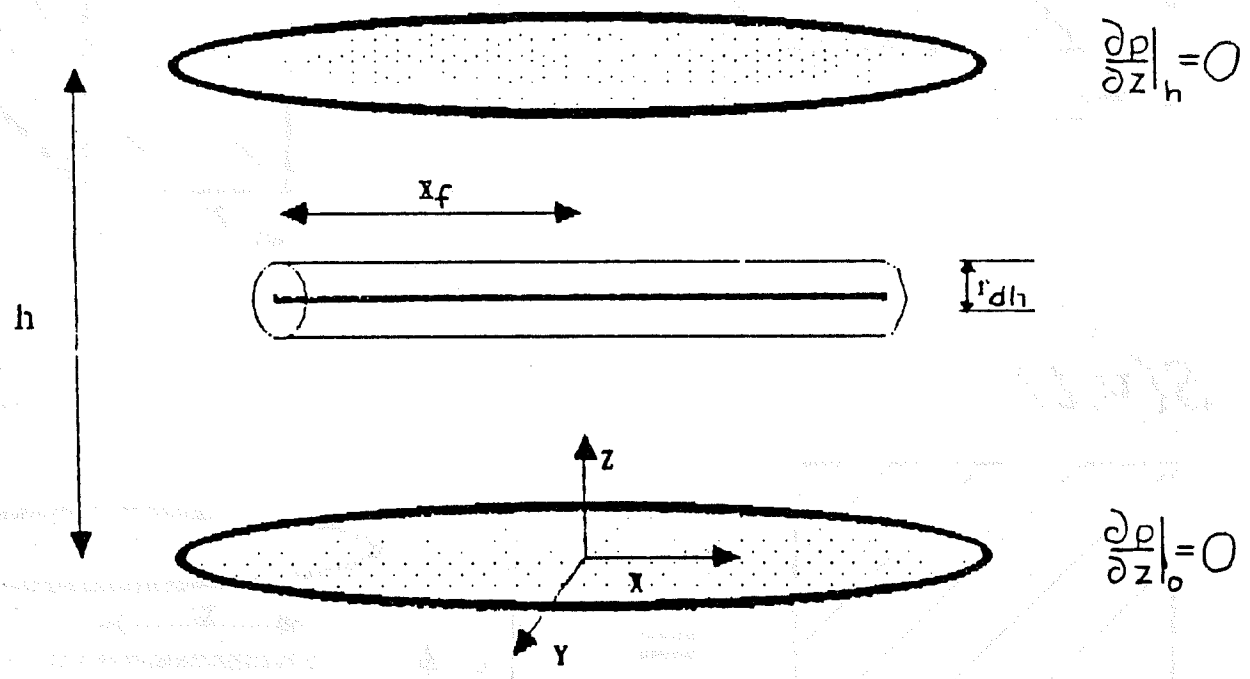

Fig. 2.1 Physical Representation of Single Drainhole System.

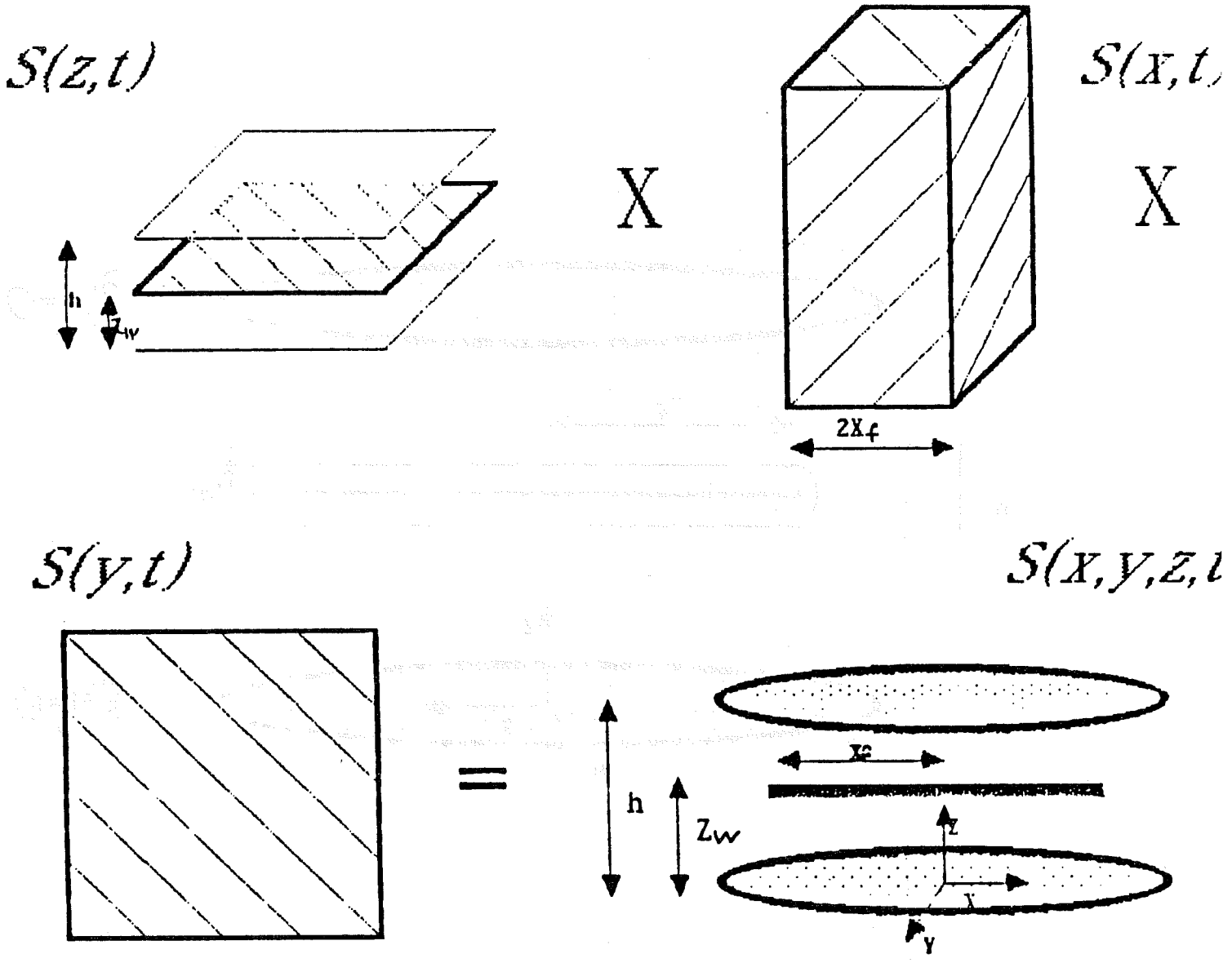

Fig. 2.2 Newman Product Representation of Single Drainhole System.

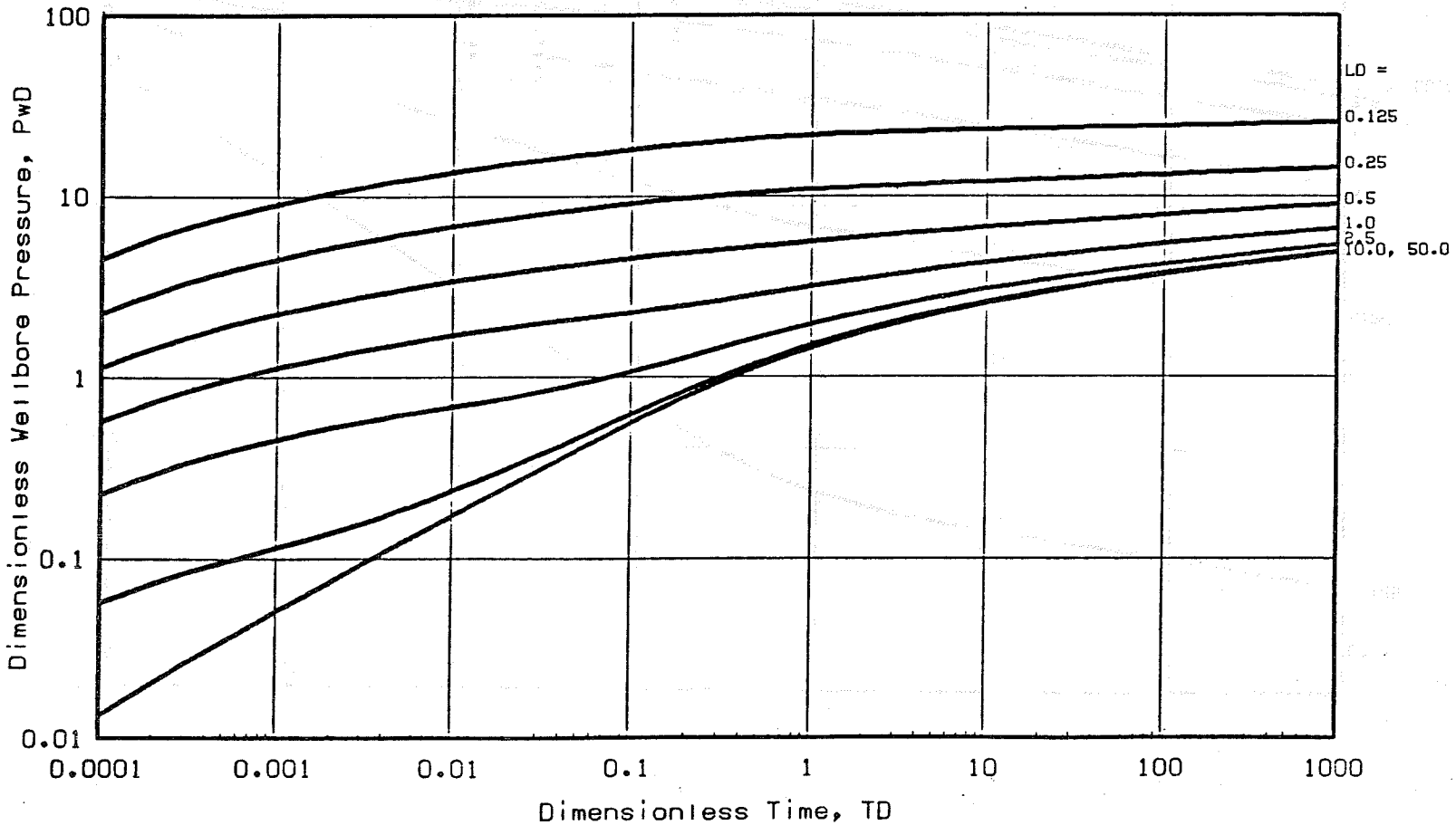

Fig. 2.3 Typical pressure transient type curve for a uniform flux drainhole ($x_D = 0$ and $r_{Ddh} = 0.005$).

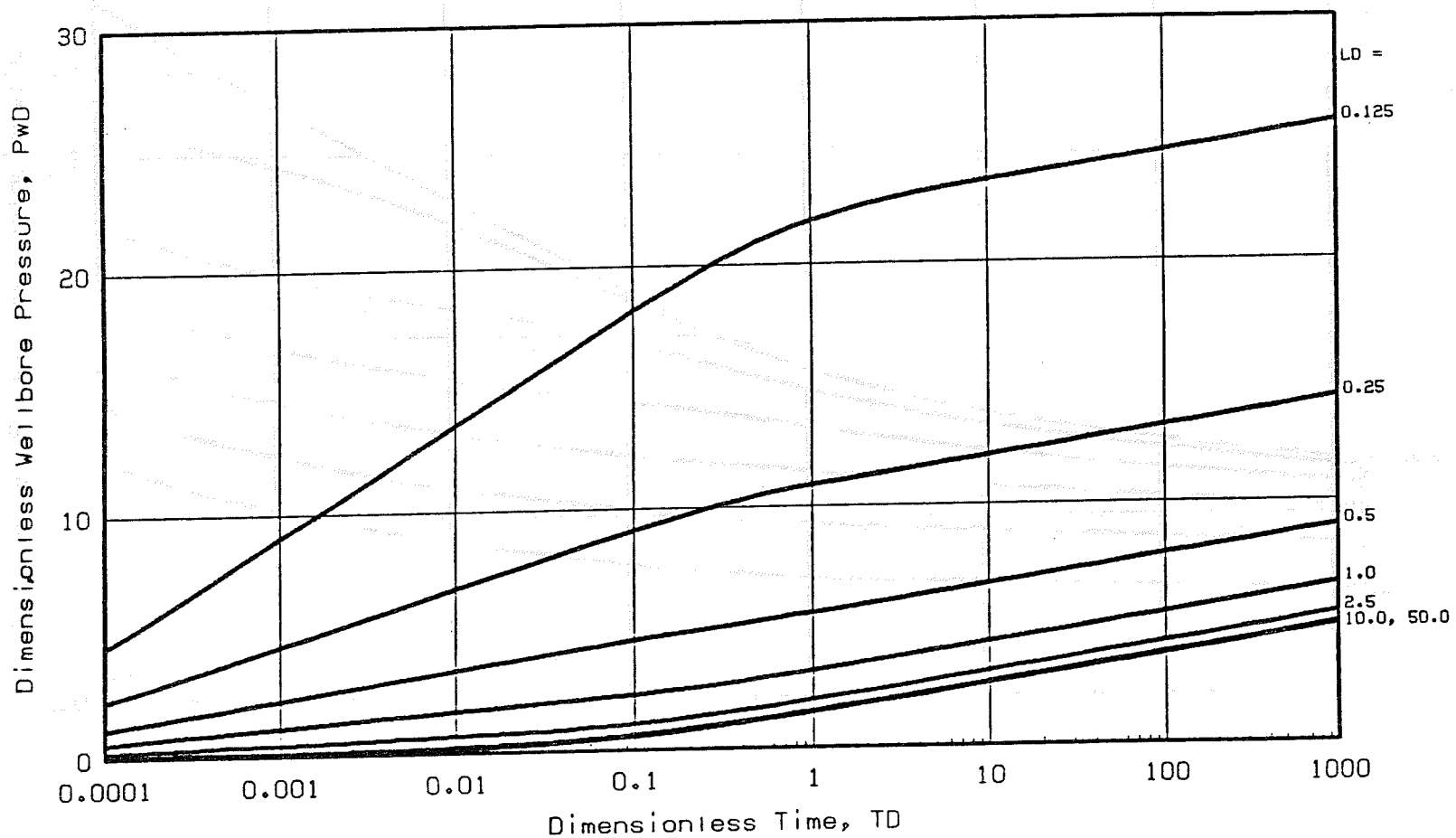

Fig. 2.4 Dimensionless Pressure vs. Log of Dimensionless Time ($x_D = 0$ and $r_{Ddh} = 0.005$).

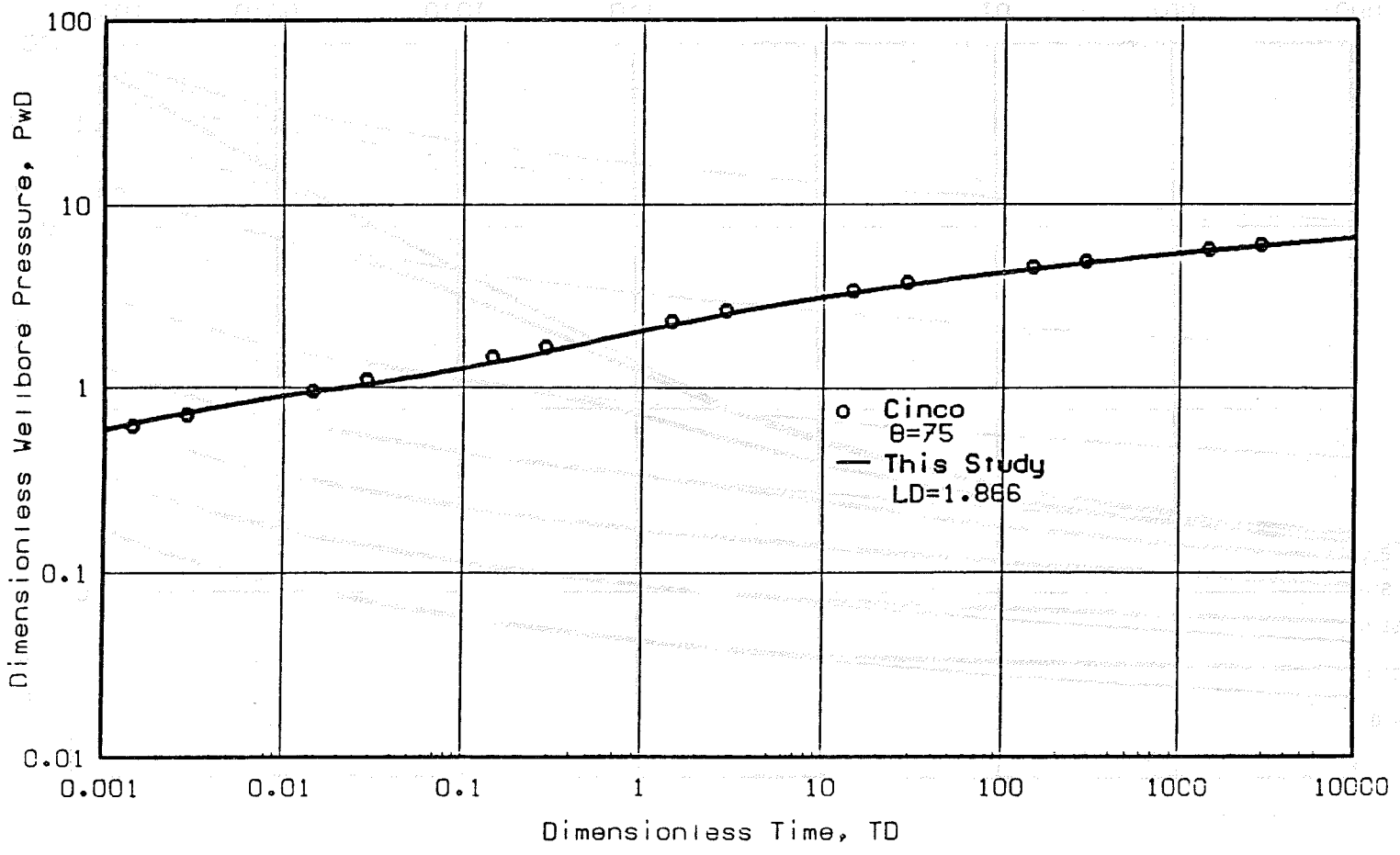

Fig. 2.5 Comparison of Drainhole Solution and Cinco Solution for a 75° Slanted Wellbore.

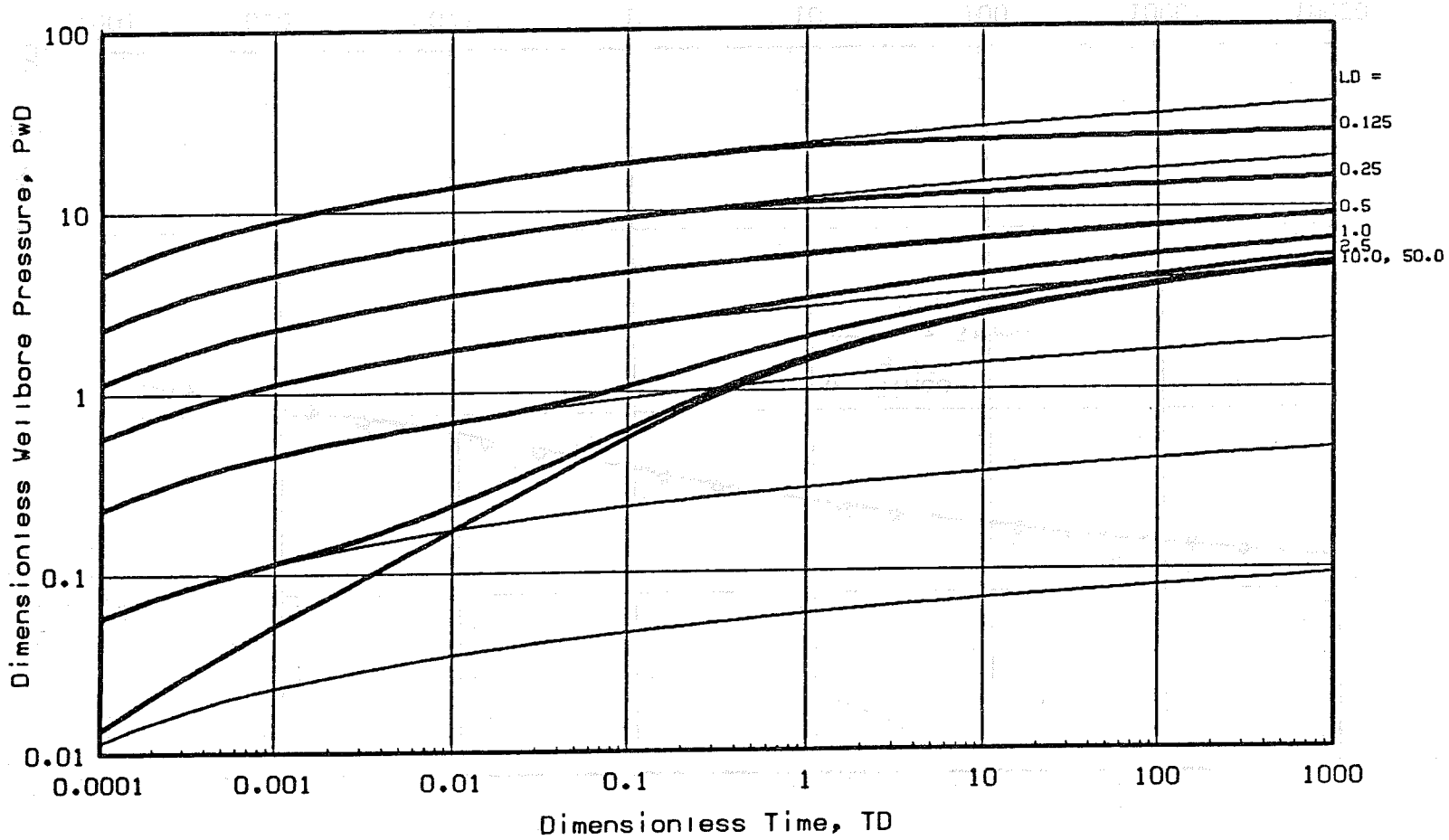

Fig. 2.6 Comparison of Short Time Approximation to General Drainhole Solution ($x_D = 0$ and $r_{Ddh} = 0.005$).

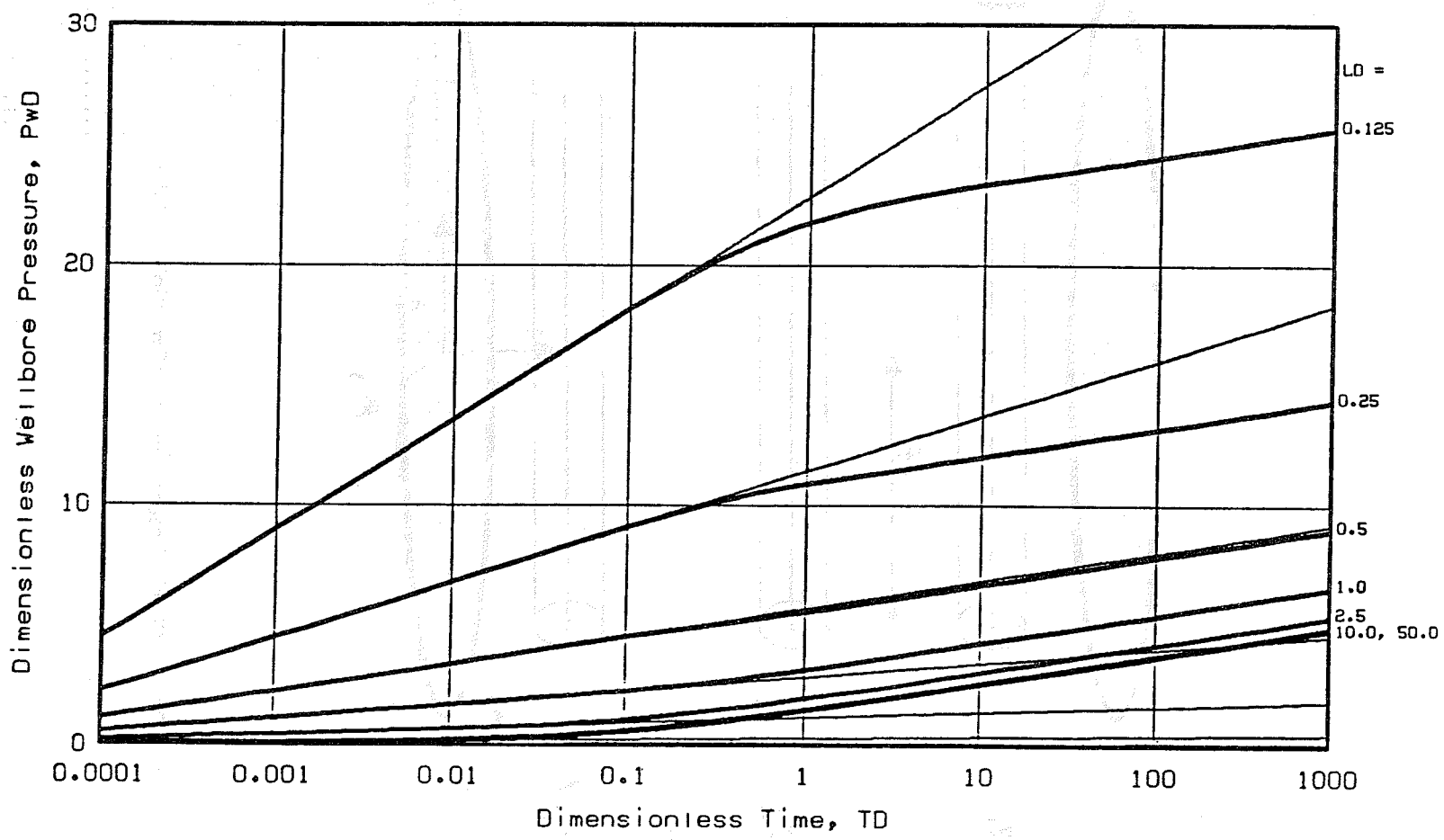

Fig. 2.7 Comparison of short time approximation to general drainhole solution ($x_D = 0$ and $r_{Ddh} = 0.005$) - p_{wD} vs. log t_D.

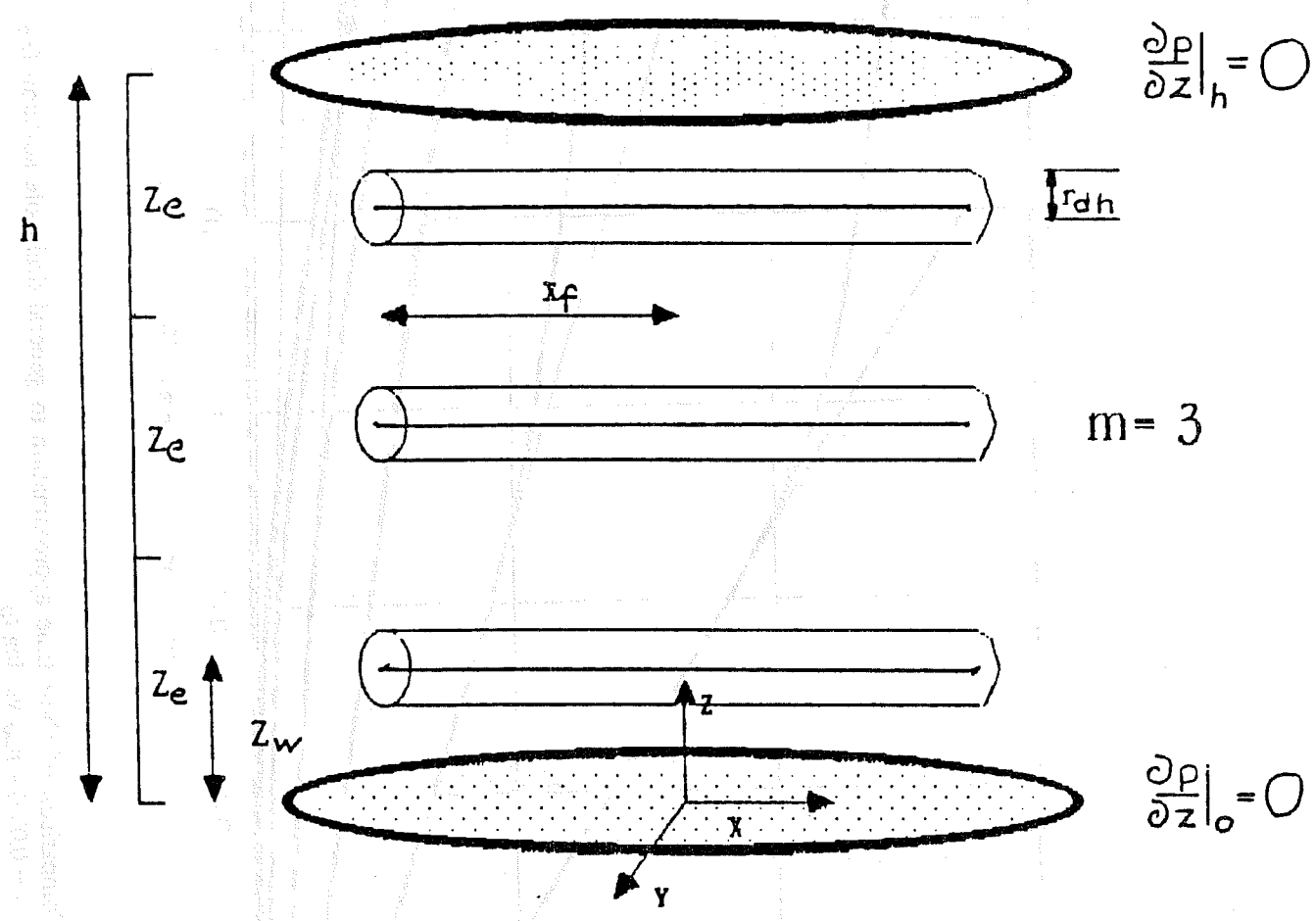

Fig. 2.8 Physical representation of multiple drainhole system.

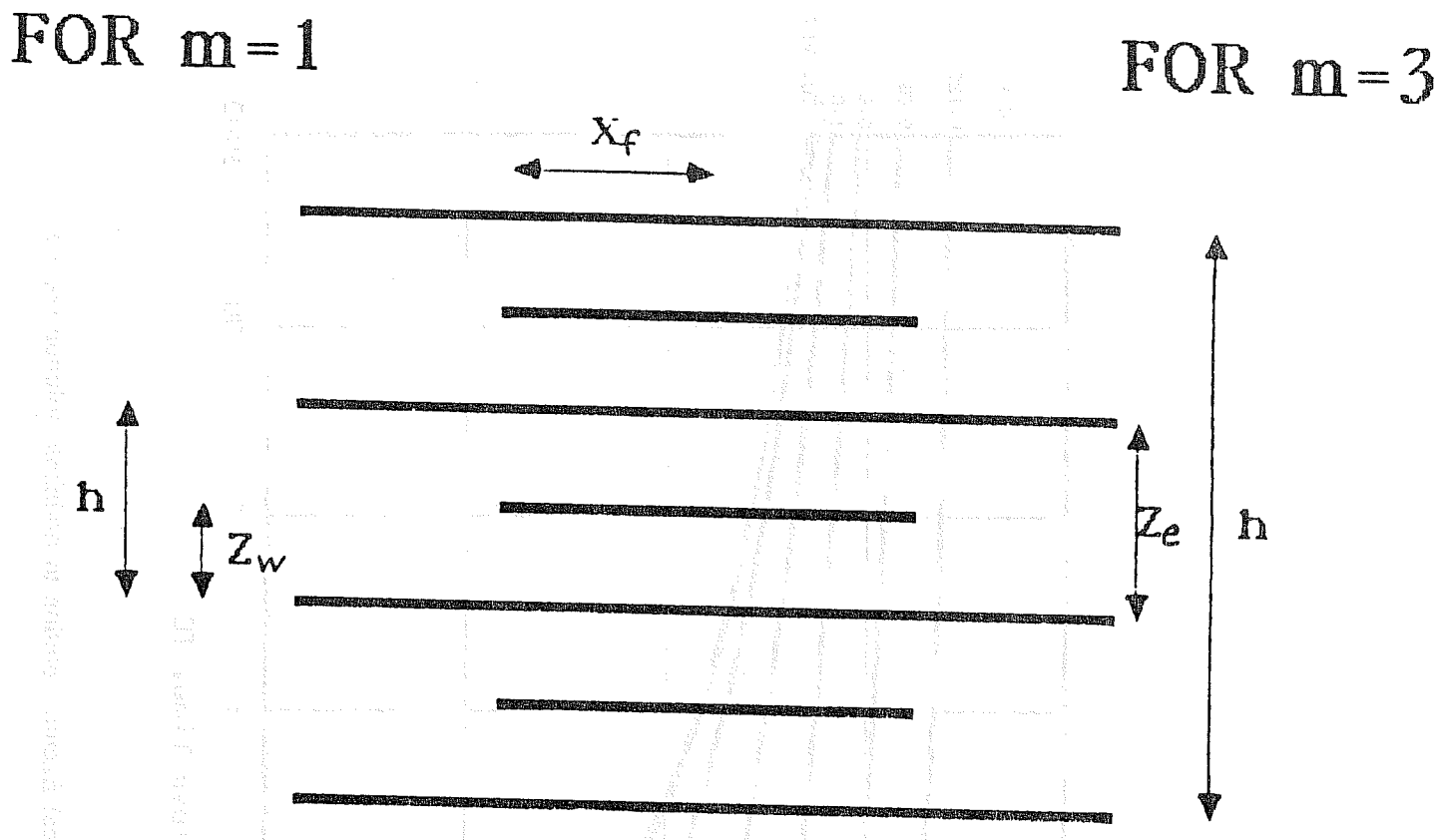

Fig. 2.9 Newman product representation of multiple drainhole system.

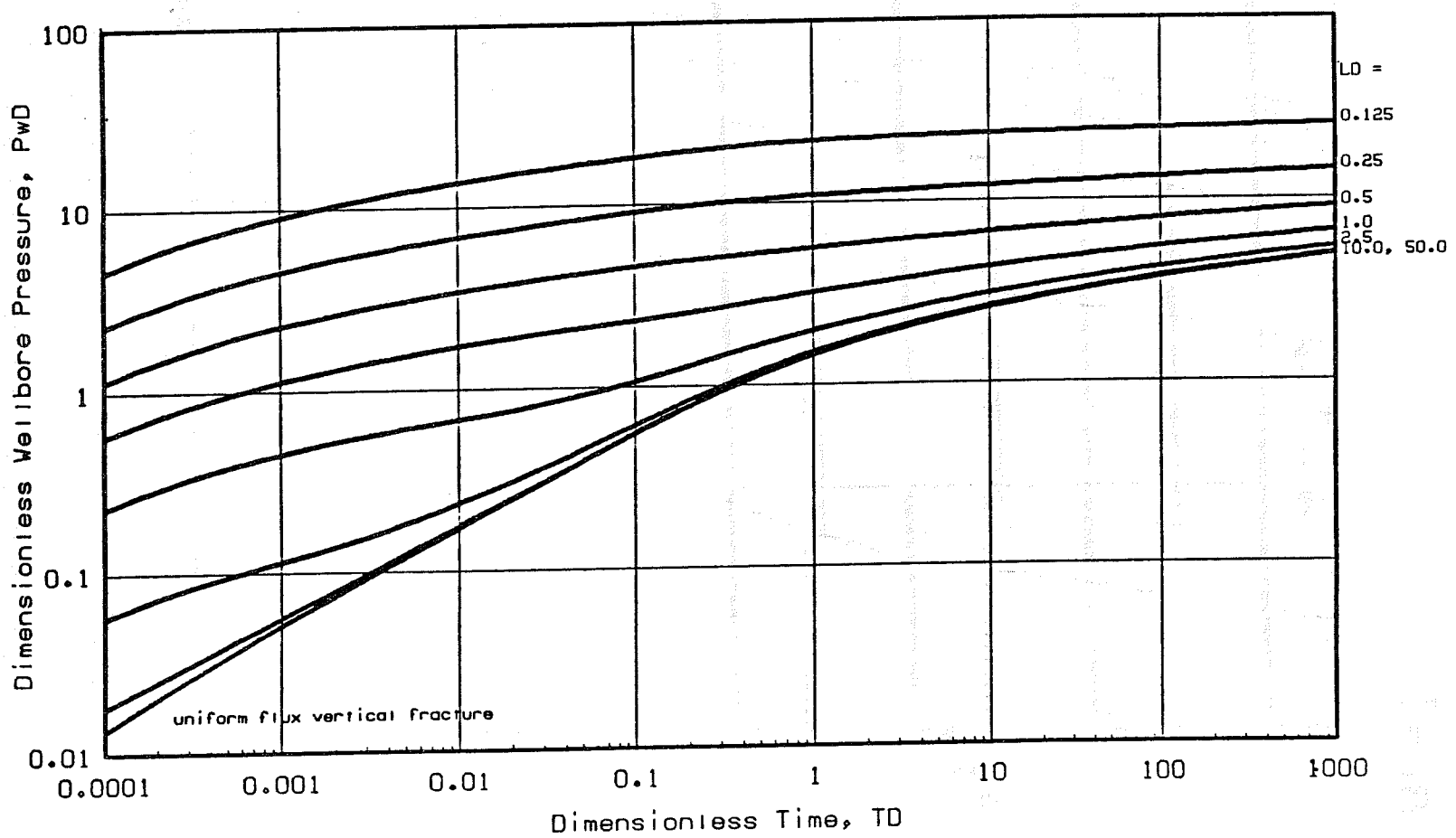

Fig 2.10 Comparison of uniform flux vertical fracture solution to drainhole solution ($x_D = 0$ and $r_{Ddh} = 0.005$).

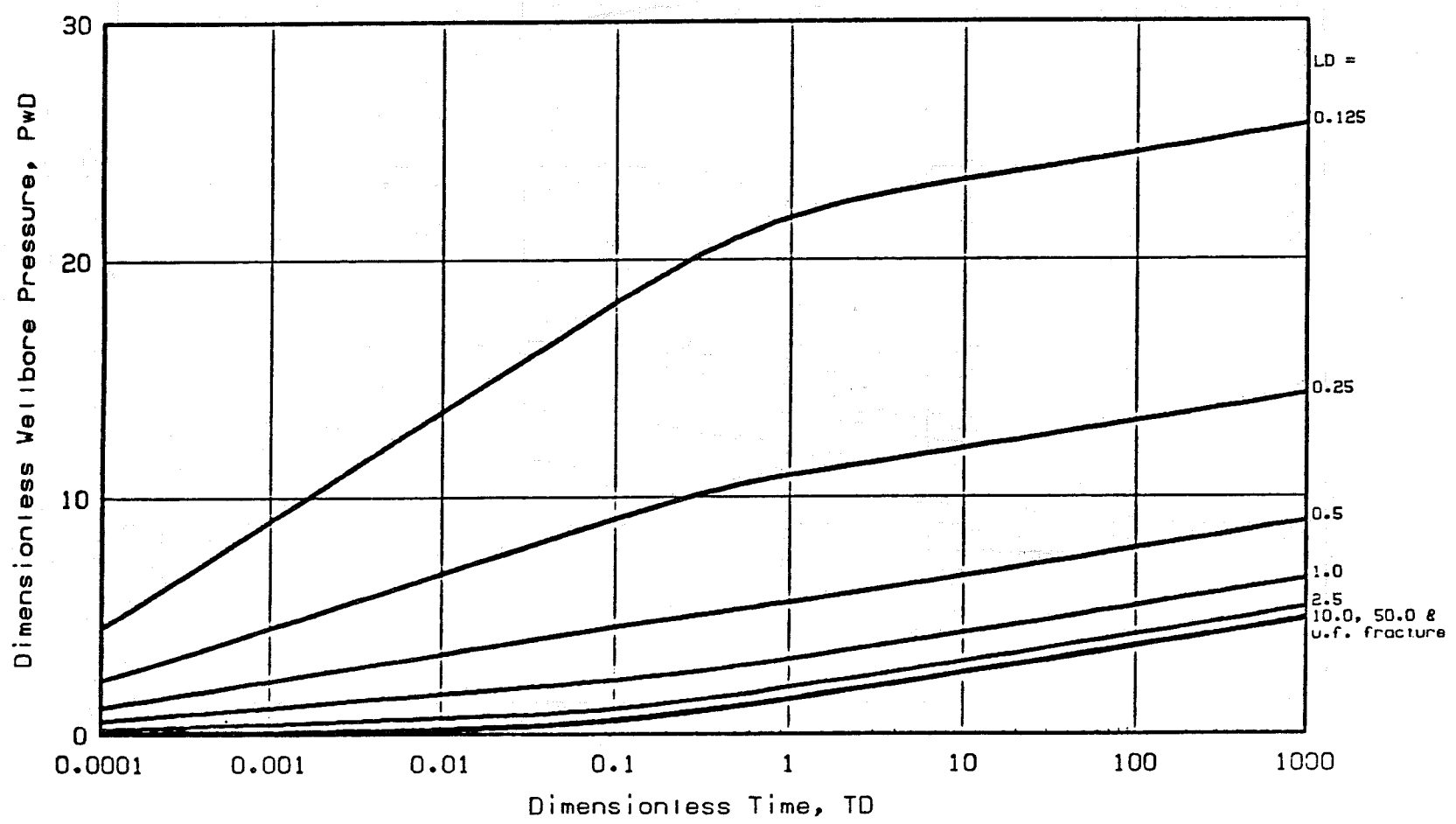

Fig. 2.11 Comparison of Uniform Flux Vertical Fracture Solution to Drainhole Solution ($x_D = 0$ and $r_{Ddh} = 0.005$) - p_{wD} vs. log t_D.

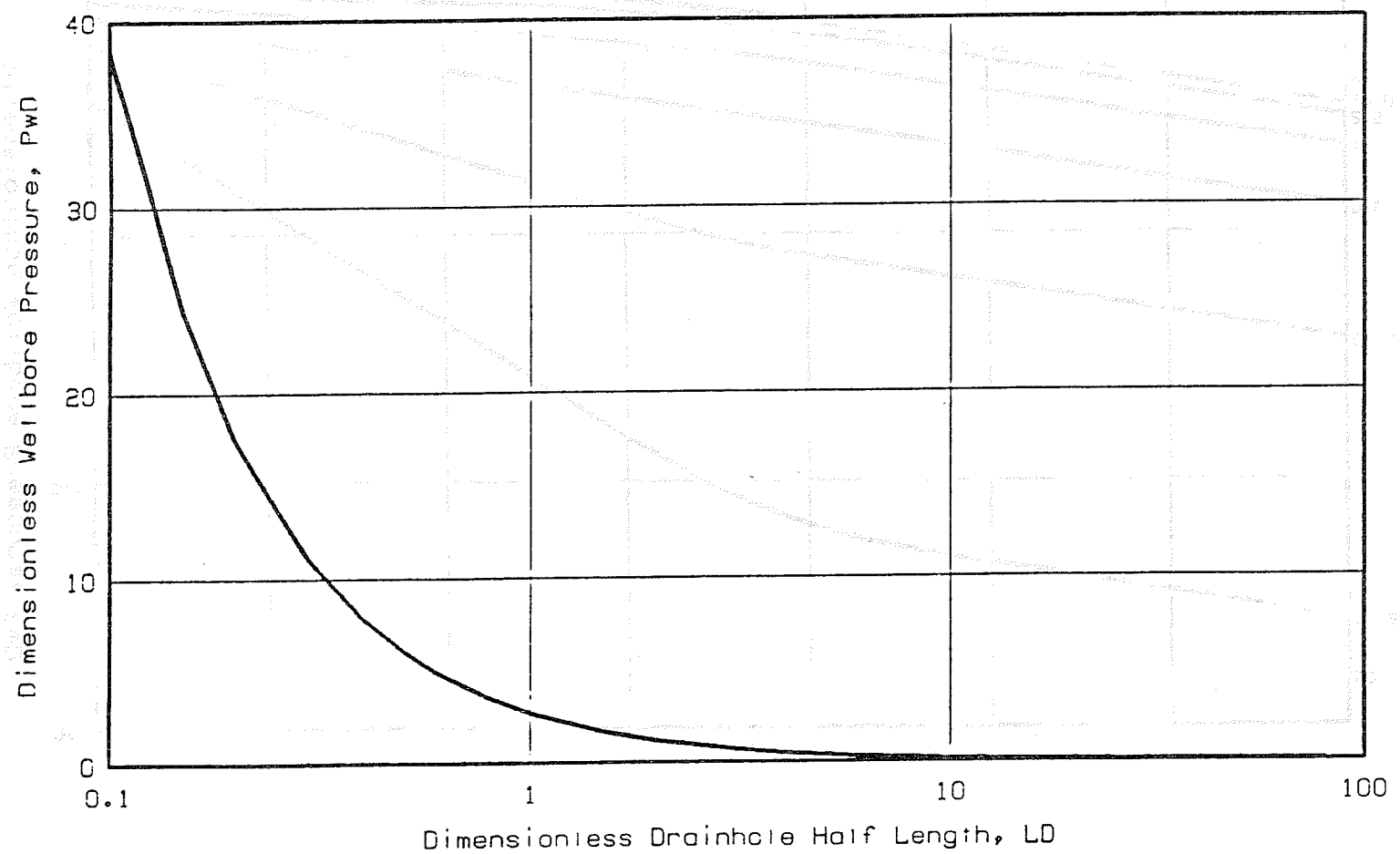

Fig. 2.12 Dimensionless Wellbore Pressure at t_{cD} vs. Dimensionless Drainhole Half Length.

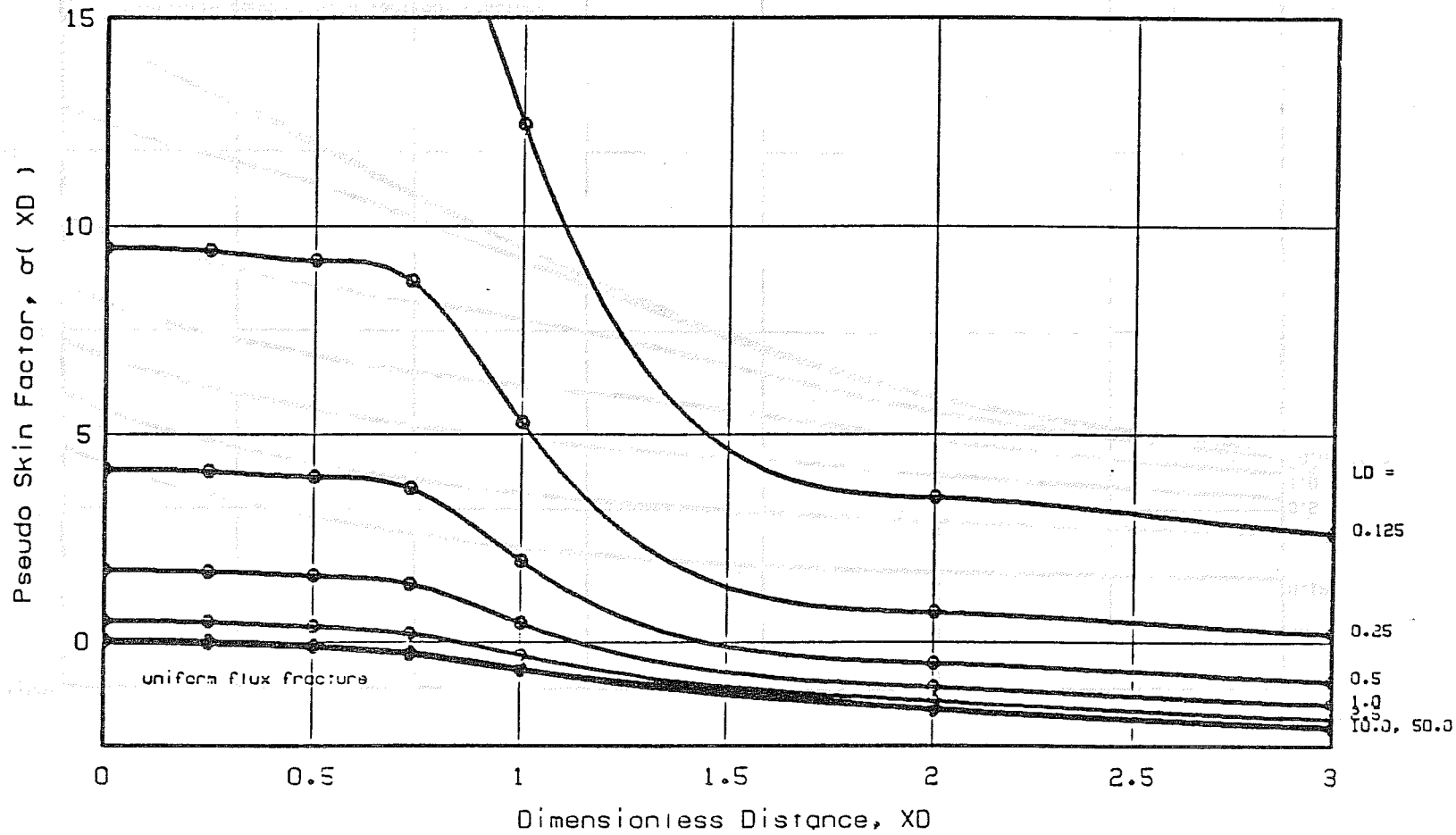

Fig. 2.13 Comparison of pseudo skin factor to uniform flux vertical fracture pseudo skin factor - σ vs. x_D.

