

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P_f & P_s)
(SURFACE) (SURFACE)

Form C-122-B
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66
LOCATION: Unit 7413 Section 2 Township 22S Range 23E
L 7413 H 7413 L/H 1.000 G .6742 % CO₂ 0.01421 % N₂ 669 % H₂S 382
d 1.995 F_r .018231 Q_m 2.068 M² (1/11) (F_r Q_m)² P_{cr} 669 T_{cr} 382
TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	3638		7276			Delta P = (37.5 GH)			
2	GH		0	2452.74		4905.48			I _c + 4 I ₁ + I ₂			
3	37.5GH		0	91,978		183,956			= 3 (183,956)			
4	P _c or P _n		2320.2	2619.2	2617.2	2914.2	2911.2	2910.2	153,743 + 624	112 + 157,498		
5	P _r		3.47	3.92	3.91	4.36	4.35	4.35	=	551,868		
6	T		531	561	561	591	591	591		935.353		
7	T _r		1.39	1.47	1.47	1.55	1.55	1.55				
8	Z		.696	.755	.755	.805	.805	.805				
9	P/Z P/Z		3333.6	3469.1	3466.5	3620.1	3616.4	3615.2	=	590.0		
10	P/TTZ		9.6	6.2780	6.1838	6.1791	6.1254	6.1191	6.1170			
11	(P/TTZ) ² /1000		.039413	.038240	.038182	.037521	.037444	.037418		P _s = P _c + Delta P		
12	L/H(F _r Q _m) ²		.001421	.001421	.001421	.001421	.001421	.001421				
13			.040834	.039661	.039603	.038962	.038865	.038839				
14	I _n		153.743	155.918	156.028	157.297	157.447	157.498				
15	M=P _n -P _{n-1}		299	297	297	297	294	293				
16	N-I _n +I _{n-1}		309.661	309.771	313.325	313.475	313.526					
17	M x N		15 x 16		92,002		91,863					
18	Σ(M x N)		Σ17		92,002		183,865					

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P_f & P_s)
 XMSURFACEXX XMSURFACEXX

Form C-122-F
 Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 % CO₂ .000078 % N₂ .000078 % H₂S .000078
 d 4.000 F_r 2.068 Q_m M²cid (L/H) (F_rQ_m)² P_{cr} 669 T_{cr} 382
TABLE IX & X TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7276	7413								
2	GH		4905.48	4997.85								
3	37.5GH		183,956	187,419								
4	P _c or P _n		2910.2	2921.2								
5	P _r		4.35	4.37								
6	T		591	592								
7	T _r		1.55	1.55								
8	Z		.805	.806								
9	P/Z P/Z	<u>4.8</u>	3615.2	3624.3								
10	P/TZ	<u>9.6</u>	6.1170	6.1222								
11	(P/TZ) ² /1000	<u>(.002/1000)</u>	.037418	.037481								
12	L/H(F _r Q _m) ²		.000078	.000078								
13		<u>11 + 12</u>	.037496	.037559								
14	I _n	<u>10 ÷ 13</u>	163.137	163.002								
15	M = P _n - P _{n-1}			11								
16	N = I _n + I _{n-1}			326.139								
17	M x N	<u>15 x 16</u>		3,583								
18	Σ (M x N)	<u>Σ 17</u>	183,956	187,544								

WORK SHEET FOR STEPWISE CALCULATION
(SUBSURFACE) PRESSURE (PPK&RS)
(SURFACE) (P_c & P_w)

Form G-122-E
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 % CO₂ 0 % N₂ 0 % H₂S 382

d Fr Q_m 0 M²cd (L/H) (F_rQ_m)² 0 P_{cr} 669 T_{cr} 382

TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7413	3706.5		0			Delta P	= 3 (37.5 GH)		
2	GH		4997.85	2498.92		0				I _s + 4 I ₁ + I ₂		
3	37.5GH		187,419	93,710		0						
4	P _c or P _n		2921.2	2634.2	2632.2	2343.2	2338.2	2339.2		= 3 (187,419)	163,340 + 646,268 + 158,220	
5	P _r		4.37	3.94	3.94	3.50	3.50	3.50				
6	T		592	562	562	531	531	531		= 562,257		
7	T _r		1.55	1.47	1.47	1.39	1.39	1.39		967.828		
8	Z		.806	.757	.757	.697	.697	.697				
9	P/Z P/Z		3624.3	3479.8	3478.5	3360.9	3354.7	3356.1		= 581.0		
10	P/TZ		9.6	6.1222	6.1918	6.3293	6.3176	6.3203				
11	(P/TZ) 2/1000		(9.6) 2/1000							P _w = P _s -	Delta P	
12	L/H(F _r Q _m) ²											
13			I ₁ + I ₂							= 2340.3		
14	I _n		163,340	161,504	161,567	157,995	158,288	158,220				
15	M - P _n - P _n - 1		287	288	288	289	294	293				
16	M - I _n + I _n - 1		324,844	324,907	319,562	319,855	319,787					
17	M x N		15 x 16		93,573		93,698					
18	Σ (M x N)		Σ 17	187,419	93,846							

