ASSESSMENT OF POSSIBLE IN-SITU FORMATION OF HYDRATE DURING GAS PRODUCTION FOR THE CONDITIONS OF THE GAS FIELD YUZNO-RUSSKOE

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Key words: hydrate formation; bottomhole zone; mathematical model

()

[1].

[2, 3].

[1].

(. 1).

. 1.

1-2

:

T_1 ;

T_2 ;

[1];

[4].

. 2.

p_0

T_0

$$t=0, r_w < r < r_k: T=T_0, p=p_0, S_h=0, S_l=S_{l0}, S_g=1-S_{l0}.$$

sk, h, l — g ; t — ; r — ; r_w — ; r_k — ; S_j ($j=g, l, h$) — ; S_{l0} —

p_w :

$$t>0, r=r_w: p=p_w < p_0, \frac{\partial T}{\partial r}=0.$$

$$t>0, r=r_k: \frac{\partial p}{\partial r}=0, \frac{\partial T}{\partial r}=0.$$

G .

m

[5, 6].

[6–10]:

$$m \frac{\partial}{\partial t} (\rho_g S_g) + m \frac{1}{r} \frac{\partial}{\partial r} (r \rho_g S_g v_g) = -G m \rho_h \frac{\partial S_h}{\partial t}, \quad (1)$$

$$m \rho_l \frac{\partial S_l}{\partial t} = -(1-G) m \rho_h \frac{\partial S_h}{\partial t}, \quad (2)$$

—). , , (-)

. 3.

, ,

pw:

*1, 2 3
pw = 4, 6 8*

$T_s(p)$. , . 3, $T_s(p)$ (. . 1). . 3 , : , (8–9).

(. 4).

. 4.

, ,

kg:

*1, 2, 3 4
kg = 10-16, 10-15, 10-14 10-13 2*

, $k_g = 10^{-13} \text{ }^2$, 10^{-14} ^2 — (365).

. 4, 10^{-13} ^2 , $11,53 \text{ }^0\text{C}$, $k_g = 10^{-14} \text{ }^2 - 11,54 \text{ }^0\text{C}$. . 5

(4). ,

5.
(1, 2, 3 4
m = 0,1; 0,3; 0,4 0,5)

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