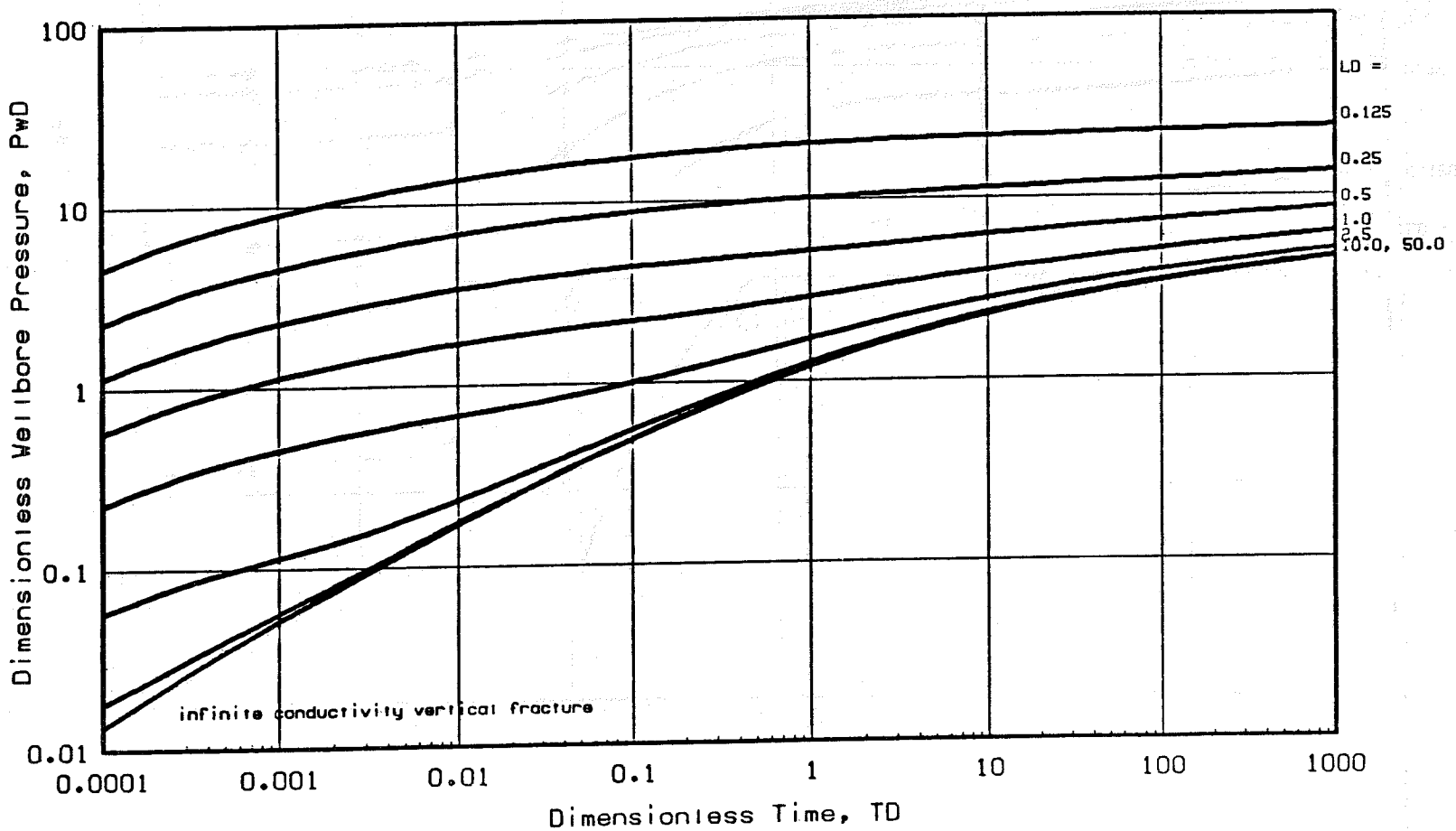

Fig. 2.14 Comparison of Infinite Conductivity Vertical Fracture Solution to Drainhole Solution ($x_D = 0.732$ and $r_{Dwb} = 0.005$).

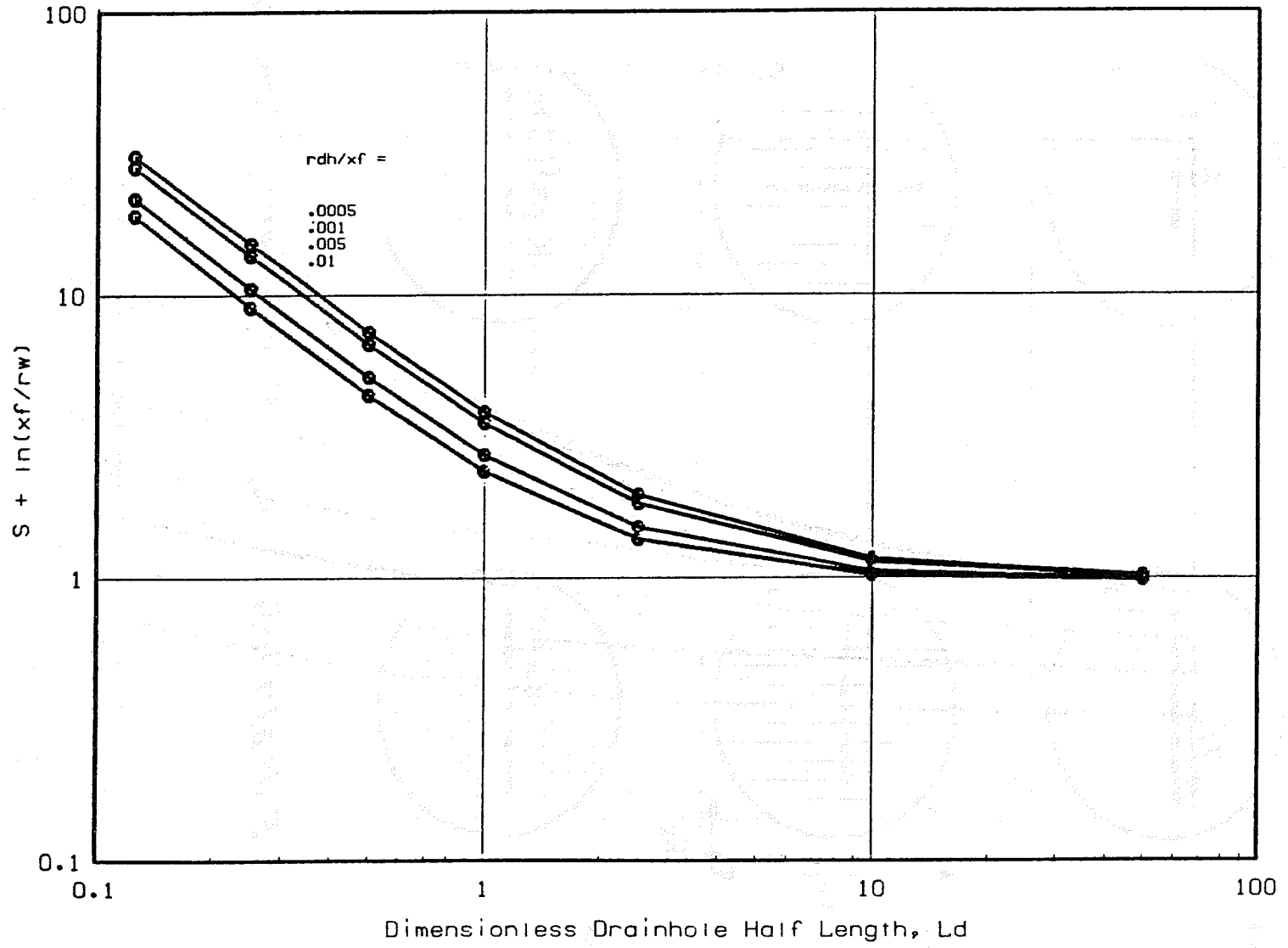

Fig. 2.15 Uniform Flux Drainhole Pseudo Skin Factor vs. Dimensionless Drainhole Half Length for Various r_{Ddh}.

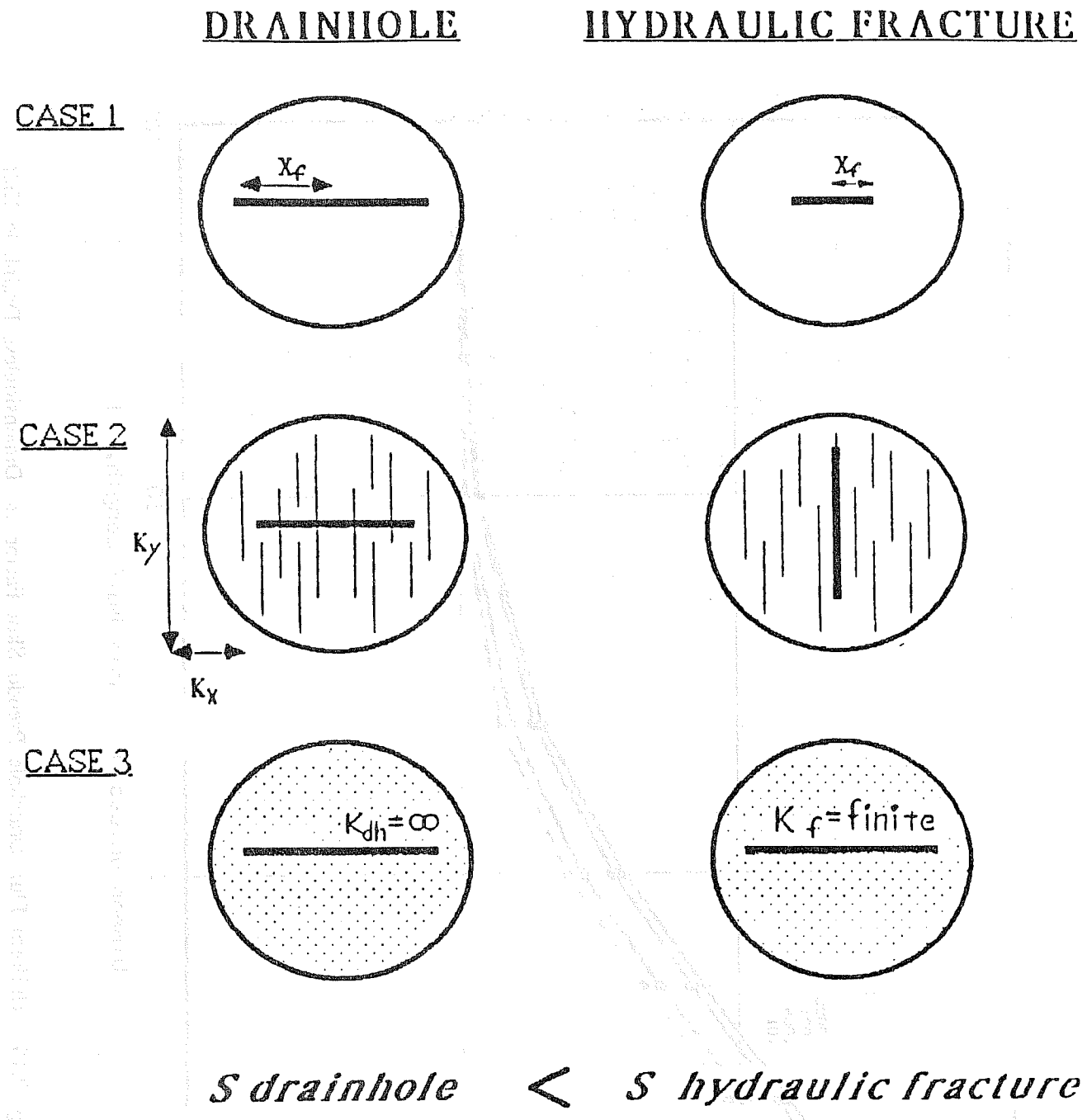

Fig. 2.16 Pseudo Skin Factor Comparison Between Drainholes and and hydraulic fractures.

APPENDIX A

COMPUTER PROGRAM

The computer program computes the dimensionless pressure drop created by a uniform flux horizontal drainhole in an infinite slab reservoir. Values for x_D, y_D, z_D, z_{wD} and L_D are input along with the number of dimensionless time cycles. The dimensionless pressure is then computed as a function of dimensionless time using Eq. (2.18).

Simpson's rule is used to compute the integral in Eq. (2.18) with respect to dimensionless time. Function DSORCE calculates the instantaneous source function for the appropriate values of t_D. Function DSDI provides an initial dimensionless pressure to begin the Simpson's rule approximation. DSDI uses the short time approximation represented by Eq. (2.15). Note that the initial t_D must be small enough for the short time approximation to apply as defined by Eqs. (2.29) and (2.34). The exponential integral for Eq. (2.37) is calculated using MMDEI, an IMSL Subroutine.

```
************************************************************************
C MAIN PROGRAM COMPUTES THE DIMENSIONLESS PRESSURE DROP CREATED BY A
C UNIFORM FLUX HORIZONTAL DRAINHOLE IN AN INFINITE SLAB RESERVOIR USING
C SIMPSON'S RULE
************************************************************************
      IMPLICIT REAL*8 (A-H,O-R,T-Z)
      REAL*4 TEST(160,10),SD(160,10),TS(160),TITRE(40)
      CHARACTER*4 FIN,F
        CHARACTER*6 DDN
        CHARACTER*6 TEXT(5)
      COMMON /ARGUMS/D(5)
      COMMON /PARAMS/ R(50),Z(50)
      DIMENSION P(5)
      DIMENSION V(10,5)
      DIMENSION II(5),NI(5)
      DIMENSION TT(160)
      EQUIVALENCE (I1,II(1)),(I2,II(2)),(I3,II(3)),(I4,II(4)),(I5,II(5))
      EQUIVALENCE (NI1,NI(1)),(NI2,NI(2)),(NI3,NI(3)),(NI4,NI(4))
     1,(NI5,NI(5))
      DATA FIN/4HFIN /

        OPEN (UNIT=2, File='file2.junk', STATUS='OLD', ACCESS='SEQUENTIAL')
 502  FORMAT(80A1)
      PRINT 9001
      READ 9002,TITRE
      PRINT 9003,TITRE
      READ 9004,T0,NMOD,NPRINT,IPUNCH
      PRINT 9005,T0,NMOD,NPRINT,IPUNCH
      IS=0
      NPAR=0
      IF(NMOD.LE.0)NMOD=11
      IF(NMOD.GT.20)NMOD=20
      NTD=NMOD*8
 111    FORMAT(1x,I4)
      IER=0
      DO 20 I=1,6
      READ 9006,F,IN,DDN,NIN
      IF(F.EQ.FIN)GO TO 30
      PRINT 9007,IN,DDN,NIN
      NPAR=I
      IS=IS+IN
      II(I)=IN
      NI(I)=NIN
       TEXT(I)=DDN
       TEXT(I)=DDN
      IF((NIN.GT.0).AND.(NIN.LE.10).AND.(IN.LE.5).AND.(IN.GT.0))GO TO 10
      IER=2*I+2
      PRINT 9008,IER
   10 READ 9009,(V(IJ,IN),IJ=1,NIN)
      PRINT 9010,(V(IJ,IN),IJ=1,NIN)
   20 CONTINUE
      READ 9006,F,IN,DDN,NIN
   30 PRINT 9011
      IF((IER.EQ.0).AND.(IS.EQ.NPAR*(NPAR+1)/2))GO TO 40
```

```
      PRINT 9012,IER,NPAR,IS
      STOP
   40 ID=5-NPAR+1
      KP=9
      IF(NIN.GT.0)KP=9*10**NIN
      ZER=KP
      ZER=9.D0/ZER
      PRINT 9013,NTD
      DO 50 IK=1,NPAR
      IN=II(IK)
      NIN=NI(IK)
      PRINT 9014,TEXT(IK),(V(IJ,IN),IJ=1,NIN)
   50 CONTINUE
      IF(ID.EQ.1)GO TO 80
      DO 60 I=1,NPAR
      K1=NPAR-I+1
      K2=6-I
      II(K2)=II(K1)
      NI(K2)=NI(K1)
      TEXT(K2)=TEXT(K1)
   60 CONTINUE
      IDF=ID-1
      IF(IDF.EQ.0)GO TO 80
      DO 70 I=1,IDF
      K1=6-I
      II(I)=K1
      NI(I)=1
      V(1,K1)=0.D0
   70 CONTINUE
   80 I=0
      DT=0.D0
      TD=T0
      DO 100 NC=1,NMOD
      DO 90 K=1,8
      TD=TD+DT
      IF((K.EQ.1).OR.(K.EQ.3))DT=TD*0.5D0
      IF(K.EQ.7)DT=TD/3.D0
      I=I+1
      TT(I)=TD
       TS(I)=SNGL(TD)
   90 CONTINUE
  100 CONTINUE
      IF(IPUNCH.NE.0)WRITE(6,9015)
      DO 240 IJ1=1,NI1
      D(I1)=V(IJ1,I1)
      P(1)=V(IJ1,I1)
      DO 230 IJ2=1,NI2
      D(I2)=V(IJ2,I2)
      P(2)=V(IJ2,I2)
      DO 220 IJ3=1,NI3
      D(I3)=V(IJ3,I3)
      P(3)=V(IJ3,I3)
      DO 210 IJ4=1,NI4
      D(I4)=V(IJ4,I4)
```

```
      P(4)=V(IJ4,I4)
      DO 170 IJ5=1,NI5
      D(I5)=V(IJ5,I5)
      P(5)=V(IJ5,I5)
      DTD=TT(1)
      DSD=DSDI(DTD)
      SD(1,IJ5)=SNGL(DSD)
      DP1=DSORCE(DTD)
       TEST(1,IJ5)=SNGL(DP1)
      IF(KP.EQ.9)GO TO 140
      IIT=2
      DO 130 NC=1,NMOD
      DELTAT=DTD*ZER
      DT=DELTAT*0.5D0
      DO 120 KK=1,KP
      DTD=DTD+DELTAT
      DP2=DSORCE(DTD)
      DSD=DSD+0.5D0*DELTAT*(DP1+DP2)
      IF((TT(IIT)-DTD).GT.DT)GO TO 110
      SD(IIT,IJ5)=SNGL(DSD)
       TEST(IIT,IJ5)=SNGL(DP2)
      IIT=IIT+1
       IF(IIT.GT.NTD) GO TO 130
  110 DP1=DP2
  120 CONTINUE
  130 CONTINUE
      GO TO 160
  140 DO 150 IIT=2,NTD
      DTD=TT(IIT)
      DP2=DSORCE(DTD)
      DELTAT=TT(IIT)-TT(IIT-1)
      DP3=DSORCE(DTD-DELTAT*0.5)
      DSD=DSD+DELTAT*(DP1+4.*DP3+DP2)/6.
      SD(IIT,IJ5)=SNGL(DSD)
       TEST(IIT,IJ5)=SNGL(DP2)
      DP1=DP2
  150 CONTINUE
  160 IF(IPUNCH.LE.0)GO TO 170
      WRITE(6,9016)TITRE,NTD,(TEXT(JJ),P(JJ),JJ=ID,5)
      WRITE(6,9017)(TT(I),SD(I,IJ5),I=1,NTD)
  170 CONTINUE
      IF(NPRINT.EQ.0)GO TO 210
      IJT=(NPRINT-1)*8
      DO 200 J=NPRINT,NMOD,6
        DO 888 ICNT=1,5
        PRINT*,'  '
  888   CONTINUE
      PRINT 9018,TITRE
      IF(ID.LT.5)PRINT 9019,(TEXT(IJ),P(IJ),IJ=ID,4)
      PRINT 9020,(V(IJ5,I5),IJ5=1,NI5)
      JM=MIN0(6,NMOD-J+1)
       NIX=NI5+1
       NIZ=NIX+1
      DO 190 I=1,JM
```

```
      PRINT 9021
      DO 180 K=1,8
      IJT=IJT+1
      PRINT 9022,TS(IJT),(SD(IJT,IJ5),IJ5=1,NI5)
C     IF(IJT.GE.17)PRINT 9022,TS(IJT),(SD(IJT,IJ5),IJ5=1,NI5)
  180 CONTINUE
  190 CONTINUE
  200 CONTINUE
      NTA=NTD-5
      IF (NMOD.LE.9) NP=0
      IF (NMOD.GT.9) NP=(NMOD-8)*8
      NP1=NP+1
  210 CONTINUE
  220 CONTINUE
  230 CONTINUE
  240 CONTINUE
        DO 333 I=1,NI5
        WRITE(2,111)NTD
        DO 334 J=1,NTD
        WRITE(2,9022)TS(J),SD(J,I)
  334   CONTINUE
  333   CONTINUE
      STOP
 9001 FORMAT(20H1RAPPEL DES DONNEES://)
 9002 FORMAT(20A4)
 9003 FORMAT(1X,20A4)
 9004 FORMAT(1X,D6.0,1X,I2,1X,I2,1X,I1)
 9005 FORMAT(25H TDMPS INITIAL DD CALCUL=,1PD8.1,
     1      23HNOMBRE DE MODULES-LOG.=,I2,
     2      14H , IMPRESSION=,I2,
     3       8H,IPERFO=,I1)
 9006 FORMAT(A4,1X,I1,1X,A6,1X,I2)
 9007 FORMAT(21H NUMERO DU PARAMETRE=,I1,
     1      18H,NOM DU PARAMETRE=,A6,
     2      33H,NOMBRE DE VALEURS DU PARAMETRE= ,I2)
 9008 FORMAT(1H+,81X,20H<— ERREUR DANS LA ,I2,10HEME CARTE.)
 9009 FORMAT(10D8.0)
 9010 FORMAT(1X,10G8.3)
 9011 FORMAT(16H FIN DES DONNEES)
 9012 FORMAT(40H0ARRET DU A UNE ERREUR DANS LES DONNEES.,3I4)
 9013 FORMAT(40H-LE CALCUL DES RABATTEMENT REDUITS POUR ,I4,
     141H VALEURS DE TEMPS REDUIT SERA FAIT AVEC ://)
 9014 FORMAT(1H0,A8,10(1PD10.4,2H, ))
 9015 FORMAT(55H***** CARTES PERFOREES PAR CARAFON *** LANDEL *********)
 9016 FORMAT(61HNATURE DU TRAIT=  ,INDICE DE LISSAGE=  ,EMPLACEMENT DU L
     1ABEL=/2(20A4/),
     2  I4,6HPOINTS,5(1H,,A5,1PE8.2))
 9017 FORMAT(1P8D10.3)
 9018 FORMAT(1X,2(20A4/))
 9019 FORMAT(1X,5(A4,G10.4,1X))
 9020 FORMAT(20H   TD          LD=  ,1PD9.3,9(3X,D9.3))
 9021 FORMAT(1X)
 9022 FORMAT(3X,1PE8.2,6X,10(2X,E10.4))
      END
```

```
*************************************************************************
C FUNCTION DSORCE COMPUTES THE DRAINHOLE INSTANTANEOUS SOURCE FUNCTION
C FOR A GIVEN VALUE OF TD
*************************************************************************

      DOUBLE PRECISION FUNCTION DSORCE(TD)
      IMPLICIT REAL*8 (A-H,O-Z)
      COMMON /ARGUMS/ XD,YD,ZD,ZWH,XFH
1     SUM=0.
      SUMCHK1=-100.
      STD=DSQRT(TD)
      PI=4.0*DATAN(1.D0)
      SPI=DSQRT(PI)
        DO 10 I=1,3000
        DI=DBLE(I)
        COTERM=DCOS(DI*PI*ZWH)*DCOS(DI*PI*(ZD*XFH+ZWH))
        SUM=SUM+DEXP(-1.D0*((DI*PI*XFH)**2)*TD)*COTERM
        CHECK=I/8.0
        TRNK=IDINT(I/8.0)
        IF(CHECK.NE.TRNK)GOTO 15
        DELTA=DABS(SUMCHK-SUM)
        IF(DELTA.LT.1.D-7)GOTO 20
        SUMCHK=SUM
15      CONTINUE
10      CONTINUE
        IF(I.GE.8000)WRITE(6,*)'summation did not converge'
20      ERTERM=DERF((1.0+XD)/(2.0*STD))+DERF((1.0-XD)/(2.0*STD))
        EXTERM=DEXP(-1.0*(YD**2)/(4.0*TD))/(2*STD)
        DSORCE=SPI*(1.0+2.0*SUM)*EXTERM*ERTERM/2.0
C       print*,'dsorce= ',DSORCE
      RETURN
      END
```

```
************************************************************************
C FUNCTION DSDI COMPUTES THE DRAINHOLE DIMENSIONLESS PRESSURE DROP FOR
C THE INITIAL VALUE OF TD USING THE SHORT TIME APPROXIMATION
************************************************************************

      DOUBLE PRECISION FUNCTION DSDI(TD)
      IMPLICIT REAL*8 (A-H,O-Z)
       INTEGER IOPT,IER
       DOUBLE PRECISION MMDEI,ARG
      COMMON /ARGUMS/ XD,YD,ZD,ZWH,XFH
      ARG=((ZD**2+YD**2)/(4.0*TD))
       IOPT=2
      DSDI=0.25*MMDEI(IOPT,ARG,IER)/XFH
       X=DSDI
      RETURN
      END
```

APPENDIX B

Tabulated Values of P_D at several x_D for various r_{Ddh} and L_D

This appendix provides the tabulated results for the uniform flux horizontal drainhole solution presented in the text. The computer program in Appendix A is used to evaluated p_D *vs.* t_D for seven values of L_D. Results were generated for various x_D and r_{dh}. In each case the dimensionless pressure is evaluated at the point (x_D, r_{dh}, 0, 0.5, L_D) using Eq. (2.18).

TABLE B.1 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0 and RDdh=0.0005

XD 0. YD 0.5000e-03 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	1.3529e+01	6.8026e+00	3.4014e+00	1.7007e+00	6.8027e-01	1.7007e-01	3.6243e-02
1.50e-04	1.4340e+01	7.2083e+00	3.6042e+00	1.8021e+00	7.2084e-01	1.8021e-01	4.0226e-02
2.00e-04	1.4916e+01	7.4960e+00	3.7481e+00	1.8740e+00	7.4962e-01	1.8740e-01	4.3584e-02
3.00e-04	1.5727e+01	7.9015e+00	3.9508e+00	1.9754e+00	7.9016e-01	1.9754e-01	4.9217e-02
4.00e-04	1.6302e+01	8.1892e+00	4.0947e+00	2.0473e+00	8.1893e-01	2.0475e-01	5.3965e-02
5.00e-04	1.6748e+01	8.4123e+00	4.2062e+00	2.1031e+00	8.4124e-01	2.1037e-01	5.8149e-02
6.00e-04	1.7113e+01	8.5946e+00	4.2974e+00	2.1487e+00	8.5948e-01	2.1502e-01	6.1931e-02
8.00e-04	1.7688e+01	8.8823e+00	4.4412e+00	2.2206e+00	8.8824e-01	2.2262e-01	6.8647e-02
1.00e-03	1.8135e+01	9.1054e+00	4.5528e+00	2.2764e+00	9.1056e-01	2.2888e-01	7.4564e-02
1.50e-03	1.8946e+01	9.5113e+00	4.7557e+00	2.3779e+00	9.5115e-01	2.4171e-01	8.7166e-02
2.00e-03	1.9522e+01	9.7992e+00	4.8996e+00	2.4498e+00	9.7993e-01	2.5236e-01	9.7788e-02
3.00e-03	2.0333e+01	1.0205e+01	5.1024e+00	2.5512e+00	1.0205e+00	2.7018e-01	1.1560e-01
4.00e-03	2.0909e+01	1.0492e+01	5.2463e+00	2.6231e+00	1.0493e+00	2.8519e-01	1.3062e-01
5.00e-03	2.1355e+01	1.0716e+01	5.3579e+00	2.6789e+00	1.0716e+00	2.9843e-01	1.4385e-01
6.00e-03	2.1720e+01	1.0898e+01	5.4490e+00	2.7245e+00	1.0898e+00	3.1039e-01	1.5582e-01
8.00e-03	2.2295e+01	1.1186e+01	5.5929e+00	2.7964e+00	1.1188e+00	3.3163e-01	1.7706e-01
1.00e-02	2.2741e+01	1.1409e+01	5.7045e+00	2.8522e+00	1.1416e+00	3.5034e-01	1.9577e-01
1.50e-02	2.3553e+01	1.1815e+01	5.9074e+00	2.9537e+00	1.1855e+00	3.9019e-01	2.3562e-01
2.00e-02	2.4129e+01	1.2103e+01	6.0513e+00	3.0257e+00	1.2201e+00	4.2378e-01	2.6921e-01
3.00e-02	2.4940e+01	1.2508e+01	6.2541e+00	3.1271e+00	1.2767e+00	4.8012e-01	3.2555e-01
4.00e-02	2.5515e+01	1.2796e+01	6.3980e+00	3.1991e+00	1.3242e+00	5.2761e-01	3.7304e-01
5.00e-02	2.5961e+01	1.3019e+01	6.5094e+00	3.2553e+00	1.3660e+00	5.6941e-01	4.1484e-01
6.00e-02	2.6325e+01	1.3201e+01	6.6004e+00	3.3017e+00	1.4038e+00	6.0715e-01	4.5257e-01
8.00e-02	2.6896e+01	1.3486e+01	6.7431e+00	3.3771e+00	1.4704e+00	6.7380e-01	5.1923e-01
1.00e-01	2.7334e+01	1.3705e+01	6.8527e+00	3.4386e+00	1.5285e+00	7.3188e-01	5.7731e-01
1.50e-01	2.8110e+01	1.4093e+01	7.0468e+00	3.5611e+00	1.6488e+00	8.5222e-01	6.9764e-01
2.00e-01	2.8634e+01	1.4355e+01	7.1787e+00	3.6580e+00	1.7454e+00	9.4884e-01	7.9427e-01
3.00e-01	2.9321e+01	1.4698e+01	7.3565e+00	3.8085e+00	1.8960e+00	1.0994e+00	9.4479e-01
4.00e-01	2.9764e+01	1.4920e+01	7.4798e+00	3.9241e+00	2.0115e+00	1.2149e+00	1.0604e+00
5.00e-01	3.0081e+01	1.5078e+01	7.5760e+00	4.0179e+00	2.1054e+00	1.3088e+00	1.1542e+00
6.00e-01	3.0321e+01	1.5199e+01	7.6557e+00	4.0969e+00	2.1844e+00	1.3878e+00	1.2332e+00
8.00e-01	3.0669e+01	1.5374e+01	7.7843e+00	4.2251e+00	2.3126e+00	1.5160e+00	1.3614e+00
1.00e+00	3.0913e+01	1.5499e+01	7.8863e+00	4.3271e+00	2.4146e+00	1.6180e+00	1.4634e+00
1.50e+00	3.1301e+01	1.5708e+01	8.0761e+00	4.5170e+00	2.6044e+00	1.8078e+00	1.6532e+00
2.00e+00	3.1536e+01	1.5849e+01	8.2134e+00	4.6542e+00	2.7417e+00	1.9451e+00	1.7905e+00
3.00e+00	3.1821e+01	1.6046e+01	8.4095e+00	4.8503e+00	2.9377e+00	2.1411e+00	1.9866e+00
4.00e+00	3.1995e+01	1.6187e+01	8.5499e+00	4.9907e+00	3.0782e+00	2.2816e+00	2.1270e+00
5.00e+00	3.2118e+01	1.6296e+01	8.6594e+00	5.1003e+00	3.1877e+00	2.3911e+00	2.2366e+00
6.00e+00	3.2214e+01	1.6386e+01	8.7492e+00	5.1901e+00	3.2775e+00	2.4809e+00	2.3263e+00
8.00e+00	3.2360e+01	1.6528e+01	8.8914e+00	5.3322e+00	3.4197e+00	2.6230e+00	2.4685e+00
1.00e+01	3.2472e+01	1.6639e+01	9.0019e+00	5.4427e+00	3.5302e+00	2.7336e+00	2.5790e+00
1.50e+01	3.2674e+01	1.6841e+01	9.2035e+00	5.6443e+00	3.7318e+00	2.9352e+00	2.7806e+00
2.00e+01	3.2817e+01	1.6984e+01	9.3467e+00	5.7875e+00	3.8750e+00	3.0784e+00	2.9238e+00
3.00e+01	3.3019e+01	1.7186e+01	9.5488e+00	5.9896e+00	4.0771e+00	3.2805e+00	3.1259e+00
4.00e+01	3.3163e+01	1.7329e+01	9.6923e+00	6.1332e+00	4.2206e+00	3.4240e+00	3.2694e+00
5.00e+01	3.3274e+01	1.7441e+01	9.8037e+00	6.2445e+00	4.3320e+00	3.5354e+00	3.3808e+00
6.00e+01	3.3365e+01	1.7532e+01	9.8947e+00	6.3356e+00	4.4230e+00	3.6264e+00	3.4718e+00
8.00e+01	3.3509e+01	1.7675e+01	1.0038e+01	6.4792e+00	4.5667e+00	3.7701e+00	3.6155e+00

TABLE B.1 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0 and RDdh=0.0005

XD 0. YD 0.5000e-03 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	3.3620e+01	1.7787e+01	1.0150e+01	6.5907e+00	4.6782e+00	3.8816e+00	3.7270e+00
1.50e+02	3.3823e+01	1.7990e+01	1.0353e+01	6.7935e+00	4.8810e+00	4.0844e+00	3.9298e+00
2.00e+02	3.3967e+01	1.8134e+01	1.0497e+01	6.9374e+00	5.0248e+00	4.2282e+00	4.0737e+00
3.00e+02	3.4170e+01	1.8336e+01	1.0699e+01	7.1401e+00	5.2276e+00	4.4310e+00	4.2764e+00
4.00e+02	3.4313e+01	1.8480e+01	1.0843e+01	7.2839e+00	5.3714e+00	4.5748e+00	4.4202e+00
5.00e+02	3.4425e+01	1.8592e+01	1.0955e+01	7.3955e+00	5.4829e+00	4.6863e+00	4.5318e+00
6.00e+02	3.4516e+01	1.8683e+01	1.1046e+01	7.4866e+00	5.5741e+00	4.7775e+00	4.6229e+00
8.00e+02	3.4660e+01	1.8827e+01	1.1190e+01	7.6305e+00	5.7179e+00	4.9213e+00	4.7667e+00
1.00e+03	3.4772e+01	1.8938e+01	1.1301e+01	7.7420e+00	5.8295e+00	5.0329e+00	4.8783e+00
1.50e+03	3.4974e+01	1.9141e+01	1.1504e+01	7.9450e+00	6.0324e+00	5.2358e+00	5.0813e+00
2.00e+03	3.5118e+01	1.9285e+01	1.1648e+01	8.0889e+00	6.1764e+00	5.3797e+00	5.2252e+00
3.00e+03	3.5321e+01	1.9488e+01	1.1851e+01	8.2917e+00	6.3791e+00	5.5825e+00	5.4280e+00
4.00e+03	3.5465e+01	1.9632e+01	1.1995e+01	8.4355e+00	6.5230e+00	5.7264e+00	5.5718e+00
5.00e+03	3.5577e+01	1.9743e+01	1.2106e+01	8.5471e+00	6.6346e+00	5.8380e+00	5.6834e+00
6.00e+03	3.5668e+01	1.9834e+01	1.2197e+01	8.6383e+00	6.7257e+00	5.9291e+00	5.7746e+00
8.00e+03	3.5812e+01	1.9978e+01	1.2341e+01	8.7821e+00	6.8696e+00	6.0730e+00	5.9184e+00
1.00e+04	3.5923e+01	2.0090e+01	1.2453e+01	8.8937e+00	6.9812e+00	6.1845e+00	6.0300e+00
1.50e+04	3.6126e+01	2.0293e+01	1.2656e+01	9.0967e+00	7.1841e+00	6.3875e+00	6.2329e+00
2.00e+04	3.6270e+01	2.0437e+01	1.2800e+01	9.2406e+00	7.3280e+00	6.5314e+00	6.3769e+00
3.00e+04	3.6473e+01	2.0640e+01	1.3003e+01	9.4434e+00	7.5308e+00	6.7342e+00	6.5797e+00
4.00e+04	3.6617e+01	2.0783e+01	1.3146e+01	9.5872e+00	7.6747e+00	6.8781e+00	6.7235e+00
5.00e+04	3.6728e+01	2.0895e+01	1.3258e+01	9.6988e+00	7.7863e+00	6.9897e+00	6.8351e+00
6.00e+04	3.6819e+01	2.0986e+01	1.3349e+01	9.7900e+00	7.8774e+00	7.0808e+00	6.9263e+00
8.00e+04	3.6963e+01	2.1130e+01	1.3493e+01	9.9338e+00	8.0213e+00	7.2247e+00	7.0701e+00
1.00e+05	3.7075e+01	2.1242e+01	1.3605e+01	1.0045e+01	8.1329e+00	7.3363e+00	7.1817e+00
1.50e+05	3.7278e+01	2.1445e+01	1.3808e+01	1.0248e+01	8.3358e+00	7.5392e+00	7.3846e+00
2.00e+05	3.7422e+01	2.1588e+01	1.3951e+01	1.0392e+01	8.4797e+00	7.6831e+00	7.5286e+00
3.00e+05	3.7625e+01	2.1791e+01	1.4154e+01	1.0595e+01	8.6825e+00	7.8859e+00	7.7314e+00
4.00e+05	3.7768e+01	2.1935e+01	1.4298e+01	1.0739e+01	8.8264e+00	8.0298e+00	7.8752e+00
5.00e+05	3.7880e+01	2.2047e+01	1.4410e+01	1.0851e+01	8.9380e+00	8.1414e+00	7.9868e+00
6.00e+05	3.7971e+01	2.2138e+01	1.4501e+01	1.0942e+01	9.0291e+00	8.2325e+00	8.0780e+00
8.00e+05	3.8115e+01	2.2282e+01	1.4645e+01	1.1086e+01	9.1730e+00	8.3764e+00	8.2218e+00
1.00e+06	3.8227e+01	2.2393e+01	1.4756e+01	1.1197e+01	9.2846e+00	8.4880e+00	8.3334e+00
1.50e+06	3.8430e+01	2.2596e+01	1.4959e+01	1.1400e+01	9.4875e+00	8.6909e+00	8.5363e+00
2.00e+06	3.8573e+01	2.2740e+01	1.5103e+01	1.1544e+01	9.6314e+00	8.8348e+00	8.6803e+00
3.00e+06	3.8776e+01	2.2943e+01	1.5306e+01	1.1747e+01	9.8342e+00	9.0376e+00	8.8831e+00
4.00e+06	3.8920e+01	2.3087e+01	1.5450e+01	1.1891e+01	9.9781e+00	9.1815e+00	9.0269e+00
5.00e+06	3.9032e+01	2.3198e+01	1.5561e+01	1.2002e+01	1.0090e+01	9.2931e+00	9.1385e+00
6.00e+06	3.9123e+01	2.3290e+01	1.5653e+01	1.2093e+01	1.0181e+01	9.3842e+00	9.2297e+00
8.00e+06	3.9267e+01	2.3433e+01	1.5796e+01	1.2237e+01	1.0325e+01	9.5281e+00	9.3735e+00
1.00e+07	3.9378e+01	2.3545e+01	1.5908e+01	1.2349e+01	1.0436e+01	9.6397e+00	9.4851e+00
1.50e+07	3.9581e+01	2.3748e+01	1.6111e+01	1.2552e+01	1.0639e+01	9.8426e+00	9.6881e+00
2.00e+07	3.9725e+01	2.3892e+01	1.6255e+01	1.2696e+01	1.0783e+01	9.9865e+00	9.8320e+00
3.00e+07	3.9928e+01	2.4095e+01	1.6458e+01	1.2898e+01	1.0986e+01	1.0189e+01	1.0035e+01
4.00e+07	4.0072e+01	2.4239e+01	1.6602e+01	1.3042e+01	1.1130e+01	1.0333e+01	1.0179e+01
5.00e+07	4.0183e+01	2.4350e+01	1.6713e+01	1.3154e+01	1.1241e+01	1.0445e+01	1.0290e+01
6.00e+07	4.0275e+01	2.4441e+01	1.6804e+01	1.3245e+01	1.1333e+01	1.0536e+01	1.0381e+01
8.00e+07	4.0418e+01	2.4585e+01	1.6948e+01	1.3389e+01	1.1476e+01	1.0680e+01	1.0525e+01

TABLE B.2 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0 and RDdh=0.001

XD 0. YD 0.1000e-02 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	1.0769e+01	5.4179e+00	2.7090e+00	1.3545e+00	5.4180e-01	1.3545e-01	2.9313e-02
1.50e-04	1.1580e+01	5.8230e+00	2.9116e+00	1.4558e+00	5.8231e-01	1.4558e-01	3.3290e-02
2.00e-04	1.2154e+01	6.1104e+00	3.0553e+00	1.5276e+00	6.1105e-01	1.5276e-01	3.6644e-02
3.00e-04	1.2965e+01	6.5156e+00	3.2578e+00	1.6289e+00	6.5157e-01	1.6289e-01	4.2272e-02
4.00e-04	1.3540e+01	6.8031e+00	3.4016e+00	1.7008e+00	6.8032e-01	1.7009e-01	4.7018e-02
5.00e-04	1.3986e+01	7.0261e+00	3.5131e+00	1.7566e+00	7.0262e-01	1.7571e-01	5.1200e-02
6.00e-04	1.4350e+01	7.2084e+00	3.6042e+00	1.8021e+00	7.2085e-01	1.8037e-01	5.4981e-02
8.00e-04	1.4926e+01	7.4960e+00	3.7480e+00	1.8740e+00	7.4961e-01	1.8796e-01	6.1696e-02
1.00e-03	1.5372e+01	7.7191e+00	3.8596e+00	1.9298e+00	7.7192e-01	1.9422e-01	6.7611e-02
1.50e-03	1.6183e+01	8.1249e+00	4.0625e+00	2.0313e+00	8.1250e-01	2.0705e-01	8.0211e-02
2.00e-03	1.6759e+01	8.4127e+00	4.2064e+00	2.1032e+00	8.4128e-01	2.1769e-01	9.0831e-02
3.00e-03	1.7570e+01	8.8182e+00	4.4092e+00	2.2046e+00	8.8184e-01	2.3551e-01	1.0865e-01
4.00e-03	1.8146e+01	9.1059e+00	4.5530e+00	2.2765e+00	9.1061e-01	2.5053e-01	1.2366e-01
5.00e-03	1.8592e+01	9.3291e+00	4.6646e+00	2.3323e+00	9.3293e-01	2.6376e-01	1.3690e-01
6.00e-03	1.8956e+01	9.5114e+00	4.7558e+00	2.3779e+00	9.5119e-01	2.7572e-01	1.4886e-01
8.00e-03	1.9532e+01	9.7991e+00	4.8996e+00	2.4498e+00	9.8015e-01	2.9696e-01	1.7010e-01
1.00e-02	1.9978e+01	1.0022e+01	5.0112e+00	2.5056e+00	1.0030e+00	3.1567e-01	1.8881e-01
1.50e-02	2.0790e+01	1.0428e+01	5.2141e+00	2.6071e+00	1.0468e+00	3.5552e-01	2.2866e-01
2.00e-02	2.1366e+01	1.0716e+01	5.3581e+00	2.6790e+00	1.0814e+00	3.8911e-01	2.6225e-01
3.00e-02	2.2177e+01	1.1122e+01	5.5608e+00	2.7804e+00	1.1380e+00	4.4545e-01	3.1859e-01
4.00e-02	2.2752e+01	1.1409e+01	5.7047e+00	2.8525e+00	1.1856e+00	4.9294e-01	3.6607e-01
5.00e-02	2.3198e+01	1.1632e+01	5.8162e+00	2.9087e+00	1.2274e+00	5.3475e-01	4.0788e-01
6.00e-02	2.3562e+01	1.1814e+01	5.9071e+00	2.9551e+00	1.2651e+00	5.7248e-01	4.4561e-01
8.00e-02	2.4133e+01	1.2100e+01	6.0498e+00	3.0305e+00	1.3317e+00	6.3913e-01	5.1226e-01
1.00e-01	2.4571e+01	1.2319e+01	6.1594e+00	3.0920e+00	1.3898e+00	6.9721e-01	5.7035e-01
1.50e-01	2.5347e+01	1.2707e+01	6.3535e+00	3.2145e+00	1.5102e+00	8.1755e-01	6.9068e-01
2.00e-01	2.5871e+01	1.2969e+01	6.4854e+00	3.3113e+00	1.6068e+00	9.1417e-01	7.8730e-01
3.00e-01	2.6557e+01	1.3312e+01	6.6632e+00	3.4619e+00	1.7573e+00	1.0647e+00	9.3782e-01
4.00e-01	2.7001e+01	1.3533e+01	6.7865e+00	3.5774e+00	1.8729e+00	1.1803e+00	1.0534e+00
5.00e-01	2.7317e+01	1.3692e+01	6.8827e+00	3.6713e+00	1.9667e+00	1.2741e+00	1.1472e+00
6.00e-01	2.7558e+01	1.3812e+01	6.9624e+00	3.7503e+00	2.0457e+00	1.3531e+00	1.2262e+00
8.00e-01	2.7906e+01	1.3988e+01	7.0910e+00	3.8785e+00	2.1739e+00	1.4813e+00	1.3544e+00
1.00e+00	2.8149e+01	1.4112e+01	7.1930e+00	3.9805e+00	2.2759e+00	1.5833e+00	1.4564e+00
1.50e+00	2.8538e+01	1.4321e+01	7.3829e+00	4.1703e+00	2.4658e+00	1.7731e+00	1.6463e+00
2.00e+00	2.8773e+01	1.4463e+01	7.5201e+00	4.3076e+00	2.6030e+00	1.9104e+00	1.7835e+00
3.00e+00	2.9057e+01	1.4660e+01	7.7162e+00	4.5036e+00	2.7991e+00	2.1065e+00	1.9796e+00
4.00e+00	2.9231e+01	1.4800e+01	7.8566e+00	4.6441e+00	2.9395e+00	2.2469e+00	2.1201e+00
5.00e+00	2.9355e+01	1.4910e+01	7.9662e+00	4.7536e+00	3.0491e+00	2.3565e+00	2.2296e+00
6.00e+00	2.9451e+01	1.5000e+01	8.0560e+00	4.8434e+00	3.1389e+00	2.4463e+00	2.3194e+00
8.00e+00	2.9597e+01	1.5142e+01	8.1981e+00	4.9856e+00	3.2810e+00	2.5884e+00	2.4615e+00
1.00e+01	2.9709e+01	1.5252e+01	8.3086e+00	5.0961e+00	3.3915e+00	2.6989e+00	2.5721e+00
1.50e+01	2.9911e+01	1.5454e+01	8.5102e+00	5.2977e+00	3.5931e+00	2.9005e+00	2.7736e+00
2.00e+01	3.0054e+01	1.5597e+01	8.6534e+00	5.4409e+00	3.7363e+00	3.0437e+00	2.9169e+00
3.00e+01	3.0256e+01	1.5799e+01	8.8555e+00	5.6430e+00	3.9384e+00	3.2458e+00	3.1190e+00
4.00e+01	3.0399e+01	1.5943e+01	8.9990e+00	5.7865e+00	4.0820e+00	3.3893e+00	3.2625e+00
5.00e+01	3.0511e+01	1.6054e+01	9.1104e+00	5.8979e+00	4.1933e+00	3.5007e+00	3.3738e+00
6.00e+01	3.0602e+01	1.6145e+01	9.2014e+00	5.9889e+00	4.2844e+00	3.5917e+00	3.4649e+00
8.00e+01	3.0745e+01	1.6289e+01	9.3451e+00	6.1326e+00	4.4280e+00	3.7354e+00	3.6085e+00