WORK SHEET FOR STEPWISE CALCULATION
(SUBSURFACE) PRESSURE (P_f & P_s)
~~X(SURFACE)~~ ~~X(SURFACE)~~

Form C-122-E
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 % CO₂ 0.003752 % N₂ 669 % H₂S 382

d 1.995 $P_f \cdot 0.18231 Q_m$ 3.360 $M^2 \cdot C_d$ (L/H) ($F_f Q_m$)² 0.003752 P_{cr} 669 T_{cr} 382
TABLE IX & X TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	3638		7276			Delta P = 3 (37.5 GH)			
2	GH		0	2452.74		4900.48			$I_t + 4 I_1 + I_2$			
3	37.5GH			91,978		193,956						
4	P_c or P_n		2276.2	2583.2	2584.2	2892.2			$= 3 (183,956)$			
5	P_t		3.40	3.86	3.86	4.32			$149.652 + 596.664 + 149.183$			
6	T		534	563	563	591			$= 551,868$			
7	I_t		1.40	1.47	1.47	1.55			895.499			
8	Z		.703	.754	.754	.804						
9	P/Z P/Z	$4 \div 8$	3237.8	3424.2	3427.3	3597.3			$= 616.3$			
10	P/TZ	$9 \div 6$	6.0634	6.0820	6.0876	6.0867						
11	(P/TZ) ² /1000	(10) ² /1000	.036764	.036991	.037059	.037048			$P_s = P_t + \text{Delta P}$			
12	L/H($F_f Q_m$) ²		.003752	.003752	.003752	.003752						
13		$11 + 12$	.040516	.040743	.040811	.040800			$= 2276.2 + 616.3$			
14	I_n	$10 \div 13$	149.652	149.278	149.166	149.183						
15	$M = P_n - P_{n-1}$			307	308	308			$= 2892.5$			
16	$N = I_n + I_{n-1}$			298.930	298.818	298.349						
17	$M \times N$	15×16			92,036	91,392						
18	$\sum (M \times N)$	$\sum 17$			92,036	183,928						

COMPANY Nonsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 % CO₂ % N₂ % H₂S

d 4.000 F_i 0042753 Q_m 3.360 M²cid (L/H) (F_iQ_m)² .000206 P_{cr} 669 T_{cr} 382

TABLE IX & X TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7276	7413								
2	GH		4905.48	4997.85								
3	37.5GH		183,956	187,419								
4	P _c or P _n		2892.5	2903.5								
5	P _r		4.32	4.34								
6	T		591	592								
7	T _r		1.55	1.55								
8	Z		.804	.805								
9	P/Z P/Z	4:8	3597.6	3606.8								
10	P/TZ	9:6	6.0874	6.0926								
11	(P/TZ) ² /1000	(10) 2/1000	.037056	.037120								
12	L/H(F _i Q _m) ²		.000206	.000206								
13		11 + 12	.037262	.037326								
14	I _n	10 ÷ 13	163.367	163.227								
15	M = P _n - P _{n-1}			11								
16	N = I _n + I _{n-1}			326.594								
17	M × N	15 × 16		3,593								
18	Σ (M × N)	Σ 17	183,956	187,549								

WORK SHEET FOR STEPWISE CALCULATION
(SUBSURFACE PRESSURE)
(SURFACE) (PRESSURE)
(P_c & P_w)

Form C-122-E
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 % CO₂ 0 % N₂ 0 % H₂S 382

d 0 F_r 0 Q_m 0 M²cid (L/H) (F_rQ_m)² 0 P_{cr} 669 T_{cr} 382
TABLE IX & X TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7413	3706.5		0			Delta P = 3 (37.5 GH)			
2	GH		4997.85	2498.92		0			I _s + 4 I ₁ + I ₂			
3	37.5GH		187,419	93,710		0						
4	P _c or P _n		2903.5	2617.5	2616.5	2329.5	2327.5		= 3 (187,419)			
5	P _r		4.34	3.91	3.91	3.48	3.48		164.134 + 649.824 + 161.520			
6	T		592	563	563	534	534		= 562,257			
7	T _r		1.55	1.47	1.47	1.40	1.40		975.478			
8	Z		.805	.755	.755	.704	.704					
9	P/Z P/Z		3606.8	3465.1	3465.6	3308.9	3306.1		= 576.4			
10	P/TZ		6.0926	6.1546	6.1555	6.1965	6.1912					
11	(P/TZ) ² /1000								P _w = P _s	Delta P		
12	L/H(F _r Q _m) ²											
13									= 2903.5 - 576.4			
14	I _n		164.134	162.480	162.456	161.381	161.520					
15	M=P _n -P _{n-1}			286	287	287	289		= 2327.1			
16	N=I _n +I _{n-1}			326.614	326.590	323.837	323.976					
17	M x N				93,731		93,629					
18	Σ(M x N)		187,419		93,688							