TABLE B.2 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0 and RDdh=0.001

XD 0. YD 0.1000e-02 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	3.0857e+01	1.6400e+01	9.4566e+00	6.2441e+00	4.5395e+00	3.8469e+00	3.7200e+00
1.50e+02	3.1060e+01	1.6603e+01	9.6594e+00	6.4469e+00	4.7423e+00	4.0497e+00	3.9228e+00
2.00e+02	3.1204e+01	1.6747e+01	9.8033e+00	6.5907e+00	4.8862e+00	4.1936e+00	4.0667e+00
3.00e+02	3.1406e+01	1.6950e+01	1.0006e+01	6.7935e+00	5.0889e+00	4.3963e+00	4.2694e+00
4.00e+02	3.1550e+01	1.7094e+01	1.0150e+01	6.9373e+00	5.2327e+00	4.5401e+00	4.4132e+00
5.00e+02	3.1662e+01	1.7205e+01	1.0261e+01	7.0488e+00	5.3443e+00	4.6517e+00	4.5248e+00
6.00e+02	3.1753e+01	1.7296e+01	1.0353e+01	7.1400e+00	5.4354e+00	4.7428e+00	4.6160e+00
8.00e+02	3.1897e+01	1.7440e+01	1.0496e+01	7.2838e+00	5.5793e+00	4.8866e+00	4.7598e+00
1.00e+03	3.2008e+01	1.7552e+01	1.0608e+01	7.3954e+00	5.6908e+00	4.9982e+00	4.8713e+00
1.50e+03	3.2211e+01	1.7755e+01	1.0811e+01	7.5983e+00	5.8938e+00	5.2012e+00	5.0743e+00
2.00e+03	3.2355e+01	1.7899e+01	1.0955e+01	7.7423e+00	6.0377e+00	5.3451e+00	5.2182e+00
3.00e+03	3.2558e+01	1.8101e+01	1.1158e+01	7.9450e+00	6.2405e+00	5.5479e+00	5.4210e+00
4.00e+03	3.2702e+01	1.8245e+01	1.1301e+01	8.0889e+00	6.3843e+00	5.6917e+00	5.5649e+00
5.00e+03	3.2813e+01	1.8357e+01	1.1413e+01	8.2005e+00	6.4959e+00	5.8033e+00	5.6764e+00
6.00e+03	3.2905e+01	1.8448e+01	1.1504e+01	8.2916e+00	6.5871e+00	5.8945e+00	5.7676e+00
8.00e+03	3.3048e+01	1.8592e+01	1.1648e+01	8.4355e+00	6.7309e+00	6.0383e+00	5.9114e+00
1.00e+04	3.3160e+01	1.8703e+01	1.1760e+01	8.5471e+00	6.8425e+00	6.1499e+00	6.0230e+00
1.50e+04	3.3363e+01	1.8906e+01	1.1963e+01	8.7500e+00	7.0455e+00	6.3528e+00	6.2260e+00
2.00e+04	3.3507e+01	1.9050e+01	1.2106e+01	8.8939e+00	7.1894e+00	6.4968e+00	6.3699e+00
3.00e+04	3.3710e+01	1.9253e+01	1.2309e+01	9.0967e+00	7.3922e+00	6.6996e+00	6.5727e+00
4.00e+04	3.3853e+01	1.9397e+01	1.2453e+01	9.2406e+00	7.5360e+00	6.8434e+00	6.7165e+00
5.00e+04	3.3965e+01	1.9508e+01	1.2565e+01	9.3522e+00	7.6476e+00	6.9550e+00	6.8281e+00
6.00e+04	3.4056e+01	1.9600e+01	1.2656e+01	9.4433e+00	7.7388e+00	7.0462e+00	6.9193e+00
8.00e+04	3.4200e+01	1.9743e+01	1.2800e+01	9.5872e+00	7.8826e+00	7.1900e+00	7.0631e+00
1.00e+05	3.4312e+01	1.9855e+01	1.2911e+01	9.6988e+00	7.9942e+00	7.3016e+00	7.1747e+00
1.50e+05	3.4515e+01	2.0058e+01	1.3114e+01	9.9017e+00	8.1972e+00	7.5045e+00	7.3777e+00
2.00e+05	3.4659e+01	2.0202e+01	1.3258e+01	1.0046e+01	8.3411e+00	7.6485e+00	7.5216e+00
3.00e+05	3.4861e+01	2.0405e+01	1.3461e+01	1.0248e+01	8.5439e+00	7.8513e+00	7.7244e+00
4.00e+05	3.5005e+01	2.0549e+01	1.3605e+01	1.0392e+01	8.6877e+00	7.9951e+00	7.8683e+00
5.00e+05	3.5117e+01	2.0660e+01	1.3716e+01	1.0504e+01	8.7993e+00	8.1067e+00	7.9798e+00
6.00e+05	3.5208e+01	2.0751e+01	1.3808e+01	1.0595e+01	8.8905e+00	8.1979e+00	8.0710e+00
8.00e+05	3.5352e+01	2.0895e+01	1.3951e+01	1.0739e+01	9.0343e+00	8.3417e+00	8.2148e+00
1.00e+06	3.5463e+01	2.1007e+01	1.4063e+01	1.0850e+01	9.1459e+00	8.4533e+00	8.3264e+00
1.50e+06	3.5666e+01	2.1210e+01	1.4266e+01	1.1053e+01	9.3489e+00	8.6562e+00	8.5294e+00
2.00e+06	3.5810e+01	2.1354e+01	1.4410e+01	1.1197e+01	9.4928e+00	8.8002e+00	8.6733e+00
3.00e+06	3.6013e+01	2.1556e+01	1.4613e+01	1.1400e+01	9.6956e+00	9.0030e+00	8.8761e+00
4.00e+06	3.6157e+01	2.1700e+01	1.4757e+01	1.1544e+01	9.8394e+00	9.1468e+00	9.0200e+00
5.00e+06	3.6268e+01	2.1812e+01	1.4868e+01	1.1656e+01	9.9510e+00	9.2584e+00	9.1315e+00
6.00e+06	3.6360e+01	2.1903e+01	1.4959e+01	1.1747e+01	1.0042e+01	9.3496e+00	9.2227e+00
8.00e+06	3.6503e+01	2.2047e+01	1.5103e+01	1.1891e+01	1.0186e+01	9.4934e+00	9.3666e+00
1.00e+07	3.6615e+01	2.2158e+01	1.5215e+01	1.2002e+01	1.0298e+01	9.6050e+00	9.4781e+00
1.50e+07	3.6818e+01	2.2361e+01	1.5418e+01	1.2205e+01	1.0501e+01	9.8080e+00	9.6811e+00
2.00e+07	3.6962e+01	2.2505e+01	1.5562e+01	1.2349e+01	1.0644e+01	9.9519e+00	9.8250e+00
3.00e+07	3.7165e+01	2.2708e+01	1.5764e+01	1.2552e+01	1.0847e+01	1.0155e+01	1.0028e+01
4.00e+07	3.7309e+01	2.2852e+01	1.5908e+01	1.2696e+01	1.0991e+01	1.0299e+01	1.0172e+01
5.00e+07	3.7420e+01	2.2964e+01	1.6020e+01	1.2807e+01	1.1103e+01	1.0410e+01	1.0283e+01
6.00e+07	3.7511e+01	2.3055e+01	1.6111e+01	1.2898e+01	1.1194e+01	1.0501e+01	1.0374e+01
8.00e+07	3.7655e+01	2.3199e+01	1.6255e+01	1.3042e+01	1.1338e+01	1.0645e+01	1.0518e+01

TABLE B.3 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0 and RDdh=0.005

XD 0. YD 0.5000e-02 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	2.4482e+01	1.3180e+01	7.8465e+00	5.4390e+00	4.2175e+00	3.7662e+00	3.7030e+00
1.50e+02	2.4685e+01	1.3383e+01	8.0494e+00	5.6419e+00	4.4203e+00	3.9690e+00	3.9058e+00
2.00e+02	2.4828e+01	1.3527e+01	8.1932e+00	5.7857e+00	4.5641e+00	4.1129e+00	4.0496e+00
3.00e+02	2.5031e+01	1.3730e+01	8.3959e+00	5.9884e+00	4.7669e+00	4.3156e+00	4.2524e+00
4.00e+02	2.5175e+01	1.3874e+01	8.5398e+00	6.1323e+00	4.9107e+00	4.4594e+00	4.3962e+00
5.00e+02	2.5287e+01	1.3985e+01	8.6513e+00	6.2438e+00	5.0222e+00	4.5710e+00	4.5077e+00
6.00e+02	2.5378e+01	1.4076e+01	8.7425e+00	6.3350e+00	5.1134e+00	4.6621e+00	4.5989e+00
8.00e+02	2.5522e+01	1.4220e+01	8.8863e+00	6.4788e+00	5.2572e+00	4.8060e+00	4.7427e+00
1.00e+03	2.5633e+01	1.4332e+01	8.9979e+00	6.5904e+00	5.3688e+00	4.9175e+00	4.8543e+00
1.50e+03	2.5836e+01	1.4535e+01	9.2008e+00	6.7933e+00	5.5717e+00	5.1205e+00	5.0572e+00
2.00e+03	2.5980e+01	1.4679e+01	9.3447e+00	6.9372e+00	5.7157e+00	5.2644e+00	5.2012e+00
3.00e+03	2.6183e+01	1.4881e+01	9.5475e+00	7.1400e+00	5.9184e+00	5.4672e+00	5.4039e+00
4.00e+03	2.6327e+01	1.5025e+01	9.6914e+00	7.2839e+00	6.0623e+00	5.6110e+00	5.5478e+00
5.00e+03	2.6438e+01	1.5137e+01	9.8030e+00	7.3954e+00	6.1739e+00	5.7226e+00	5.6594e+00
6.00e+03	2.6529e+01	1.5228e+01	9.8941e+00	7.4866e+00	6.2650e+00	5.8138e+00	5.7505e+00
8.00e+03	2.6673e+01	1.5372e+01	1.0038e+01	7.6305e+00	6.4089e+00	5.9576e+00	5.8944e+00
1.00e+04	2.6785e+01	1.5483e+01	1.0150e+01	7.7420e+00	6.5205e+00	6.0692e+00	6.0060e+00
1.50e+04	2.6988e+01	1.5686e+01	1.0353e+01	7.9450e+00	6.7234e+00	6.2722e+00	6.2089e+00
2.00e+04	2.7132e+01	1.5830e+01	1.0496e+01	8.0889e+00	6.8673e+00	6.4161e+00	6.3528e+00
3.00e+04	2.7334e+01	1.6033e+01	1.0699e+01	8.2917e+00	7.0701e+00	6.6189e+00	6.5556e+00
4.00e+04	2.7478e+01	1.6177e+01	1.0843e+01	8.4356e+00	7.2140e+00	6.7627e+00	6.6995e+00
5.00e+04	2.7590e+01	1.6288e+01	1.0955e+01	8.5471e+00	7.3256e+00	6.8743e+00	6.8111e+00
6.00e+04	2.7681e+01	1.6380e+01	1.1046e+01	8.6383e+00	7.4167e+00	6.9655e+00	6.9022e+00
8.00e+04	2.7825e+01	1.6524e+01	1.1190e+01	8.7822e+00	7.5606e+00	7.1093e+00	7.0461e+00
1.00e+05	2.7936e+01	1.6635e+01	1.1301e+01	8.8937e+00	7.6722e+00	7.2209e+00	7.1577e+00
1.50e+05	2.8139e+01	1.6838e+01	1.1504e+01	9.0967e+00	7.8751e+00	7.4239e+00	7.3606e+00
2.00e+05	2.8283e+01	1.6982e+01	1.1648e+01	9.2406e+00	8.0190e+00	7.5678e+00	7.5045e+00
3.00e+05	2.8486e+01	1.7185e+01	1.1851e+01	9.4434e+00	8.2218e+00	7.7706e+00	7.7073e+00
4.00e+05	2.8630e+01	1.7329e+01	1.1995e+01	9.5873e+00	8.3657e+00	7.9144e+00	7.8512e+00
5.00e+05	2.8742e+01	1.7440e+01	1.2106e+01	9.6988e+00	8.4773e+00	8.0260e+00	7.9628e+00
6.00e+05	2.8833e+01	1.7531e+01	1.2198e+01	9.7900e+00	8.5684e+00	8.1172e+00	8.0539e+00
8.00e+05	2.8977e+01	1.7675e+01	1.2341e+01	9.9339e+00	8.7123e+00	8.2610e+00	8.1978e+00
1.00e+06	2.9088e+01	1.7787e+01	1.2453e+01	1.0045e+01	8.8239e+00	8.3726e+00	8.3094e+00
1.50e+06	2.9291e+01	1.7990e+01	1.2656e+01	1.0248e+01	9.0268e+00	8.5756e+00	8.5123e+00
2.00e+06	2.9435e+01	1.8134e+01	1.2800e+01	1.0392e+01	9.1707e+00	8.7195e+00	8.6563e+00
3.00e+06	2.9638e+01	1.8336e+01	1.3003e+01	1.0595e+01	9.3735e+00	8.9223e+00	8.8590e+00
4.00e+06	2.9782e+01	1.8480e+01	1.3146e+01	1.0739e+01	9.5174e+00	9.0661e+00	9.0029e+00
5.00e+06	2.9893e+01	1.8592e+01	1.3258e+01	1.0851e+01	9.6290e+00	9.1777e+00	9.1145e+00
6.00e+06	2.9984e+01	1.8683e+01	1.3349e+01	1.0942e+01	9.7201e+00	9.2689e+00	9.2056e+00
8.00e+06	3.0128e+01	1.8827e+01	1.3493e+01	1.1086e+01	9.8640e+00	9.4127e+00	9.3495e+00
1.00e+07	3.0240e+01	1.8938e+01	1.3605e+01	1.1197e+01	9.9756e+00	9.5243e+00	9.4611e+00
1.50e+07	3.0443e+01	1.9141e+01	1.3808e+01	1.1400e+01	1.0179e+01	9.7273e+00	9.6640e+00
2.00e+07	3.0587e+01	1.9285e+01	1.3952e+01	1.1544e+01	1.0322e+01	9.8712e+00	9.8080e+00
3.00e+07	3.0790e+01	1.9488e+01	1.4154e+01	1.1747e+01	1.0525e+01	1.0074e+01	1.0011e+01
4.00e+07	3.0933e+01	1.9632e+01	1.4298e+01	1.1891e+01	1.0669e+01	1.0218e+01	1.0155e+01
5.00e+07	3.1045e+01	1.9744e+01	1.4410e+01	1.2002e+01	1.0781e+01	1.0329e+01	1.0266e+01
6.00e+07	3.1136e+01	1.9835e+01	1.4501e+01	1.2093e+01	1.0872e+01	1.0421e+01	1.0357e+01
8.00e+07	3.1280e+01	1.9979e+01	1.4645e+01	1.2237e+01	1.1016e+01	1.0564e+01	1.0501e+01

TABLE B.4 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0 and RDdh=0.01

XD 0. YD 0.1000e-01 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	2.0883e+00	1.0442e+00	5.2209e-01	2.6104e-01	1.0442e-01	2.6104e-02	6.7131e-03
1.50e-04	2.7493e+00	1.3746e+00	6.8732e-01	3.4366e-01	1.3746e-01	3.4366e-02	9.9624e-03
2.00e-04	3.2473e+00	1.6236e+00	8.1182e-01	4.0591e-01	1.6236e-01	4.0591e-02	1.2870e-02
3.00e-04	3.9792e+00	1.9896e+00	9.9481e-01	4.9741e-01	1.9896e-01	4.9742e-02	1.7957e-02
4.00e-04	4.5145e+00	2.2572e+00	1.1286e+00	5.6431e-01	2.2572e-01	5.6444e-02	2.2376e-02
5.00e-04	4.9365e+00	2.4682e+00	1.2341e+00	6.1706e-01	2.4682e-01	6.1760e-02	2.6333e-02
6.00e-04	5.2849e+00	2.6424e+00	1.3212e+00	6.6061e-01	2.6424e-01	6.6208e-02	2.9947e-02
8.00e-04	5.8398e+00	2.9199e+00	1.4599e+00	7.2997e-01	2.9199e-01	7.3533e-02	3.6426e-02
1.00e-03	6.2738e+00	3.1369e+00	1.5684e+00	7.8422e-01	3.1369e-01	7.9628e-02	4.2180e-02
1.50e-03	7.0691e+00	3.5345e+00	1.7673e+00	8.8363e-01	3.5345e-01	9.2192e-02	5.4527e-02
2.00e-03	7.6365e+00	3.8182e+00	1.9091e+00	9.5456e-01	3.8182e-01	1.0269e-01	6.4997e-02
3.00e-03	8.4393e+00	4.2197e+00	2.1098e+00	1.0549e+00	4.2197e-01	1.2033e-01	8.2632e-02
4.00e-03	9.0106e+00	4.5053e+00	2.2527e+00	1.1263e+00	4.5053e-01	1.3524e-01	9.7544e-02
5.00e-03	9.4545e+00	4.7272e+00	2.3636e+00	1.1818e+00	4.7273e-01	1.4840e-01	1.1070e-01
6.00e-03	9.8175e+00	4.9087e+00	2.4544e+00	1.2272e+00	4.9091e-01	1.6030e-01	1.2261e-01
8.00e-03	1.0391e+01	5.1954e+00	2.5977e+00	1.2988e+00	5.1977e-01	1.8147e-01	1.4377e-01
1.00e-02	1.0836e+01	5.4179e+00	2.7090e+00	1.3545e+00	5.4254e-01	2.0013e-01	1.6243e-01
1.50e-02	1.1646e+01	5.8230e+00	2.9115e+00	1.4557e+00	5.8630e-01	2.3990e-01	2.0220e-01
2.00e-02	1.2221e+01	6.1104e+00	3.0552e+00	1.5276e+00	6.2081e-01	2.7344e-01	2.3574e-01
3.00e-02	1.3031e+01	6.5156e+00	3.2578e+00	1.6289e+00	6.7741e-01	3.2972e-01	2.9203e-01
4.00e-02	1.3606e+01	6.8030e+00	3.4015e+00	1.7009e+00	7.2488e-01	3.7717e-01	3.3948e-01
5.00e-02	1.4052e+01	7.0259e+00	3.5129e+00	1.7570e+00	7.6667e-01	4.1896e-01	3.8126e-01
6.00e-02	1.4415e+01	7.2077e+00	3.6038e+00	1.8035e+00	8.0438e-01	4.5667e-01	4.1898e-01
8.00e-02	1.4986e+01	7.4931e+00	3.7465e+00	1.8788e+00	8.7101e-01	5.2330e-01	4.8560e-01
1.00e-01	1.5424e+01	7.7121e+00	3.8560e+00	1.9403e+00	9.2907e-01	5.8136e-01	5.4367e-01
1.50e-01	1.6200e+01	8.0999e+00	4.0501e+00	2.0628e+00	1.0494e+00	7.0168e-01	6.6398e-01
2.00e-01	1.6724e+01	8.3619e+00	4.1820e+00	2.1596e+00	1.1460e+00	7.9829e-01	7.6059e-01
3.00e-01	1.7410e+01	8.7051e+00	4.3598e+00	2.3101e+00	1.2965e+00	9.4879e-01	9.1110e-01
4.00e-01	1.7853e+01	8.9267e+00	4.4831e+00	2.4257e+00	1.4121e+00	1.0643e+00	1.0267e+00
5.00e-01	1.8170e+01	9.0851e+00	4.5793e+00	2.5195e+00	1.5059e+00	1.1582e+00	1.1205e+00
6.00e-01	1.8411e+01	9.2057e+00	4.6590e+00	2.5985e+00	1.5849e+00	1.2372e+00	1.1995e+00
8.00e-01	1.8759e+01	9.3808e+00	4.7875e+00	2.7267e+00	1.7131e+00	1.3654e+00	1.3277e+00
1.00e+00	1.9002e+01	9.5054e+00	4.8896e+00	2.8287e+00	1.8151e+00	1.4674e+00	1.4297e+00
1.50e+00	1.9390e+01	9.7146e+00	5.0794e+00	3.0186e+00	2.0049e+00	1.6572e+00	1.6195e+00
2.00e+00	1.9626e+01	9.8559e+00	5.2167e+00	3.1558e+00	2.1422e+00	1.7945e+00	1.7568e+00
3.00e+00	1.9910e+01	1.0053e+01	5.4127e+00	3.3519e+00	2.3382e+00	1.9905e+00	1.9528e+00
4.00e+00	2.0084e+01	1.0194e+01	5.5532e+00	3.4923e+00	2.4787e+00	2.1310e+00	2.0933e+00
5.00e+00	2.0208e+01	1.0303e+01	5.6627e+00	3.6019e+00	2.5882e+00	2.2405e+00	2.2028e+00
6.00e+00	2.0304e+01	1.0393e+01	5.7525e+00	3.6917e+00	2.6780e+00	2.3303e+00	2.2926e+00
8.00e+00	2.0450e+01	1.0535e+01	5.8946e+00	3.8338e+00	2.8202e+00	2.4724e+00	2.4348e+00
1.00e+01	2.0561e+01	1.0646e+01	6.0052e+00	3.9443e+00	2.9307e+00	2.5830e+00	2.5453e+00
1.50e+01	2.0763e+01	1.0847e+01	6.2068e+00	4.1459e+00	3.1323e+00	2.7846e+00	2.7469e+00
2.00e+01	2.0907e+01	1.0990e+01	6.3500e+00	4.2891e+00	3.2755e+00	2.9278e+00	2.8901e+00
3.00e+01	2.1109e+01	1.1193e+01	6.5521e+00	4.4912e+00	3.4776e+00	3.1299e+00	3.0922e+00
4.00e+01	2.1252e+01	1.1336e+01	6.6956e+00	4.6348e+00	3.6211e+00	3.2734e+00	3.2357e+00
5.00e+01	2.1364e+01	1.1447e+01	6.8070e+00	4.7461e+00	3.7325e+00	3.3848e+00	3.3471e+00
6.00e+01	2.1455e+01	1.1538e+01	6.8980e+00	4.8372e+00	3.8235e+00	3.4758e+00	3.4381e+00
8.00e+01	2.1598e+01	1.1682e+01	7.0417e+00	4.9808e+00	3.9672e+00	3.6195e+00	3.5818e+00

TABLE B.4 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0 and RDdh=0.01

XD 0. YD 0.1000e-01 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	2.1710e+01	1.1794e+01	7.1531e+00	5.0923e+00	4.0787e+00	3.7309e+00	3.6933e+00
1.50e+02	2.1913e+01	1.1996e+01	7.3560e+00	5.2951e+00	4.2815e+00	3.9338e+00	3.8961e+00
2.00e+02	2.2056e+01	1.2140e+01	7.4998e+00	5.4390e+00	4.4253e+00	4.0776e+00	4.0399e+00
3.00e+02	2.2259e+01	1.2343e+01	7.7025e+00	5.6417e+00	4.6281e+00	4.2803e+00	4.2427e+00
4.00e+02	2.2403e+01	1.2487e+01	7.8464e+00	5.7855e+00	4.7719e+00	4.4242e+00	4.3865e+00
5.00e+02	2.2515e+01	1.2598e+01	7.9579e+00	5.8971e+00	4.8834e+00	4.5357e+00	4.4980e+00
6.00e+02	2.2606e+01	1.2690e+01	8.0491e+00	5.9882e+00	4.9746e+00	4.6269e+00	4.5892e+00
8.00e+02	2.2750e+01	1.2833e+01	8.1929e+00	6.1321e+00	5.1184e+00	4.7707e+00	4.7330e+00
1.00e+03	2.2861e+01	1.2945e+01	8.3045e+00	6.2436e+00	5.2300e+00	4.8823e+00	4.8446e+00
1.50e+03	2.3064e+01	1.3148e+01	8.5074e+00	6.4466e+00	5.4329e+00	5.0852e+00	5.0475e+00
2.00e+03	2.3208e+01	1.3292e+01	8.6513e+00	6.5905e+00	5.5769e+00	5.2291e+00	5.1914e+00
3.00e+03	2.3411e+01	1.3495e+01	8.8541e+00	6.7933e+00	5.7796e+00	5.4319e+00	5.3942e+00
4.00e+03	2.3555e+01	1.3638e+01	8.9980e+00	6.9371e+00	5.9235e+00	5.5758e+00	5.5381e+00
5.00e+03	2.3666e+01	1.3750e+01	9.1096e+00	7.0487e+00	6.0351e+00	5.6874e+00	5.6497e+00
6.00e+03	2.3757e+01	1.3841e+01	9.2007e+00	7.1399e+00	6.1262e+00	5.7785e+00	5.7408e+00
8.00e+03	2.3901e+01	1.3985e+01	9.3446e+00	7.2837e+00	6.2701e+00	5.9224e+00	5.8847e+00
1.00e+04	2.4013e+01	1.4097e+01	9.4561e+00	7.3953e+00	6.3817e+00	6.0339e+00	5.9963e+00
1.50e+04	2.4216e+01	1.4300e+01	9.6591e+00	7.5983e+00	6.5846e+00	6.2369e+00	6.1992e+00
2.00e+04	2.4360e+01	1.4443e+01	9.8030e+00	7.7422e+00	6.7285e+00	6.3808e+00	6.3431e+00
3.00e+04	2.4562e+01	1.4646e+01	1.0006e+01	7.9450e+00	6.9313e+00	6.5836e+00	6.5459e+00
4.00e+04	2.4706e+01	1.4790e+01	1.0150e+01	8.0888e+00	7.0752e+00	6.7275e+00	6.6898e+00
5.00e+04	2.4818e+01	1.4902e+01	1.0261e+01	8.2004e+00	7.1868e+00	6.8391e+00	6.8014e+00
6.00e+04	2.4909e+01	1.4993e+01	1.0352e+01	8.2916e+00	7.2779e+00	6.9302e+00	6.8925e+00
8.00e+04	2.5053e+01	1.5137e+01	1.0496e+01	8.4354e+00	7.4218e+00	7.0741e+00	7.0364e+00
1.00e+05	2.5164e+01	1.5248e+01	1.0608e+01	8.5470e+00	7.5334e+00	7.1856e+00	7.1480e+00
1.50e+05	2.5367e+01	1.5451e+01	1.0811e+01	8.7500e+00	7.7363e+00	7.3886e+00	7.3509e+00
2.00e+05	2.5511e+01	1.5595e+01	1.0955e+01	8.8939e+00	7.8802e+00	7.5325e+00	7.4948e+00
3.00e+05	2.5714e+01	1.5798e+01	1.1158e+01	9.0967e+00	8.0830e+00	7.7353e+00	7.6976e+00
4.00e+05	2.5858e+01	1.5942e+01	1.1301e+01	9.2405e+00	8.2269e+00	7.8792e+00	7.8415e+00
5.00e+05	2.5970e+01	1.6053e+01	1.1413e+01	9.3521e+00	8.3385e+00	7.9908e+00	7.9531e+00
6.00e+05	2.6061e+01	1.6145e+01	1.1504e+01	9.4433e+00	8.4296e+00	8.0819e+00	8.0442e+00
8.00e+05	2.6205e+01	1.6288e+01	1.1648e+01	9.5871e+00	8.5735e+00	8.2258e+00	8.1881e+00
1.00e+06	2.6316e+01	1.6400e+01	1.1760e+01	9.6987e+00	8.6851e+00	8.3373e+00	8.2997e+00
1.50e+06	2.6519e+01	1.6603e+01	1.1963e+01	9.9017e+00	8.8880e+00	8.5403e+00	8.5026e+00
2.00e+06	2.6663e+01	1.6747e+01	1.2106e+01	1.0046e+01	9.0319e+00	8.6842e+00	8.6465e+00
3.00e+06	2.6866e+01	1.6950e+01	1.2309e+01	1.0248e+01	9.2347e+00	8.8870e+00	8.8493e+00
4.00e+06	2.7010e+01	1.7094e+01	1.2453e+01	1.0392e+01	9.3786e+00	9.0309e+00	8.9932e+00
5.00e+06	2.7121e+01	1.7205e+01	1.2565e+01	1.0504e+01	9.4902e+00	9.1425e+00	9.1048e+00
6.00e+06	2.7212e+01	1.7296e+01	1.2656e+01	1.0595e+01	9.5813e+00	9.2336e+00	9.1959e+00
8.00e+06	2.7356e+01	1.7440e+01	1.2800e+01	1.0739e+01	9.7252e+00	9.3775e+00	9.3398e+00
1.00e+07	2.7468e+01	1.7552e+01	1.2911e+01	1.0850e+01	9.8368e+00	9.4891e+00	9.4514e+00
1.50e+07	2.7671e+01	1.7755e+01	1.3114e+01	1.1053e+01	1.0040e+01	9.6920e+00	9.6543e+00
2.00e+07	2.7815e+01	1.7899e+01	1.3258e+01	1.1197e+01	1.0184e+01	9.8359e+00	9.7982e+00
3.00e+07	2.8018e+01	1.8101e+01	1.3461e+01	1.1400e+01	1.0386e+01	1.0039e+01	1.0001e+01
4.00e+07	2.8161e+01	1.8245e+01	1.3605e+01	1.1544e+01	1.0530e+01	1.0183e+01	1.0145e+01
5.00e+07	2.8273e+01	1.8357e+01	1.3716e+01	1.1656e+01	1.0642e+01	1.0294e+01	1.0256e+01
6.00e+07	2.8364e+01	1.8448e+01	1.3808e+01	1.1747e+01	1.0733e+01	1.0385e+01	1.0348e+01
8.00e+07	2.8508e+01	1.8592e+01	1.3951e+01	1.1891e+01	1.0877e+01	1.0529e+01	1.0491e+01

TABLE B.5 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0 and RDdh=0.05

XD 0.	YD 0.5000e-01	ZD 0.	ZWH 0.5000				
TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	5.4112e-04	2.7056e-04	1.3528e-04	6.7640e-05	2.7056e-05	6.7640e-06	2.2565e-06
1.50e-04	6.2002e-03	3.1001e-03	1.5500e-03	7.7502e-04	3.1001e-04	7.7502e-05	3.0997e-05
2.00e-04	2.2296e-02	1.1148e-02	5.5741e-03	2.7870e-03	1.1148e-03	2.7870e-04	1.2615e-04
3.00e-04	8.7205e-02	4.3602e-02	2.1801e-02	1.0901e-02	4.3602e-03	1.0902e-03	5.8482e-04
4.00e-04	1.8237e-01	9.1186e-02	4.5593e-02	2.2796e-02	9.1186e-03	2.2820e-03	1.3752e-03
5.00e-04	2.9281e-01	1.4641e-01	7.3204e-02	3.6602e-02	1.4641e-02	3.6737e-03	2.4137e-03
6.00e-04	4.0933e-01	2.0466e-01	1.0233e-01	5.1166e-02	2.0466e-02	5.1616e-03	3.6243e-03
8.00e-04	6.4269e-01	3.2134e-01	1.6067e-01	8.0336e-02	3.2134e-02	8.2454e-03	6.3569e-03
1.00e-03	8.6448e-01	4.3224e-01	2.1612e-01	1.0806e-01	4.3224e-02	1.1363e-02	9.3019e-03
1.50e-03	1.3505e+00	6.7526e-01	3.3763e-01	1.6881e-01	6.7526e-02	1.9065e-02	1.6875e-02
2.00e-03	1.7513e+00	8.7567e-01	4.3784e-01	2.1892e-01	8.7567e-02	2.6489e-02	2.4281e-02
3.00e-03	2.3789e+00	1.1895e+00	5.9473e-01	2.9737e-01	1.1895e-01	4.0300e-02	3.8090e-02
4.00e-03	2.8591e+00	1.4296e+00	7.1478e-01	3.5739e-01	1.4296e-01	5.2841e-02	5.0631e-02
5.00e-03	3.2471e+00	1.6236e+00	8.1178e-01	4.0589e-01	1.6236e-01	6.4348e-02	6.2137e-02
6.00e-03	3.5724e+00	1.7862e+00	8.9310e-01	4.4655e-01	1.7865e-01	7.5020e-02	7.2810e-02
8.00e-03	4.0980e+00	2.0490e+00	1.0245e+00	5.1225e-01	2.0511e-01	9.4428e-02	9.2218e-02
1.00e-02	4.5141e+00	2.2571e+00	1.1285e+00	5.6427e-01	2.2641e-01	1.1188e-01	1.0967e-01
1.50e-02	5.2852e+00	2.6426e+00	1.3213e+00	6.6065e-01	2.6806e-01	1.4974e-01	1.4753e-01
2.00e-02	5.8404e+00	2.9202e+00	1.4601e+00	7.3005e-01	3.0139e-01	1.8214e-01	1.7993e-01
3.00e-02	6.6310e+00	3.3155e+00	1.6578e+00	8.2889e-01	3.5662e-01	2.3706e-01	2.3485e-01
4.00e-02	7.1960e+00	3.5980e+00	1.7990e+00	8.9964e-01	4.0328e-01	2.8370e-01	2.8149e-01
5.00e-02	7.6358e+00	3.8179e+00	1.9089e+00	9.5503e-01	4.4451e-01	3.2493e-01	3.2272e-01
6.00e-02	7.9953e+00	3.9977e+00	1.9988e+00	1.0009e+00	4.8181e-01	3.6223e-01	3.6002e-01
8.00e-02	8.5612e+00	4.2806e+00	2.1403e+00	1.0756e+00	5.4786e-01	4.2828e-01	4.2607e-01
1.00e-01	8.9963e+00	4.4981e+00	2.2491e+00	1.1367e+00	6.0554e-01	4.8596e-01	4.8375e-01
1.50e-01	9.7682e+00	4.8841e+00	2.4422e+00	1.2586e+00	7.2526e-01	6.0568e-01	6.0347e-01
2.00e-01	1.0290e+01	5.1451e+00	2.5736e+00	1.3551e+00	8.2154e-01	7.0196e-01	6.9975e-01
3.00e-01	1.0975e+01	5.4875e+00	2.7510e+00	1.5053e+00	9.7167e-01	8.5209e-01	8.4988e-01
4.00e-01	1.1417e+01	5.7087e+00	2.8741e+00	1.6206e+00	1.0870e+00	9.6745e-01	9.6524e-01
5.00e-01	1.1734e+01	5.8669e+00	2.9701e+00	1.7143e+00	1.1807e+00	1.0612e+00	1.0589e+00
6.00e-01	1.1974e+01	5.9874e+00	3.0498e+00	1.7932e+00	1.2596e+00	1.1401e+00	1.1378e+00
8.00e-01	1.2322e+01	6.1623e+00	3.1782e+00	1.9213e+00	1.3877e+00	1.2682e+00	1.2660e+00
1.00e+00	1.2565e+01	6.2868e+00	3.2801e+00	2.0232e+00	1.4897e+00	1.3701e+00	1.3679e+00
1.50e+00	1.2953e+01	6.4959e+00	3.4699e+00	2.2130e+00	1.6794e+00	1.5598e+00	1.5576e+00
2.00e+00	1.3189e+01	6.6372e+00	3.6071e+00	2.3502e+00	1.8166e+00	1.6970e+00	1.6948e+00
3.00e+00	1.3473e+01	6.8343e+00	3.8031e+00	2.5462e+00	2.0126e+00	1.8930e+00	1.8908e+00
4.00e+00	1.3647e+01	6.9748e+00	3.9435e+00	2.6866e+00	2.1531e+00	2.0335e+00	2.0313e+00
5.00e+00	1.3770e+01	7.0843e+00	4.0531e+00	2.7962e+00	2.2626e+00	2.1430e+00	2.1408e+00
6.00e+00	1.3866e+01	7.1741e+00	4.1428e+00	2.8859e+00	2.3524e+00	2.2328e+00	2.2306e+00
8.00e+00	1.4012e+01	7.3162e+00	4.2850e+00	3.0281e+00	2.4945e+00	2.3749e+00	2.3727e+00
1.00e+01	1.4124e+01	7.4268e+00	4.3955e+00	3.1386e+00	2.6050e+00	2.4854e+00	2.4832e+00
1.50e+01	1.4326e+01	7.6283e+00	4.5971e+00	3.3402e+00	2.8066e+00	2.6870e+00	2.6848e+00
2.00e+01	1.4469e+01	7.7716e+00	4.7403e+00	3.4834e+00	2.9498e+00	2.8302e+00	2.8280e+00
3.00e+01	1.4671e+01	7.9737e+00	4.9424e+00	3.6855e+00	3.1519e+00	3.0323e+00	3.0301e+00
4.00e+01	1.4815e+01	8.1172e+00	5.0859e+00	3.8290e+00	3.2954e+00	3.1758e+00	3.1736e+00
5.00e+01	1.4926e+01	8.2285e+00	5.1973e+00	3.9404e+00	3.4068e+00	3.2872e+00	3.2850e+00
6.00e+01	1.5017e+01	8.3196e+00	5.2883e+00	4.0314e+00	3.4978e+00	3.3782e+00	3.3760e+00
8.00e+01	1.5161e+01	8.4632e+00	5.4320e+00	4.1751e+00	3.6415e+00	3.5219e+00	3.5197e+00

Pressure for a Uniform Flux Drainhole
Slab Reservoir for XD=0 and RDdh=0.05

XD 0.

YD 0.5000e-01 ZD 0. ZWH 0.5000
LD= 1.250d-01 2.500d-01 5.000d-01 1.000d+00 2.500d+00 1.000d+01 5.000d+01

TD							
1.00e+02	1.5272e+01	8.5747e+00	5.5434e+00	4.2865e+00	3.7530e+00	3.6334e+00	3.6312e+00
1.50e+02	1.5475e+01	8.7775e+00	5.7462e+00	4.4894e+00	3.9558e+00	3.8362e+00	3.8340e+00
2.00e+02	1.5619e+01	8.9214e+00	5.8901e+00	4.6332e+00	4.0996e+00	3.9800e+00	3.9778e+00
3.00e+02	1.5822e+01	9.1241e+00	6.0928e+00	4.8359e+00	4.3023e+00	4.1828e+00	4.1806e+00
4.00e+02	1.5965e+01	9.2679e+00	6.2366e+00	4.9798e+00	4.4462e+00	4.3266e+00	4.3244e+00
5.00e+02	1.6077e+01	9.3795e+00	6.3482e+00	5.0913e+00	4.5577e+00	4.4382e+00	4.4359e+00
6.00e+02	1.6168e+01	9.4706e+00	6.4394e+00	5.1825e+00	4.6489e+00	4.5293e+00	4.5271e+00
8.00e+02	1.6312e+01	9.6145e+00	6.5832e+00	5.3263e+00	4.7927e+00	4.6731e+00	4.6709e+00
1.00e+03	1.6423e+01	9.7260e+00	6.6947e+00	5.4379e+00	4.9043e+00	4.7847e+00	4.7825e+00
1.50e+03	1.6626e+01	9.9290e+00	6.8977e+00	5.6408e+00	5.1072e+00	4.9876e+00	4.9854e+00
2.00e+03	1.6770e+01	1.0073e+01	7.0416e+00	5.7847e+00	5.2511e+00	5.1316e+00	5.1294e+00
3.00e+03	1.6973e+01	1.0276e+01	7.2444e+00	5.9875e+00	5.4539e+00	5.3343e+00	5.3321e+00
4.00e+03	1.7117e+01	1.0420e+01	7.3883e+00	6.1314e+00	5.5978e+00	5.4782e+00	5.4760e+00
5.00e+03	1.7229e+01	1.0531e+01	7.4998e+00	6.2429e+00	5.7094e+00	5.5898e+00	5.5876e+00
6.00e+03	1.7320e+01	1.0622e+01	7.5910e+00	6.3341e+00	5.8005e+00	5.6809e+00	5.6787e+00
8.00e+03	1.7464e+01	1.0766e+01	7.7348e+00	6.4780e+00	5.9444e+00	5.8248e+00	5.8226e+00
1.00e+04	1.7575e+01	1.0878e+01	7.8464e+00	6.5895e+00	6.0559e+00	5.9364e+00	5.9342e+00
1.50e+04	1.7778e+01	1.1081e+01	8.0494e+00	6.7925e+00	6.2589e+00	6.1393e+00	6.1371e+00
2.00e+04	1.7922e+01	1.1225e+01	8.1933e+00	6.9364e+00	6.4028e+00	6.2832e+00	6.2810e+00
3.00e+04	1.8125e+01	1.1427e+01	8.3961e+00	7.1392e+00	6.6056e+00	6.4860e+00	6.4838e+00
4.00e+04	1.8269e+01	1.1571e+01	8.5399e+00	7.2831e+00	6.7495e+00	6.6299e+00	6.6277e+00
5.00e+04	1.8380e+01	1.1683e+01	8.6515e+00	7.3946e+00	6.8611e+00	6.7415e+00	6.7393e+00
6.00e+04	1.8471e+01	1.1774e+01	8.7427e+00	7.4858e+00	6.9522e+00	6.8326e+00	6.8304e+00
8.00e+04	1.8615e+01	1.1918e+01	8.8865e+00	7.6297e+00	7.0961e+00	6.9765e+00	6.9743e+00
1.00e+05	1.8727e+01	1.2029e+01	8.9981e+00	7.7412e+00	7.2076e+00	7.0881e+00	7.0859e+00
1.50e+05	1.8930e+01	1.2232e+01	9.2011e+00	7.9442e+00	7.4106e+00	7.2910e+00	7.2888e+00
2.00e+05	1.9074e+01	1.2376e+01	9.3450e+00	8.0881e+00	7.5545e+00	7.4350e+00	7.4327e+00
3.00e+05	1.9277e+01	1.2579e+01	9.5478e+00	8.2909e+00	7.7573e+00	7.6377e+00	7.6355e+00
4.00e+05	1.9420e+01	1.2723e+01	9.6917e+00	8.4348e+00	7.9012e+00	7.7816e+00	7.7794e+00
5.00e+05	1.9532e+01	1.2835e+01	9.8032e+00	8.5463e+00	8.0128e+00	7.8932e+00	7.8910e+00
6.00e+05	1.9623e+01	1.2926e+01	9.8944e+00	8.6375e+00	8.1039e+00	7.9843e+00	7.9821e+00
8.00e+05	1.9767e+01	1.3070e+01	1.0038e+01	8.7814e+00	8.2478e+00	8.1282e+00	8.1260e+00
1.00e+06	1.9879e+01	1.3181e+01	1.0150e+01	8.8929e+00	8.3593e+00	8.2398e+00	8.2376e+00
1.50e+06	2.0082e+01	1.3384e+01	1.0353e+01	9.0959e+00	8.5623e+00	8.4427e+00	8.4405e+00
2.00e+06	2.0225e+01	1.3528e+01	1.0497e+01	9.2398e+00	8.7062e+00	8.5867e+00	8.5844e+00
3.00e+06	2.0428e+01	1.3731e+01	1.0699e+01	9.4426e+00	8.9090e+00	8.7894e+00	8.7872e+00
4.00e+06	2.0572e+01	1.3875e+01	1.0843e+01	9.5865e+00	9.0529e+00	8.9333e+00	8.9311e+00
5.00e+06	2.0684e+01	1.3986e+01	1.0955e+01	9.6981e+00	9.1645e+00	9.0449e+00	9.0427e+00
6.00e+06	2.0775e+01	1.4077e+01	1.1046e+01	9.7892e+00	9.2556e+00	9.1361e+00	9.1338e+00
8.00e+06	2.0919e+01	1.4221e+01	1.1190e+01	9.9331e+00	9.3995e+00	9.2799e+00	9.2777e+00
1.00e+07	2.1030e+01	1.4333e+01	1.1302e+01	1.0045e+01	9.5111e+00	9.3915e+00	9.3893e+00
1.50e+07	2.1233e+01	1.4536e+01	1.1504e+01	1.0248e+01	9.7140e+00	9.5944e+00	9.5922e+00
2.00e+07	2.1377e+01	1.4680e+01	1.1648e+01	1.0392e+01	9.8579e+00	9.7384e+00	9.7361e+00
3.00e+07	2.1580e+01	1.4882e+01	1.1851e+01	1.0594e+01	1.0061e+01	9.9411e+00	9.9389e+00
4.00e+07	2.1724e+01	1.5026e+01	1.1995e+01	1.0738e+01	1.0205e+01	1.0085e+01	1.0083e+01
5.00e+07	2.1835e+01	1.5138e+01	1.2107e+01	1.0850e+01	1.0316e+01	1.0197e+01	1.0194e+01
6.00e+07	2.1927e+01	1.5229e+01	1.2198e+01	1.0941e+01	1.0407e+01	1.0288e+01	1.0286e+01
8.00e+07	2.2070e+01	1.5373e+01	1.2342e+01	1.1085e+01	1.0551e+01	1.0432e+01	1.0429e+01

TABLE B.6 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.25 and RDdh=0.0005

XD 0.2500 YD 0.5000e-03 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	1.3529e+01	6.8026e+00	3.4014e+00	1.7007e+00	6.8027e-01	1.7007e-01	3.6243e-02
1.50e-04	1.4340e+01	7.2083e+00	3.6042e+00	1.8021e+00	7.2084e-01	1.8021e-01	4.0226e-02
2.00e-04	1.4916e+01	7.4960e+00	3.7481e+00	1.8740e+00	7.4962e-01	1.8740e-01	4.3584e-02
3.00e-04	1.5727e+01	7.9015e+00	3.9508e+00	1.9754e+00	7.9016e-01	1.9754e-01	4.9217e-02
4.00e-04	1.6302e+01	8.1892e+00	4.0947e+00	2.0473e+00	8.1893e-01	2.0475e-01	5.3965e-02
5.00e-04	1.6748e+01	8.4123e+00	4.2062e+00	2.1031e+00	8.4124e-01	2.1037e-01	5.8149e-02
6.00e-04	1.7113e+01	8.5946e+00	4.2974e+00	2.1487e+00	8.5948e-01	2.1502e-01	6.1931e-02
8.00e-04	1.7688e+01	8.8823e+00	4.4412e+00	2.2206e+00	8.8824e-01	2.2262e-01	6.8647e-02
1.00e-03	1.8135e+01	9.1054e+00	4.5528e+00	2.2764e+00	9.1056e-01	2.2888e-01	7.4564e-02
1.50e-03	1.8946e+01	9.5113e+00	4.7557e+00	2.3779e+00	9.5115e-01	2.4171e-01	8.7166e-02
2.00e-03	1.9522e+01	9.7992e+00	4.8996e+00	2.4498e+00	9.7993e-01	2.5236e-01	9.7788e-02
3.00e-03	2.0333e+01	1.0205e+01	5.1024e+00	2.5512e+00	1.0205e+00	2.7018e-01	1.1560e-01
4.00e-03	2.0909e+01	1.0492e+01	5.2463e+00	2.6231e+00	1.0493e+00	2.8519e-01	1.3062e-01
5.00e-03	2.1355e+01	1.0716e+01	5.3579e+00	2.6789e+00	1.0716e+00	2.9843e-01	1.4385e-01
6.00e-03	2.1720e+01	1.0898e+01	5.4490e+00	2.7245e+00	1.0898e+00	3.1039e-01	1.5582e-01
8.00e-03	2.2295e+01	1.1186e+01	5.5929e+00	2.7964e+00	1.1188e+00	3.3163e-01	1.7706e-01
1.00e-02	2.2741e+01	1.1409e+01	5.7045e+00	2.8522e+00	1.1416e+00	3.5034e-01	1.9577e-01
1.50e-02	2.3553e+01	1.1815e+01	5.9074e+00	2.9537e+00	1.1855e+00	3.9019e-01	2.3562e-01
2.00e-02	2.4129e+01	1.2103e+01	6.0513e+00	3.0257e+00	1.2201e+00	4.2378e-01	2.6921e-01
3.00e-02	2.4940e+01	1.2508e+01	6.2540e+00	3.1270e+00	1.2767e+00	4.8010e-01	3.2552e-01
4.00e-02	2.5514e+01	1.2795e+01	6.3976e+00	3.1989e+00	1.3241e+00	5.2748e-01	3.7291e-01
5.00e-02	2.5957e+01	1.3017e+01	6.5085e+00	3.2548e+00	1.3657e+00	5.6906e-01	4.1449e-01
6.00e-02	2.6318e+01	1.3197e+01	6.5985e+00	3.3008e+00	1.4030e+00	6.0644e-01	4.5187e-01
8.00e-02	2.6880e+01	1.3478e+01	6.7391e+00	3.3750e+00	1.4687e+00	6.7207e-01	5.1750e-01
1.00e-01	2.7309e+01	1.3692e+01	6.8462e+00	3.4352e+00	1.5255e+00	7.2887e-01	5.7430e-01
1.50e-01	2.8062e+01	1.4069e+01	7.0349e+00	3.5542e+00	1.6424e+00	8.4580e-01	6.9123e-01
2.00e-01	2.8570e+01	1.4323e+01	7.1626e+00	3.6480e+00	1.7360e+00	9.3938e-01	7.8481e-01
3.00e-01	2.9236e+01	1.4656e+01	7.3350e+00	3.7940e+00	1.8819e+00	1.0853e+00	9.3074e-01
4.00e-01	2.9667e+01	1.4872e+01	7.4550e+00	3.9064e+00	1.9944e+00	1.1978e+00	1.0432e+00
5.00e-01	2.9976e+01	1.5026e+01	7.5489e+00	3.9981e+00	2.0860e+00	1.2894e+00	1.1348e+00
6.00e-01	3.0212e+01	1.5144e+01	7.6270e+00	4.0754e+00	2.1634e+00	1.3668e+00	1.2122e+00
8.00e-01	3.0554e+01	1.5316e+01	7.7533e+00	4.2014e+00	2.2894e+00	1.4928e+00	1.3382e+00
1.00e+00	3.0794e+01	1.5439e+01	7.8539e+00	4.3019e+00	2.3899e+00	1.5933e+00	1.4387e+00
1.50e+00	3.1177e+01	1.5646e+01	8.0416e+00	4.4897e+00	2.5776e+00	1.7810e+00	1.6264e+00
2.00e+00	3.1411e+01	1.5786e+01	8.1778e+00	4.6258e+00	2.7138e+00	1.9172e+00	1.7626e+00
3.00e+00	3.1694e+01	1.5982e+01	8.3726e+00	4.8207e+00	2.9086e+00	2.1120e+00	1.9575e+00
4.00e+00	3.1867e+01	1.6122e+01	8.5125e+00	4.9605e+00	3.0485e+00	2.2519e+00	2.0973e+00
5.00e+00	3.1990e+01	1.6231e+01	8.6217e+00	5.0697e+00	3.1577e+00	2.3611e+00	2.2065e+00
6.00e+00	3.2086e+01	1.6321e+01	8.7112e+00	5.1593e+00	3.2472e+00	2.4506e+00	2.2960e+00
8.00e+00	3.2232e+01	1.6463e+01	8.8530e+00	5.3011e+00	3.3890e+00	2.5924e+00	2.4378e+00
1.00e+01	3.2343e+01	1.6573e+01	8.9634e+00	5.4114e+00	3.4994e+00	2.7028e+00	2.5482e+00
1.50e+01	3.2545e+01	1.6774e+01	9.1647e+00	5.6127e+00	3.7007e+00	2.9041e+00	2.7495e+00
2.00e+01	3.2688e+01	1.6917e+01	9.3078e+00	5.7558e+00	3.8438e+00	3.0472e+00	2.8926e+00
3.00e+01	3.2890e+01	1.7119e+01	9.5098e+00	5.9578e+00	4.0458e+00	3.2492e+00	3.0946e+00
4.00e+01	3.3033e+01	1.7263e+01	9.6532e+00	6.1013e+00	4.1892e+00	3.3926e+00	3.2380e+00
5.00e+01	3.3145e+01	1.7374e+01	9.7646e+00	6.2126e+00	4.3006e+00	3.5039e+00	3.3494e+00
6.00e+01	3.3236e+01	1.7465e+01	9.8556e+00	6.3036e+00	4.3916e+00	3.5949e+00	3.4404e+00
8.00e+01	3.3379e+01	1.7609e+01	9.9992e+00	6.4472e+00	4.5352e+00	3.7386e+00	3.5840e+00

TABLE B.6 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.25 and RDdh=0.0005

XD 0.2500 YD 0.5000e-03 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	3.3491e+01	1.7720e+01	1.0111e+01	6.5587e+00	4.6466e+00	3.8500e+00	3.6955e+00
1.50e+02	3.3693e+01	1.7923e+01	1.0313e+01	6.7615e+00	4.8494e+00	4.0528e+00	3.8983e+00
2.00e+02	3.3837e+01	1.8067e+01	1.0457e+01	6.9053e+00	4.9933e+00	4.1967e+00	4.0421e+00
3.00e+02	3.4040e+01	1.8270e+01	1.0660e+01	7.1080e+00	5.1960e+00	4.3994e+00	4.2448e+00
4.00e+02	3.4184e+01	1.8413e+01	1.0804e+01	7.2519e+00	5.3398e+00	4.5432e+00	4.3886e+00
5.00e+02	3.4295e+01	1.8525e+01	1.0915e+01	7.3634e+00	5.4514e+00	4.6548e+00	4.5002e+00
6.00e+02	3.4386e+01	1.8616e+01	1.1007e+01	7.4546e+00	5.5425e+00	4.7459e+00	4.5913e+00
8.00e+02	3.4530e+01	1.8760e+01	1.1150e+01	7.5984e+00	5.6863e+00	4.8897e+00	4.7352e+00
1.00e+03	3.4642e+01	1.8872e+01	1.1262e+01	7.7100e+00	5.7979e+00	5.0013e+00	4.8467e+00
1.50e+03	3.4845e+01	1.9074e+01	1.1465e+01	7.9129e+00	6.0009e+00	5.2042e+00	5.0497e+00
2.00e+03	3.4989e+01	1.9218e+01	1.1609e+01	8.0568e+00	6.1448e+00	5.3482e+00	5.1936e+00
3.00e+03	3.5192e+01	1.9421e+01	1.1812e+01	8.2596e+00	6.3475e+00	5.5509e+00	5.3964e+00
4.00e+03	3.5335e+01	1.9565e+01	1.1955e+01	8.4035e+00	6.4914e+00	5.6948e+00	5.5402e+00
5.00e+03	3.5447e+01	1.9677e+01	1.2067e+01	8.5150e+00	6.6030e+00	5.8064e+00	5.6518e+00
6.00e+03	3.5538e+01	1.9768e+01	1.2158e+01	8.6062e+00	6.6941e+00	5.8975e+00	5.7430e+00
8.00e+03	3.5682e+01	1.9912e+01	1.2302e+01	8.7500e+00	6.8380e+00	6.0414e+00	5.8868e+00
1.00e+04	3.5794e+01	2.0023e+01	1.2414e+01	8.8616e+00	6.9496e+00	6.1530e+00	5.9984e+00
1.50e+04	3.5996e+01	2.0226e+01	1.2617e+01	9.0646e+00	7.1525e+00	6.3559e+00	6.2013e+00
2.00e+04	3.6140e+01	2.0370e+01	1.2760e+01	9.2085e+00	7.2964e+00	6.4998e+00	6.3453e+00
3.00e+04	3.6343e+01	2.0573e+01	1.2963e+01	9.4113e+00	7.4992e+00	6.7026e+00	6.5481e+00
4.00e+04	3.6487e+01	2.0717e+01	1.3107e+01	9.5551e+00	7.6431e+00	6.8465e+00	6.6919e+00
5.00e+04	3.6599e+01	2.0828e+01	1.3219e+01	9.6667e+00	7.7547e+00	6.9581e+00	6.8035e+00
6.00e+04	3.6690e+01	2.0919e+01	1.3310e+01	9.7579e+00	7.8458e+00	7.0492e+00	6.8947e+00
8.00e+04	3.6834e+01	2.1063e+01	1.3454e+01	9.9017e+00	7.9897e+00	7.1931e+00	7.0385e+00
1.00e+05	3.6945e+01	2.1175e+01	1.3565e+01	1.0013e+01	8.1013e+00	7.3047e+00	7.1501e+00
1.50e+05	3.7148e+01	2.1378e+01	1.3768e+01	1.0216e+01	8.3042e+00	7.5076e+00	7.3531e+00
2.00e+05	3.7292e+01	2.1522e+01	1.3912e+01	1.0360e+01	8.4482e+00	7.6515e+00	7.4970e+00
3.00e+05	3.7495e+01	2.1725e+01	1.4115e+01	1.0563e+01	8.6509e+00	7.8543e+00	7.6998e+00
4.00e+05	3.7639e+01	2.1868e+01	1.4259e+01	1.0707e+01	8.7948e+00	7.9982e+00	7.8436e+00
5.00e+05	3.7750e+01	2.1980e+01	1.4370e+01	1.0818e+01	8.9064e+00	8.1098e+00	7.9552e+00
6.00e+05	3.7842e+01	2.2071e+01	1.4462e+01	1.0910e+01	8.9976e+00	8.2009e+00	8.0464e+00
8.00e+05	3.7985e+01	2.2215e+01	1.4605e+01	1.1053e+01	9.1414e+00	8.3448e+00	8.1902e+00
1.00e+06	3.8097e+01	2.2327e+01	1.4717e+01	1.1165e+01	9.2530e+00	8.4564e+00	8.3018e+00
1.50e+06	3.8300e+01	2.2530e+01	1.4920e+01	1.1368e+01	9.4559e+00	8.6593e+00	8.5048e+00
2.00e+06	3.8444e+01	2.2673e+01	1.5064e+01	1.1512e+01	9.5999e+00	8.8032e+00	8.6487e+00
3.00e+06	3.8647e+01	2.2876e+01	1.5267e+01	1.1715e+01	9.8026e+00	9.0060e+00	8.8515e+00
4.00e+06	3.8790e+01	2.3020e+01	1.5411e+01	1.1859e+01	9.9465e+00	9.1499e+00	8.9953e+00
5.00e+06	3.8902e+01	2.3132e+01	1.5522e+01	1.1970e+01	1.0058e+01	9.2615e+00	9.1069e+00
6.00e+06	3.8993e+01	2.3223e+01	1.5613e+01	1.2061e+01	1.0149e+01	9.3526e+00	9.1981e+00
8.00e+06	3.9137e+01	2.3367e+01	1.5757e+01	1.2205e+01	1.0293e+01	9.4965e+00	9.3419e+00
1.00e+07	3.9249e+01	2.3478e+01	1.5869e+01	1.2317e+01	1.0405e+01	9.6081e+00	9.4535e+00
1.50e+07	3.9452e+01	2.3681e+01	1.6072e+01	1.2520e+01	1.0608e+01	9.8110e+00	9.6565e+00
2.00e+07	3.9596e+01	2.3825e+01	1.6216e+01	1.2664e+01	1.0752e+01	9.9550e+00	9.8004e+00
3.00e+07	3.9798e+01	2.4028e+01	1.6418e+01	1.2866e+01	1.0954e+01	1.0158e+01	1.0003e+01
4.00e+07	3.9942e+01	2.4172e+01	1.6562e+01	1.3010e+01	1.1098e+01	1.0302e+01	1.0147e+01
5.00e+07	4.0054e+01	2.4283e+01	1.6674e+01	1.3122e+01	1.1210e+01	1.0413e+01	1.0259e+01
6.00e+07	4.0145e+01	2.4375e+01	1.6765e+01	1.3213e+01	1.1301e+01	1.0504e+01	1.0350e+01
8.00e+07	4.0289e+01	2.4518e+01	1.6909e+01	1.3357e+01	1.1445e+01	1.0648e+01	1.0494e+01

TABLE B.7 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.25 and RDdh=0.005

XD 0.2500 YD 0.5000e-02 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	4.5126e+00	2.2571e+00	1.1285e+00	5.6426e-01	2.2571e-01	5.6426e-02	1.3298e-02
1.50e-04	5.2837e+00	2.6426e+00	1.3213e+00	6.6065e-01	2.6426e-01	6.6065e-02	1.7085e-02
2.00e-04	5.8389e+00	2.9202e+00	1.4601e+00	7.3005e-01	2.9202e-01	7.3005e-02	2.0325e-02
3.00e-04	6.6294e+00	3.3155e+00	1.6578e+00	8.2888e-01	3.3155e-01	8.2889e-02	2.5817e-02
4.00e-04	7.1946e+00	3.5981e+00	1.7990e+00	8.9952e-01	3.5981e-01	8.9965e-02	3.0481e-02
5.00e-04	7.6347e+00	3.8181e+00	1.9091e+00	9.5453e-01	3.8181e-01	9.5510e-02	3.4608e-02
6.00e-04	7.9952e+00	3.9984e+00	1.9992e+00	9.9960e-01	3.9984e-01	1.0011e-01	3.8348e-02
8.00e-04	8.5654e+00	4.2835e+00	2.1417e+00	1.0709e+00	4.2835e-01	1.0764e-01	4.5004e-02
1.00e-03	9.0086e+00	4.5051e+00	2.2525e+00	1.1263e+00	4.5051e-01	1.1386e-01	5.0880e-02
1.50e-03	9.8163e+00	4.9089e+00	2.4545e+00	1.2272e+00	4.9089e-01	1.2662e-01	6.3418e-02
2.00e-03	1.0390e+01	5.1957e+00	2.5979e+00	1.2989e+00	5.1957e-01	1.3723e-01	7.4002e-02
3.00e-03	1.1199e+01	5.6003e+00	2.8001e+00	1.4001e+00	5.6003e-01	1.5501e-01	9.1773e-02
4.00e-03	1.1773e+01	5.8875e+00	2.9437e+00	1.4719e+00	5.8875e-01	1.7000e-01	1.0677e-01
5.00e-03	1.2219e+01	6.1103e+00	3.0552e+00	1.5276e+00	6.1104e-01	1.8321e-01	1.1998e-01
6.00e-03	1.2583e+01	6.2924e+00	3.1462e+00	1.5731e+00	6.2928e-01	1.9516e-01	1.3193e-01
8.00e-03	1.3158e+01	6.5799e+00	3.2899e+00	1.6450e+00	6.5822e-01	2.1638e-01	1.5315e-01
1.00e-02	1.3604e+01	6.8029e+00	3.4014e+00	1.7007e+00	6.8104e-01	2.3508e-01	1.7185e-01
1.50e-02	1.4416e+01	7.2086e+00	3.6043e+00	1.8021e+00	7.2486e-01	2.7491e-01	2.1168e-01
2.00e-02	1.4991e+01	7.4963e+00	3.7482e+00	1.8741e+00	7.5941e-01	3.0849e-01	2.4525e-01
3.00e-02	1.5802e+01	7.9016e+00	3.9508e+00	1.9754e+00	8.1603e-01	3.6479e-01	3.0156e-01
4.00e-02	1.6376e+01	8.1886e+00	4.0943e+00	2.0473e+00	8.6342e-01	4.1216e-01	3.4893e-01
5.00e-02	1.6819e+01	8.4104e+00	4.2052e+00	2.1032e+00	9.0500e-01	4.5374e-01	3.9051e-01
6.00e-02	1.7179e+01	8.5905e+00	4.2952e+00	2.1492e+00	9.4237e-01	4.9111e-01	4.2788e-01
8.00e-02	1.7742e+01	8.8716e+00	4.4358e+00	2.2234e+00	1.0080e+00	5.5674e-01	4.9350e-01
1.00e-01	1.8170e+01	9.0859e+00	4.5429e+00	2.2835e+00	1.0648e+00	6.1354e-01	5.5030e-01
1.50e-01	1.8924e+01	9.4628e+00	4.7316e+00	2.4025e+00	1.1817e+00	7.3046e-01	6.6723e-01
2.00e-01	1.9432e+01	9.7166e+00	4.8593e+00	2.4963e+00	1.2753e+00	8.2404e-01	7.6080e-01
3.00e-01	2.0097e+01	1.0049e+01	5.0317e+00	2.6423e+00	1.4212e+00	9.6997e-01	9.0674e-01
4.00e-01	2.0528e+01	1.0265e+01	5.1517e+00	2.7548e+00	1.5337e+00	1.0824e+00	1.0192e+00
5.00e-01	2.0838e+01	1.0420e+01	5.2456e+00	2.8464e+00	1.6253e+00	1.1741e+00	1.1108e+00
6.00e-01	2.1074e+01	1.0538e+01	5.3237e+00	2.9238e+00	1.7027e+00	1.2514e+00	1.1882e+00
8.00e-01	2.1415e+01	1.0710e+01	5.4500e+00	3.0497e+00	1.8287e+00	1.3774e+00	1.3142e+00
1.00e+00	2.1655e+01	1.0833e+01	5.5505e+00	3.1503e+00	1.9292e+00	1.4779e+00	1.4147e+00
1.50e+00	2.2039e+01	1.1040e+01	5.7383e+00	3.3380e+00	2.1169e+00	1.6657e+00	1.6024e+00
2.00e+00	2.2273e+01	1.1180e+01	5.8744e+00	3.4741e+00	2.2531e+00	1.8018e+00	1.7386e+00
3.00e+00	2.2555e+01	1.1376e+01	6.0693e+00	3.6690e+00	2.4479e+00	1.9967e+00	1.9334e+00
4.00e+00	2.2728e+01	1.1516e+01	6.2092e+00	3.8089e+00	2.5878e+00	2.1365e+00	2.0733e+00
5.00e+00	2.2852e+01	1.1625e+01	6.3183e+00	3.9180e+00	2.6970e+00	2.2457e+00	2.1825e+00
6.00e+00	2.2947e+01	1.1714e+01	6.4079e+00	4.0076e+00	2.7865e+00	2.3352e+00	2.2720e+00
8.00e+00	2.3093e+01	1.1856e+01	6.5497e+00	4.1494e+00	2.9283e+00	2.4771e+00	2.4138e+00
1.00e+01	2.3205e+01	1.1966e+01	6.6600e+00	4.2598e+00	3.0387e+00	2.5874e+00	2.5242e+00
1.50e+01	2.3406e+01	1.2168e+01	6.8614e+00	4.4611e+00	3.2400e+00	2.7887e+00	2.7255e+00
2.00e+01	2.3549e+01	1.2311e+01	7.0045e+00	4.6042e+00	3.3831e+00	2.9318e+00	2.8686e+00
3.00e+01	2.3751e+01	1.2513e+01	7.2064e+00	4.8061e+00	3.5851e+00	3.1338e+00	3.0706e+00
4.00e+01	2.3895e+01	1.2656e+01	7.3499e+00	4.9496e+00	3.7285e+00	3.2773e+00	3.2140e+00
5.00e+01	2.4006e+01	1.2768e+01	7.4612e+00	5.0609e+00	3.8399e+00	3.3886e+00	3.3254e+00
6.00e+01	2.4097e+01	1.2859e+01	7.5522e+00	5.1519e+00	3.9309e+00	3.4796e+00	3.4164e+00
8.00e+01	2.4241e+01	1.3002e+01	7.6959e+00	5.2956e+00	4.0745e+00	3.6232e+00	3.5600e+00

TABLE B.7 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.25 and RDdh=0.005

XD 0.2500 YD 0.5000e-02 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	2.4352e+01	1.3114e+01	7.8073e+00	5.4070e+00	4.1859e+00	3.7347e+00	3.6714e+00
1.50e+02	2.4555e+01	1.3317e+01	8.0101e+00	5.6098e+00	4.3887e+00	3.9375e+00	3.8742e+00
2.00e+02	2.4699e+01	1.3460e+01	8.1540e+00	5.7537e+00	4.5326e+00	4.0813e+00	4.0181e+00
3.00e+02	2.4902e+01	1.3663e+01	8.3567e+00	5.9564e+00	4.7353e+00	4.2840e+00	4.2208e+00
4.00e+02	2.5045e+01	1.3807e+01	8.5005e+00	6.1002e+00	4.8791e+00	4.4278e+00	4.3646e+00
5.00e+02	2.5157e+01	1.3918e+01	8.6120e+00	6.2117e+00	4.9907e+00	4.5394e+00	4.4762e+00
6.00e+02	2.5248e+01	1.4010e+01	8.7032e+00	6.3029e+00	5.0818e+00	4.6306e+00	4.5673e+00
8.00e+02	2.5392e+01	1.4153e+01	8.8470e+00	6.4467e+00	5.2256e+00	4.7744e+00	4.7111e+00
1.00e+03	2.5503e+01	1.4265e+01	8.9586e+00	6.5583e+00	5.3372e+00	4.8859e+00	4.8227e+00
1.50e+03	2.5706e+01	1.4468e+01	9.1615e+00	6.7612e+00	5.5401e+00	5.0889e+00	5.0257e+00
2.00e+03	2.5850e+01	1.4612e+01	9.3054e+00	6.9051e+00	5.6841e+00	5.2328e+00	5.1696e+00
3.00e+03	2.6053e+01	1.4815e+01	9.5082e+00	7.1079e+00	5.8868e+00	5.4356e+00	5.3724e+00
4.00e+03	2.6197e+01	1.4958e+01	9.6521e+00	7.2518e+00	6.0307e+00	5.5794e+00	5.5162e+00
5.00e+03	2.6309e+01	1.5070e+01	9.7637e+00	7.3634e+00	6.1423e+00	5.6910e+00	5.6278e+00
6.00e+03	2.6400e+01	1.5161e+01	9.8548e+00	7.4545e+00	6.2334e+00	5.7822e+00	5.7190e+00
8.00e+03	2.6544e+01	1.5305e+01	9.9987e+00	7.5984e+00	6.3773e+00	5.9260e+00	5.8628e+00
1.00e+04	2.6655e+01	1.5417e+01	1.0110e+01	7.7099e+00	6.4889e+00	6.0376e+00	5.9744e+00
1.50e+04	2.6858e+01	1.5620e+01	1.0313e+01	7.9129e+00	6.6918e+00	6.2406e+00	6.1773e+00
2.00e+04	2.7002e+01	1.5764e+01	1.0457e+01	8.0568e+00	6.8357e+00	6.3845e+00	6.3213e+00
3.00e+04	2.7205e+01	1.5966e+01	1.0660e+01	8.2596e+00	7.0385e+00	6.5873e+00	6.5240e+00
4.00e+04	2.7349e+01	1.6110e+01	1.0804e+01	8.4035e+00	7.1824e+00	6.7311e+00	6.6679e+00
5.00e+04	2.7460e+01	1.6222e+01	1.0915e+01	8.5151e+00	7.2940e+00	6.8427e+00	6.7795e+00
6.00e+04	2.7551e+01	1.6313e+01	1.1007e+01	8.6062e+00	7.3851e+00	6.9339e+00	6.8706e+00
8.00e+04	2.7695e+01	1.6457e+01	1.1150e+01	8.7501e+00	7.5290e+00	7.0777e+00	7.0145e+00
1.00e+05	2.7807e+01	1.6568e+01	1.1262e+01	8.8616e+00	7.6406e+00	7.1893e+00	7.1261e+00
1.50e+05	2.8010e+01	1.6771e+01	1.1465e+01	9.0646e+00	7.8435e+00	7.3923e+00	7.3290e+00
2.00e+05	2.8154e+01	1.6915e+01	1.1609e+01	9.2085e+00	7.9874e+00	7.5362e+00	7.4730e+00
3.00e+05	2.8356e+01	1.7118e+01	1.1812e+01	9.4113e+00	8.1902e+00	7.7390e+00	7.6757e+00
4.00e+05	2.8500e+01	1.7262e+01	1.1955e+01	9.5552e+00	8.3341e+00	7.8828e+00	7.8196e+00
5.00e+05	2.8612e+01	1.7373e+01	1.2067e+01	9.6668e+00	8.4457e+00	7.9944e+00	7.9312e+00
6.00e+05	2.8703e+01	1.7465e+01	1.2158e+01	9.7579e+00	8.5368e+00	8.0856e+00	8.0224e+00
8.00e+05	2.8847e+01	1.7608e+01	1.2302e+01	9.9018e+00	8.6807e+00	8.2294e+00	8.1662e+00
1.00e+06	2.8958e+01	1.7720e+01	1.2414e+01	1.0013e+01	8.7923e+00	8.3410e+00	8.2778e+00
1.50e+06	2.9161e+01	1.7923e+01	1.2617e+01	1.0216e+01	8.9952e+00	8.5440e+00	8.4807e+00
2.00e+06	2.9305e+01	1.8067e+01	1.2761e+01	1.0360e+01	9.1392e+00	8.6879e+00	8.6247e+00
3.00e+06	2.9508e+01	1.8270e+01	1.2963e+01	1.0563e+01	9.3419e+00	8.8907e+00	8.8274e+00
4.00e+06	2.9652e+01	1.8414e+01	1.3107e+01	1.0707e+01	9.4858e+00	9.0345e+00	8.9713e+00
5.00e+06	2.9764e+01	1.8525e+01	1.3219e+01	1.0818e+01	9.5974e+00	9.1461e+00	9.0829e+00
6.00e+06	2.9855e+01	1.8616e+01	1.3310e+01	1.0910e+01	9.6885e+00	9.2373e+00	9.1741e+00
8.00e+06	2.9999e+01	1.8760e+01	1.3454e+01	1.1053e+01	9.8324e+00	9.3811e+00	9.3179e+00
1.00e+07	3.0110e+01	1.8872e+01	1.3565e+01	1.1165e+01	9.9440e+00	9.4927e+00	9.4295e+00
1.50e+07	3.0313e+01	1.9075e+01	1.3768e+01	1.1368e+01	1.0147e+01	9.6957e+00	9.6324e+00
2.00e+07	3.0457e+01	1.9219e+01	1.3912e+01	1.1512e+01	1.0291e+01	9.8396e+00	9.7764e+00
3.00e+07	3.0660e+01	1.9421e+01	1.4115e+01	1.1715e+01	1.0494e+01	1.0042e+01	9.9792e+00
4.00e+07	3.0804e+01	1.9565e+01	1.4259e+01	1.1859e+01	1.0638e+01	1.0186e+01	1.0123e+01
5.00e+07	3.0915e+01	1.9677e+01	1.4370e+01	1.1970e+01	1.0749e+01	1.0298e+01	1.0235e+01
6.00e+07	3.1006e+01	1.9768e+01	1.4462e+01	1.2061e+01	1.0840e+01	1.0389e+01	1.0326e+01
8.00e+07	3.1150e+01	1.9912e+01	1.4605e+01	1.2205e+01	1.0984e+01	1.0533e+01	1.0470e+01

TABLE B.8 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.25 and RDdh=0.05

XD 0.2500 YD 0.5000e-01 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	5.4112e-04	2.7056e-04	1.3528e-04	6.7640e-05	2.7056e-05	6.7640e-06	2.2565e-06
1.50e-04	6.2002e-03	3.1001e-03	1.5500e-03	7.7502e-04	3.1001e-04	7.7502e-05	3.0997e-05
2.00e-04	2.2296e-02	1.1148e-02	5.5741e-03	2.7870e-03	1.1148e-03	2.7870e-04	1.2615e-04
3.00e-04	8.7205e-02	4.3602e-02	2.1801e-02	1.0901e-02	4.3602e-03	1.0902e-03	5.8482e-04
4.00e-04	1.8237e-01	9.1186e-02	4.5593e-02	2.2796e-02	9.1186e-03	2.2820e-03	1.3752e-03
5.00e-04	2.9281e-01	1.4641e-01	7.3204e-02	3.6602e-02	1.4641e-02	3.6737e-03	2.4137e-03
6.00e-04	4.0933e-01	2.0466e-01	1.0233e-01	5.1166e-02	2.0466e-02	5.1616e-03	3.6243e-03
8.00e-04	6.4269e-01	3.2134e-01	1.6067e-01	8.0336e-02	3.2134e-02	8.2454e-03	6.3569e-03
1.00e-03	8.6448e-01	4.3224e-01	2.1612e-01	1.0806e-01	4.3224e-02	1.1363e-02	9.3019e-03
1.50e-03	1.3505e+00	6.7526e-01	3.3763e-01	1.6881e-01	6.7526e-02	1.9065e-02	1.6875e-02
2.00e-03	1.7513e+00	8.7567e-01	4.3784e-01	2.1892e-01	8.7567e-02	2.6489e-02	2.4281e-02
3.00e-03	2.3789e+00	1.1895e+00	5.9473e-01	2.9737e-01	1.1895e-01	4.0300e-02	3.8090e-02
4.00e-03	2.8591e+00	1.4296e+00	7.1478e-01	3.5739e-01	1.4296e-01	5.2841e-02	5.0631e-02
5.00e-03	3.2471e+00	1.6236e+00	8.1178e-01	4.0589e-01	1.6236e-01	6.4348e-02	6.2137e-02
6.00e-03	3.5724e+00	1.7862e+00	8.9310e-01	4.4655e-01	1.7865e-01	7.5020e-02	7.2810e-02
8.00e-03	4.0980e+00	2.0490e+00	1.0245e+00	5.1225e-01	2.0511e-01	9.4428e-02	9.2218e-02
1.00e-02	4.5141e+00	2.2571e+00	1.1285e+00	5.6427e-01	2.2641e-01	1.1188e-01	1.0967e-01
1.50e-02	5.2852e+00	2.6426e+00	1.3213e+00	6.6065e-01	2.6806e-01	1.4974e-01	1.4753e-01
2.00e-02	5.8404e+00	2.9202e+00	1.4601e+00	7.3005e-01	3.0139e-01	1.8214e-01	1.7993e-01
3.00e-02	6.6306e+00	3.3153e+00	1.6577e+00	8.2884e-01	3.5659e-01	2.3704e-01	2.3483e-01
4.00e-02	7.1945e+00	3.5972e+00	1.7986e+00	8.9944e-01	4.0315e-01	2.8357e-01	2.8136e-01
5.00e-02	7.6318e+00	3.8159e+00	1.9080e+00	9.5454e-01	4.4416e-01	3.2458e-01	3.2237e-01
6.00e-02	7.9881e+00	3.9940e+00	1.9970e+00	1.0000e+00	4.8111e-01	3.6153e-01	3.5932e-01
8.00e-02	8.5453e+00	4.2727e+00	2.1363e+00	1.0736e+00	5.4615e-01	4.2657e-01	4.2436e-01
1.00e-01	8.9708e+00	4.4854e+00	2.2427e+00	1.1333e+00	6.0256e-01	4.8298e-01	4.8077e-01
1.50e-01	9.7209e+00	4.8605e+00	2.4304e+00	1.2517e+00	7.1889e-01	5.9931e-01	5.9710e-01
2.00e-01	1.0227e+01	5.1133e+00	2.5577e+00	1.3452e+00	8.1213e-01	6.9255e-01	6.9034e-01
3.00e-01	1.0890e+01	5.4452e+00	2.7296e+00	1.4908e+00	9.5770e-01	8.3812e-01	8.3591e-01
4.00e-01	1.1321e+01	5.6605e+00	2.8494e+00	1.6030e+00	1.0699e+00	9.5037e-01	9.4816e-01
5.00e-01	1.1630e+01	5.8150e+00	2.9432e+00	1.6945e+00	1.1615e+00	1.0419e+00	1.0397e+00
6.00e-01	1.1865e+01	5.9330e+00	3.0212e+00	1.7718e+00	1.2387e+00	1.1191e+00	1.1169e+00
8.00e-01	1.2207e+01	6.1048e+00	3.1474e+00	1.8977e+00	1.3646e+00	1.2450e+00	1.2428e+00
1.00e+00	1.2447e+01	6.2275e+00	3.2478e+00	1.9981e+00	1.4650e+00	1.3455e+00	1.3433e+00
1.50e+00	1.2830e+01	6.4343e+00	3.4355e+00	2.1858e+00	1.6527e+00	1.5331e+00	1.5309e+00
2.00e+00	1.3064e+01	6.5744e+00	3.5716e+00	2.3219e+00	1.7888e+00	1.6692e+00	1.6670e+00
3.00e+00	1.3346e+01	6.7704e+00	3.7664e+00	2.5167e+00	1.9836e+00	1.8640e+00	1.8618e+00
4.00e+00	1.3519e+01	6.9103e+00	3.9063e+00	2.6565e+00	2.1234e+00	2.0039e+00	2.0017e+00
5.00e+00	1.3643e+01	7.0194e+00	4.0154e+00	2.7657e+00	2.2326e+00	2.1130e+00	2.1108e+00
6.00e+00	1.3738e+01	7.1089e+00	4.1049e+00	2.8552e+00	2.3221e+00	2.2026e+00	2.2003e+00
8.00e+00	1.3884e+01	7.2507e+00	4.2467e+00	2.9970e+00	2.4639e+00	2.3444e+00	2.3421e+00
1.00e+01	1.3996e+01	7.3611e+00	4.3571e+00	3.1074e+00	2.5743e+00	2.4547e+00	2.4525e+00
1.50e+01	1.4197e+01	7.5624e+00	4.5584e+00	3.3087e+00	2.7756e+00	2.6560e+00	2.6538e+00
2.00e+01	1.4340e+01	7.7055e+00	4.7015e+00	3.4518e+00	2.9187e+00	2.7991e+00	2.7969e+00
3.00e+01	1.4542e+01	7.9075e+00	4.9035e+00	3.6537e+00	3.1207e+00	3.0011e+00	2.9989e+00
4.00e+01	1.4686e+01	8.0509e+00	5.0469e+00	3.7972e+00	3.2641e+00	3.1445e+00	3.1423e+00
5.00e+01	1.4797e+01	8.1622e+00	5.1582e+00	3.9085e+00	3.3754e+00	3.2559e+00	3.2536e+00
6.00e+01	1.4888e+01	8.2532e+00	5.2492e+00	3.9995e+00	3.4664e+00	3.3469e+00	3.3446e+00
8.00e+01	1.5032e+01	8.3969e+00	5.3929e+00	4.1432e+00	3.6101e+00	3.4905e+00	3.4883e+00

TABLE B.8 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.25 and RDdh=0.05

XD 0.2500 YD 0.5000e-01 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	1.5143e+01	8.5083e+00	5.5043e+00	4.2546e+00	3.7215e+00	3.6019e+00	3.5997e+00
1.50e+02	1.5346e+01	8.7111e+00	5.7071e+00	4.4574e+00	3.9243e+00	3.8047e+00	3.8025e+00
2.00e+02	1.5490e+01	8.8550e+00	5.8510e+00	4.6012e+00	4.0682e+00	3.9486e+00	3.9464e+00
3.00e+02	1.5692e+01	9.0577e+00	6.0537e+00	4.8040e+00	4.2709e+00	4.1513e+00	4.1491e+00
4.00e+02	1.5836e+01	9.2015e+00	6.1975e+00	4.9478e+00	4.4147e+00	4.2951e+00	4.2929e+00
5.00e+02	1.5948e+01	9.3130e+00	6.3090e+00	5.0593e+00	4.5262e+00	4.4067e+00	4.4044e+00
6.00e+02	1.6039e+01	9.4042e+00	6.4002e+00	5.1505e+00	4.6174e+00	4.4978e+00	4.4956e+00
8.00e+02	1.6183e+01	9.5480e+00	6.5440e+00	5.2943e+00	4.7612e+00	4.6416e+00	4.6394e+00
1.00e+03	1.6294e+01	9.6596e+00	6.6556e+00	5.4059e+00	4.8728e+00	4.7532e+00	4.7510e+00
1.50e+03	1.6497e+01	9.8625e+00	6.8585e+00	5.6088e+00	5.0757e+00	4.9561e+00	4.9539e+00
2.00e+03	1.6641e+01	1.0006e+01	7.0024e+00	5.7527e+00	5.2196e+00	5.1001e+00	5.0978e+00
3.00e+03	1.6844e+01	1.0209e+01	7.2052e+00	5.9555e+00	5.4224e+00	5.3028e+00	5.3006e+00
4.00e+03	1.6988e+01	1.0353e+01	7.3491e+00	6.0994e+00	5.5663e+00	5.4467e+00	5.4445e+00
5.00e+03	1.7099e+01	1.0465e+01	7.4607e+00	6.2109e+00	5.6779e+00	5.5583e+00	5.5561e+00
6.00e+03	1.7191e+01	1.0556e+01	7.5518e+00	6.3021e+00	5.7690e+00	5.6494e+00	5.6472e+00
8.00e+03	1.7334e+01	1.0700e+01	7.6957e+00	6.4460e+00	5.9129e+00	5.7933e+00	5.7911e+00
1.00e+04	1.7446e+01	1.0811e+01	7.8072e+00	6.5575e+00	6.0244e+00	5.9049e+00	5.9026e+00
1.50e+04	1.7649e+01	1.1014e+01	8.0102e+00	6.7605e+00	6.2274e+00	6.1078e+00	6.1056e+00
2.00e+04	1.7793e+01	1.1158e+01	8.1541e+00	6.9044e+00	6.3713e+00	6.2517e+00	6.2495e+00
3.00e+04	1.7996e+01	1.1361e+01	8.3569e+00	7.1072e+00	6.5741e+00	6.4545e+00	6.4523e+00
4.00e+04	1.8140e+01	1.1505e+01	8.5008e+00	7.2511e+00	6.7180e+00	6.5984e+00	6.5962e+00
5.00e+04	1.8251e+01	1.1616e+01	8.6124e+00	7.3626e+00	6.8295e+00	6.7100e+00	6.7078e+00
6.00e+04	1.8342e+01	1.1708e+01	8.7035e+00	7.4538e+00	6.9207e+00	6.8011e+00	6.7989e+00
8.00e+04	1.8486e+01	1.1851e+01	8.8474e+00	7.5977e+00	7.0646e+00	6.9450e+00	6.9428e+00
1.00e+05	1.8598e+01	1.1963e+01	8.9589e+00	7.7092e+00	7.1761e+00	7.0566e+00	7.0543e+00
1.50e+05	1.8801e+01	1.2166e+01	9.1619e+00	7.9122e+00	7.3791e+00	7.2595e+00	7.2573e+00
2.00e+05	1.8945e+01	1.2310e+01	9.3058e+00	8.0561e+00	7.5230e+00	7.4034e+00	7.4012e+00
3.00e+05	1.9147e+01	1.2513e+01	9.5086e+00	8.2589e+00	7.7258e+00	7.6062e+00	7.6040e+00
4.00e+05	1.9291e+01	1.2656e+01	9.6525e+00	8.4028e+00	7.8697e+00	7.7501e+00	7.7479e+00
5.00e+05	1.9403e+01	1.2768e+01	9.7641e+00	8.5143e+00	7.9813e+00	7.8617e+00	7.8595e+00
6.00e+05	1.9494e+01	1.2859e+01	9.8552e+00	8.6055e+00	8.0724e+00	7.9528e+00	7.9506e+00
8.00e+05	1.9638e+01	1.3003e+01	9.9991e+00	8.7494e+00	8.2163e+00	8.0967e+00	8.0945e+00
1.00e+06	1.9749e+01	1.3115e+01	1.0111e+01	8.8609e+00	8.3278e+00	8.2083e+00	8.2060e+00
1.50e+06	1.9952e+01	1.3318e+01	1.0314e+01	9.0639e+00	8.5308e+00	8.4112e+00	8.4090e+00
2.00e+06	2.0096e+01	1.3462e+01	1.0458e+01	9.2078e+00	8.6747e+00	8.5551e+00	8.5529e+00
3.00e+06	2.0299e+01	1.3664e+01	1.0660e+01	9.4106e+00	8.8775e+00	8.7579e+00	8.7557e+00
4.00e+06	2.0443e+01	1.3808e+01	1.0804e+01	9.5545e+00	9.0214e+00	8.9018e+00	8.8996e+00
5.00e+06	2.0555e+01	1.3920e+01	1.0916e+01	9.6660e+00	9.1330e+00	9.0134e+00	9.0112e+00
6.00e+06	2.0646e+01	1.4011e+01	1.1007e+01	9.7572e+00	9.2241e+00	9.1045e+00	9.1023e+00
8.00e+06	2.0790e+01	1.4155e+01	1.1151e+01	9.9011e+00	9.3680e+00	9.2484e+00	9.2462e+00
1.00e+07	2.0901e+01	1.4266e+01	1.1262e+01	1.0013e+01	9.4795e+00	9.3600e+00	9.3578e+00
1.50e+07	2.1104e+01	1.4469e+01	1.1465e+01	1.0216e+01	9.6825e+00	9.5629e+00	9.5607e+00
2.00e+07	2.1248e+01	1.4613e+01	1.1609e+01	1.0360e+01	9.8264e+00	9.7069e+00	9.7046e+00
3.00e+07	2.1451e+01	1.4816e+01	1.1812e+01	1.0562e+01	1.0029e+01	9.9096e+00	9.9074e+00
4.00e+07	2.1595e+01	1.4960e+01	1.1956e+01	1.0706e+01	1.0173e+01	1.0054e+01	1.0051e+01
5.00e+07	2.1706e+01	1.5071e+01	1.2067e+01	1.0818e+01	1.0285e+01	1.0165e+01	1.0163e+01
6.00e+07	2.1797e+01	1.5163e+01	1.2159e+01	1.0909e+01	1.0376e+01	1.0256e+01	1.0254e+01
8.00e+07	2.1941e+01	1.5306e+01	1.2302e+01	1.1053e+01	1.0520e+01	1.0400e+01	1.0398e+01

TABLE B.9 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.5 and RDdh=0.0005

XD 0.5000 YD 0.5000e-03 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	1.3529e+01	6.8026e+00	3.4014e+00	1.7007e+00	6.8027e-01	1.7007e-01	3.6243e-02
1.50e-04	1.4340e+01	7.2083e+00	3.6042e+00	1.8021e+00	7.2084e-01	1.8021e-01	4.0226e-02
2.00e-04	1.4916e+01	7.4960e+00	3.7481e+00	1.8740e+00	7.4962e-01	1.8740e-01	4.3584e-02
3.00e-04	1.5727e+01	7.9015e+00	3.9508e+00	1.9754e+00	7.9016e-01	1.9754e-01	4.9217e-02
4.00e-04	1.6302e+01	8.1892e+00	4.0947e+00	2.0473e+00	8.1893e-01	2.0475e-01	5.3965e-02
5.00e-04	1.6748e+01	8.4123e+00	4.2062e+00	2.1031e+00	8.4124e-01	2.1037e-01	5.8149e-02
6.00e-04	1.7113e+01	8.5946e+00	4.2974e+00	2.1487e+00	8.5948e-01	2.1502e-01	6.1931e-02
8.00e-04	1.7688e+01	8.8823e+00	4.4412e+00	2.2206e+00	8.8824e-01	2.2262e-01	6.8647e-02
1.00e-03	1.8135e+01	9.1054e+00	4.5528e+00	2.2764e+00	9.1056e-01	2.2888e-01	7.4564e-02
1.50e-03	1.8946e+01	9.5113e+00	4.7557e+00	2.3779e+00	9.5115e-01	2.4171e-01	8.7166e-02
2.00e-03	1.9522e+01	9.7992e+00	4.8996e+00	2.4498e+00	9.7993e-01	2.5236e-01	9.7788e-02
3.00e-03	2.0333e+01	1.0205e+01	5.1024e+00	2.5512e+00	1.0205e+00	2.7018e-01	1.1560e-01
4.00e-03	2.0909e+01	1.0492e+01	5.2463e+00	2.6231e+00	1.0493e+00	2.8519e-01	1.3062e-01
5.00e-03	2.1355e+01	1.0716e+01	5.3579e+00	2.6789e+00	1.0716e+00	2.9843e-01	1.4385e-01
6.00e-03	2.1720e+01	1.0898e+01	5.4490e+00	2.7245e+00	1.0898e+00	3.1039e-01	1.5582e-01
8.00e-03	2.2295e+01	1.1186e+01	5.5929e+00	2.7964e+00	1.1188e+00	3.3163e-01	1.7706e-01
1.00e-02	2.2741e+01	1.1409e+01	5.7044e+00	2.8522e+00	1.1416e+00	3.5034e-01	1.9577e-01
1.50e-02	2.3552e+01	1.1814e+01	5.9072e+00	2.9536e+00	1.1854e+00	3.9016e-01	2.3558e-01
2.00e-02	2.4126e+01	1.2101e+01	6.0506e+00	3.0253e+00	1.2199e+00	4.2362e-01	2.6904e-01
3.00e-02	2.4927e+01	1.2502e+01	6.2509e+00	3.1255e+00	1.2758e+00	4.7924e-01	3.2467e-01
4.00e-02	2.5486e+01	1.2781e+01	6.3906e+00	3.1954e+00	1.3219e+00	5.2535e-01	3.7078e-01
5.00e-02	2.5911e+01	1.2994e+01	6.4969e+00	3.2490e+00	1.3618e+00	5.6520e-01	4.1063e-01
6.00e-02	2.6252e+01	1.3164e+01	6.5821e+00	3.2925e+00	1.3971e+00	6.0055e-01	4.4598e-01
8.00e-02	2.6775e+01	1.3426e+01	6.7130e+00	3.3616e+00	1.4583e+00	6.6166e-01	5.0709e-01
1.00e-01	2.7169e+01	1.3622e+01	6.8113e+00	3.4168e+00	1.5104e+00	7.1379e-01	5.5921e-01
1.50e-01	2.7853e+01	1.3965e+01	6.9825e+00	3.5248e+00	1.6165e+00	8.1985e-01	6.6528e-01
2.00e-01	2.8312e+01	1.4194e+01	7.0979e+00	3.6096e+00	1.7010e+00	9.0443e-01	7.4986e-01
3.00e-01	2.8917e+01	1.4496e+01	7.2547e+00	3.7423e+00	1.8338e+00	1.0372e+00	8.8261e-01
4.00e-01	2.9314e+01	1.4695e+01	7.3652e+00	3.8459e+00	1.9373e+00	1.1407e+00	9.8617e-01
5.00e-01	2.9602e+01	1.4839e+01	7.4526e+00	3.9312e+00	2.0226e+00	1.2260e+00	1.0715e+00
6.00e-01	2.9823e+01	1.4950e+01	7.5260e+00	4.0039e+00	2.0953e+00	1.2987e+00	1.1441e+00
8.00e-01	3.0147e+01	1.5113e+01	7.6457e+00	4.1233e+00	2.2148e+00	1.4182e+00	1.2636e+00
1.00e+00	3.0377e+01	1.5231e+01	7.7420e+00	4.2196e+00	2.3110e+00	1.5144e+00	1.3599e+00
1.50e+00	3.0748e+01	1.5431e+01	7.9236e+00	4.4012e+00	2.4926e+00	1.6960e+00	1.5414e+00
2.00e+00	3.0976e+01	1.5567e+01	8.0564e+00	4.5340e+00	2.6254e+00	1.8288e+00	1.6742e+00
3.00e+00	3.1254e+01	1.5760e+01	8.2478e+00	4.7254e+00	2.8168e+00	2.0202e+00	1.8657e+00
4.00e+00	3.1425e+01	1.5898e+01	8.3859e+00	4.8635e+00	2.9549e+00	2.1583e+00	2.0037e+00
5.00e+00	3.1547e+01	1.6006e+01	8.4940e+00	4.9715e+00	3.0630e+00	2.2664e+00	2.1118e+00
6.00e+00	3.1641e+01	1.6095e+01	8.5828e+00	5.0603e+00	3.1518e+00	2.3552e+00	2.2006e+00
8.00e+00	3.1786e+01	1.6236e+01	8.7236e+00	5.2012e+00	3.2926e+00	2.4960e+00	2.3415e+00
1.00e+01	3.1897e+01	1.6346e+01	8.8334e+00	5.3110e+00	3.4024e+00	2.6058e+00	2.4513e+00
1.50e+01	3.2098e+01	1.6546e+01	9.0340e+00	5.5115e+00	3.6030e+00	2.8064e+00	2.6518e+00
2.00e+01	3.2241e+01	1.6689e+01	9.1767e+00	5.6543e+00	3.7457e+00	2.9491e+00	2.7945e+00
3.00e+01	3.2442e+01	1.6891e+01	9.3783e+00	5.8558e+00	3.9473e+00	3.1507e+00	2.9961e+00
4.00e+01	3.2586e+01	1.7034e+01	9.5215e+00	5.9991e+00	4.0905e+00	3.2939e+00	3.1394e+00
5.00e+01	3.2697e+01	1.7145e+01	9.6327e+00	6.1103e+00	4.2018e+00	3.4052e+00	3.2506e+00
6.00e+01	3.2788e+01	1.7236e+01	9.7237e+00	6.2012e+00	4.2927e+00	3.4961e+00	3.3415e+00
8.00e+01	3.2931e+01	1.7379e+01	9.8672e+00	6.3448e+00	4.4362e+00	3.6396e+00	3.4850e+00

TABLE B.9 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.5 and RDdh=0.0005

XD 0.5000 YD 0.5000e-03 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	3.3043e+01	1.7491e+01	9.9786e+00	6.4562e+00	4.5476e+00	3.7510e+00	3.5964e+00
1.50e+02	3.3245e+01	1.7694e+01	1.0181e+01	6.6589e+00	4.7503e+00	3.9537e+00	3.7992e+00
2.00e+02	3.3389e+01	1.7837e+01	1.0325e+01	6.8027e+00	4.8941e+00	4.0975e+00	3.9430e+00
3.00e+02	3.3592e+01	1.8040e+01	1.0528e+01	7.0054e+00	5.0968e+00	4.3002e+00	4.1456e+00
4.00e+02	3.3736e+01	1.8184e+01	1.0672e+01	7.1492e+00	5.2406e+00	4.4440e+00	4.2894e+00
5.00e+02	3.3847e+01	1.8295e+01	1.0783e+01	7.2607e+00	5.3521e+00	4.5555e+00	4.4010e+00
6.00e+02	3.3938e+01	1.8387e+01	1.0874e+01	7.3518e+00	5.4433e+00	4.6467e+00	4.4921e+00
8.00e+02	3.4082e+01	1.8530e+01	1.1018e+01	7.4957e+00	5.5871e+00	4.7905e+00	4.6359e+00
1.00e+03	3.4194e+01	1.8642e+01	1.1130e+01	7.6072e+00	5.6987e+00	4.9021e+00	4.7475e+00
1.50e+03	3.4397e+01	1.8845e+01	1.1333e+01	7.8102e+00	5.9016e+00	5.1050e+00	4.9504e+00
2.00e+03	3.4541e+01	1.8989e+01	1.1477e+01	7.9541e+00	6.0455e+00	5.2489e+00	5.0943e+00
3.00e+03	3.4743e+01	1.9192e+01	1.1679e+01	8.1568e+00	6.2483e+00	5.4517e+00	5.2971e+00
4.00e+03	3.4887e+01	1.9335e+01	1.1823e+01	8.3007e+00	6.3921e+00	5.5955e+00	5.4410e+00
5.00e+03	3.4999e+01	1.9447e+01	1.1935e+01	8.4123e+00	6.5037e+00	5.7071e+00	5.5525e+00
6.00e+03	3.5090e+01	1.9538e+01	1.2026e+01	8.5034e+00	6.5949e+00	5.7983e+00	5.6437e+00
8.00e+03	3.5234e+01	1.9682e+01	1.2170e+01	8.6473e+00	6.7387e+00	5.9421e+00	5.7876e+00
1.00e+04	3.5345e+01	1.9794e+01	1.2281e+01	8.7589e+00	6.8503e+00	6.0537e+00	5.8991e+00
1.50e+04	3.5548e+01	1.9996e+01	1.2484e+01	8.9618e+00	7.0533e+00	6.2567e+00	6.1021e+00
2.00e+04	3.5692e+01	2.0140e+01	1.2628e+01	9.1057e+00	7.1972e+00	6.4006e+00	6.2460e+00
3.00e+04	3.5895e+01	2.0343e+01	1.2831e+01	9.3085e+00	7.4000e+00	6.6034e+00	6.4488e+00
4.00e+04	3.6039e+01	2.0487e+01	1.2975e+01	9.4524e+00	7.5438e+00	6.7472e+00	6.5927e+00
5.00e+04	3.6150e+01	2.0599e+01	1.3086e+01	9.5640e+00	7.6554e+00	6.8588e+00	6.7042e+00
6.00e+04	3.6242e+01	2.0690e+01	1.3178e+01	9.6551e+00	7.7466e+00	6.9500e+00	6.7954e+00
8.00e+04	3.6385e+01	2.0834e+01	1.3321e+01	9.7990e+00	7.8904e+00	7.0938e+00	6.9393e+00
1.00e+05	3.6497e+01	2.0945e+01	1.3433e+01	9.9106e+00	8.0020e+00	7.2054e+00	7.0508e+00
1.50e+05	3.6700e+01	2.1148e+01	1.3636e+01	1.0114e+01	8.2050e+00	7.4084e+00	7.2538e+00
2.00e+05	3.6844e+01	2.1292e+01	1.3780e+01	1.0257e+01	8.3489e+00	7.5523e+00	7.3977e+00
3.00e+05	3.7047e+01	2.1495e+01	1.3983e+01	1.0460e+01	8.5517e+00	7.7551e+00	7.6005e+00
4.00e+05	3.7191e+01	2.1639e+01	1.4127e+01	1.0604e+01	8.6955e+00	7.8989e+00	7.7444e+00
5.00e+05	3.7302e+01	2.1750e+01	1.4238e+01	1.0716e+01	8.8071e+00	8.0105e+00	7.8559e+00
6.00e+05	3.7393e+01	2.1842e+01	1.4329e+01	1.0807e+01	8.8983e+00	8.1017e+00	7.9471e+00
8.00e+05	3.7537e+01	2.1985e+01	1.4473e+01	1.0951e+01	9.0421e+00	8.2455e+00	8.0910e+00
1.00e+06	3.7649e+01	2.2097e+01	1.4585e+01	1.1062e+01	9.1537e+00	8.3571e+00	8.2025e+00
1.50e+06	3.7852e+01	2.2300e+01	1.4788e+01	1.1265e+01	9.3567e+00	8.5601e+00	8.4055e+00
2.00e+06	3.7996e+01	2.2444e+01	1.4932e+01	1.1409e+01	9.5006e+00	8.7040e+00	8.5494e+00
3.00e+06	3.8198e+01	2.2647e+01	1.5134e+01	1.1612e+01	9.7034e+00	8.9068e+00	8.7522e+00
4.00e+06	3.8342e+01	2.2790e+01	1.5278e+01	1.1756e+01	9.8472e+00	9.0506e+00	8.8961e+00
5.00e+06	3.8454e+01	2.2902e+01	1.5390e+01	1.1867e+01	9.9588e+00	9.1622e+00	9.0076e+00
6.00e+06	3.8545e+01	2.2993e+01	1.5481e+01	1.1959e+01	1.0050e+01	9.2534e+00	9.0988e+00
8.00e+06	3.8689e+01	2.3137e+01	1.5625e+01	1.2102e+01	1.0194e+01	9.3972e+00	9.2427e+00
1.00e+07	3.8800e+01	2.3249e+01	1.5736e+01	1.2214e+01	1.0305e+01	9.5088e+00	9.3542e+00
1.50e+07	3.9003e+01	2.3452e+01	1.5939e+01	1.2417e+01	1.0508e+01	9.7118e+00	9.5572e+00
2.00e+07	3.9147e+01	2.3596e+01	1.6083e+01	1.2561e+01	1.0652e+01	9.8557e+00	9.7011e+00
3.00e+07	3.9350e+01	2.3798e+01	1.6286e+01	1.2764e+01	1.0855e+01	1.0058e+01	9.9039e+00
4.00e+07	3.9494e+01	2.3942e+01	1.6430e+01	1.2908e+01	1.0999e+01	1.0202e+01	1.0048e+01
5.00e+07	3.9606e+01	2.4054e+01	1.6542e+01	1.3019e+01	1:1111e+01	1.0314e+01	1.0159e+01
6.00e+07	3.9697e+01	2.4145e+01	1.6633e+01	1.3110e+01	1.1202e+01	1.0405e+01	1.0251e+01
8.00e+07	3.9841e+01	2.4289e+01	1.6777e+01	1.3254e+01	1.1346e+01	1.0549e+01	1.0394e+01

TABLE B.10 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.5 and RDdh=0.005

XD 0.5000 YD 0.5000e-02 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	4.5126e+00	2.2571e+00	1.1285e+00	5.6426e-01	2.2571e-01	5.6426e-02	1.3298e-02
1.50e-04	5.2837e+00	2.6426e+00	1.3213e+00	6.6065e-01	2.6426e-01	6.6065e-02	1.7085e-02
2.00e-04	5.8389e+00	2.9202e+00	1.4601e+00	7.3005e-01	2.9202e-01	7.3005e-02	2.0325e-02
3.00e-04	6.6294e+00	3.3155e+00	1.6578e+00	8.2888e-01	3.3155e-01	8.2889e-02	2.5817e-02
4.00e-04	7.1946e+00	3.5981e+00	1.7990e+00	8.9952e-01	3.5981e-01	8.9965e-02	3.0481e-02
5.00e-04	7.6347e+00	3.8181e+00	1.9091e+00	9.5453e-01	3.8181e-01	9.5510e-02	3.4608e-02
6.00e-04	7.9952e+00	3.9984e+00	1.9992e+00	9.9960e-01	3.9984e-01	1.0011e-01	3.8348e-02
8.00e-04	8.5654e+00	4.2835e+00	2.1417e+00	1.0709e+00	4.2835e-01	1.0764e-01	4.5004e-02
1.00e-03	9.0086e+00	4.5051e+00	2.2525e+00	1.1263e+00	4.5051e-01	1.1386e-01	5.0880e-02
1.50e-03	9.8163e+00	4.9089e+00	2.4545e+00	1.2272e+00	4.9089e-01	1.2662e-01	6.3418e-02
2.00e-03	1.0390e+01	5.1957e+00	2.5979e+00	1.2989e+00	5.1957e-01	1.3723e-01	7.4002e-02
3.00e-03	1.1199e+01	5.6003e+00	2.8001e+00	1.4001e+00	5.6003e-01	1.5501e-01	9.1773e-02
4.00e-03	1.1773e+01	5.8875e+00	2.9437e+00	1.4719e+00	5.8875e-01	1.7000e-01	1.0677e-01
5.00e-03	1.2219e+01	6.1103e+00	3.0552e+00	1.5276e+00	6.1104e-01	1.8321e-01	1.1998e-01
6.00e-03	1.2583e+01	6.2924e+00	3.1462e+00	1.5731e+00	6.2928e-01	1.9516e-01	1.3193e-01
8.00e-03	1.3158e+01	6.5799e+00	3.2899e+00	1.6450e+00	6.5822e-01	2.1638e-01	1.5315e-01
1.00e-02	1.3604e+01	6.8028e+00	3.4014e+00	1.7007e+00	6.8104e-01	2.3508e-01	1.7185e-01
1.50e-02	1.4415e+01	7.2082e+00	3.6041e+00	1.8021e+00	7.2482e-01	2.7488e-01	2.1164e-01
2.00e-02	1.4988e+01	7.4949e+00	3.7474e+00	1.8737e+00	7.5924e-01	3.0832e-01	2.4509e-01
3.00e-02	1.5789e+01	7.8953e+00	3.9477e+00	1.9738e+00	8.1516e-01	3.6394e-01	3.0070e-01
4.00e-02	1.6348e+01	8.1746e+00	4.0873e+00	2.0438e+00	8.6128e-01	4.1004e-01	3.4680e-01
5.00e-02	1.6773e+01	8.3872e+00	4.1936e+00	2.0973e+00	9.0113e-01	4.4988e-01	3.8665e-01
6.00e-02	1.7114e+01	8.5575e+00	4.2788e+00	2.1408e+00	9.3647e-01	4.8522e-01	4.2199e-01
8.00e-02	1.7637e+01	8.8194e+00	4.4097e+00	2.2100e+00	9.9758e-01	5.4633e-01	4.8309e-01
1.00e-01	1.8030e+01	9.0160e+00	4.5080e+00	2.2652e+00	1.0497e+00	5.9845e-01	5.3522e-01
1.50e-01	1.8714e+01	9.3580e+00	4.6792e+00	2.3731e+00	1.1558e+00	7.0452e-01	6.4128e-01
2.00e-01	1.9173e+01	9.5874e+00	4.7946e+00	2.4579e+00	1.2403e+00	7.8909e-01	7.2586e-01
3.00e-01	1.9778e+01	9.8900e+00	4.9514e+00	2.5907e+00	1.3731e+00	9.2184e-01	8.5860e-01
4.00e-01	2.0176e+01	1.0089e+01	5.0619e+00	2.6942e+00	1.4766e+00	1.0254e+00	9.6216e-01
5.00e-01	2.0463e+01	1.0233e+01	5.1493e+00	2.7795e+00	1.5619e+00	1.1107e+00	1.0475e+00
6.00e-01	2.0685e+01	1.0343e+01	5.2227e+00	2.8522e+00	1.6346e+00	1.1834e+00	1.1201e+00
8.00e-01	2.1009e+01	1.0507e+01	5.3424e+00	2.9717e+00	1.7541e+00	1.3028e+00	1.2396e+00
1.00e+00	2.1239e+01	1.0624e+01	5.4387e+00	3.0679e+00	1.8503e+00	1.3991e+00	1.3358e+00
1.50e+00	2.1610e+01	1.0824e+01	5.6203e+00	3.2495e+00	2.0319e+00	1.5806e+00	1.5174e+00
2.00e+00	2.1838e+01	1.0961e+01	5.7531e+00	3.3823e+00	2.1647e+00	1.7135e+00	1.6502e+00
3.00e+00	2.2115e+01	1.1153e+01	5.9445e+00	3.5737e+00	2.3561e+00	1.9049e+00	1.8416e+00
4.00e+00	2.2286e+01	1.1292e+01	6.0826e+00	3.7118e+00	2.4942e+00	2.0429e+00	1.9797e+00
5.00e+00	2.2408e+01	1.1400e+01	6.1906e+00	3.8198e+00	2.6023e+00	2.1510e+00	2.0878e+00
6.00e+00	2.2503e+01	1.1488e+01	6.2794e+00	3.9087e+00	2.6911e+00	2.2398e+00	2.1766e+00
8.00e+00	2.2648e+01	1.1629e+01	6.4203e+00	4.0495e+00	2.8319e+00	2.3807e+00	2.3175e+00
1.00e+01	2.2759e+01	1.1739e+01	6.5301e+00	4.1593e+00	2.9417e+00	2.4905e+00	2.4272e+00
1.50e+01	2.2960e+01	1.1940e+01	6.7307e+00	4.3599e+00	3.1423e+00	2.6910e+00	2.6278e+00
2.00e+01	2.3102e+01	1.2082e+01	6.8734e+00	4.5026e+00	3.2850e+00	2.8337e+00	2.7705e+00
3.00e+01	2.3304e+01	1.2284e+01	7.0750e+00	4.7042e+00	3.4866e+00	3.0353e+00	2.9721e+00
4.00e+01	2.3447e+01	1.2427e+01	7.2182e+00	4.8474e+00	3.6298e+00	3.1786e+00	3.1154e+00
5.00e+01	2.3558e+01	1.2538e+01	7.3294e+00	4.9586e+00	3.7411e+00	3.2898e+00	3.2266e+00
6.00e+01	2.3649e+01	1.2629e+01	7.4203e+00	5.0496e+00	3.8320e+00	3.3807e+00	3.3175e+00
8.00e+01	2.3793e+01	1.2773e+01	7.5639e+00	5.1931e+00	3.9755e+00	3.5243e+00	3.4610e+00

TABLE B.10 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.5 and RDdh=0.005

XD 0.5000 YD 0.5000e-02 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	2.3904e+01	1.2884e+01	7.6753e+00	5.3045e+00	4.0869e+00	3.6357e+00	3.5724e+00
1.50e+02	2.4107e+01	1.3087e+01	7.8780e+00	5.5072e+00	4.2896e+00	3.8384e+00	3.7751e+00
2.00e+02	2.4251e+01	1.3231e+01	8.0218e+00	5.6510e+00	4.4334e+00	3.9822e+00	3.9189e+00
3.00e+02	2.4453e+01	1.3434e+01	8.2245e+00	5.8537e+00	4.6361e+00	4.1848e+00	4.1216e+00
4.00e+02	2.4597e+01	1.3577e+01	8.3683e+00	5.9975e+00	4.7799e+00	4.3286e+00	4.2654e+00
5.00e+02	2.4709e+01	1.3689e+01	8.4798e+00	6.1090e+00	4.8914e+00	4.4402e+00	4.3770e+00
6.00e+02	2.4800e+01	1.3780e+01	8.5710e+00	6.2002e+00	4.9826e+00	4.5313e+00	4.4681e+00
8.00e+02	2.4944e+01	1.3924e+01	8.7148e+00	6.3440e+00	5.1264e+00	4.6752e+00	4.6119e+00
1.00e+03	2.5055e+01	1.4035e+01	8.8263e+00	6.4556e+00	5.2380e+00	4.7867e+00	4.7235e+00
1.50e+03	2.5258e+01	1.4238e+01	9.0293e+00	6.6585e+00	5.4409e+00	4.9896e+00	4.9264e+00
2.00e+03	2.5402e+01	1.4382e+01	9.1732e+00	6.8024e+00	5.5848e+00	5.1336e+00	5.0703e+00
3.00e+03	2.5605e+01	1.4585e+01	9.3760e+00	7.0052e+00	5.7876e+00	5.3363e+00	5.2731e+00
4.00e+03	2.5749e+01	1.4729e+01	9.5198e+00	7.1490e+00	5.9314e+00	5.4802e+00	5.4170e+00
5.00e+03	2.5860e+01	1.4840e+01	9.6314e+00	7.2606e+00	6.0430e+00	5.5918e+00	5.5285e+00
6.00e+03	2.5952e+01	1.4932e+01	9.7226e+00	7.3518e+00	6.1342e+00	5.6829e+00	5.6197e+00
8.00e+03	2.6095e+01	1.5075e+01	9.8664e+00	7.4956e+00	6.2780e+00	5.8268e+00	5.7635e+00
1.00e+04	2.6207e+01	1.5187e+01	9.9780e+00	7.6072e+00	6.3896e+00	5.9383e+00	5.8751e+00
1.50e+04	2.6410e+01	1.5390e+01	1.0181e+01	7.8102e+00	6.5926e+00	6.1413e+00	6.0781e+00
2.00e+04	2.6554e+01	1.5534e+01	1.0325e+01	7.9541e+00	6.7365e+00	6.2852e+00	6.2220e+00
3.00e+04	2.6757e+01	1.5737e+01	1.0528e+01	8.1569e+00	6.9393e+00	6.4880e+00	6.4248e+00
4.00e+04	2.6900e+01	1.5881e+01	1.0672e+01	8.3007e+00	7.0831e+00	6.6319e+00	6.5686e+00
5.00e+04	2.7012e+01	1.5992e+01	1.0783e+01	8.4123e+00	7.1947e+00	6.7435e+00	6.6802e+00
6.00e+04	2.7103e+01	1.6083e+01	1.0874e+01	8.5035e+00	7.2859e+00	6.8346e+00	6.7714e+00
8.00e+04	2.7247e+01	1.6227e+01	1.1018e+01	8.6473e+00	7.4297e+00	6.9785e+00	6.9152e+00
1.00e+05	2.7359e+01	1.6339e+01	1.1130e+01	8.7589e+00	7.5413e+00	7.0900e+00	7.0268e+00
1.50e+05	2.7562e+01	1.6542e+01	1.1333e+01	8.9619e+00	7.7443e+00	7.2930e+00	7.2298e+00
2.00e+05	2.7706e+01	1.6686e+01	1.1477e+01	9.1058e+00	7.8882e+00	7.4369e+00	7.3737e+00
3.00e+05	2.7908e+01	1.6888e+01	1.1679e+01	9.3086e+00	8.0910e+00	7.6397e+00	7.5765e+00
4.00e+05	2.8052e+01	1.7032e+01	1.1823e+01	9.4524e+00	8.2348e+00	7.7836e+00	7.7203e+00
5.00e+05	2.8164e+01	1.7144e+01	1.1935e+01	9.5640e+00	8.3464e+00	7.8952e+00	7.8319e+00
6.00e+05	2.8255e+01	1.7235e+01	1.2026e+01	9.6552e+00	8.4376e+00	7.9863e+00	7.9231e+00
8.00e+05	2.8399e+01	1.7379e+01	1.2170e+01	9.7990e+00	8.5814e+00	8.1302e+00	8.0669e+00
1.00e+06	2.8510e+01	1.7490e+01	1.2281e+01	9.9106e+00	8.6930e+00	8.2417e+00	8.1785e+00
1.50e+06	2.8713e+01	1.7693e+01	1.2484e+01	1.0114e+01	8.8960e+00	8.4447e+00	8.3815e+00
2.00e+06	2.8857e+01	1.7837e+01	1.2628e+01	1.0257e+01	9.0399e+00	8.5886e+00	8.5254e+00
3.00e+06	2.9060e+01	1.8040e+01	1.2831e+01	1.0460e+01	9.2427e+00	8.7914e+00	8.7282e+00
4.00e+06	2.9204e+01	1.8184e+01	1.2975e+01	1.0604e+01	9.3865e+00	8.9353e+00	8.8721e+00
5.00e+06	2.9315e+01	1.8296e+01	1.3086e+01	1.0716e+01	9.4981e+00	9.0469e+00	8.9836e+00
6.00e+06	2.9407e+01	1.8387e+01	1.3178e+01	1.0807e+01	9.5893e+00	9.1380e+00	9.0748e+00
8.00e+06	2.9550e+01	1.8531e+01	1.3322e+01	1.0951e+01	9.7331e+00	9.2819e+00	9.2186e+00
1.00e+07	2.9662e+01	1.8642e+01	1.3433e+01	1.1062e+01	9.8447e+00	9.3935e+00	9.3302e+00
1.50e+07	2.9865e+01	1.8845e+01	1.3636e+01	1.1265e+01	1.0048e+01	9.5964e+00	9.5332e+00
2.00e+07	3.0009e+01	1.8989e+01	1.3780e+01	1.1409e+01	1.0192e+01	9.7403e+00	9.6771e+00
3.00e+07	3.0212e+01	1.9192e+01	1.3983e+01	1.1612e+01	1.0394e+01	9.9431e+00	9.8799e+00
4.00e+07	3.0356e+01	1.9336e+01	1.4127e+01	1.1756e+01	1.0538e+01	1.0087e+01	1.0024e+01
5.00e+07	3.0467e+01	1.9447e+01	1.4238e+01	1.1867e+01	1.0650e+01	1.0199e+01	1.0135e+01
6.00e+07	3.0558e+01	1.9538e+01	1.4329e+01	1.1959e+01	1.0741e+01	1.0290e+01	1.0227e+01
8.00e+07	3.0702e+01	1.9682e+01	1.4473e+01	1.2102e+01	1.0885e+01	1.0434e+01	1.0370e+01

TABLE B.11 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.5 and RDdh=0.05

XD 0.5000 YD 0.5000e-01 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	5.4112e-04	2.7056e-04	1.3528e-04	6.7640e-05	2.7056e-05	6.7640e-06	2.2565e-06
1.50e-04	6.2002e-03	3.1001e-03	1.5500e-03	7.7502e-04	3.1001e-04	7.7502e-05	3.0997e-05
2.00e-04	2.2296e-02	1.1148e-02	5.5741e-03	2.7870e-03	1.1148e-03	2.7870e-04	1.2615e-04
3.00e-04	8.7205e-02	4.3602e-02	2.1801e-02	1.0901e-02	4.3602e-03	1.0902e-03	5.8482e-04
4.00e-04	1.8237e-01	9.1186e-02	4.5593e-02	2.2796e-02	9.1186e-03	2.2820e-03	1.3752e-03
5.00e-04	2.9281e-01	1.4641e-01	7.3204e-02	3.6602e-02	1.4641e-02	3.6737e-03	2.4137e-03
6.00e-04	4.0933e-01	2.0466e-01	1.0233e-01	5.1166e-02	2.0466e-02	5.1616e-03	3.6243e-03
8.00e-04	6.4269e-01	3.2134e-01	1.6067e-01	8.0336e-02	3.2134e-02	8.2454e-03	6.3569e-03
1.00e-03	8.6448e-01	4.3224e-01	2.1612e-01	1.0806e-01	4.3224e-02	1.1363e-02	9.3019e-03
1.50e-03	1.3505e+00	6.7526e-01	3.3763e-01	1.6881e-01	6.7526e-02	1.9065e-02	1.6875e-02
2.00e-03	1.7513e+00	8.7567e-01	4.3784e-01	2.1892e-01	8.7567e-02	2.6489e-02	2.4281e-02
3.00e-03	2.3789e+00	1.1895e+00	5.9473e-01	2.9737e-01	1.1895e-01	4.0300e-02	3.8090e-02
4.00e-03	2.8591e+00	1.4296e+00	7.1478e-01	3.5739e-01	1.4296e-01	5.2841e-02	5.0631e-02
5.00e-03	3.2471e+00	1.6236e+00	8.1178e-01	4.0589e-01	1.6236e-01	6.4348e-02	6.2137e-02
6.00e-03	3.5724e+00	1.7862e+00	8.9310e-01	4.4655e-01	1.7865e-01	7.5020e-02	7.2810e-02
8.00e-03	4.0980e+00	2.0490e+00	1.0245e+00	5.1225e-01	2.0511e-01	9.4428e-02	9.2218e-02
1.00e-02	4.5141e+00	2.2570e+00	1.1285e+00	5.6426e-01	2.2640e-01	1.1188e-01	1.0967e-01
1.50e-02	5.2845e+00	2.6423e+00	1.3211e+00	6.6057e-01	2.6802e-01	1.4971e-01	1.4750e-01
2.00e-02	5.8376e+00	2.9188e+00	1.4594e+00	7.2971e-01	3.0123e-01	1.8198e-01	1.7977e-01
3.00e-02	6.6184e+00	3.3092e+00	1.6546e+00	8.2731e-01	3.5575e-01	2.3621e-01	2.3400e-01
4.00e-02	7.1671e+00	3.5836e+00	1.7918e+00	8.9602e-01	4.0106e-01	2.8149e-01	2.7928e-01
5.00e-02	7.5864e+00	3.7932e+00	1.8966e+00	9.4883e-01	4.4036e-01	3.2079e-01	3.1858e-01
6.00e-02	7.9232e+00	3.9616e+00	1.9808e+00	9.9184e-01	4.7530e-01	3.5573e-01	3.5352e-01
8.00e-02	8.4423e+00	4.2211e+00	2.1106e+00	1.0603e+00	5.3586e-01	4.1629e-01	4.1408e-01
1.00e-01	8.8328e+00	4.4164e+00	2.2082e+00	1.1152e+00	5.8763e-01	4.6806e-01	4.6585e-01
1.50e-01	9.5133e+00	4.7567e+00	2.3785e+00	1.2226e+00	6.9316e-01	5.7359e-01	5.7138e-01
2.00e-01	9.9704e+00	4.9852e+00	2.4935e+00	1.3071e+00	7.7743e-01	6.5786e-01	6.5565e-01
3.00e-01	1.0574e+01	5.2870e+00	2.6499e+00	1.4395e+00	9.0984e-01	7.9027e-01	7.8806e-01
4.00e-01	1.0970e+01	5.4852e+00	2.7602e+00	1.5429e+00	1.0132e+00	8.9364e-01	8.9143e-01
5.00e-01	1.1258e+01	5.6290e+00	2.8475e+00	1.6281e+00	1.0984e+00	9.7882e-01	9.7661e-01
6.00e-01	1.1479e+01	5.7399e+00	2.9208e+00	1.7006e+00	1.1710e+00	1.0514e+00	1.0492e+00
8.00e-01	1.1803e+01	5.9028e+00	3.0404e+00	1.8200e+00	1.2903e+00	1.1708e+00	1.1686e+00
1.00e+00	1.2033e+01	6.0203e+00	3.1366e+00	1.9162e+00	1.3865e+00	1.2670e+00	1.2647e+00
1.50e+00	1.2403e+01	6.2203e+00	3.3181e+00	2.0977e+00	1.5680e+00	1.4484e+00	1.4462e+00
2.00e+00	1.2631e+01	6.3569e+00	3.4509e+00	2.2304e+00	1.7008e+00	1.5812e+00	1.5790e+00
3.00e+00	1.2909e+01	6.5494e+00	3.6422e+00	2.4218e+00	1.8921e+00	1.7726e+00	1.7704e+00
4.00e+00	1.3080e+01	6.6875e+00	3.7803e+00	2.5598e+00	2.0302e+00	1.9106e+00	1.9084e+00
5.00e+00	1.3202e+01	6.7956e+00	3.8883e+00	2.6679e+00	2.1382e+00	2.0186e+00	2.0164e+00
6.00e+00	1.3297e+01	6.8843e+00	3.9771e+00	2.7567e+00	2.2270e+00	2.1074e+00	2.1052e+00
8.00e+00	1.3441e+01	7.0252e+00	4.1180e+00	2.8975e+00	2.3679e+00	2.2483e+00	2.2461e+00
1.00e+01	1.3552e+01	7.1350e+00	4.2278e+00	3.0073e+00	2.4777e+00	2.3581e+00	2.3559e+00
1.50e+01	1.3753e+01	7.3355e+00	4.4283e+00	3.2079e+00	2.6782e+00	2.5586e+00	2.5564e+00
2.00e+01	1.3896e+01	7.4783e+00	4.5710e+00	3.3506e+00	2.8209e+00	2.7013e+00	2.6991e+00
3.00e+01	1.4097e+01	7.6798e+00	4.7726e+00	3.5522e+00	3.0225e+00	2.9029e+00	2.9007e+00
4.00e+01	1.4241e+01	7.8231e+00	4.9159e+00	3.6954e+00	3.1657e+00	3.0462e+00	3.0440e+00
5.00e+01	1.4352e+01	7.9343e+00	5.0271e+00	3.8066e+00	3.2770e+00	3.1574e+00	3.1552e+00
6.00e+01	1.4443e+01	8.0252e+00	5.1180e+00	3.8975e+00	3.3679e+00	3.2483e+00	3.2461e+00
8.00e+01	1.4586e+01	8.1688e+00	5.2615e+00	4.0411e+00	3.5114e+00	3.3919e+00	3.3896e+00

TABLE B.11 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.5 and RDdh=0.05

XD 0.5000 YD 0.5000e-01 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	1.4698e+01	8.2802e+00	5.3729e+00	4.1525e+00	3.6228e+00	3.5032e+00	3.5010e+00
1.50e+02	1.4900e+01	8.4829e+00	5.5756e+00	4.3552e+00	3.8255e+00	3.7060e+00	3.7038e+00
2.00e+02	1.5044e+01	8.6267e+00	5.7194e+00	4.4990e+00	3.9693e+00	3.8498e+00	3.8476e+00
3.00e+02	1.5247e+01	8.8293e+00	5.9221e+00	4.7017e+00	4.1720e+00	4.0524e+00	4.0502e+00
4.00e+02	1.5391e+01	8.9731e+00	6.0659e+00	4.8455e+00	4.3158e+00	4.1962e+00	4.1940e+00
5.00e+02	1.5502e+01	9.0847e+00	6.1775e+00	4.9570e+00	4.4273e+00	4.3078e+00	4.3056e+00
6.00e+02	1.5593e+01	9.1758e+00	6.2686e+00	5.0481e+00	4.5185e+00	4.3989e+00	4.3967e+00
8.00e+02	1.5737e+01	9.3196e+00	6.4124e+00	5.1920e+00	4.6623e+00	4.5427e+00	4.5405e+00
1.00e+03	1.5849e+01	9.4312e+00	6.5240e+00	5.3035e+00	4.7739e+00	4.6543e+00	4.6521e+00
1.50e+03	1.6052e+01	9.6341e+00	6.7269e+00	5.5065e+00	4.9768e+00	4.8572e+00	4.8550e+00
2.00e+03	1.6196e+01	9.7780e+00	6.8708e+00	5.6504e+00	5.1207e+00	5.0011e+00	4.9989e+00
3.00e+03	1.6398e+01	9.9808e+00	7.0736e+00	5.8531e+00	5.3235e+00	5.2039e+00	5.2017e+00
4.00e+03	1.6542e+01	1.0125e+01	7.2175e+00	5.9970e+00	5.4673e+00	5.3478e+00	5.3456e+00
5.00e+03	1.6654e+01	1.0236e+01	7.3290e+00	6.1086e+00	5.5789e+00	5.4594e+00	5.4571e+00
6.00e+03	1.6745e+01	1.0327e+01	7.4202e+00	6.1997e+00	5.6701e+00	5.5505e+00	5.5483e+00
8.00e+03	1.6889e+01	1.0471e+01	7.5640e+00	6.3436e+00	5.8139e+00	5.6944e+00	5.6921e+00
1.00e+04	1.7000e+01	1.0583e+01	7.6756e+00	6.4552e+00	5.9255e+00	5.8059e+00	5.8037e+00
1.50e+04	1.7203e+01	1.0786e+01	7.8786e+00	6.6581e+00	6.1285e+00	6.0089e+00	6.0067e+00
2.00e+04	1.7347e+01	1.0930e+01	8.0225e+00	6.8020e+00	6.2724e+00	6.1528e+00	6.1506e+00
3.00e+04	1.7550e+01	1.1133e+01	8.2253e+00	7.0048e+00	6.4752e+00	6.3556e+00	6.3534e+00
4.00e+04	1.7694e+01	1.1276e+01	8.3691e+00	7.1487e+00	6.6190e+00	6.4995e+00	6.4973e+00
5.00e+04	1.7805e+01	1.1388e+01	8.4807e+00	7.2603e+00	6.7306e+00	6.6110e+00	6.6088e+00
6.00e+04	1.7897e+01	1.1479e+01	8.5719e+00	7.3514e+00	6.8218e+00	6.7022e+00	6.7000e+00
8.00e+04	1.8040e+01	1.1623e+01	8.7157e+00	7.4953e+00	6.9656e+00	6.8461e+00	6.8438e+00
1.00e+05	1.8152e+01	1.1735e+01	8.8273e+00	7.6069e+00	7.0772e+00	6.9576e+00	6.9554e+00
1.50e+05	1.8355e+01	1.1937e+01	9.0303e+00	7.8098e+00	7.2802e+00	7.1606e+00	7.1584e+00
2.00e+05	1.8499e+01	1.2081e+01	9.1742e+00	7.9537e+00	7.4241e+00	7.3045e+00	7.3023e+00
3.00e+05	1.8702e+01	1.2284e+01	9.3770e+00	8.1565e+00	7.6269e+00	7.5073e+00	7.5051e+00
4.00e+05	1.8846e+01	1.2428e+01	9.5208e+00	8.3004e+00	7.7707e+00	7.6512e+00	7.6490e+00
5.00e+05	1.8957e+01	1.2540e+01	9.6324e+00	8.4120e+00	7.8823e+00	7.7627e+00	7.7605e+00
6.00e+05	1.9048e+01	1.2631e+01	9.7236e+00	8.5031e+00	7.9735e+00	7.8539e+00	7.8517e+00
8.00e+05	1.9192e+01	1.2775e+01	9.8674e+00	8.6470e+00	8.1173e+00	7.9978e+00	7.9955e+00
1.00e+06	1.9304e+01	1.2886e+01	9.9790e+00	8.7586e+00	8.2289e+00	8.1093e+00	8.1071e+00
1.50e+06	1.9507e+01	1.3089e+01	1.0182e+01	8.9615e+00	8.4319e+00	8.3123e+00	8.3101e+00
2.00e+06	1.9651e+01	1.3233e+01	1.0326e+01	9.1054e+00	8.5758e+00	8.4562e+00	8.4540e+00
3.00e+06	1.9853e+01	1.3436e+01	1.0529e+01	9.3082e+00	8.7786e+00	8.6590e+00	8.6568e+00
4.00e+06	1.9997e+01	1.3580e+01	1.0673e+01	9.4521e+00	8.9224e+00	8.8029e+00	8.8007e+00
5.00e+06	2.0109e+01	1.3691e+01	1.0784e+01	9.5637e+00	9.0340e+00	8.9145e+00	8.9122e+00
6.00e+06	2.0200e+01	1.3783e+01	1.0875e+01	9.6548e+00	9.1252e+00	9.0056e+00	9.0034e+00
8.00e+06	2.0344e+01	1.3926e+01	1.1019e+01	9.7987e+00	9.2690e+00	9.1495e+00	9.1473e+00
1.00e+07	2.0455e+01	1.4038e+01	1.1131e+01	9.9103e+00	9.3806e+00	9.2610e+00	9.2588e+00
1.50e+07	2.0658e+01	1.4241e+01	1.1334e+01	1.0113e+01	9.5836e+00	9.4640e+00	9.4618e+00
2.00e+07	2.0802e+01	1.4385e+01	1.1478e+01	1.0257e+01	9.7275e+00	9.6079e+00	9.6057e+00
3.00e+07	2.1005e+01	1.4588e+01	1.1680e+01	1.0460e+01	9.9303e+00	9.8107e+00	9.8085e+00
4.00e+07	2.1149e+01	1.4731e+01	1.1824e+01	1.0604e+01	1.0074e+01	9.9546e+00	9.9524e+00
5.00e+07	2.1261e+01	1.4843e+01	1.1936e+01	1.0715e+01	1.0186e+01	1.0066e+01	1.0064e+01
6.00e+07	2.1352e+01	1.4934e+01	1.2027e+01	1.0807e+01	1.0277e+01	1.0157e+01	1.0155e+01
8.00e+07	2.1496e+01	1.5078e+01	1.2171e+01	1.0950e+01	1.0421e+01	1.0301e+01	1.0299e+01

TABLE B.12 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.732 and RDdh=0.0005

XD 0.7320 YD 0.5000e-03 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	1.3529e+01	6.8026e+00	3.4014e+00	1.7007e+00	6.8027e-01	1.7007e-01	3.6243e-02
1.50e-04	1.4340e+01	7.2083e+00	3.6042e+00	1.8021e+00	7.2084e-01	1.8021e-01	4.0226e-02
2.00e-04	1.4916e+01	7.4960e+00	3.7481e+00	1.8740e+00	7.4962e-01	1.8740e-01	4.3584e-02
3.00e-04	1.5727e+01	7.9015e+00	3.9508e+00	1.9754e+00	7.9016e-01	1.9754e-01	4.9217e-02
4.00e-04	1.6302e+01	8.1892e+00	4.0947e+00	2.0473e+00	8.1893e-01	2.0475e-01	5.3965e-02
5.00e-04	1.6748e+01	8.4123e+00	4.2062e+00	2.1031e+00	8.4124e-01	2.1037e-01	5.8149e-02
6.00e-04	1.7113e+01	8.5946e+00	4.2974e+00	2.1487e+00	8.5948e-01	2.1502e-01	6.1931e-02
8.00e-04	1.7688e+01	8.8823e+00	4.4412e+00	2.2206e+00	8.8824e-01	2.2262e-01	6.8647e-02
1.00e-03	1.8135e+01	9.1054e+00	4.5528e+00	2.2764e+00	9.1056e-01	2.2888e-01	7.4564e-02
1.50e-03	1.8946e+01	9.5113e+00	4.7557e+00	2.3779e+00	9.5115e-01	2.4171e-01	8.7166e-02
2.00e-03	1.9522e+01	9.7992e+00	4.8996e+00	2.4498e+00	9.7993e-01	2.5236e-01	9.7788e-02
3.00e-03	2.0333e+01	1.0205e+01	5.1024e+00	2.5512e+00	1.0205e+00	2.7017e-01	1.1560e-01
4.00e-03	2.0908e+01	1.0492e+01	5.2462e+00	2.6231e+00	1.0492e+00	2.8518e-01	1.3061e-01
5.00e-03	2.1353e+01	1.0715e+01	5.3575e+00	2.6787e+00	1.0715e+00	2.9838e-01	1.4381e-01
6.00e-03	2.1716e+01	1.0896e+01	5.4482e+00	2.7241e+00	1.0897e+00	3.1028e-01	1.5571e-01
8.00e-03	2.2285e+01	1.1181e+01	5.5903e+00	2.7952e+00	1.1183e+00	3.3127e-01	1.7670e-01
1.00e-02	2.2721e+01	1.1399e+01	5.6994e+00	2.8497e+00	1.1406e+00	3.4956e-01	1.9498e-01
1.50e-02	2.3497e+01	1.1787e+01	5.8934e+00	2.9467e+00	1.1825e+00	3.8764e-01	2.3307e-01
2.00e-02	2.4030e+01	1.2053e+01	6.0266e+00	3.0133e+00	1.2145e+00	4.1869e-01	2.6412e-01
3.00e-02	2.4749e+01	1.2413e+01	6.2064e+00	3.1032e+00	1.2647e+00	4.6861e-01	3.1404e-01
4.00e-02	2.5236e+01	1.2656e+01	6.3281e+00	3.1642e+00	1.3049e+00	5.0876e-01	3.5419e-01
5.00e-02	2.5600e+01	1.2838e+01	6.4190e+00	3.2100e+00	1.3389e+00	5.4285e-01	3.8828e-01
6.00e-02	2.5888e+01	1.2982e+01	6.4911e+00	3.2468e+00	1.3689e+00	5.7277e-01	4.1820e-01
8.00e-02	2.6328e+01	1.3202e+01	6.6011e+00	3.3048e+00	1.4202e+00	6.2408e-01	4.6951e-01
1.00e-01	2.6657e+01	1.3366e+01	6.6833e+00	3.3510e+00	1.4638e+00	6.6767e-01	5.1310e-01
1.50e-01	2.7230e+01	1.3653e+01	6.8267e+00	3.4415e+00	1.5526e+00	7.5656e-01	6.0198e-01
2.00e-01	2.7618e+01	1.3847e+01	6.9244e+00	3.5132e+00	1.6242e+00	8.2811e-01	6.7354e-01
3.00e-01	2.8139e+01	1.4108e+01	7.0593e+00	3.6276e+00	1.7385e+00	9.4243e-01	7.8786e-01
4.00e-01	2.8488e+01	1.4282e+01	7.1566e+00	3.7187e+00	1.8297e+00	1.0336e+00	8.7902e-01
5.00e-01	2.8746e+01	1.4411e+01	7.2350e+00	3.7952e+00	1.9061e+00	1.1100e+00	9.5546e-01
6.00e-01	2.8948e+01	1.4512e+01	7.3016e+00	3.8612e+00	1.9721e+00	1.1760e+00	1.0215e+00
8.00e-01	2.9246e+01	1.4663e+01	7.4120e+00	3.9714e+00	2.0823e+00	1.2862e+00	1.1317e+00
1.00e+00	2.9461e+01	1.4773e+01	7.5022e+00	4.0614e+00	2.1724e+00	1.3763e+00	1.2218e+00
1.50e+00	2.9814e+01	1.4963e+01	7.6747e+00	4.2340e+00	2.3449e+00	1.5488e+00	1.3943e+00
2.00e+00	3.0033e+01	1.5094e+01	7.8026e+00	4.3619e+00	2.4729e+00	1.6768e+00	1.5222e+00
3.00e+00	3.0303e+01	1.5282e+01	7.9888e+00	4.5481e+00	2.6591e+00	1.8630e+00	1.7084e+00
4.00e+00	3.0471e+01	1.5417e+01	8.1242e+00	4.6835e+00	2.7945e+00	1.9984e+00	1.8438e+00
5.00e+00	3.0591e+01	1.5523e+01	8.2306e+00	4.7899e+00	2.9009e+00	2.1048e+00	1.9502e+00
6.00e+00	3.0685e+01	1.5611e+01	8.3183e+00	4.8776e+00	2.9886e+00	2.1925e+00	2.0379e+00
8.00e+00	3.0828e+01	1.5751e+01	8.4578e+00	5.0171e+00	3.1280e+00	2.3319e+00	2.1774e+00
1.00e+01	3.0938e+01	1.5860e+01	8.5667e+00	5.1260e+00	3.2370e+00	2.4409e+00	2.2863e+00
1.50e+01	3.1138e+01	1.6059e+01	8.7661e+00	5.3254e+00	3.4364e+00	2.6403e+00	2.4857e+00
2.00e+01	3.1280e+01	1.6201e+01	8.9082e+00	5.4675e+00	3.5785e+00	2.7824e+00	2.6278e+00
3.00e+01	3.1481e+01	1.6402e+01	9.1092e+00	5.6685e+00	3.7795e+00	2.9834e+00	2.8288e+00
4.00e+01	3.1624e+01	1.6545e+01	9.2522e+00	5.8115e+00	3.9224e+00	3.1264e+00	2.9718e+00
5.00e+01	3.1735e+01	1.6656e+01	9.3632e+00	5.9225e+00	4.0335e+00	3.2374e+00	3.0828e+00
6.00e+01	3.1826e+01	1.6747e+01	9.4540e+00	6.0133e+00	4.1243e+00	3.3282e+00	3.1736e+00
8.00e+01	3.1969e+01	1.6890e+01	9.5974e+00	6.1567e+00	4.2677e+00	3.4716e+00	3.3170e+00

TABLE B.12 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.732 and RDdh=0.0005

XD 0.7320 YD 0.5000e-03 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	3.2080e+01	1.7002e+01	9.7087e+00	6.2680e+00	4.3790e+00	3.5829e+00	3.4283e+00
1.50e+02	3.2283e+01	1.7204e+01	9.9113e+00	6.4706e+00	4.5816e+00	3.7855e+00	3.6309e+00
2.00e+02	3.2427e+01	1.7348e+01	1.0055e+01	6.6144e+00	4.7253e+00	3.9292e+00	3.7747e+00
3.00e+02	3.2629e+01	1.7550e+01	1.0258e+01	6.8170e+00	4.9279e+00	4.1318e+00	3.9773e+00
4.00e+02	3.2773e+01	1.7694e+01	1.0401e+01	6.9607e+00	5.0717e+00	4.2756e+00	4.1210e+00
5.00e+02	3.2885e+01	1.7806e+01	1.0513e+01	7.0723e+00	5.1832e+00	4.3871e+00	4.2326e+00
6.00e+02	3.2976e+01	1.7897e+01	1.0604e+01	7.1634e+00	5.2744e+00	4.4783e+00	4.3237e+00
8.00e+02	3.3120e+01	1.8041e+01	1.0748e+01	7.3072e+00	5.4182e+00	4.6221e+00	4.4675e+00
1.00e+03	3.3231e+01	1.8152e+01	1.0859e+01	7.4187e+00	5.5297e+00	4.7336e+00	4.5791e+00
1.50e+03	3.3434e+01	1.8355e+01	1.1062e+01	7.6217e+00	5.7326e+00	4.9366e+00	4.7820e+00
2.00e+03	3.3578e+01	1.8499e+01	1.1206e+01	7.7656e+00	5.8765e+00	5.0805e+00	4.9259e+00
3.00e+03	3.3781e+01	1.8702e+01	1.1409e+01	7.9683e+00	6.0793e+00	5.2832e+00	5.1287e+00
4.00e+03	3.3925e+01	1.8846e+01	1.1553e+01	8.1122e+00	6.2232e+00	5.4271e+00	5.2725e+00
5.00e+03	3.4036e+01	1.8957e+01	1.1664e+01	8.2238e+00	6.3347e+00	5.5387e+00	5.3841e+00
6.00e+03	3.4127e+01	1.9048e+01	1.1756e+01	8.3149e+00	6.4259e+00	5.6298e+00	5.4752e+00
8.00e+03	3.4271e+01	1.9192e+01	1.1899e+01	8.4588e+00	6.5697e+00	5.7737e+00	5.6191e+00
1.00e+04	3.4383e+01	1.9304e+01	1.2011e+01	8.5704e+00	6.6813e+00	5.8852e+00	5.7307e+00
1.50e+04	3.4586e+01	1.9507e+01	1.2214e+01	8.7733e+00	6.8843e+00	6.0882e+00	5.9336e+00
2.00e+04	3.4730e+01	1.9651e+01	1.2358e+01	8.9172e+00	7.0282e+00	6.2321e+00	6.0775e+00
3.00e+04	3.4932e+01	1.9854e+01	1.2561e+01	9.1200e+00	7.2310e+00	6.4349e+00	6.2803e+00
4.00e+04	3.5076e+01	1.9997e+01	1.2705e+01	9.2639e+00	7.3749e+00	6.5788e+00	6.4242e+00
5.00e+04	3.5188e+01	2.0109e+01	1.2816e+01	9.3755e+00	7.4864e+00	6.6903e+00	6.5358e+00
6.00e+04	3.5279e+01	2.0200e+01	1.2907e+01	9.4666e+00	7.5776e+00	6.7815e+00	6.6269e+00
8.00e+04	3.5423e+01	2.0344e+01	1.3051e+01	9.6105e+00	7.7214e+00	6.9254e+00	6.7708e+00
1.00e+05	3.5534e+01	2.0456e+01	1.3163e+01	9.7220e+00	7.8330e+00	7.0369e+00	6.8824e+00
1.50e+05	3.5737e+01	2.0659e+01	1.3366e+01	9.9250e+00	8.0360e+00	7.2399e+00	7.0853e+00
2.00e+05	3.5881e+01	2.0802e+01	1.3510e+01	1.0069e+01	8.1799e+00	7.3838e+00	7.2292e+00
3.00e+05	3.6084e+01	2.1005e+01	1.3712e+01	1.0272e+01	8.3827e+00	7.5866e+00	7.4320e+00
4.00e+05	3.6228e+01	2.1149e+01	1.3856e+01	1.0416e+01	8.5266e+00	7.7305e+00	7.5759e+00
5.00e+05	3.6340e+01	2.1261e+01	1.3968e+01	1.0527e+01	8.6381e+00	7.8420e+00	7.6875e+00
6.00e+05	3.6431e+01	2.1352e+01	1.4059e+01	1.0618e+01	8.7293e+00	7.9332e+00	7.7786e+00
8.00e+05	3.6575e+01	2.1496e+01	1.4203e+01	1.0762e+01	8.8731e+00	8.0771e+00	7.9225e+00
1.00e+06	3.6686e+01	2.1607e+01	1.4314e+01	1.0874e+01	8.9847e+00	8.1886e+00	8.0341e+00
1.50e+06	3.6889e+01	2.1810e+01	1.4517e+01	1.1077e+01	9.1877e+00	8.3916e+00	8.2370e+00
2.00e+06	3.7033e+01	2.1954e+01	1.4661e+01	1.1221e+01	9.3316e+00	8.5355e+00	8.3809e+00
3.00e+06	3.7236e+01	2.2157e+01	1.4864e+01	1.1423e+01	9.5344e+00	8.7383e+00	8.5837e+00
4.00e+06	3.7380e+01	2.2301e+01	1.5008e+01	1.1567e+01	9.6783e+00	8.8822e+00	8.7276e+00
5.00e+06	3.7491e+01	2.2412e+01	1.5120e+01	1.1679e+01	9.7898e+00	8.9937e+00	8.8392e+00
6.00e+06	3.7582e+01	2.2504e+01	1.5211e+01	1.1770e+01	9.8810e+00	9.0849e+00	8.9303e+00
8.00e+06	3.7726e+01	2.2647e+01	1.5355e+01	1.1914e+01	1.0025e+01	9.2288e+00	9.0742e+00
1.00e+07	3.7838e+01	2.2759e+01	1.5466e+01	1.2025e+01	1.0136e+01	9.3403e+00	9.1858e+00
1.50e+07	3.8041e+01	2.2962e+01	1.5669e+01	1.2228e+01	1.0339e+01	9.5433e+00	9.3887e+00
2.00e+07	3.8185e+01	2.3106e+01	1.5813e+01	1.2372e+01	1.0483e+01	9.6872e+00	9.5326e+00
3.00e+07	3.8388e+01	2.3309e+01	1.6016e+01	1.2575e+01	1.0686e+01	9.8900e+00	9.7354e+00
4.00e+07	3.8531e+01	2.3453e+01	1.6160e+01	1.2719e+01	1.0830e+01	1.0034e+01	9.8793e+00
5.00e+07	3.8643e+01	2.3564e+01	1.6271e+01	1.2831e+01	1.0942e+01	1.0145e+01	9.9909e+00
6.00e+07	3.8734e+01	2.3655e+01	1.6362e+01	1.2922e+01	1.1033e+01	1.0237e+01	1.0082e+01
8.00e+07	3.8878e+01	2.3799e+01	1.6506e+01	1.3066e+01	1.1177e+01	1.0380e+01	1.0226e+01

TABLE B.13 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.732 and RDdh=0.005

XD 0.7320 YD 0.5000e-02 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	4.5126e+00	2.2571e+00	1.1285e+00	5.6426e-01	2.2571e-01	5.6426e-02	1.3298e-02
1.50e-04	5.2837e+00	2.6426e+00	1.3213e+00	6.6065e-01	2.6426e-01	6.6065e-02	1.7085e-02
2.00e-04	5.8389e+00	2.9202e+00	1.4601e+00	7.3005e-01	2.9202e-01	7.3005e-02	2.0325e-02
3.00e-04	6.6294e+00	3.3155e+00	1.6578e+00	8.2888e-01	3.3155e-01	8.2889e-02	2.5817e-02
4.00e-04	7.1946e+00	3.5981e+00	1.7990e+00	8.9952e-01	3.5981e-01	8.9965e-02	3.0481e-02
5.00e-04	7.6347e+00	3.8181e+00	1.9091e+00	9.5453e-01	3.8181e-01	9.5510e-02	3.4608e-02
6.00e-04	7.9952e+00	3.9984e+00	1.9992e+00	9.9960e-01	3.9984e-01	1.0011e-01	3.8348e-02
8.00e-04	8.5654e+00	4.2835e+00	2.1417e+00	1.0709e+00	4.2835e-01	1.0764e-01	4.5004e-02
1.00e-03	9.0086e+00	4.5051e+00	2.2525e+00	1.1263e+00	4.5051e-01	1.1386e-01	5.0880e-02
1.50e-03	9.8163e+00	4.9089e+00	2.4545e+00	1.2272e+00	4.9089e-01	1.2662e-01	6.3418e-02
2.00e-03	1.0390e+01	5.1957e+00	2.5979e+00	1.2989e+00	5.1957e-01	1.3723e-01	7.4002e-02
3.00e-03	1.1199e+01	5.6002e+00	2.8001e+00	1.4001e+00	5.6002e-01	1.5500e-01	9.1771e-02
4.00e-03	1.1773e+01	5.8872e+00	2.9436e+00	1.4718e+00	5.8872e-01	1.6999e-01	1.0675e-01
5.00e-03	1.2218e+01	6.1095e+00	3.0548e+00	1.5274e+00	6.1096e-01	1.8317e-01	1.1993e-01
6.00e-03	1.2580e+01	6.2907e+00	3.1454e+00	1.5727e+00	6.2910e-01	1.9505e-01	1.3182e-01
8.00e-03	1.3148e+01	6.5748e+00	3.2874e+00	1.6437e+00	6.5771e-01	2.1602e-01	1.5279e-01
1.00e-02	1.3584e+01	6.7927e+00	3.3964e+00	1.6982e+00	6.8001e-01	2.3430e-01	1.7106e-01
1.50e-02	1.4360e+01	7.1806e+00	3.5903e+00	1.7952e+00	7.2190e-01	2.7236e-01	2.0912e-01
2.00e-02	1.4892e+01	7.4468e+00	3.7234e+00	1.8617e+00	7.5385e-01	3.0340e-01	2.4017e-01
3.00e-02	1.5611e+01	7.8064e+00	3.9032e+00	1.9516e+00	8.0404e-01	3.5331e-01	2.9008e-01
4.00e-02	1.6098e+01	8.0497e+00	4.0248e+00	2.0125e+00	8.4419e-01	3.9345e-01	3.3022e-01
5.00e-02	1.6461e+01	8.2315e+00	4.1158e+00	2.0584e+00	8.7828e-01	4.2754e-01	3.6430e-01
6.00e-02	1.6750e+01	8.3757e+00	4.1879e+00	2.0952e+00	9.0819e-01	4.5745e-01	3.9422e-01
8.00e-02	1.7190e+01	8.5956e+00	4.2978e+00	2.1532e+00	9.5950e-01	5.0875e-01	4.4552e-01
1.00e-01	1.7518e+01	8.7600e+00	4.3800e+00	2.1994e+00	1.0031e+00	5.5234e-01	4.8911e-01
1.50e-01	1.8092e+01	9.0466e+00	4.5234e+00	2.2898e+00	1.0920e+00	6.4123e-01	5.7799e-01
2.00e-01	1.8480e+01	9.2406e+00	4.6211e+00	2.3616e+00	1.1635e+00	7.1278e-01	6.4955e-01
3.00e-01	1.9001e+01	9.5011e+00	4.7561e+00	2.4759e+00	1.2778e+00	8.2709e-01	7.6386e-01
4.00e-01	1.9350e+01	9.6759e+00	4.8533e+00	2.5671e+00	1.3690e+00	9.1826e-01	8.5502e-01
5.00e-01	1.9608e+01	9.8049e+00	4.9317e+00	2.6435e+00	1.4454e+00	9.9469e-01	9.3146e-01
6.00e-01	1.9809e+01	9.9057e+00	4.9983e+00	2.7095e+00	1.5114e+00	1.0607e+00	9.9747e-01
8.00e-01	2.0108e+01	1.0056e+01	5.1088e+00	2.8197e+00	1.6216e+00	1.1709e+00	1.1077e+00
1.00e+00	2.0323e+01	1.0166e+01	5.1989e+00	2.9098e+00	1.7117e+00	1.2610e+00	1.1978e+00
1.50e+00	2.0676e+01	1.0356e+01	5.3714e+00	3.0823e+00	1.8842e+00	1.4335e+00	1.3703e+00
2.00e+00	2.0895e+01	1.0488e+01	5.4993e+00	3.2102e+00	2.0122e+00	1.5614e+00	1.4982e+00
3.00e+00	2.1165e+01	1.0675e+01	5.6856e+00	3.3965e+00	2.1984e+00	1.7477e+00	1.6844e+00
4.00e+00	2.1333e+01	1.0811e+01	5.8209e+00	3.5319e+00	2.3338e+00	1.8830e+00	1.8198e+00
5.00e+00	2.1453e+01	1.0917e+01	5.9273e+00	3.6383e+00	2.4402e+00	1.9894e+00	1.9262e+00
6.00e+00	2.1546e+01	1.1005e+01	6.0150e+00	3.7260e+00	2.5279e+00	2.0771e+00	2.0139e+00
8.00e+00	2.1690e+01	1.1144e+01	6.1545e+00	3.8654e+00	2.6673e+00	2.2166e+00	2.1534e+00
1.00e+01	2.1800e+01	1.1253e+01	6.2634e+00	3.9743e+00	2.7763e+00	2.3255e+00	2.2623e+00
1.50e+01	2.2000e+01	1.1452e+01	6.4628e+00	4.1737e+00	2.9757e+00	2.5249e+00	2.4617e+00
2.00e+01	2.2142e+01	1.1595e+01	6.6049e+00	4.3159e+00	3.1178e+00	2.6671e+00	2.6038e+00
3.00e+01	2.2343e+01	1.1796e+01	6.8059e+00	4.5169e+00	3.3188e+00	2.8680e+00	2.8048e+00
4.00e+01	2.2486e+01	1.1939e+01	6.9489e+00	4.6598e+00	3.4618e+00	3.0110e+00	2.9478e+00
5.00e+01	2.2597e+01	1.2050e+01	7.0599e+00	4.7709e+00	3.5728e+00	3.1221e+00	3.0588e+00
6.00e+01	2.2687e+01	1.2140e+01	7.1507e+00	4.8617e+00	3.6636e+00	3.2129e+00	3.1496e+00
8.00e+01	2.2831e+01	1.2284e+01	7.2941e+00	5.0051e+00	3.8070e+00	3.3563e+00	3.2930e+00

TABLE B.13 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.732 and RDdh=0.005

XD 0.7320 YD 0.5000e-02 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	2.2942e+01	1.2395e+01	7.4054e+00	5.1164e+00	3.9183e+00	3.4676e+00	3.4043e+00
1.50e+02	2.3145e+01	1.2598e+01	7.6080e+00	5.3190e+00	4.1209e+00	3.6702e+00	3.6069e+00
2.00e+02	2.3289e+01	1.2741e+01	7.7518e+00	5.4627e+00	4.2646e+00	3.8139e+00	3.7507e+00
3.00e+02	2.3491e+01	1.2944e+01	7.9544e+00	5.6653e+00	4.4672e+00	4.0165e+00	3.9533e+00
4.00e+02	2.3635e+01	1.3088e+01	8.0982e+00	5.8091e+00	4.6110e+00	4.1603e+00	4.0970e+00
5.00e+02	2.3746e+01	1.3199e+01	8.2097e+00	5.9206e+00	4.7225e+00	4.2718e+00	4.2086e+00
6.00e+02	2.3838e+01	1.3290e+01	8.3008e+00	6.0117e+00	4.8137e+00	4.3629e+00	4.2997e+00
8.00e+02	2.3981e+01	1.3434e+01	8.4446e+00	6.1555e+00	4.9575e+00	4.5067e+00	4.4435e+00
1.00e+03	2.4093e+01	1.3546e+01	8.5562e+00	6.2671e+00	5.0690e+00	4.6183e+00	4.5550e+00
1.50e+03	2.4296e+01	1.3749e+01	8.7591e+00	6.4700e+00	5.2720e+00	4.8212e+00	4.7580e+00
2.00e+03	2.4440e+01	1.3893e+01	8.9030e+00	6.6139e+00	5.4159e+00	4.9651e+00	4.9019e+00
3.00e+03	2.4643e+01	1.4095e+01	9.1058e+00	6.8167e+00	5.6186e+00	5.1679e+00	5.1047e+00
4.00e+03	2.4786e+01	1.4239e+01	9.2496e+00	6.9605e+00	5.7625e+00	5.3117e+00	5.2485e+00
5.00e+03	2.4898e+01	1.4351e+01	9.3612e+00	7.0721e+00	5.8741e+00	5.4233e+00	5.3601e+00
6.00e+03	2.4989e+01	1.4442e+01	9.4524e+00	7.1633e+00	5.9652e+00	5.5145e+00	5.4512e+00
8.00e+03	2.5133e+01	1.4586e+01	9.5962e+00	7.3071e+00	6.1091e+00	5.6583e+00	5.5951e+00
1.00e+04	2.5245e+01	1.4697e+01	9.7078e+00	7.4187e+00	6.2206e+00	5.7699e+00	5.7067e+00
1.50e+04	2.5447e+01	1.4900e+01	9.9107e+00	7.6217e+00	6.4236e+00	5.9728e+00	5.9096e+00
2.00e+04	2.5591e+01	1.5044e+01	1.0055e+01	7.7656e+00	6.5675e+00	6.1168e+00	6.0535e+00
3.00e+04	2.5794e+01	1.5247e+01	1.0257e+01	7.9684e+00	6.7703e+00	6.3196e+00	6.2563e+00
4.00e+04	2.5938e+01	1.5391e+01	1.0401e+01	8.1122e+00	6.9142e+00	6.4634e+00	6.4002e+00
5.00e+04	2.6050e+01	1.5503e+01	1.0513e+01	8.2238e+00	7.0257e+00	6.5750e+00	6.5118e+00
6.00e+04	2.6141e+01	1.5594e+01	1.0604e+01	8.3150e+00	7.1169e+00	6.6662e+00	6.6029e+00
8.00e+04	2.6285e+01	1.5738e+01	1.0748e+01	8.4588e+00	7.2608e+00	6.8100e+00	6.7468e+00
1.00e+05	2.6396e+01	1.5849e+01	1.0859e+01	8.5704e+00	7.3723e+00	6.9216e+00	6.8583e+00
1.50e+05	2.6599e+01	1.6052e+01	1.1062e+01	8.7734e+00	7.5753e+00	7.1245e+00	7.0613e+00
2.00e+05	2.6743e+01	1.6196e+01	1.1206e+01	8.9173e+00	7.7192e+00	7.2685e+00	7.2052e+00
3.00e+05	2.6946e+01	1.6399e+01	1.1409e+01	9.1201e+00	7.9220e+00	7.4713e+00	7.4080e+00
4.00e+05	2.7090e+01	1.6543e+01	1.1553e+01	9.2639e+00	8.0659e+00	7.6151e+00	7.5519e+00
5.00e+05	2.7201e+01	1.6654e+01	1.1665e+01	9.3755e+00	8.1774e+00	7.7267e+00	7.6635e+00
6.00e+05	2.7292e+01	1.6745e+01	1.1756e+01	9.4667e+00	8.2686e+00	7.8179e+00	7.7546e+00
8.00e+05	2.7436e+01	1.6889e+01	1.1900e+01	9.6105e+00	8.4125e+00	7.9617e+00	7.8985e+00
1.00e+06	2.7548e+01	1.7001e+01	1.2011e+01	9.7221e+00	8.5240e+00	8.0733e+00	8.0101e+00
1.50e+06	2.7751e+01	1.7204e+01	1.2214e+01	9.9251e+00	8.7270e+00	8.2762e+00	8.2130e+00
2.00e+06	2.7895e+01	1.7348e+01	1.2358e+01	1.0069e+01	8.8709e+00	8.4202e+00	8.3569e+00
3.00e+06	2.8098e+01	1.7550e+01	1.2561e+01	1.0272e+01	9.0737e+00	8.6230e+00	8.5597e+00
4.00e+06	2.8241e+01	1.7694e+01	1.2705e+01	1.0416e+01	9.2176e+00	8.7668e+00	8.7036e+00
5.00e+06	2.8353e+01	1.7806e+01	1.2816e+01	1.0527e+01	9.3291e+00	8.8784e+00	8.8152e+00
6.00e+06	2.8444e+01	1.7897e+01	1.2907e+01	1.0618e+01	9.4203e+00	8.9696e+00	8.9063e+00
8.00e+06	2.8588e+01	1.8041e+01	1.3051e+01	1.0762e+01	9.5642e+00	9.1134e+00	9.0502e+00
1.00e+07	2.8700e+01	1.8153e+01	1.3163e+01	1.0874e+01	9.6757e+00	9.2250e+00	9.1618e+00
1.50e+07	2.8903e+01	1.8355e+01	1.3366e+01	1.1077e+01	9.8787e+00	9.4280e+00	9.3647e+00
2.00e+07	2.9047e+01	1.8499e+01	1.3510e+01	1.1221e+01	1.0023e+01	9.5719e+00	9.5086e+00
3.00e+07	2.9249e+01	1.8702e+01	1.3713e+01	1.1423e+01	1.0225e+01	9.7747e+00	9.7114e+00
4.00e+07	2.9393e+01	1.8846e+01	1.3856e+01	1.1567e+01	1.0369e+01	9.9185e+00	9.8553e+00
5.00e+07	2.9505e+01	1.8958e+01	1.3968e+01	1.1679e+01	1.0481e+01	1.0030e+01	9.9669e+00
6.00e+07	2.9596e+01	1.9049e+01	1.4059e+01	1.1770e+01	1.0572e+01	1.0121e+01	1.0058e+01
8.00e+07	2.9740e+01	1.9193e+01	1.4203e+01	1.1914e+01	1.0716e+01	1.0265e+01	1.0202e+01

TABLE B.14 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.732 and RDdh=0.05

XD 0.7320 YD 0.5000e-01 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	5.4112e-04	2.7056e-04	1.3528e-04	6.7640e-05	2.7056e-05	6.7640e-06	2.2565e-06
1.50e-04	6.2002e-03	3.1001e-03	1.5500e-03	7.7502e-04	3.1001e-04	7.7502e-05	3.0997e-05
2.00e-04	2.2296e-02	1.1148e-02	5.5741e-03	2.7870e-03	1.1148e-03	2.7870e-04	1.2615e-04
3.00e-04	8.7205e-02	4.3602e-02	2.1801e-02	1.0901e-02	4.3602e-03	1.0902e-03	5.8482e-04
4.00e-04	1.8237e-01	9.1186e-02	4.5593e-02	2.2796e-02	9.1186e-03	2.2820e-03	1.3752e-03
5.00e-04	2.9281e-01	1.4641e-01	7.3204e-02	3.6602e-02	1.4641e-02	3.6737e-03	2.4137e-03
6.00e-04	4.0933e-01	2.0466e-01	1.0233e-01	5.1166e-02	2.0466e-02	5.1616e-03	3.6243e-03
8.00e-04	6.4269e-01	3.2134e-01	1.6067e-01	8.0336e-02	3.2134e-02	8.2454e-03	6.3569e-03
1.00e-03	8.6448e-01	4.3224e-01	2.1612e-01	1.0806e-01	4.3224e-02	1.1363e-02	9.3019e-03
1.50e-03	1.3505e+00	6.7526e-01	3.3763e-01	1.6881e-01	6.7526e-02	1.9065e-02	1.6875e-02
2.00e-03	1.7513e+00	8.7567e-01	4.3784e-01	2.1892e-01	8.7567e-02	2.6489e-02	2.4281e-02
3.00e-03	2.3789e+00	1.1894e+00	5.9472e-01	2.9736e-01	1.1894e-01	4.0299e-02	3.8089e-02
4.00e-03	2.8587e+00	1.4294e+00	7.1468e-01	3.5734e-01	1.4294e-01	5.2831e-02	5.0620e-02
5.00e-03	3.2458e+00	1.6229e+00	8.1145e-01	4.0572e-01	1.6230e-01	6.4310e-02	6.2099e-02
6.00e-03	3.5694e+00	1.7847e+00	8.9234e-01	4.4617e-01	1.7850e-01	7.4925e-02	7.2715e-02
8.00e-03	4.0888e+00	2.0444e+00	1.0222e+00	5.1110e-01	2.0465e-01	9.4105e-02	9.1894e-02
1.00e-02	4.4955e+00	2.2477e+00	1.1239e+00	5.6194e-01	2.2546e-01	1.1116e-01	1.0895e-01
1.50e-02	5.2327e+00	2.6164e+00	1.3082e+00	6.5409e-01	2.6527e-01	1.4734e-01	1.4513e-01
2.00e-02	5.7462e+00	2.8731e+00	1.4366e+00	7.1828e-01	2.9609e-01	1.7729e-01	1.7508e-01
3.00e-02	6.4474e+00	3.2237e+00	1.6118e+00	8.0593e-01	3.4503e-01	2.2595e-01	2.2374e-01
4.00e-02	6.9253e+00	3.4626e+00	1.7313e+00	8.6577e-01	3.8448e-01	2.6538e-01	2.6317e-01
5.00e-02	7.2840e+00	3.6420e+00	1.8210e+00	9.1096e-01	4.1809e-01	2.9900e-01	2.9679e-01
6.00e-02	7.5691e+00	3.7846e+00	1.8923e+00	9.4736e-01	4.4767e-01	3.2857e-01	3.2636e-01
8.00e-02	8.0049e+00	4.0025e+00	2.0012e+00	1.0049e+00	4.9852e-01	3.7942e-01	3.7721e-01
1.00e-01	8.3315e+00	4.1658e+00	2.0829e+00	1.0507e+00	5.4181e-01	4.2271e-01	4.2050e-01
1.50e-01	8.9018e+00	4.4509e+00	2.2256e+00	1.1407e+00	6.3024e-01	5.1114e-01	5.0893e-01
2.00e-01	9.2884e+00	4.6442e+00	2.3229e+00	1.2122e+00	7.0154e-01	5.8244e-01	5.8023e-01
3.00e-01	9.8080e+00	4.9040e+00	2.4575e+00	1.3263e+00	8.1556e-01	6.9647e-01	6.9426e-01
4.00e-01	1.0157e+01	5.0785e+00	2.5546e+00	1.4173e+00	9.0657e-01	7.8747e-01	7.8526e-01
5.00e-01	1.0414e+01	5.2073e+00	2.6328e+00	1.4936e+00	9.8290e-01	8.6380e-01	8.6159e-01
6.00e-01	1.0616e+01	5.3080e+00	2.6994e+00	1.5595e+00	1.0488e+00	9.2974e-01	9.2752e-01
8.00e-01	1.0914e+01	5.4582e+00	2.8097e+00	1.6696e+00	1.1589e+00	1.0398e+00	1.0376e+00
1.00e+00	1.1129e+01	5.5682e+00	2.8998e+00	1.7596e+00	1.2489e+00	1.1299e+00	1.1276e+00
1.50e+00	1.1481e+01	5.7581e+00	3.0722e+00	1.9321e+00	1.4214e+00	1.3023e+00	1.3001e+00
2.00e+00	1.1701e+01	5.8898e+00	3.2001e+00	2.0600e+00	1.5493e+00	1.4302e+00	1.4280e+00
3.00e+00	1.1970e+01	6.0770e+00	3.3863e+00	2.2462e+00	1.7355e+00	1.6164e+00	1.6142e+00
4.00e+00	1.2138e+01	6.2125e+00	3.5216e+00	2.3815e+00	1.8708e+00	1.7517e+00	1.7495e+00
5.00e+00	1.2258e+01	6.3189e+00	3.6280e+00	2.4879e+00	1.9772e+00	1.8581e+00	1.8559e+00
6.00e+00	1.2352e+01	6.4065e+00	3.7157e+00	2.5756e+00	2.0649e+00	1.9458e+00	1.9436e+00
8.00e+00	1.2495e+01	6.5460e+00	3.8552e+00	2.7150e+00	2.2043e+00	2.0852e+00	2.0830e+00
1.00e+01	1.2605e+01	6.6549e+00	3.9641e+00	2.8239e+00	2.3132e+00	2.1941e+00	2.1919e+00
1.50e+01	1.2805e+01	6.8543e+00	4.1635e+00	3.0233e+00	2.5126e+00	2.3935e+00	2.3913e+00
2.00e+01	1.2947e+01	6.9964e+00	4.3056e+00	3.1655e+00	2.6548e+00	2.5357e+00	2.5334e+00
3.00e+01	1.3148e+01	7.1974e+00	4.5066e+00	3.3664e+00	2.8557e+00	2.7366e+00	2.7344e+00
4.00e+01	1.3291e+01	7.3404e+00	4.6495e+00	3.5094e+00	2.9987e+00	2.8796e+00	2.8774e+00
5.00e+01	1.3402e+01	7.4514e+00	4.7606e+00	3.6204e+00	3.1097e+00	2.9906e+00	2.9884e+00
6.00e+01	1.3493e+01	7.5422e+00	4.8514e+00	3.7112e+00	3.2005e+00	3.0814e+00	3.0792e+00
8.00e+01	1.3636e+01	7.6856e+00	4.9948e+00	3.8546e+00	3.3439e+00	3.2248e+00	3.2226e+00

TABLE B.14 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=0.732 and RDdh=0.05

XD 0.7320 YD 0.5000e-01 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	1.3748e+01	7.7969e+00	5.1061e+00	3.9659e+00	3.4552e+00	3.3361e+00	3.3339e+00
1.50e+02	1.3950e+01	7.9995e+00	5.3087e+00	4.1685e+00	3.6578e+00	3.5387e+00	3.5365e+00
2.00e+02	1.4094e+01	8.1432e+00	5.4524e+00	4.3123e+00	3.8016e+00	3.6825e+00	3.6803e+00
3.00e+02	1.4296e+01	8.3458e+00	5.6550e+00	4.5149e+00	4.0042e+00	3.8851e+00	3.8829e+00
4.00e+02	1.4440e+01	8.4896e+00	5.7988e+00	4.6587e+00	4.1480e+00	4.0289e+00	4.0267e+00
5.00e+02	1.4552e+01	8.6011e+00	5.9103e+00	4.7702e+00	4.2595e+00	4.1404e+00	4.1382e+00
6.00e+02	1.4643e+01	8.6923e+00	6.0015e+00	4.8613e+00	4.3506e+00	4.2315e+00	4.2293e+00
8.00e+02	1.4787e+01	8.8361e+00	6.1453e+00	5.0051e+00	4.4944e+00	4.3753e+00	4.3731e+00
1.00e+03	1.4898e+01	8.9476e+00	6.2568e+00	5.1167e+00	4.6060e+00	4.4869e+00	4.4847e+00
1.50e+03	1.5101e+01	9.1505e+00	6.4597e+00	5.3196e+00	4.8089e+00	4.6898e+00	4.6876e+00
2.00e+03	1.5245e+01	9.2945e+00	6.6036e+00	5.4635e+00	4.9528e+00	4.8337e+00	4.8315e+00
3.00e+03	1.5448e+01	9.4972e+00	6.8064e+00	5.6663e+00	5.1556e+00	5.0365e+00	5.0343e+00
4.00e+03	1.5592e+01	9.6411e+00	6.9503e+00	5.8101e+00	5.2994e+00	5.1803e+00	5.1781e+00
5.00e+03	1.5703e+01	9.7527e+00	7.0618e+00	5.9217e+00	5.4110e+00	5.2919e+00	5.2897e+00
6.00e+03	1.5794e+01	9.8438e+00	7.1530e+00	6.0129e+00	5.5022e+00	5.3831e+00	5.3809e+00
8.00e+03	1.5938e+01	9.9877e+00	7.2968e+00	6.1567e+00	5.6460e+00	5.5269e+00	5.5247e+00
1.00e+04	1.6050e+01	1.0099e+01	7.4084e+00	6.2683e+00	5.7576e+00	5.6385e+00	5.6363e+00
1.50e+04	1.6253e+01	1.0302e+01	7.6114e+00	6.4712e+00	5.9605e+00	5.8414e+00	5.8392e+00
2.00e+04	1.6397e+01	1.0446e+01	7.7553e+00	6.6151e+00	6.1045e+00	5.9854e+00	5.9831e+00
3.00e+04	1.6600e+01	1.0649e+01	7.9581e+00	6.8179e+00	6.3072e+00	6.1881e+00	6.1859e+00
4.00e+04	1.6743e+01	1.0793e+01	8.1019e+00	6.9618e+00	6.4511e+00	6.3320e+00	6.3298e+00
5.00e+04	1.6855e+01	1.0904e+01	8.2135e+00	7.0734e+00	6.5627e+00	6.4436e+00	6.4414e+00
6.00e+04	1.6946e+01	1.0996e+01	8.3047e+00	7.1645e+00	6.6538e+00	6.5347e+00	6.5325e+00
8.00e+04	1.7090e+01	1.1139e+01	8.4485e+00	7.3084e+00	6.7977e+00	6.6786e+00	6.6764e+00
1.00e+05	1.7202e+01	1.1251e+01	8.5601e+00	7.4200e+00	6.9093e+00	6.7902e+00	6.7880e+00
1.50e+05	1.7405e+01	1.1454e+01	8.7631e+00	7.6229e+00	7.1122e+00	6.9931e+00	6.9909e+00
2.00e+05	1.7548e+01	1.1598e+01	8.9070e+00	7.7668e+00	7.2562e+00	7.1371e+00	7.1348e+00
3.00e+05	1.7751e+01	1.1801e+01	9.1098e+00	7.9696e+00	7.4589e+00	7.3398e+00	7.3376e+00
4.00e+05	1.7895e+01	1.1944e+01	9.2536e+00	8.1135e+00	7.6028e+00	7.4837e+00	7.4815e+00
5.00e+05	1.8007e+01	1.2056e+01	9.3652e+00	8.2251e+00	7.7144e+00	7.5953e+00	7.5931e+00
6.00e+05	1.8098e+01	1.2147e+01	9.4564e+00	8.3162e+00	7.8055e+00	7.6865e+00	7.6842e+00
8.00e+05	1.8242e+01	1.2291e+01	9.6002e+00	8.4601e+00	7.9494e+00	7.8303e+00	7.8281e+00
1.00e+06	1.8353e+01	1.2403e+01	9.7118e+00	8.5717e+00	8.0610e+00	7.9419e+00	7.9397e+00
1.50e+06	1.8556e+01	1.2606e+01	9.9148e+00	8.7746e+00	8.2639e+00	8.1448e+00	8.1426e+00
2.00e+06	1.8700e+01	1.2750e+01	1.0059e+01	8.9186e+00	8.4079e+00	8.2888e+00	8.2865e+00
3.00e+06	1.8903e+01	1.2952e+01	1.0261e+01	9.1213e+00	8.6106e+00	8.4915e+00	8.4893e+00
4.00e+06	1.9047e+01	1.3096e+01	1.0405e+01	9.2652e+00	8.7545e+00	8.6354e+00	8.6332e+00
5.00e+06	1.9158e+01	1.3208e+01	1.0517e+01	9.3768e+00	8.8661e+00	8.7470e+00	8.7448e+00
6.00e+06	1.9250e+01	1.3299e+01	1.0608e+01	9.4680e+00	8.9573e+00	8.8382e+00	8.8359e+00
8.00e+06	1.9393e+01	1.3443e+01	1.0752e+01	9.6118e+00	9.1011e+00	8.9820e+00	8.9798e+00
1.00e+07	1.9505e+01	1.3554e+01	1.0864e+01	9.7234e+00	9.2127e+00	9.0936e+00	9.0914e+00
1.50e+07	1.9708e+01	1.3757e+01	1.1066e+01	9.9263e+00	9.4156e+00	9.2965e+00	9.2943e+00
2.00e+07	1.9852e+01	1.3901e+01	1.1210e+01	1.0070e+01	9.5596e+00	9.4405e+00	9.4383e+00
3.00e+07	2.0055e+01	1.4104e+01	1.1413e+01	1.0273e+01	9.7624e+00	9.6433e+00	9.6410e+00
4.00e+07	2.0198e+01	1.4248e+01	1.1557e+01	1.0417e+01	9.9062e+00	9.7871e+00	9.7849e+00
5.00e+07	2.0310e+01	1.4359e+01	1.1669e+01	1.0528e+01	1.0018e+01	9.8987e+00	9.8965e+00
6.00e+07	2.0401e+01	1.4451e+01	1.1760e+01	1.0620e+01	1.0109e+01	9.9899e+00	9.9877e+00
8.00e+07	2.0545e+01	1.4594e+01	1.1904e+01	1.0764e+01	1.0253e+01	1.0134e+01	1.0131e+01

TABLE B.15 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=1.0 and RDdh=0.0005

XD 1.000 YD 0.5000e-03 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	9.0214e+00	4.5297e+00	2.2649e+00	1.1325e+00	4.5298e-01	1.1325e-01	2.3764e-02
1.50e-04	9.4271e+00	4.7326e+00	2.3663e+00	1.1832e+00	4.7327e-01	1.1832e-01	2.5755e-02
2.00e-04	9.7149e+00	4.8765e+00	2.4383e+00	1.2191e+00	4.8765e-01	1.2191e-01	2.7434e-02
3.00e-04	1.0120e+01	5.0792e+00	2.5396e+00	1.2698e+00	5.0793e-01	1.2698e-01	3.0251e-02
4.00e-04	1.0408e+01	5.2230e+00	2.6116e+00	1.3058e+00	5.2231e-01	1.3058e-01	3.2625e-02
5.00e-04	1.0631e+01	5.3346e+00	2.6673e+00	1.3337e+00	5.3347e-01	1.3340e-01	3.4717e-02
6.00e-04	1.0813e+01	5.4258e+00	2.7129e+00	1.3565e+00	5.4258e-01	1.3572e-01	3.6608e-02
8.00e-04	1.1101e+01	5.5696e+00	2.7848e+00	1.3924e+00	5.5697e-01	1.3952e-01	3.9966e-02
1.00e-03	1.1324e+01	5.6812e+00	2.8406e+00	1.4203e+00	5.6812e-01	1.4265e-01	4.2924e-02
1.50e-03	1.1730e+01	5.8841e+00	2.9421e+00	1.4710e+00	5.8842e-01	1.4907e-01	4.9225e-02
2.00e-03	1.2018e+01	6.0280e+00	3.0141e+00	1.5070e+00	6.0281e-01	1.5439e-01	5.4536e-02
3.00e-03	1.2424e+01	6.2308e+00	3.1154e+00	1.5577e+00	6.2309e-01	1.6330e-01	6.3444e-02
4.00e-03	1.2711e+01	6.3747e+00	3.1874e+00	1.5937e+00	6.3747e-01	1.7081e-01	7.0954e-02
5.00e-03	1.2934e+01	6.4863e+00	3.2432e+00	1.6216e+00	6.4864e-01	1.7742e-01	7.7570e-02
6.00e-03	1.3117e+01	6.5774e+00	3.2887e+00	1.6444e+00	6.5777e-01	1.8341e-01	8.3551e-02
8.00e-03	1.3404e+01	6.7213e+00	3.3607e+00	1.6803e+00	6.7225e-01	1.9403e-01	9.4171e-02
1.00e-02	1.3628e+01	6.8328e+00	3.4165e+00	1.7082e+00	6.8367e-01	2.0338e-01	1.0353e-01
1.50e-02	1.4034e+01	7.0358e+00	3.5179e+00	1.7590e+00	7.0559e-01	2.2331e-01	1.2345e-01
2.00e-02	1.4321e+01	7.1797e+00	3.5899e+00	1.7949e+00	7.2287e-01	2.4010e-01	1.4025e-01
3.00e-02	1.4727e+01	7.3825e+00	3.6913e+00	1.8457e+00	7.5120e-01	2.6827e-01	1.6842e-01
4.00e-02	1.5015e+01	7.5264e+00	3.7632e+00	1.8817e+00	7.7496e-01	2.9202e-01	1.9217e-01
5.00e-02	1.5238e+01	7.6380e+00	3.8190e+00	1.9098e+00	7.9588e-01	3.1294e-01	2.1309e-01
6.00e-02	1.5420e+01	7.7291e+00	3.8646e+00	1.9331e+00	8.1479e-01	3.3186e-01	2.3200e-01
8.00e-02	1.5708e+01	7.8730e+00	3.9365e+00	1.9710e+00	8.4838e-01	3.6544e-01	2.6558e-01
1.00e-01	1.5931e+01	7.9845e+00	3.9923e+00	2.0024e+00	8.7796e-01	3.9503e-01	2.9517e-01
1.50e-01	1.6337e+01	8.1875e+00	4.0939e+00	2.0665e+00	9.4097e-01	4.5803e-01	3.5818e-01
2.00e-01	1.6625e+01	8.3313e+00	4.1663e+00	2.1197e+00	9.9404e-01	5.1110e-01	4.1125e-01
3.00e-01	1.7028e+01	8.5331e+00	4.2709e+00	2.2084e+00	1.0827e+00	5.9975e-01	4.9989e-01
4.00e-01	1.7311e+01	8.6746e+00	4.3496e+00	2.2822e+00	1.1565e+00	6.7358e-01	5.7372e-01
5.00e-01	1.7526e+01	8.7823e+00	4.4151e+00	2.3460e+00	1.2204e+00	7.3742e-01	6.3757e-01
6.00e-01	1.7699e+01	8.8685e+00	4.4720e+00	2.4025e+00	1.2768e+00	7.9386e-01	6.9401e-01
8.00e-01	1.7960e+01	9.0003e+00	4.5688e+00	2.4991e+00	1.3734e+00	8.9046e-01	7.9061e-01
1.00e+00	1.8153e+01	9.0991e+00	4.6498e+00	2.5800e+00	1.4543e+00	9.7135e-01	8.7149e-01
1.50e+00	1.8478e+01	9.2740e+00	4.8086e+00	2.7388e+00	1.6131e+00	1.1301e+00	1.0303e+00
2.00e+00	1.8684e+01	9.3978e+00	4.9289e+00	2.8591e+00	1.7334e+00	1.2505e+00	1.1506e+00
3.00e+00	1.8942e+01	9.5770e+00	5.1071e+00	3.0373e+00	1.9116e+00	1.4286e+00	1.3288e+00
4.00e+00	1.9105e+01	9.7082e+00	5.2382e+00	3.1684e+00	2.0427e+00	1.5597e+00	1.4599e+00
5.00e+00	1.9222e+01	9.8120e+00	5.3419e+00	3.2721e+00	2.1465e+00	1.6635e+00	1.5637e+00
6.00e+00	1.9313e+01	9.8979e+00	5.4278e+00	3.3580e+00	2.2324e+00	1.7494e+00	1.6496e+00
8.00e+00	1.9455e+01	1.0035e+01	5.5650e+00	3.4952e+00	2.3696e+00	1.8866e+00	1.7868e+00
1.00e+01	1.9563e+01	1.0143e+01	5.6726e+00	3.6028e+00	2.4771e+00	1.9942e+00	1.8943e+00
1.50e+01	1.9761e+01	1.0340e+01	5.8701e+00	3.8003e+00	2.6746e+00	2.1917e+00	2.0918e+00
2.00e+01	1.9902e+01	1.0481e+01	6.0113e+00	3.9415e+00	2.8158e+00	2.3329e+00	2.2330e+00
3.00e+01	2.0102e+01	1.0681e+01	6.2113e+00	4.1415e+00	3.0159e+00	2.5329e+00	2.4331e+00
4.00e+01	2.0245e+01	1.0824e+01	6.3538e+00	4.2840e+00	3.1583e+00	2.6754e+00	2.5756e+00
5.00e+01	2.0355e+01	1.0935e+01	6.4646e+00	4.3948e+00	3.2691e+00	2.7862e+00	2.6863e+00
6.00e+01	2.0446e+01	1.1025e+01	6.5552e+00	4.4854e+00	3.3597e+00	2.8768e+00	2.7769e+00
8.00e+01	2.0589e+01	1.1168e+01	6.6983e+00	4.6285e+00	3.5029e+00	3.0199e+00	2.9201e+00

TABLE B.15 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=1.0 and RDdh=0.0005

XD 1.000 YD 0.5000e-03 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	2.0700e+01	1.1280e+01	6.8095e+00	4.7397e+00	3.6140e+00	3.1311e+00	3.0312e+00
1.50e+02	2.0903e+01	1.1482e+01	7.0119e+00	4.9421e+00	3.8164e+00	3.3335e+00	3.2336e+00
2.00e+02	2.1046e+01	1.1626e+01	7.1556e+00	5.0858e+00	3.9601e+00	3.4771e+00	3.3773e+00
3.00e+02	2.1249e+01	1.1828e+01	7.3581e+00	5.2883e+00	4.1626e+00	3.6797e+00	3.5798e+00
4.00e+02	2.1393e+01	1.1972e+01	7.5018e+00	5.4320e+00	4.3063e+00	3.8234e+00	3.7235e+00
5.00e+02	2.1504e+01	1.2083e+01	7.6133e+00	5.5435e+00	4.4178e+00	3.9349e+00	3.8350e+00
6.00e+02	2.1595e+01	1.2174e+01	7.7044e+00	5.6346e+00	4.5089e+00	4.0260e+00	3.9261e+00
8.00e+02	2.1739e+01	1.2318e+01	7.8482e+00	5.7784e+00	4.6527e+00	4.1698e+00	4.0699e+00
1.00e+03	2.1851e+01	1.2430e+01	7.9597e+00	5.8899e+00	4.7642e+00	4.2813e+00	4.1814e+00
1.50e+03	2.2053e+01	1.2633e+01	8.1626e+00	6.0928e+00	4.9671e+00	4.4842e+00	4.3843e+00
2.00e+03	2.2197e+01	1.2777e+01	8.3065e+00	6.2367e+00	5.1110e+00	4.6281e+00	4.5282e+00
3.00e+03	2.2400e+01	1.2979e+01	8.5093e+00	6.4395e+00	5.3138e+00	4.8309e+00	4.7310e+00
4.00e+03	2.2544e+01	1.3123e+01	8.6531e+00	6.5833e+00	5.4576e+00	4.9747e+00	4.8748e+00
5.00e+03	2.2656e+01	1.3235e+01	8.7647e+00	6.6949e+00	5.5692e+00	5.0863e+00	4.9864e+00
6.00e+03	2.2747e+01	1.3326e+01	8.8559e+00	6.7861e+00	5.6604e+00	5.1774e+00	5.0776e+00
8.00e+03	2.2891e+01	1.3470e+01	8.9997e+00	6.9299e+00	5.8042e+00	5.3213e+00	5.2214e+00
1.00e+04	2.3002e+01	1.3581e+01	9.1113e+00	7.0415e+00	5.9158e+00	5.4328e+00	5.3330e+00
1.50e+04	2.3205e+01	1.3784e+01	9.3142e+00	7.2444e+00	6.1187e+00	5.6358e+00	5.5359e+00
2.00e+04	2.3349e+01	1.3928e+01	9.4581e+00	7.3883e+00	6.2627e+00	5.7797e+00	5.6799e+00
3.00e+04	2.3552e+01	1.4131e+01	9.6609e+00	7.5911e+00	6.4654e+00	5.9825e+00	5.8827e+00
4.00e+04	2.3696e+01	1.4275e+01	9.8048e+00	7.7350e+00	6.6093e+00	6.1264e+00	6.0265e+00
5.00e+04	2.3807e+01	1.4386e+01	9.9164e+00	7.8466e+00	6.7209e+00	6.2380e+00	6.1381e+00
6.00e+04	2.3898e+01	1.4478e+01	1.0008e+01	7.9377e+00	6.8121e+00	6.3291e+00	6.2293e+00
8.00e+04	2.4042e+01	1.4621e+01	1.0151e+01	8.0816e+00	6.9559e+00	6.4730e+00	6.3731e+00
1.00e+05	2.4154e+01	1.4733e+01	1.0263e+01	8.1932e+00	7.0675e+00	6.5845e+00	6.4847e+00
1.50e+05	2.4357e+01	1.4936e+01	1.0466e+01	8.3961e+00	7.2704e+00	6.7875e+00	6.6876e+00
2.00e+05	2.4501e+01	1.5080e+01	1.0610e+01	8.5400e+00	7.4144e+00	6.9314e+00	6.8316e+00
3.00e+05	2.4703e+01	1.5283e+01	1.0813e+01	8.7428e+00	7.6171e+00	7.1342e+00	7.0344e+00
4.00e+05	2.4847e+01	1.5427e+01	1.0956e+01	8.8867e+00	7.7610e+00	7.2781e+00	7.1782e+00
5.00e+05	2.4959e+01	1.5538e+01	1.1068e+01	8.9983e+00	7.8726e+00	7.3897e+00	7.2898e+00
6.00e+05	2.5050e+01	1.5629e+01	1.1159e+01	9.0894e+00	7.9638e+00	7.4808e+00	7.3810e+00
8.00e+05	2.5194e+01	1.5773e+01	1.1303e+01	9.2333e+00	8.1076e+00	7.6247e+00	7.5248e+00
1.00e+06	2.5306e+01	1.5885e+01	1.1415e+01	9.3449e+00	8.2192e+00	7.7362e+00	7.6364e+00
1.50e+06	2.5508e+01	1.6088e+01	1.1618e+01	9.5478e+00	8.4221e+00	7.9392e+00	7.8393e+00
2.00e+06	2.5652e+01	1.6232e+01	1.1762e+01	9.6917e+00	8.5661e+00	8.0831e+00	7.9833e+00
3.00e+06	2.5855e+01	1.6434e+01	1.1964e+01	9.8945e+00	8.7689e+00	8.2859e+00	8.1861e+00
4.00e+06	2.5999e+01	1.6578e+01	1.2108e+01	1.0038e+01	8.9127e+00	8.4298e+00	8.3299e+00
5.00e+06	2.6111e+01	1.6690e+01	1.2220e+01	1.0150e+01	9.0243e+00	8.5414e+00	8.4415e+00
6.00e+06	2.6202e+01	1.6781e+01	1.2311e+01	1.0241e+01	9.1155e+00	8.6325e+00	8.5327e+00
8.00e+06	2.6346e+01	1.6925e+01	1.2455e+01	1.0385e+01	9.2593e+00	8.7764e+00	8.6765e+00
1.00e+07	2.6457e+01	1.7036e+01	1.2566e+01	1.0497e+01	9.3709e+00	8.8879e+00	8.7881e+00
1.50e+07	2.6660e+01	1.7239e+01	1.2769e+01	1.0700e+01	9.5738e+00	9.0909e+00	8.9911e+00
2.00e+07	2.6804e+01	1.7383e+01	1.2913e+01	1.0843e+01	9.7178e+00	9.2348e+00	9.1350e+00
3.00e+07	2.7007e+01	1.7586e+01	1.3116e+01	1.1046e+01	9.9206e+00	9.4376e+00	9.3378e+00
4.00e+07	2.7151e+01	1.7730e+01	1.3260e+01	1.1190e+01	1.0064e+01	9.5815e+00	9.4816e+00
5.00e+07	2.7262e+01	1.7841e+01	1.3371e+01	1.1302e+01	1.0176e+01	9.6931e+00	9.5932e+00
6.00e+07	2.7354e+01	1.7933e+01	1.3463e+01	1.1393e+01	1.0267e+01	9.7842e+00	9.6844e+00
8.00e+07	2.7497e+01	1.8077e+01	1.3606e+01	1.1537e+01	1.0411e+01	9.9281e+00	9.8282e+00

TABLE B.16 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=1.0 and RDdh=0.005

XD 1.000 YD 0.5000e-02 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	2.2565e+00	1.1287e+00	5.6433e-01	2.8217e-01	1.1287e-01	2.8217e-02	6.6497e-03
1.50e-04	2.6421e+00	1.3214e+00	6.6072e-01	3.3036e-01	1.3214e-01	3.3036e-02	8.5431e-03
2.00e-04	2.9197e+00	1.4602e+00	7.3012e-01	3.6506e-01	1.4602e-01	3.6506e-02	1.0163e-02
3.00e-04	3.3150e+00	1.6579e+00	8.2894e-01	4.1447e-01	1.6579e-01	4.1448e-02	1.2909e-02
4.00e-04	3.5976e+00	1.7992e+00	8.9958e-01	4.4979e-01	1.7992e-01	4.4986e-02	1.5241e-02
5.00e-04	3.8176e+00	1.9092e+00	9.5460e-01	4.7730e-01	1.9092e-01	4.7758e-02	1.7304e-02
6.00e-04	3.9979e+00	1.9993e+00	9.9966e-01	4.9983e-01	1.9993e-01	5.0059e-02	1.9174e-02
8.00e-04	4.2830e+00	2.1419e+00	1.0709e+00	5.3547e-01	2.1419e-01	5.3823e-02	2.2503e-02
1.00e-03	4.5046e+00	2.2527e+00	1.1263e+00	5.6317e-01	2.2527e-01	5.6935e-02	2.5441e-02
1.50e-03	4.9084e+00	2.4546e+00	1.2273e+00	6.1365e-01	2.4546e-01	6.3314e-02	3.1710e-02
2.00e-03	5.1952e+00	2.5980e+00	1.2990e+00	6.4950e-01	2.5980e-01	6.8619e-02	3.7001e-02
3.00e-03	5.5997e+00	2.8003e+00	1.4001e+00	7.0007e-01	2.8003e-01	7.7506e-02	4.5887e-02
4.00e-03	5.8869e+00	2.9439e+00	1.4719e+00	7.3597e-01	2.9439e-01	8.5002e-02	5.3383e-02
5.00e-03	6.1098e+00	3.0553e+00	1.5276e+00	7.6382e-01	3.0553e-01	9.1609e-02	5.9990e-02
6.00e-03	6.2919e+00	3.1464e+00	1.5732e+00	7.8659e-01	3.1465e-01	9.7584e-02	6.5964e-02
8.00e-03	6.5794e+00	3.2901e+00	1.6450e+00	8.2252e-01	3.2912e-01	1.0819e-01	7.6575e-02
1.00e-02	6.8023e+00	3.4016e+00	1.7008e+00	8.5039e-01	3.4053e-01	1.1754e-01	8.5924e-02
1.50e-02	7.2081e+00	3.6044e+00	1.8022e+00	9.0111e-01	3.6244e-01	1.3746e-01	1.0584e-01
2.00e-02	7.4958e+00	3.7483e+00	1.8741e+00	9.3707e-01	3.7972e-01	1.5425e-01	1.2263e-01
3.00e-02	7.9013e+00	3.9510e+00	1.9755e+00	9.8776e-01	4.0804e-01	1.8241e-01	1.5079e-01
4.00e-02	8.1890e+00	4.0949e+00	2.0474e+00	1.0238e+00	4.3179e-01	2.0615e-01	1.7454e-01
5.00e-02	8.4121e+00	4.2064e+00	2.1032e+00	1.0519e+00	4.5271e-01	2.2707e-01	1.9545e-01
6.00e-02	8.5944e+00	4.2976e+00	2.1488e+00	1.0752e+00	4.7163e-01	2.4599e-01	2.1437e-01
8.00e-02	8.8821e+00	4.4414e+00	2.2207e+00	1.1131e+00	5.0521e-01	2.7957e-01	2.4795e-01
1.00e-01	9.1052e+00	4.5530e+00	2.2765e+00	1.1445e+00	5.3479e-01	3.0915e-01	2.7753e-01
1.50e-01	9.5111e+00	4.7559e+00	2.3780e+00	1.2086e+00	5.9779e-01	3.7215e-01	3.4053e-01
2.00e-01	9.7987e+00	4.8997e+00	2.4504e+00	1.2618e+00	6.5086e-01	4.2522e-01	3.9360e-01
3.00e-01	1.0202e+01	5.1016e+00	2.5550e+00	1.3504e+00	7.3951e-01	5.1387e-01	4.8225e-01
4.00e-01	1.0485e+01	5.2430e+00	2.6338e+00	1.4243e+00	8.1333e-01	5.8769e-01	5.5607e-01
5.00e-01	1.0701e+01	5.3507e+00	2.6992e+00	1.4881e+00	8.7718e-01	6.5154e-01	6.1992e-01
6.00e-01	1.0873e+01	5.4369e+00	2.7562e+00	1.5446e+00	9.3362e-01	7.0798e-01	6.7636e-01
8.00e-01	1.1135e+01	5.5687e+00	2.8530e+00	1.6412e+00	1.0302e+00	8.0457e-01	7.7296e-01
1.00e+00	1.1328e+01	5.6675e+00	2.9339e+00	1.7220e+00	1.1111e+00	8.8546e-01	8.5384e-01
1.50e+00	1.1652e+01	5.8424e+00	3.0927e+00	1.8808e+00	1.2699e+00	1.0442e+00	1.0126e+00
2.00e+00	1.1858e+01	5.9663e+00	3.2131e+00	2.0012e+00	1.3903e+00	1.1646e+00	1.1330e+00
3.00e+00	1.2116e+01	6.1454e+00	3.3912e+00	2.1793e+00	1.5684e+00	1.3428e+00	1.3111e+00
4.00e+00	1.2279e+01	6.2766e+00	3.5223e+00	2.3104e+00	1.6995e+00	1.4739e+00	1.4422e+00
5.00e+00	1.2396e+01	6.3804e+00	3.6261e+00	2.4142e+00	1.8033e+00	1.5776e+00	1.5460e+00
6.00e+00	1.2488e+01	6.4663e+00	3.7120e+00	2.5001e+00	1.8892e+00	1.6635e+00	1.6319e+00
8.00e+00	1.2629e+01	6.6035e+00	3.8492e+00	2.6373e+00	2.0264e+00	1.8007e+00	1.7691e+00
1.00e+01	1.2737e+01	6.7110e+00	3.9568e+00	2.7449e+00	2.1339e+00	1.9083e+00	1.8767e+00
1.50e+01	1.2935e+01	6.9085e+00	4.1543e+00	2.9424e+00	2.3314e+00	2.1058e+00	2.0742e+00
2.00e+01	1.3076e+01	7.0497e+00	4.2955e+00	3.0836e+00	2.4726e+00	2.2470e+00	2.2154e+00
3.00e+01	1.3276e+01	7.2498e+00	4.4955e+00	3.2836e+00	2.6727e+00	2.4470e+00	2.4154e+00
4.00e+01	1.3419e+01	7.3923e+00	4.6380e+00	3.4261e+00	2.8152e+00	2.5895e+00	2.5579e+00
5.00e+01	1.3530e+01	7.5030e+00	4.7487e+00	3.5369e+00	2.9259e+00	2.7003e+00	2.6687e+00
6.00e+01	1.3620e+01	7.5936e+00	4.8394e+00	3.6275e+00	3.0165e+00	2.7909e+00	2.7593e+00
8.00e+01	1.3763e+01	7.7368e+00	4.9825e+00	3.7706e+00	3.1597e+00	2.9340e+00	2.9024e+00

TABLE B.16 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=1.0 and RDdh=0.005

XD 1.000 YD 0.5000e-02 ZD 0. ZWH 0.5000

TD	LD= 1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	1.3875e+01	7.8479e+00	5.0937e+00	3.8818e+00	3.2708e+00	3.0452e+00	3.0136e+00
1.50e+02	1.4077e+01	8.0503e+00	5.2961e+00	4.0842e+00	3.4732e+00	3.2476e+00	3.2160e+00
2.00e+02	1.4221e+01	8.1940e+00	5.4397e+00	4.2278e+00	3.6169e+00	3.3912e+00	3.3596e+00
3.00e+02	1.4423e+01	8.3965e+00	5.6422e+00	4.4303e+00	3.8194e+00	3.5938e+00	3.5621e+00
4.00e+02	1.4567e+01	8.5402e+00	5.7860e+00	4.5741e+00	3.9631e+00	3.7375e+00	3.7059e+00
5.00e+02	1.4678e+01	8.6517e+00	5.8975e+00	4.6856e+00	4.0746e+00	3.8490e+00	3.8174e+00
6.00e+02	1.4769e+01	8.7428e+00	5.9886e+00	4.7767e+00	4.1657e+00	3.9401e+00	3.9085e+00
8.00e+02	1.4913e+01	8.8866e+00	6.1323e+00	4.9205e+00	4.3095e+00	4.0839e+00	4.0523e+00
1.00e+03	1.5025e+01	8.9981e+00	6.2439e+00	5.0320e+00	4.4210e+00	4.1954e+00	4.1638e+00
1.50e+03	1.5228e+01	9.2010e+00	6.4468e+00	5.2349e+00	4.6240e+00	4.3983e+00	4.3667e+00
2.00e+03	1.5372e+01	9.3449e+00	6.5907e+00	5.3788e+00	4.7678e+00	4.5422e+00	4.5106e+00
3.00e+03	1.5574e+01	9.5477e+00	6.7934e+00	5.5816e+00	4.9706e+00	4.7450e+00	4.7133e+00
4.00e+03	1.5718e+01	9.6916e+00	6.9373e+00	5.7254e+00	5.1145e+00	4.8888e+00	4.8572e+00
5.00e+03	1.5830e+01	9.8031e+00	7.0489e+00	5.8370e+00	5.2260e+00	5.0004e+00	4.9688e+00
6.00e+03	1.5921e+01	9.8943e+00	7.1400e+00	5.9281e+00	5.3172e+00	5.0915e+00	5.0599e+00
8.00e+03	1.6065e+01	1.0038e+01	7.2839e+00	6.0720e+00	5.4610e+00	5.2354e+00	5.2038e+00
1.00e+04	1.6176e+01	1.0150e+01	7.3954e+00	6.1835e+00	5.5726e+00	5.3470e+00	5.3153e+00
1.50e+04	1.6379e+01	1.0353e+01	7.5984e+00	6.3865e+00	5.7756e+00	5.5499e+00	5.5183e+00
2.00e+04	1.6523e+01	1.0497e+01	7.7423e+00	6.5304e+00	5.9195e+00	5.6938e+00	5.6622e+00
3.00e+04	1.6726e+01	1.0699e+01	7.9451e+00	6.7332e+00	6.1223e+00	5.8966e+00	5.8650e+00
4.00e+04	1.6870e+01	1.0843e+01	8.0890e+00	6.8771e+00	6.2661e+00	6.0405e+00	6.0089e+00
5.00e+04	1.6981e+01	1.0955e+01	8.2005e+00	6.9886e+00	6.3777e+00	6.1521e+00	6.1204e+00
6.00e+04	1.7073e+01	1.1046e+01	8.2917e+00	7.0798e+00	6.4689e+00	6.2432e+00	6.2116e+00
8.00e+04	1.7216e+01	1.1190e+01	8.4355e+00	7.2237e+00	6.6127e+00	6.3871e+00	6.3555e+00
1.00e+05	1.7328e+01	1.1301e+01	8.5471e+00	7.3352e+00	6.7243e+00	6.4986e+00	6.4670e+00
1.50e+05	1.7531e+01	1.1504e+01	8.7501e+00	7.5382e+00	6.9272e+00	6.7016e+00	6.6700e+00
2.00e+05	1.7675e+01	1.1648e+01	8.8940e+00	7.6821e+00	7.0712e+00	6.8455e+00	6.8139e+00
3.00e+05	1.7878e+01	1.1851e+01	9.0968e+00	7.8849e+00	7.2740e+00	7.0483e+00	7.0167e+00
4.00e+05	1.8021e+01	1.1995e+01	9.2407e+00	8.0288e+00	7.4178e+00	7.1922e+00	7.1606e+00
5.00e+05	1.8133e+01	1.2106e+01	9.3522e+00	8.1403e+00	7.5294e+00	7.3038e+00	7.2721e+00
6.00e+05	1.8224e+01	1.2198e+01	9.4434e+00	8.2315e+00	7.6206e+00	7.3949e+00	7.3633e+00
8.00e+05	1.8368e+01	1.2342e+01	9.5873e+00	8.3754e+00	7.7644e+00	7.5388e+00	7.5072e+00
1.00e+06	1.8480e+01	1.2453e+01	9.6988e+00	8.4869e+00	7.8760e+00	7.6503e+00	7.6187e+00
1.50e+06	1.8683e+01	1.2656e+01	9.9018e+00	8.6899e+00	8.0790e+00	7.8533e+00	7.8217e+00
2.00e+06	1.8827e+01	1.2800e+01	1.0046e+01	8.8338e+00	8.2229e+00	7.9972e+00	7.9656e+00
3.00e+06	1.9029e+01	1.3003e+01	1.0249e+01	9.0366e+00	8.4257e+00	8.2000e+00	8.1684e+00
4.00e+06	1.9173e+01	1.3147e+01	1.0392e+01	9.1805e+00	8.5695e+00	8.3439e+00	8.3123e+00
5.00e+06	1.9285e+01	1.3258e+01	1.0504e+01	9.2921e+00	8.6811e+00	8.4555e+00	8.4238e+00
6.00e+06	1.9376e+01	1.3349e+01	1.0595e+01	9.3832e+00	8.7723e+00	8.5466e+00	8.5150e+00
8.00e+06	1.9520e+01	1.3493e+01	1.0739e+01	9.5271e+00	8.9161e+00	8.6905e+00	8.6589e+00
1.00e+07	1.9631e+01	1.3605e+01	1.0851e+01	9.6386e+00	9.0277e+00	8.8021e+00	8.7704e+00
1.50e+07	1.9834e+01	1.3808e+01	1.1053e+01	9.8416e+00	9.2307e+00	9.0050e+00	8.9734e+00
2.00e+07	1.9978e+01	1.3952e+01	1.1197e+01	9.9855e+00	9.3746e+00	9.1489e+00	9.1173e+00
3.00e+07	2.0181e+01	1.4154e+01	1.1400e+01	1.0188e+01	9.5774e+00	9.3517e+00	9.3201e+00
4.00e+07	2.0325e+01	1.4298e+01	1.1544e+01	1.0332e+01	9.7212e+00	9.4956e+00	9.4640e+00
5.00e+07	2.0436e+01	1.4410e+01	1.1656e+01	1.0444e+01	9.8328e+00	9.6072e+00	9.5756e+00
6.00e+07	2.0528e+01	1.4501e+01	1.1747e+01	1.0535e+01	9.9240e+00	9.6983e+00	9.6667e+00
8.00e+07	2.0671e+01	1.4645e+01	1.1891e+01	1.0679e+01	1.0068e+01	9.8422e+00	9.8106e+00

TABLE B.17 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=1.0 and RDdh=0.05

XD 1.000 YD 0.5000e-01 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e-04	2.7056e-04	1.3528e-04	6.7640e-05	3.3820e-05	1.3528e-05	3.3820e-06	1.1282e-06
1.50e-04	3.1001e-03	1.5500e-03	7.7502e-04	3.8751e-04	1.5500e-04	3.8751e-05	1.5499e-05
2.00e-04	1.1148e-02	5.5741e-03	2.7870e-03	1.3935e-03	5.5741e-04	1.3935e-04	6.3073e-05
3.00e-04	4.3602e-02	2.1801e-02	1.0901e-02	5.4503e-03	2.1801e-03	5.4510e-04	2.9241e-04
4.00e-04	9.1186e-02	4.5593e-02	2.2796e-02	1.1398e-02	4.5593e-03	1.1410e-03	6.8762e-04
5.00e-04	1.4641e-01	7.3204e-02	3.6602e-02	1.8301e-02	7.3204e-03	1.8369e-03	1.2069e-03
6.00e-04	2.0466e-01	1.0233e-01	5.1166e-02	2.5583e-02	1.0233e-02	2.5808e-03	1.8122e-03
8.00e-04	3.2134e-01	1.6067e-01	8.0336e-02	4.0168e-02	1.6067e-02	4.1227e-03	3.1784e-03
1.00e-03	4.3224e-01	2.1612e-01	1.0806e-01	5.4030e-02	2.1612e-02	5.6815e-03	4.6510e-03
1.50e-03	6.7526e-01	3.3763e-01	1.6881e-01	8.4407e-02	3.3763e-02	9.5327e-03	8.4376e-03
2.00e-03	8.7567e-01	4.3784e-01	2.1892e-01	1.0946e-01	4.3784e-02	1.3244e-02	1.2140e-02
3.00e-03	1.1895e+00	5.9473e-01	2.9737e-01	1.4868e-01	5.9473e-02	2.0150e-02	1.9045e-02
4.00e-03	1.4296e+00	7.1478e-01	3.5739e-01	1.7869e-01	7.1478e-02	2.6421e-02	2.5315e-02
5.00e-03	1.6236e+00	8.1178e-01	4.0589e-01	2.0294e-01	8.1181e-02	3.2174e-02	3.1069e-02
6.00e-03	1.7862e+00	8.9310e-01	4.4655e-01	2.2328e-01	8.9325e-02	3.7510e-02	3.6405e-02
8.00e-03	2.0490e+00	1.0245e+00	5.1225e-01	2.5613e-01	1.0255e-01	4.7214e-02	4.6109e-02
1.00e-02	2.2571e+00	1.1285e+00	5.6427e-01	2.8213e-01	1.1320e-01	5.5939e-02	5.4834e-02
1.50e-02	2.6426e+00	1.3213e+00	6.6065e-01	3.3033e-01	1.3403e-01	7.4872e-02	7.3767e-02
2.00e-02	2.9202e+00	1.4601e+00	7.3005e-01	3.6503e-01	1.5070e-01	9.1071e-02	8.9966e-02
3.00e-02	3.3155e+00	1.6578e+00	8.2888e-01	4.1444e-01	1.7831e-01	1.1853e-01	1.1743e-01
4.00e-02	3.5981e+00	1.7990e+00	8.9952e-01	4.4982e-01	2.0164e-01	1.4185e-01	1.4075e-01
5.00e-02	3.8181e+00	1.9091e+00	9.5453e-01	4.7755e-01	2.2228e-01	1.6249e-01	1.6138e-01
6.00e-02	3.9984e+00	1.9992e+00	9.9960e-01	5.0056e-01	2.4098e-01	1.8119e-01	1.8008e-01
8.00e-02	4.2835e+00	2.1417e+00	1.0709e+00	5.3819e-01	2.7426e-01	2.1447e-01	2.1336e-01
1.00e-01	4.5051e+00	2.2525e+00	1.1263e+00	5.6931e-01	3.0364e-01	2.4385e-01	2.4274e-01
1.50e-01	4.9089e+00	2.4544e+00	1.2273e+00	6.3310e-01	3.6632e-01	3.0653e-01	3.0543e-01
2.00e-01	5.1955e+00	2.5977e+00	1.2994e+00	6.8611e-01	4.1920e-01	3.5941e-01	3.5830e-01
3.00e-01	5.5981e+00	2.7990e+00	1.4038e+00	7.7455e-01	5.0762e-01	4.4783e-01	4.4673e-01
4.00e-01	5.8805e+00	2.9402e+00	1.4824e+00	8.4824e-01	5.8132e-01	5.2153e-01	5.2042e-01
5.00e-01	6.0956e+00	3.0478e+00	1.5477e+00	9.1200e-01	6.4507e-01	5.8528e-01	5.8418e-01
6.00e-01	6.2675e+00	3.1339e+00	1.6046e+00	9.6838e-01	7.0145e-01	6.4166e-01	6.4055e-01
8.00e-01	6.5291e+00	3.2656e+00	1.7014e+00	1.0649e+00	7.9796e-01	7.3817e-01	7.3707e-01
1.00e+00	6.7220e+00	3.3643e+00	1.7822e+00	1.1457e+00	8.7879e-01	8.1900e-01	8.1790e-01
1.50e+00	7.0460e+00	3.5391e+00	1.9409e+00	1.3044e+00	1.0375e+00	9.7771e-01	9.7660e-01
2.00e+00	7.2525e+00	3.6629e+00	2.0613e+00	1.4247e+00	1.1578e+00	1.0980e+00	1.0969e+00
3.00e+00	7.5105e+00	3.8420e+00	2.2394e+00	1.6028e+00	1.3359e+00	1.2761e+00	1.2750e+00
4.00e+00	7.6728e+00	3.9732e+00	2.3704e+00	1.7339e+00	1.4670e+00	1.4072e+00	1.4061e+00
5.00e+00	7.7899e+00	4.0770e+00	2.4742e+00	1.8377e+00	1.5708e+00	1.5110e+00	1.5099e+00
6.00e+00	7.8817e+00	4.1629e+00	2.5601e+00	1.9236e+00	1.6567e+00	1.5969e+00	1.5958e+00
8.00e+00	8.0228e+00	4.3000e+00	2.6973e+00	2.0608e+00	1.7938e+00	1.7340e+00	1.7329e+00
1.00e+01	8.1313e+00	4.4076e+00	2.8048e+00	2.1683e+00	1.9014e+00	1.8416e+00	1.8405e+00
1.50e+01	8.3291e+00	4.6051e+00	3.0023e+00	2.3658e+00	2.0989e+00	2.0391e+00	2.0380e+00
2.00e+01	8.4703e+00	4.7463e+00	3.1435e+00	2.5070e+00	2.2401e+00	2.1803e+00	2.1792e+00
3.00e+01	8.6703e+00	4.9463e+00	3.3436e+00	2.7070e+00	2.4401e+00	2.3803e+00	2.3792e+00
4.00e+01	8.8128e+00	5.0888e+00	3.4860e+00	2.8495e+00	2.5826e+00	2.5228e+00	2.5217e+00
5.00e+01	8.9236e+00	5.1995e+00	3.5968e+00	2.9603e+00	2.6933e+00	2.6336e+00	2.6324e+00
6.00e+01	9.0142e+00	5.2902e+00	3.6874e+00	3.0509e+00	2.7840e+00	2.7242e+00	2.7231e+00
8.00e+01	9.1573e+00	5.4333e+00	3.8305e+00	3.1940e+00	2.9271e+00	2.8673e+00	2.8662e+00

TABLE B.17 - Dimensionless Pressure for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD=1.0 and RDdh=0.05

XD 1.000 YD 0.5000e-01 ZD 0. ZWH 0.5000

TD \ LD=	1.250d-01	2.500d-01	5.000d-01	1.000d+00	2.500d+00	1.000d+01	5.000d+01
1.00e+02	9.2685e+00	5.5445e+00	3.9417e+00	3.3052e+00	3.0383e+00	2.9785e+00	2.9774e+00
1.50e+02	9.4709e+00	5.7469e+00	4.1441e+00	3.5076e+00	3.2407e+00	3.1809e+00	3.1798e+00
2.00e+02	9.6145e+00	5.8905e+00	4.2878e+00	3.6512e+00	3.3843e+00	3.3245e+00	3.3234e+00
3.00e+02	9.8171e+00	6.0930e+00	4.4903e+00	3.8538e+00	3.5868e+00	3.5270e+00	3.5259e+00
4.00e+02	9.9608e+00	6.2367e+00	4.6340e+00	3.9975e+00	3.7305e+00	3.6708e+00	3.6697e+00
5.00e+02	1.0072e+01	6.3482e+00	4.7455e+00	4.1090e+00	3.8420e+00	3.7823e+00	3.7812e+00
6.00e+02	1.0163e+01	6.4394e+00	4.8366e+00	4.2001e+00	3.9332e+00	3.8734e+00	3.8723e+00
8.00e+02	1.0307e+01	6.5831e+00	4.9804e+00	4.3439e+00	4.0769e+00	4.0171e+00	4.0160e+00
1.00e+03	1.0419e+01	6.6947e+00	5.0919e+00	4.4554e+00	4.1885e+00	4.1287e+00	4.1276e+00
1.50e+03	1.0622e+01	6.8976e+00	5.2948e+00	4.6583e+00	4.3914e+00	4.3316e+00	4.3305e+00
2.00e+03	1.0765e+01	7.0415e+00	5.4387e+00	4.8022e+00	4.5353e+00	4.4755e+00	4.4744e+00
3.00e+03	1.0968e+01	7.2442e+00	5.6415e+00	5.0050e+00	4.7380e+00	4.6782e+00	4.6771e+00
4.00e+03	1.1112e+01	7.3881e+00	5.7853e+00	5.1488e+00	4.8819e+00	4.8221e+00	4.8210e+00
5.00e+03	1.1224e+01	7.4996e+00	5.8969e+00	5.2604e+00	4.9935e+00	4.9337e+00	4.9326e+00
6.00e+03	1.1315e+01	7.5908e+00	5.9881e+00	5.3515e+00	5.0846e+00	5.0248e+00	5.0237e+00
8.00e+03	1.1459e+01	7.7346e+00	6.1319e+00	5.4954e+00	5.2284e+00	5.1687e+00	5.1676e+00
1.00e+04	1.1570e+01	7.8462e+00	6.2435e+00	5.6069e+00	5.3400e+00	5.2802e+00	5.2791e+00
1.50e+04	1.1773e+01	8.0492e+00	6.4464e+00	5.8099e+00	5.5430e+00	5.4832e+00	5.4821e+00
2.00e+04	1.1917e+01	8.1931e+00	6.5903e+00	5.9538e+00	5.6869e+00	5.6271e+00	5.6260e+00
3.00e+04	1.2120e+01	8.3959e+00	6.7931e+00	6.1566e+00	5.8897e+00	5.8299e+00	5.8288e+00
4.00e+04	1.2264e+01	8.5397e+00	6.9370e+00	6.3005e+00	6.0335e+00	5.9738e+00	5.9726e+00
5.00e+04	1.2375e+01	8.6513e+00	7.0486e+00	6.4121e+00	6.1451e+00	6.0853e+00	6.0842e+00
6.00e+04	1.2467e+01	8.7425e+00	7.1397e+00	6.5032e+00	6.2363e+00	6.1765e+00	6.1754e+00
8.00e+04	1.2610e+01	8.8863e+00	7.2836e+00	6.6471e+00	6.3801e+00	6.3203e+00	6.3192e+00
1.00e+05	1.2722e+01	8.9979e+00	7.3952e+00	6.7586e+00	6.4917e+00	6.4319e+00	6.4308e+00
1.50e+05	1.2925e+01	9.2009e+00	7.5981e+00	6.9616e+00	6.6947e+00	6.6349e+00	6.6338e+00
2.00e+05	1.3069e+01	9.3448e+00	7.7420e+00	7.1055e+00	6.8386e+00	6.7788e+00	6.7777e+00
3.00e+05	1.3272e+01	9.5476e+00	7.9448e+00	7.3083e+00	7.0414e+00	6.9816e+00	6.9805e+00
4.00e+05	1.3415e+01	9.6914e+00	8.0887e+00	7.4522e+00	7.1852e+00	7.1255e+00	7.1244e+00
5.00e+05	1.3527e+01	9.8030e+00	8.2003e+00	7.5638e+00	7.2968e+00	7.2370e+00	7.2359e+00
6.00e+05	1.3618e+01	9.8942e+00	8.2914e+00	7.6549e+00	7.3880e+00	7.3282e+00	7.3271e+00
8.00e+05	1.3762e+01	1.0038e+01	8.4353e+00	7.7988e+00	7.5318e+00	7.4720e+00	7.4709e+00
1.00e+06	1.3874e+01	1.0150e+01	8.5469e+00	7.9103e+00	7.6434e+00	7.5836e+00	7.5825e+00
1.50e+06	1.4077e+01	1.0353e+01	8.7498e+00	8.1133e+00	7.8464e+00	7.7866e+00	7.7855e+00
2.00e+06	1.4221e+01	1.0496e+01	8.8937e+00	8.2572e+00	7.9903e+00	7.9305e+00	7.9294e+00
3.00e+06	1.4423e+01	1.0699e+01	9.0965e+00	8.4600e+00	8.1931e+00	8.1333e+00	8.1322e+00
4.00e+06	1.4567e+01	1.0843e+01	9.2404e+00	8.6039e+00	8.3369e+00	8.2772e+00	8.2761e+00
5.00e+06	1.4679e+01	1.0955e+01	9.3520e+00	8.7155e+00	8.4485e+00	8.3887e+00	8.3876e+00
6.00e+06	1.4770e+01	1.1046e+01	9.4431e+00	8.8066e+00	8.5397e+00	8.4799e+00	8.4788e+00
8.00e+06	1.4914e+01	1.1190e+01	9.5870e+00	8.9505e+00	8.6835e+00	8.6238e+00	8.6226e+00
1.00e+07	1.5025e+01	1.1301e+01	9.6986e+00	9.0620e+00	8.7951e+00	8.7353e+00	8.7342e+00
1.50e+07	1.5228e+01	1.1504e+01	9.9015e+00	9.2650e+00	8.9981e+00	8.9383e+00	8.9372e+00
2.00e+07	1.5372e+01	1.1648e+01	1.0045e+01	9.4089e+00	9.1420e+00	9.0822e+00	9.0811e+00
3.00e+07	1.5575e+01	1.1851e+01	1.0248e+01	9.6117e+00	9.3448e+00	9.2850e+00	9.2839e+00
4.00e+07	1.5719e+01	1.1995e+01	1.0392e+01	9.7556e+00	9.4887e+00	9.4289e+00	9.4278e+00
5.00e+07	1.5830e+01	1.2106e+01	1.0504e+01	9.8672e+00	9.6002e+00	9.5404e+00	9.5393e+00
6.00e+07	1.5922e+01	1.2198e+01	1.0595e+01	9.9583e+00	9.6914e+00	9.6316e+00	9.6305e+00
8.00e+07	1.6065e+01	1.2341e+01	1.0739e+01	1.0102e+01	9.8352e+00	9.7755e+00	9.7744e+00

APPENDIX C

DRAINHOLE PRESSURE TRANSIENT TYPE CURVES

This appendix provides graphical results for the uniform flux horizontal drainhole solution presented in the text. The computer program in Appendix A is used to evaluated p_D vs. t_D for seven values of L_D. Results were generated for various x_D and r_{dh}. In each case the dimensionless pressure is evaluated at the point (x_D, r_{dh}, 0, 0.5, L_D) using Eq. (2.18).

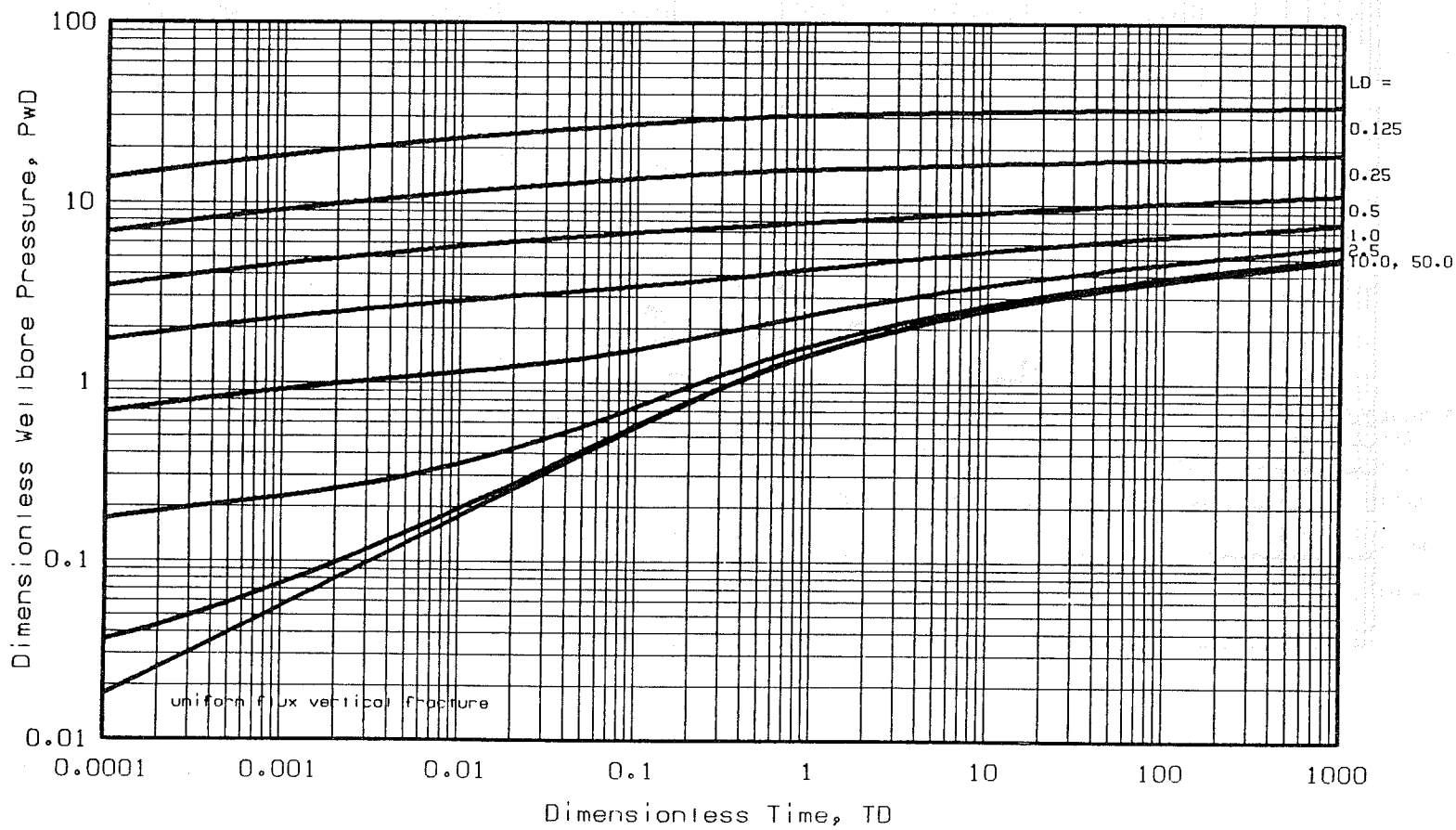

Fig. C.1 PwD vs. TD for a Uniform Flux Drainhole

in an Infinite Slab Reservoir for XD = 0 and RDdh = 0.0005

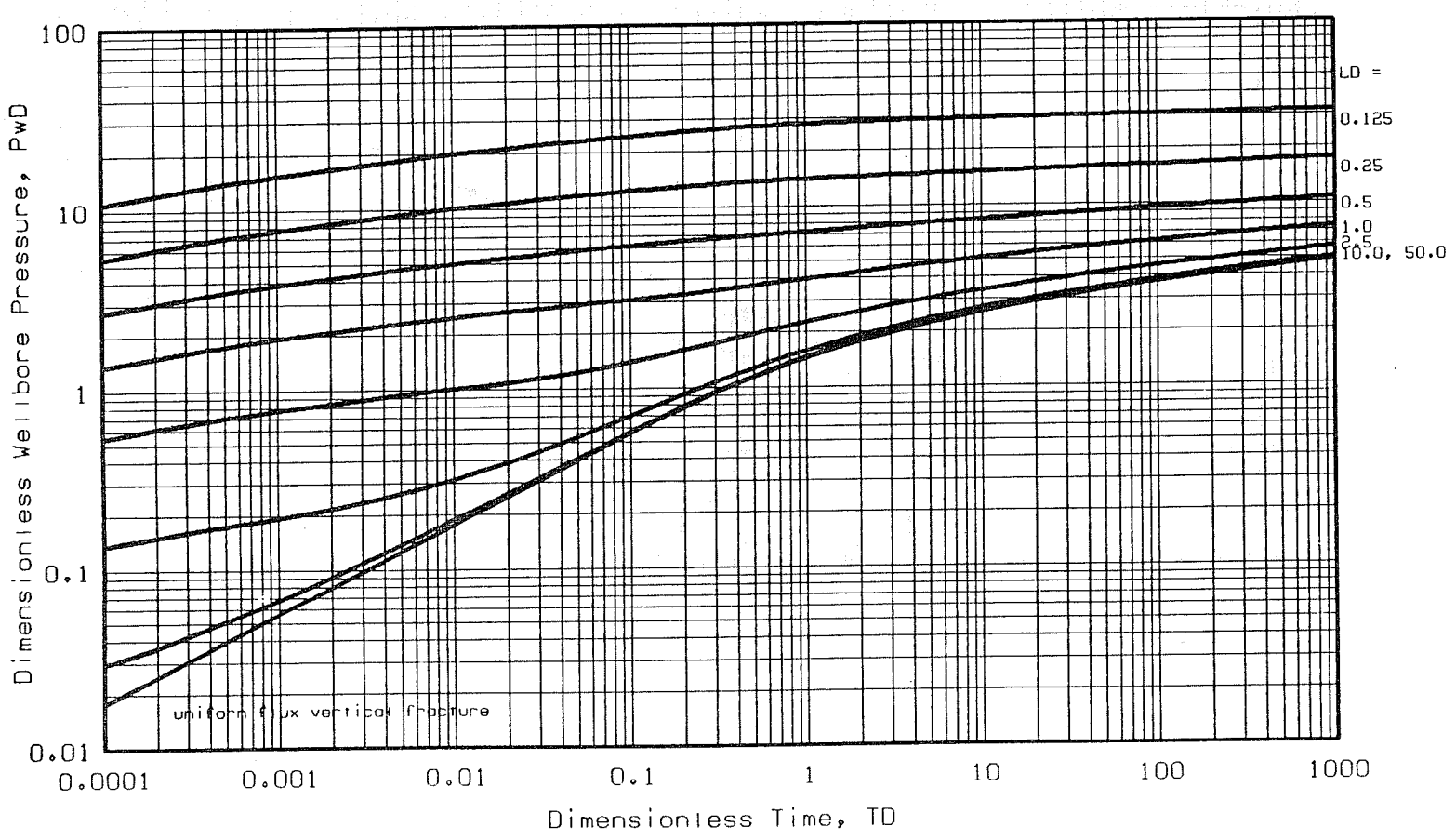

Fig. C.2 PwD vs. TD for a Uniform Flux Drainhole

in an Infinite Slab Reservoir for XD = 0 and RDdh = 0.001

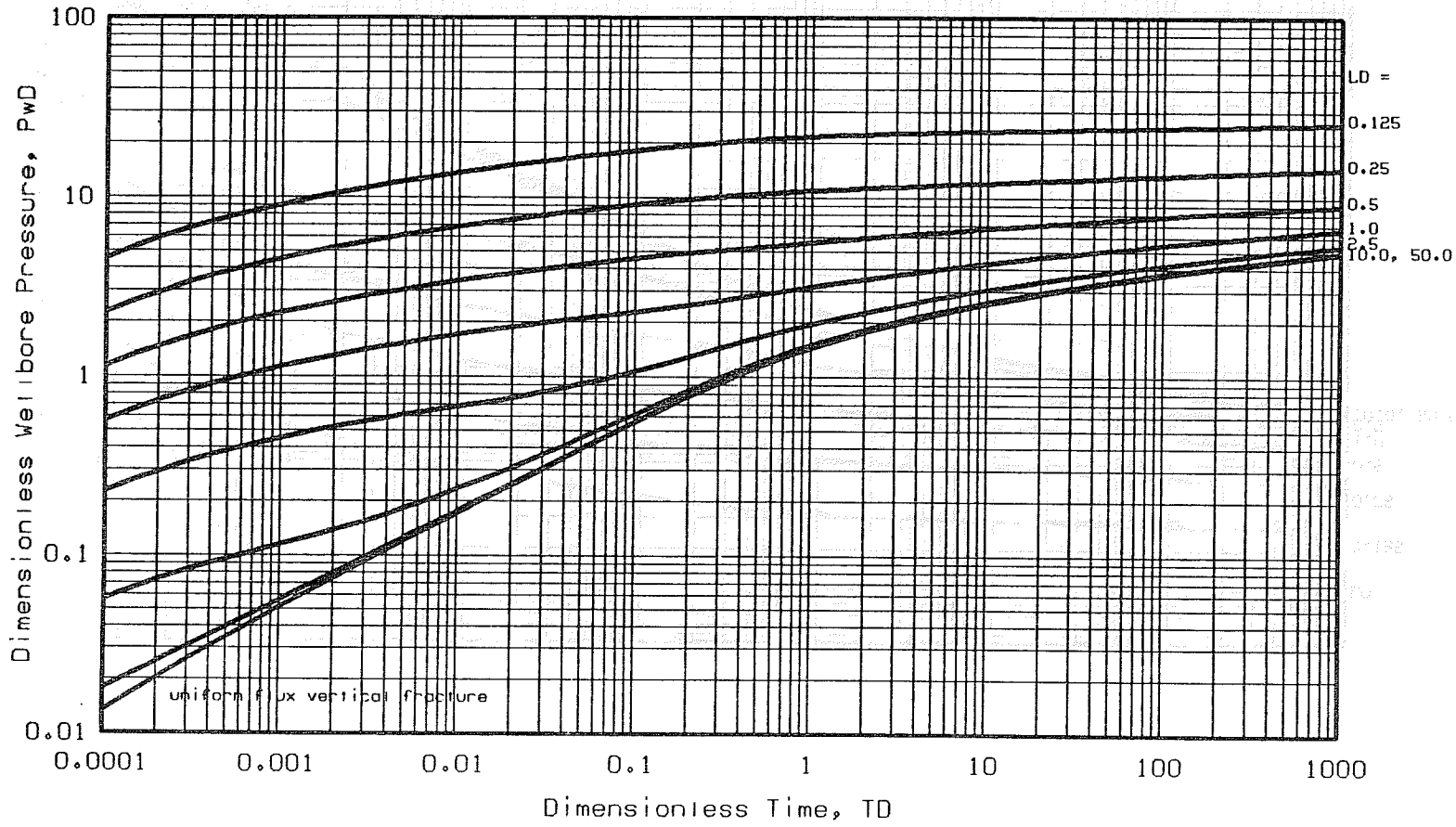

Fig. C.3 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 0 and RDdh = 0.005

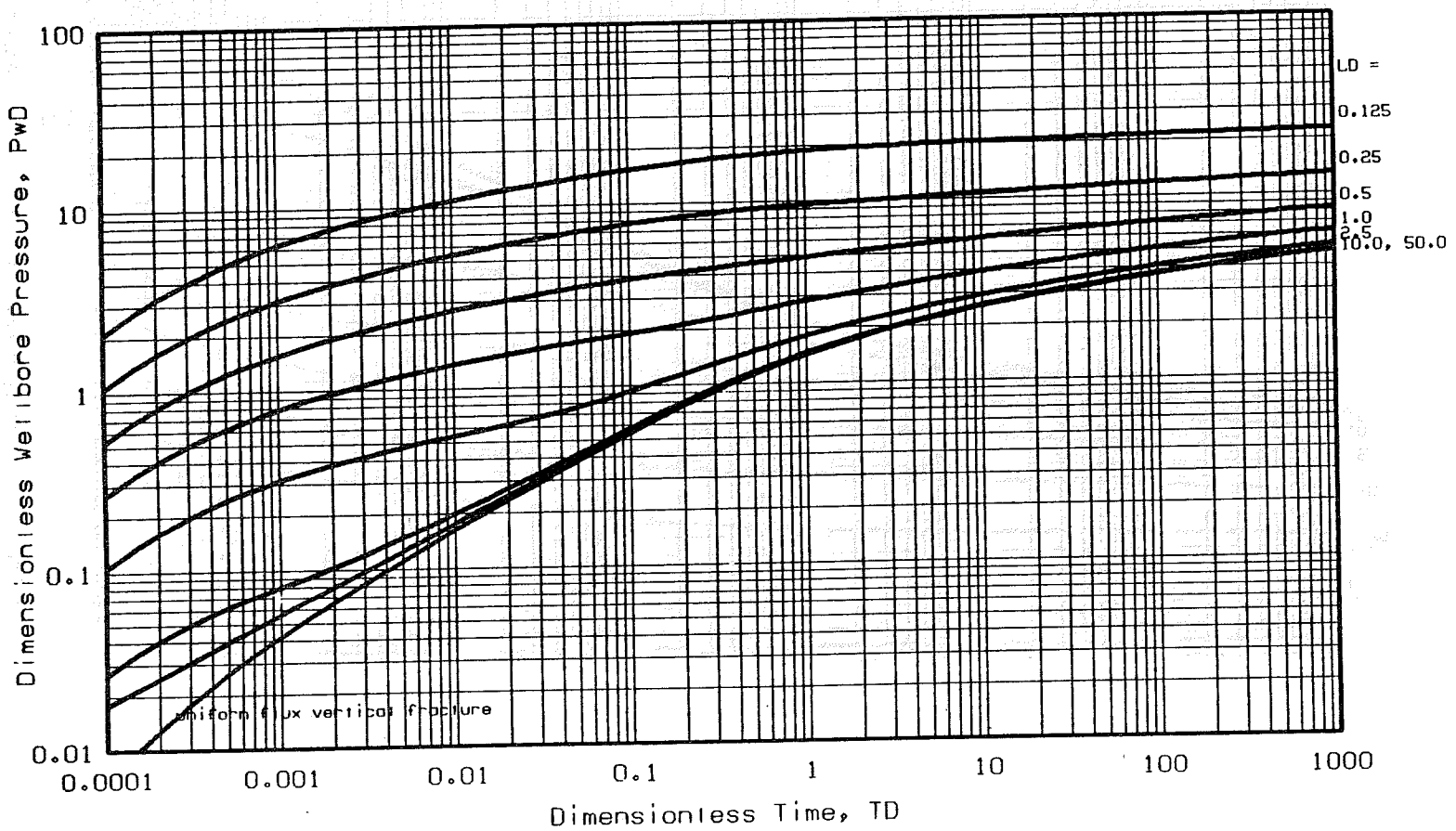

Fig. C.4 PwD vs. TD for a Uniform Flux Drainhole

in an Infinite Slab Reservoir for XD = 0 and RDdh = 0.01

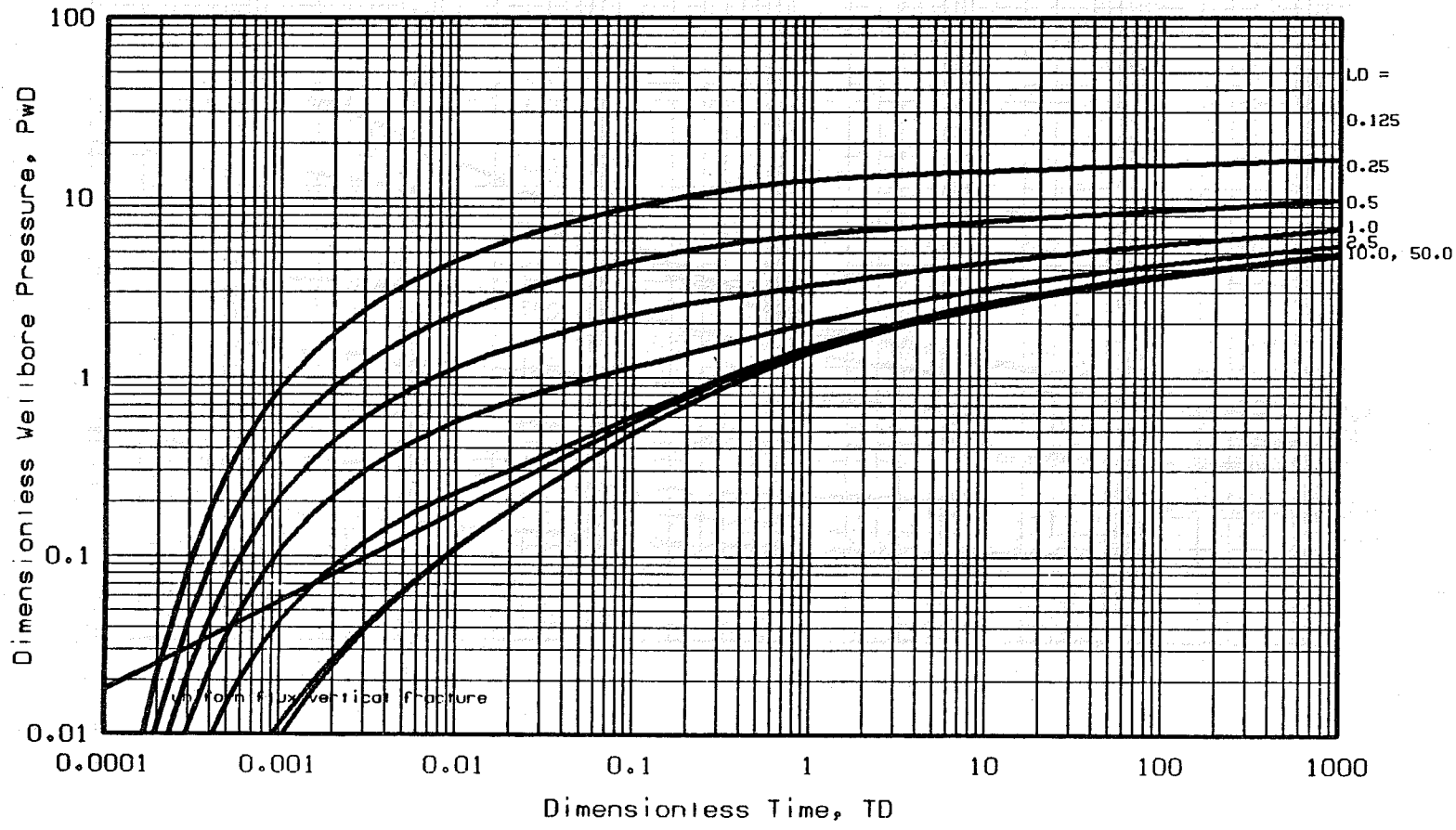

Fig. C.5 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 0 and RDdh = 0.05

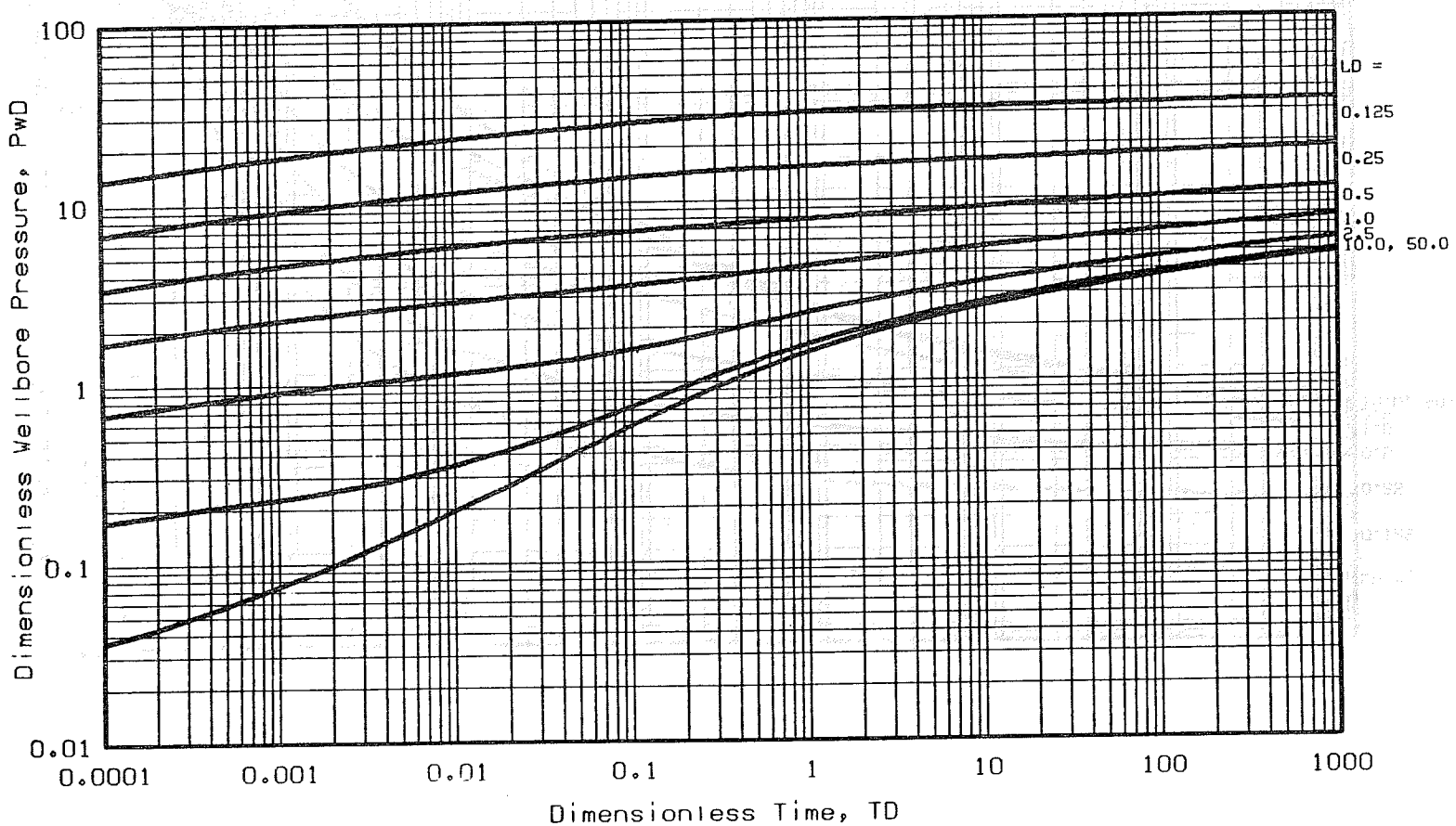

Fig. C.6 PwD vs. TD for a Uniform Flux Drainhole

in an Infinite Slab Reservoir for XD = 0.25 and RDdh = 0.0005

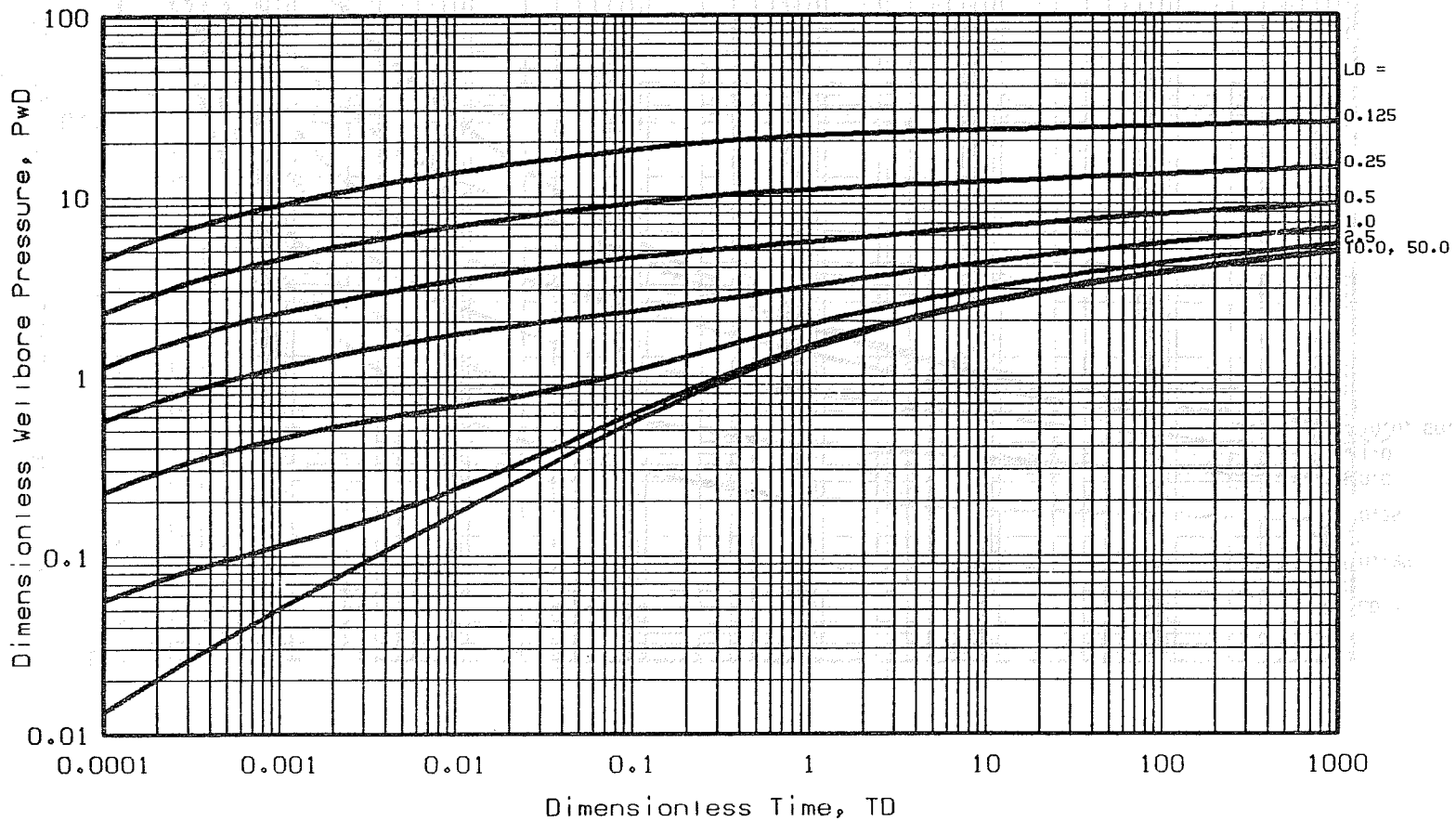

Fig. C.7 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 0.25 and RDdh = 0.005

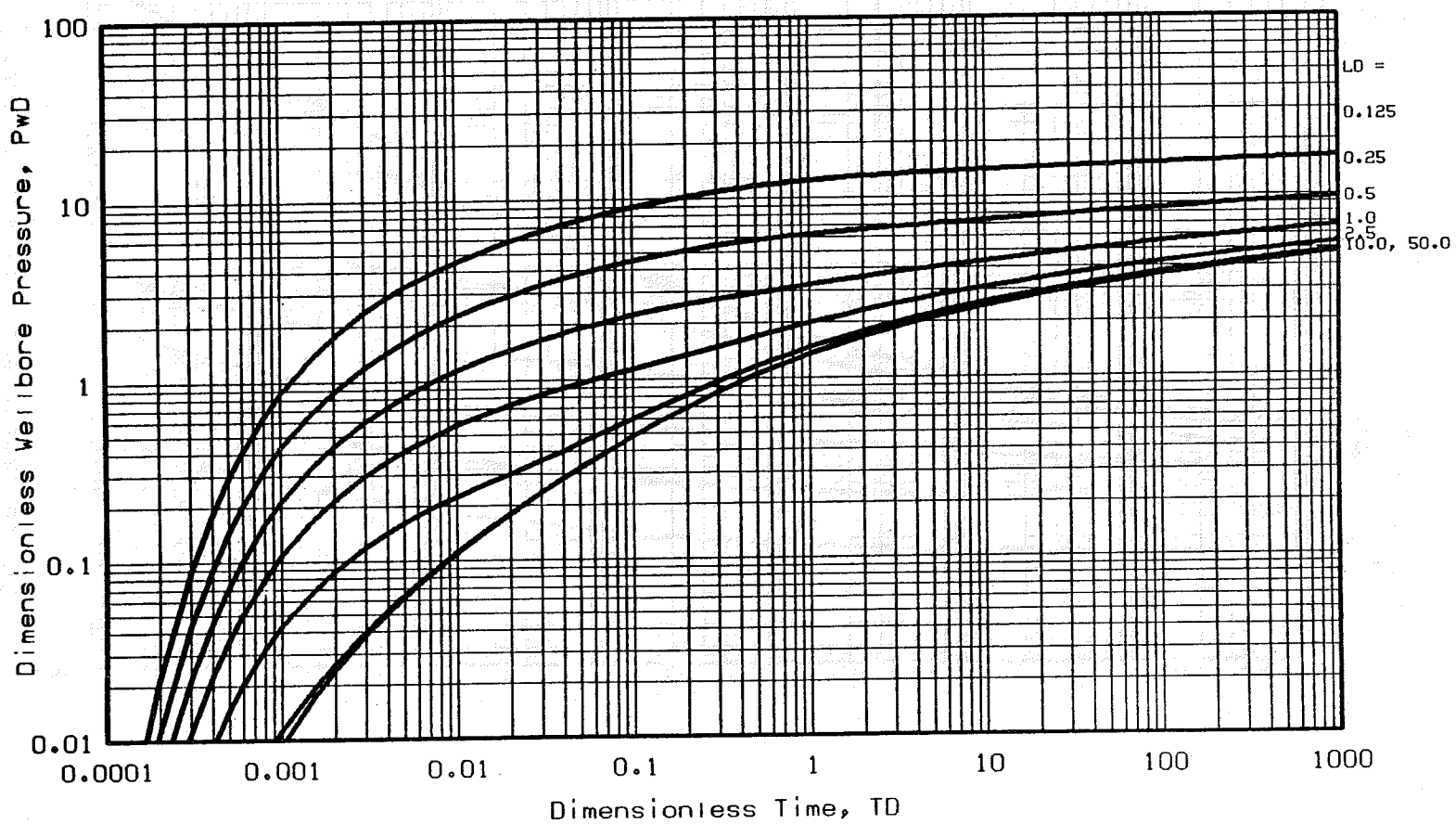

Fig. C.8 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 0.25 and RDdh = 0.05

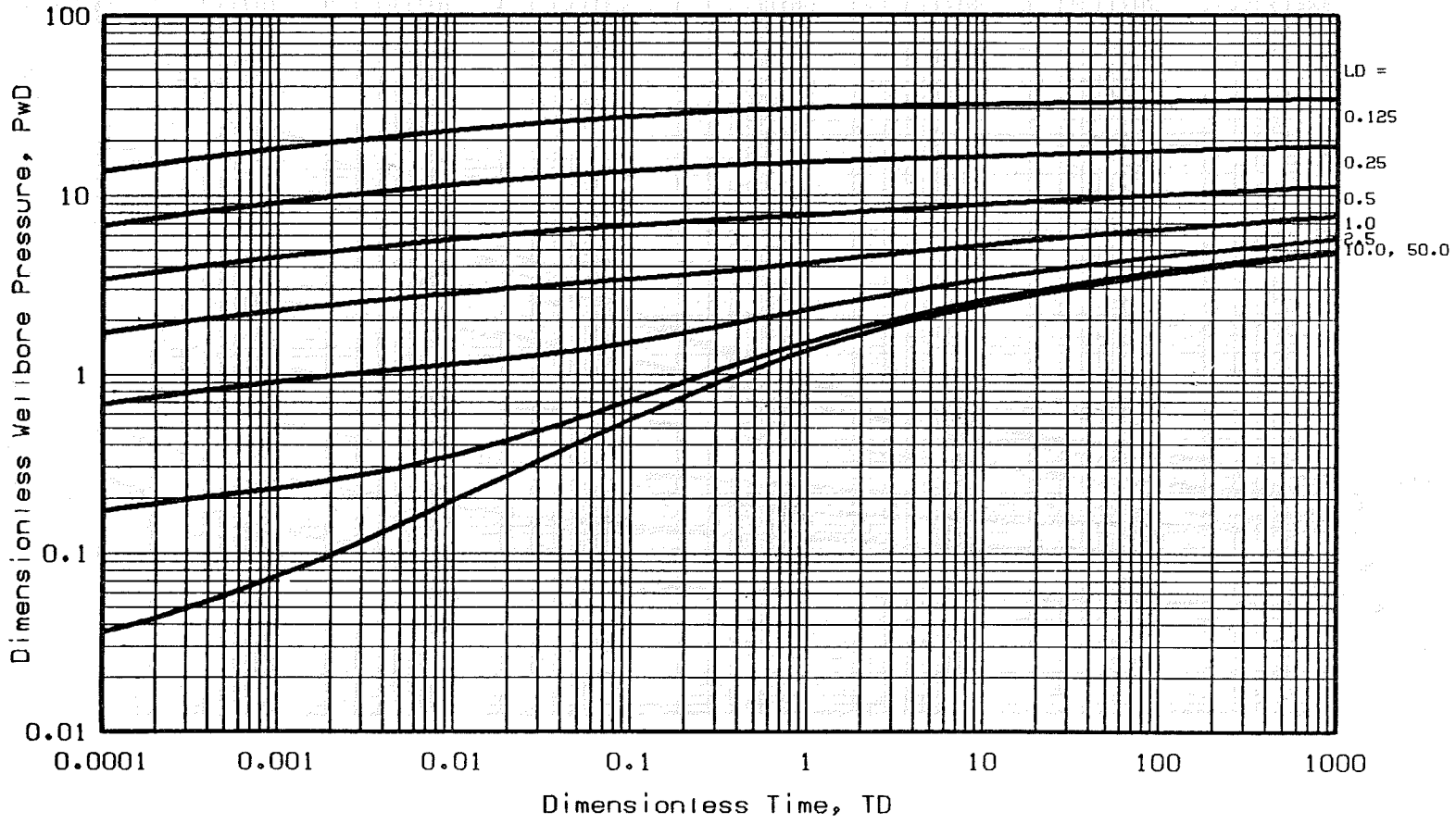

Fig. C.9 PwD vs. TD for a Uniform Flux Drainhole

in an Infinite Slab Reservoir for XD = 0.5 and RDdh = 0.0005

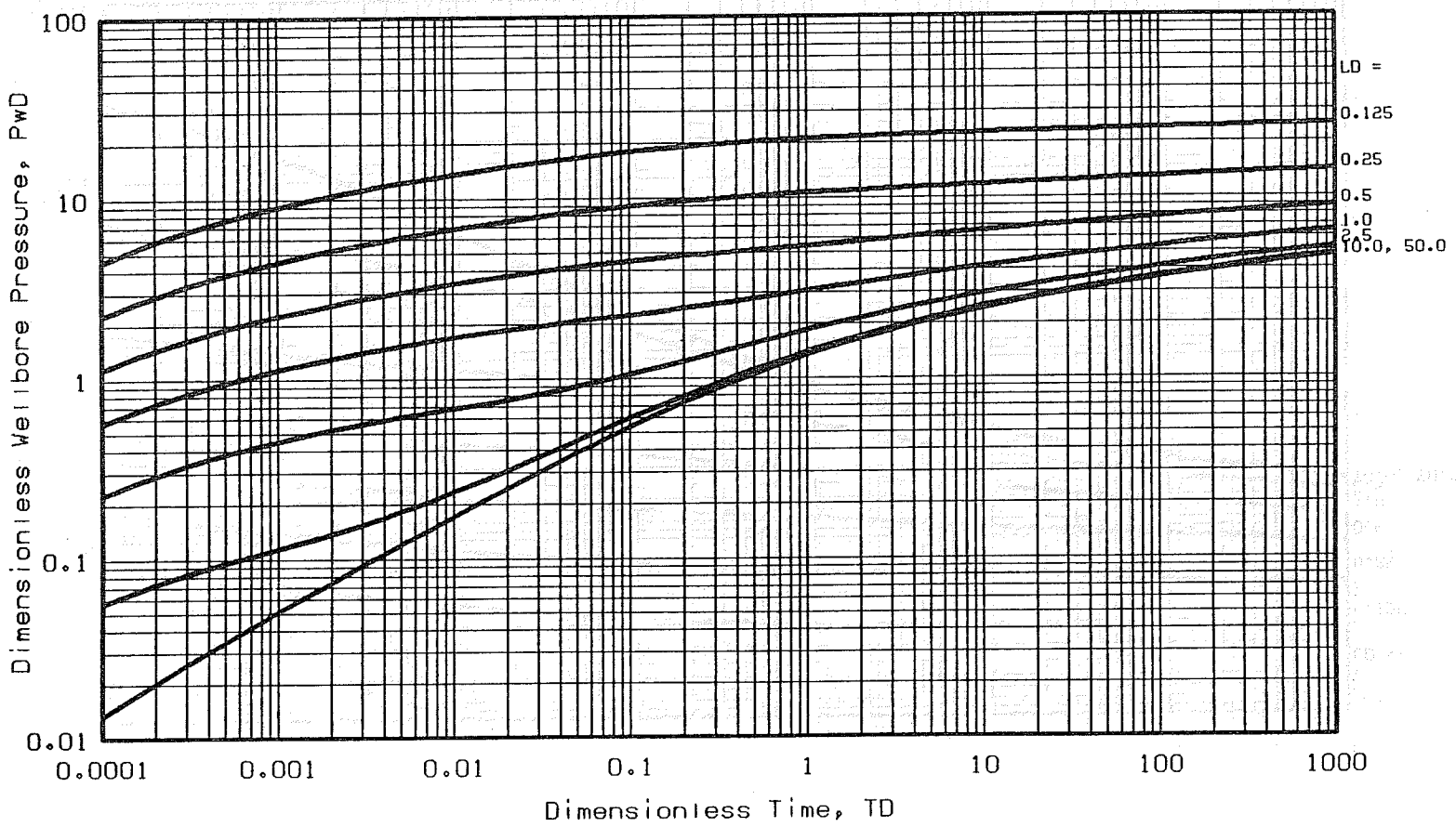

Fig. C.10 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 0.5 and RDdh = 0.005

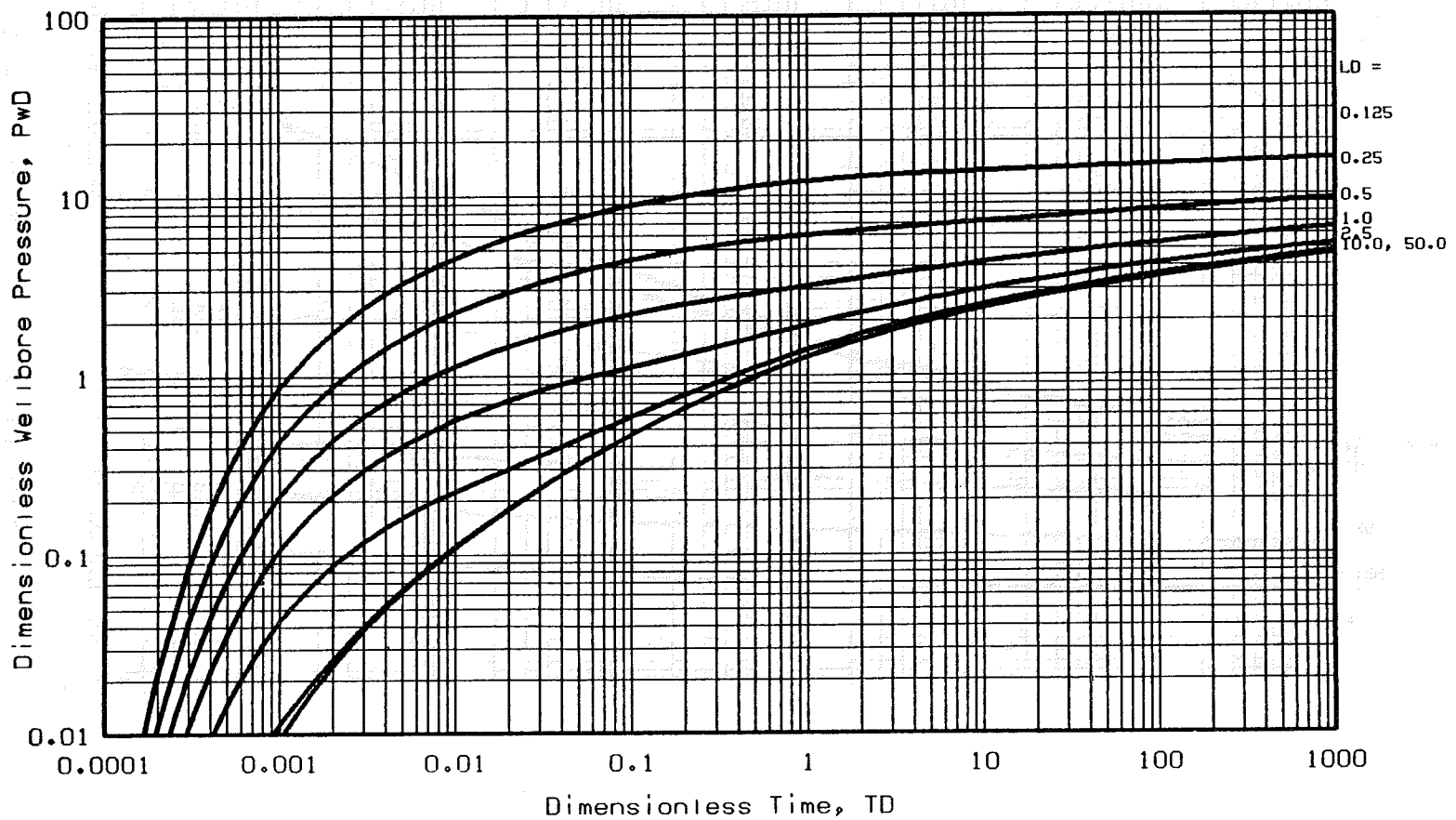

Fig. C.11 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 0.5 and RDdh = 0.05

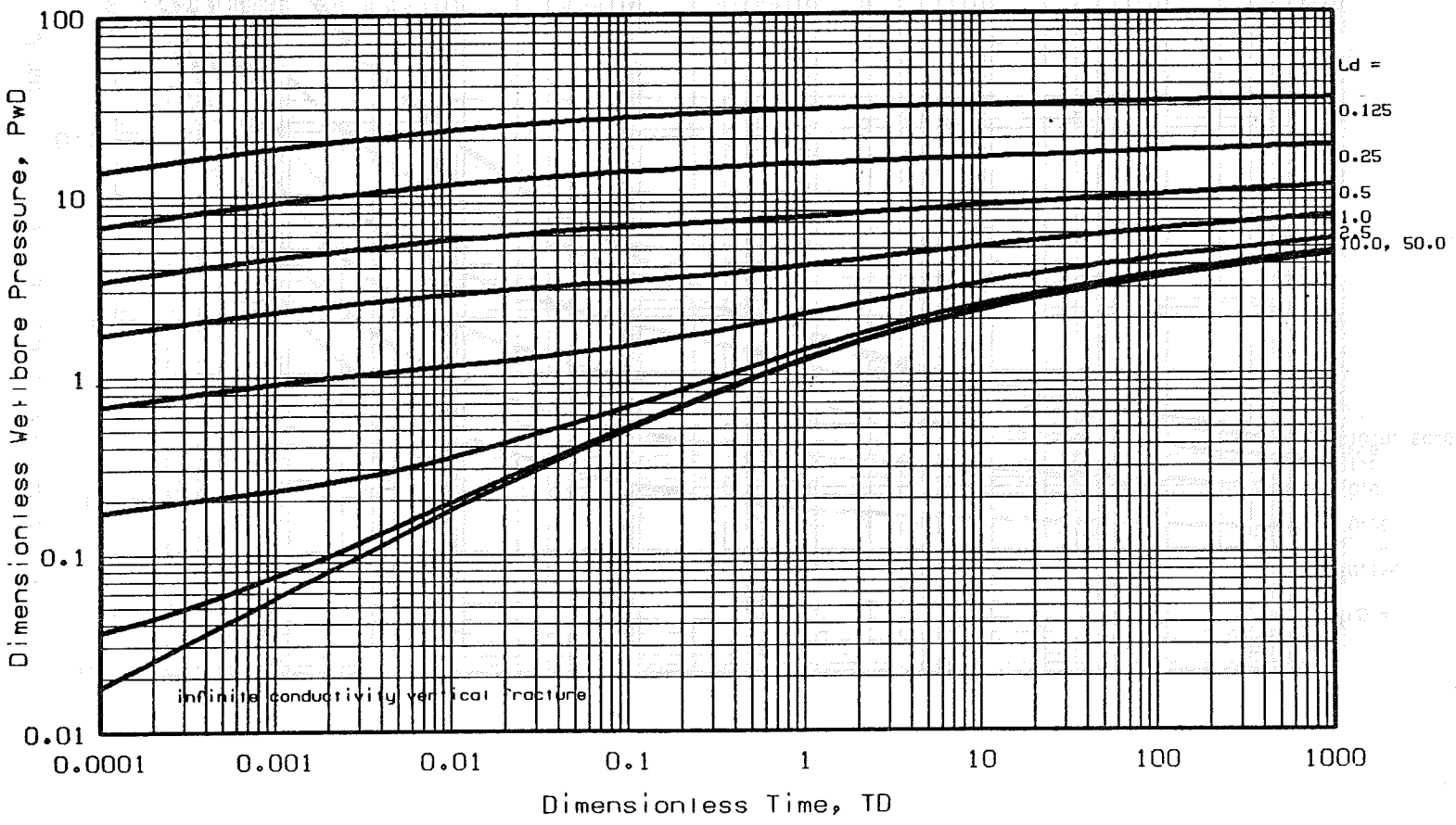

Fig. C.12 PwD vs. TD for a Uniform Flux Drainhole

in an Infinite Slab Reservoir for XD = 0.732 and RDdh = 0.0005

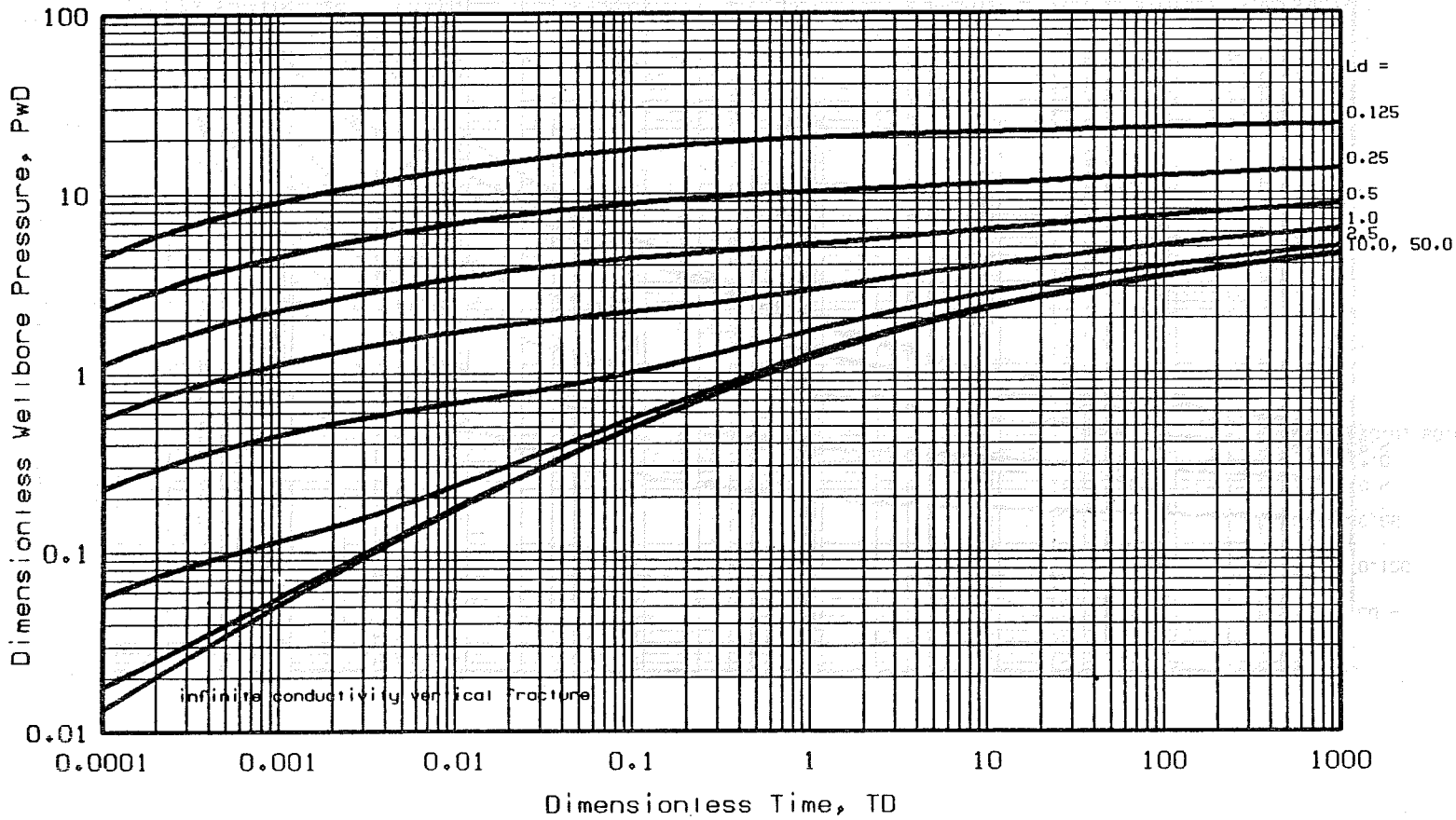

Fig. C.13 PwD vs. TD for a Uniform Flux Drainhole

in an Infinite Slab Reservoir for XD = 0.732 and RDdh = 0.005

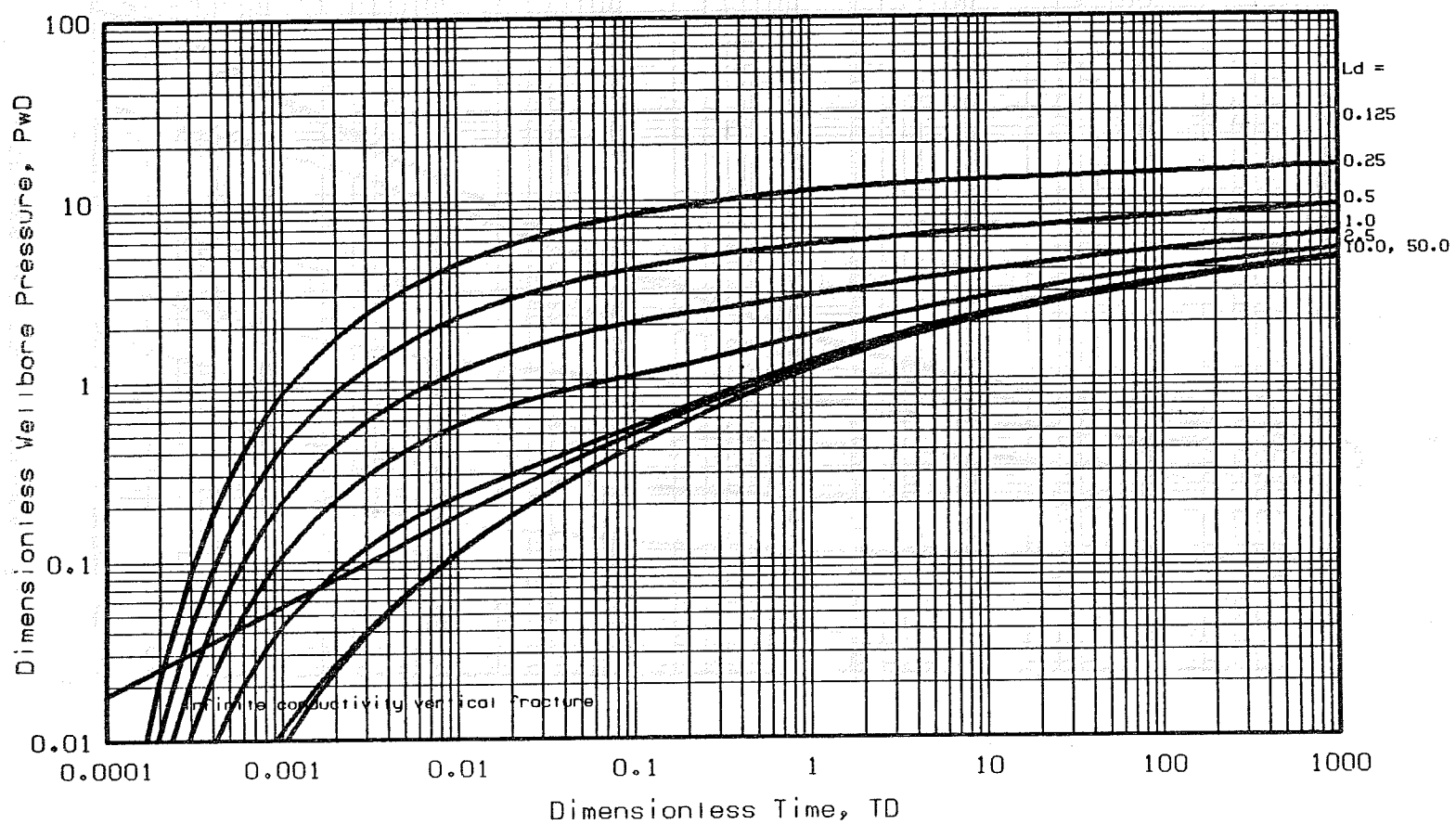

Fig. C.14 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 0.732 and RDdh = 0.05

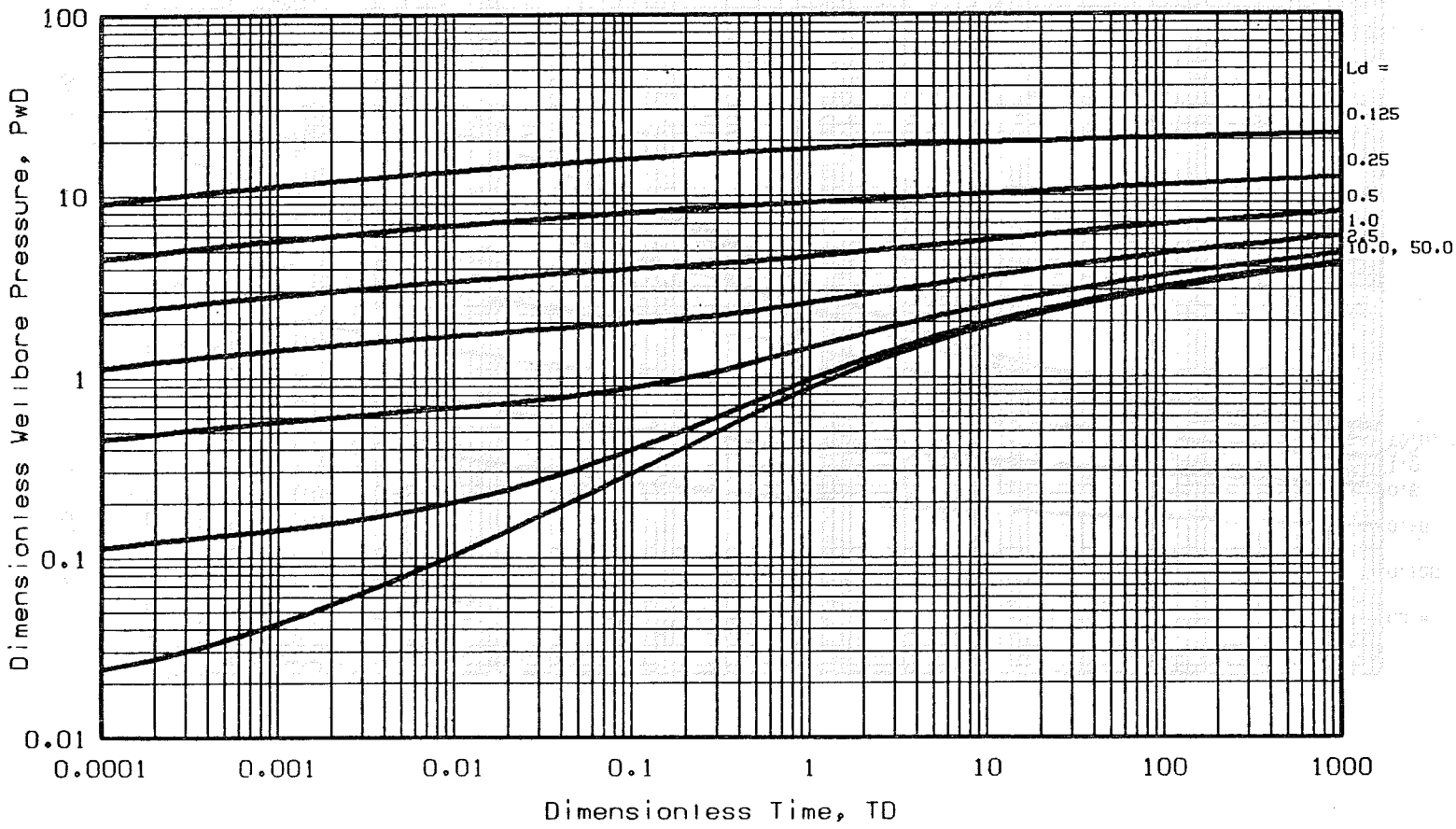

Fig. C.15 PwD vs. TD for a Uniform Flux Drainhole

in an Infinite Slab Reservoir for XD = 1.0 and RDdh = 0.0005

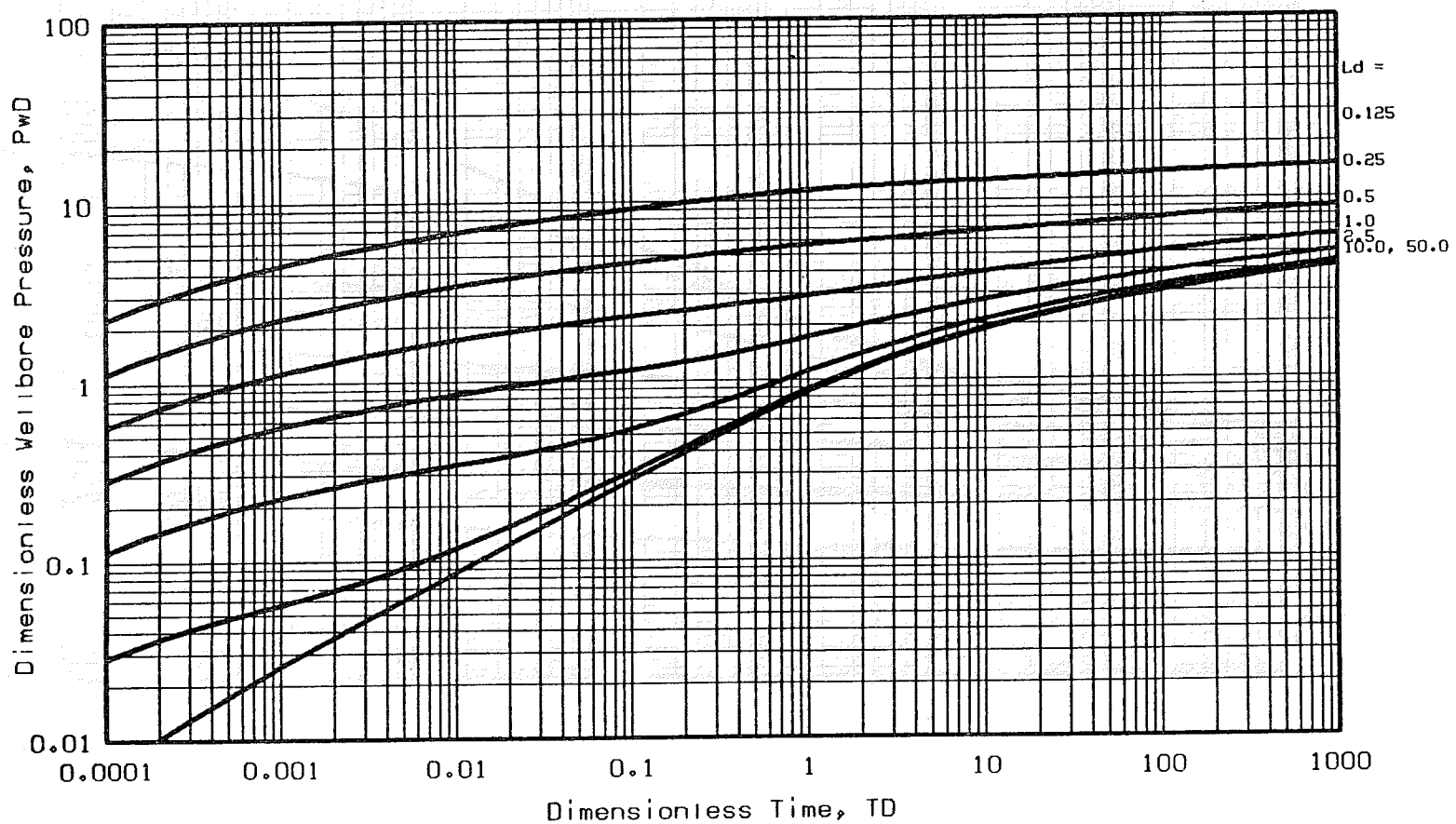

Fig. C.16 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 1.0 and RDdh = 0.005

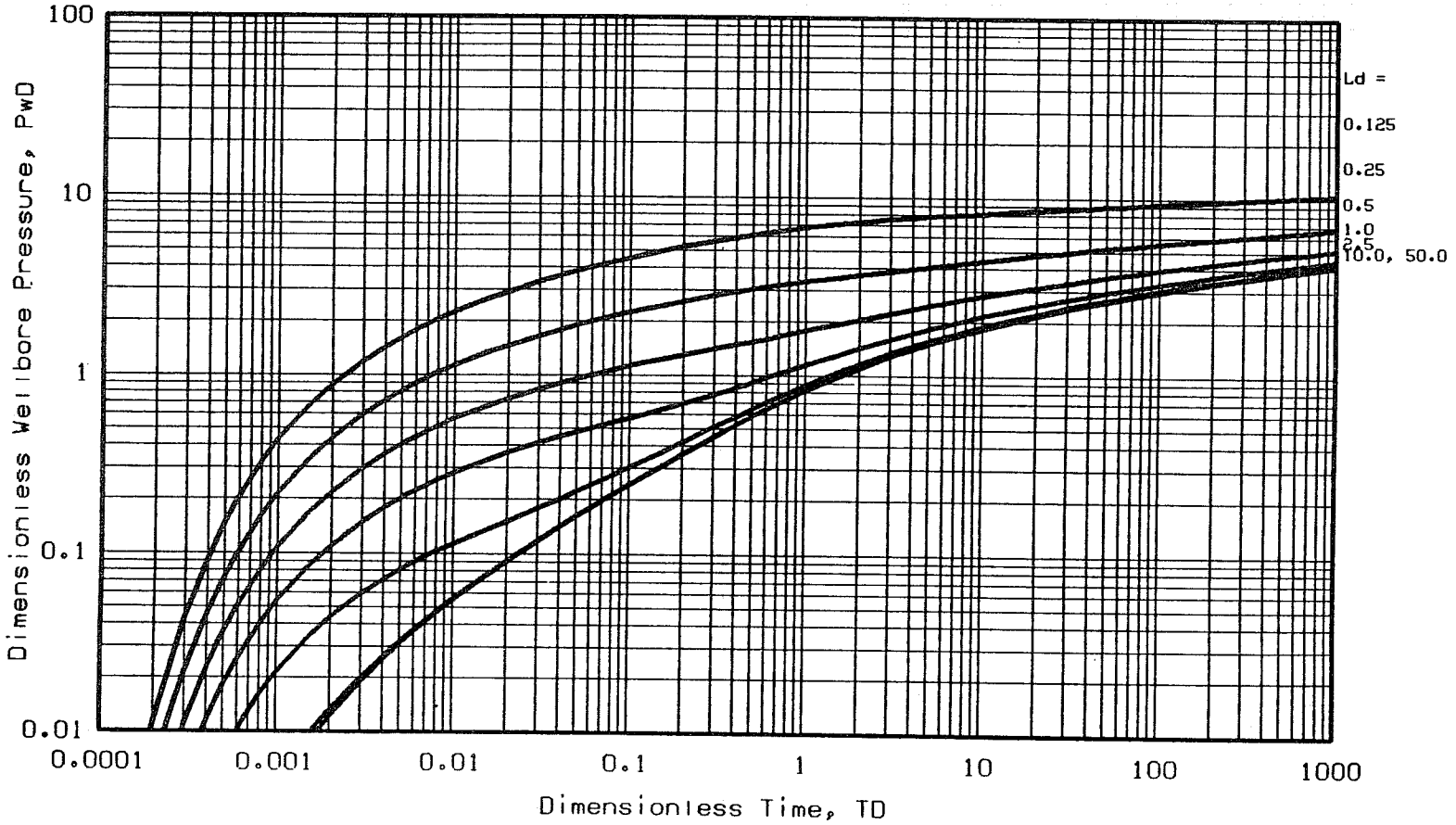

Fig. C.17 PwD vs. TD for a Uniform Flux Drainhole in an Infinite Slab Reservoir for XD = 1.0 and RDdh = 0.05

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