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P_f & P_s)
(SURFACE) ~~XXXXXX~~ ~~XXXXXX~~

Form C-122-E
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 H 7413 Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 % CO₂ .007140 % H₂S 382
d 1.995 F_f .01823 Q_m 4.635 M₂ cfd (L/H) (F_f Q_m)² .007140 P_{cr} 669 T_{cr} 382
TABLE IX & X TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	3638		7276			Delta P = 3 (37.5 GH)			
2	GH		0	2452.74		4905.48			I _f + 4 I ₁ + I ₂			
3	37.5GH		0	91,978		183,956			= 3 (183,956)			
4	P _c or P _n		2213.2	2536.2	2538.2	2863.2	2868.2		142,270 + 562,368 + 138,522			
5	P _f		3.31	3.79	3.79	4.28	4.29		= 551,868			
6	T		538	565	565	591	591					
7	T _f		1.41	1.48	1.48	1.55	1.55		843.160			
8	Z		.709	.761	.761	.804	.804					
9	P/Z P/Z		3118.9	3332.7	3335.3	3563.4	3567.4		= 654.5			
10	P/TZ		5.7973	5.8986	5.9033	6.0295	6.0362					
11	(P/TZ) ² /1000		.033609	.034794	.034849	.036354	.036436		P _s = P _c + Delta P			
12	L/H(F _f Q _m) ²		.007140	.007140	.007140	.007140	.007140					
13			.040749	.041934	.041989	.043494	.043576		= 2213.2 + 654.5			
14	I _n		142.270	140.665	140.592	138.626	138.522					
15	M = P _n - P _{n-1}		323	325	325	330			= 2867.7			
16	N = I _n + I _{n-1}		282.935	282.862	279.218	279.114						
17	M x N		91,930				92,108					
18	Σ (M x N)		91,930				184,038					

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P₁ & P₂)
(SURFACE) (P₁ & P₂)

Form C-122-E
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 % CO₂ 0.000393 % N₂ 669 % H₂S 382
d 4.000 F_r .0042753 Q_m 4.635 M² (H) (L/H) (F_rQ_m)² P_{CT} TABLE IX B T_{CT} TABLE IX B

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7276	7413								
2	GH		4905.48	4997.85								
3	37.5GH		183,956	187,419								
4	P _c or P _n		2867.7	2878.7								
5	P _r		4.29	4.30								
6	T		591	592								
7	T _r		1.55	1.55								
8	Z		.804	.804								
9	P/Z P/Z	$\bar{4} \pm \bar{8}$	3566.8	3580.5								
10	P/TZ	$\bar{9} \pm \bar{6}$	6.0352	6.0481								
11	(P/TZ) ² /1000	($\bar{10}$) ² /1000	.036423	.036579								
12	L/H(F _r Q _m) ²		.000393	.000393								
13		$\bar{11} + \bar{12}$	.036816	.036972								
14	I _n	$\bar{10} \div \bar{13}$	163.927	163.584								
15	M=P _n -P _{n-1}		11									
16	N=I _n +I _{n-1}		327.511									
17	M x N	$\bar{15} \times \bar{16}$	3,603									
18	$\Sigma (M \times N)$	$\Sigma \bar{17}$	183,956	187,559								

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE PRESSURE (P_c & P_w))

Form C-122-E
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66
LOCATION: Unit 7413 H 7413 Section 2 Township 22S Range 23E
L 7413 H 7413 L/H 1.000 G .6742 % CO₂ 0 % N₂ 0 % H₂S 382
d Fr Om 0 M²cf/d (L/H) (F_rQ_m)² 0 P_{cr} 669 T_{cr} 382
TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7413	3706.5		0		Delta	P = 3 (37.5 GH)			
2	GH		4997.85	2498.92		0			I _s + 4 I ₁ + I ₂			
3	37.5GH		187,419	93,710		0			= 3 (187,419)			
4	P _c or P _n		2878.7	2595.7	2594.7	2310.7			165.341 + 657.612 + 165.355			
5	P _r		4.30	3.88	3.88	3.45			= 562,257			
6	T		592	565	565	538			988.308			
7	T _r		1.55	1.47	1.47	1.41						
8	Z		.804	.755	.755	.710						
9	P/Z P/Z	4.8	3580.5	3436.2	3436.7	3253.6			= 568.9			
10	P/TZ	9.6	6.0481	6.0818	6.0826	6.0476						
11	(P/TZ) ² /1000	(10) 2/1000							P _w = P _s - Delta P			
12	L/H(F _r Q _m) ²								= 2878.7 - 568.9			
13		11 + 12										
14	I _n	10 ÷ 13	165.341	164.425	164.403	165.355						
15	M = P _n - P _{n-1}		283	284	284				= 2309.8			
16	N = I _n + I _{n-1}		329.766	329.744	329.758							
17	M × N	15 × 16	93,647	93,651								
18	Σ (M × N)	Σ 17	187,419		93,772							

WORK SHEET FOR STEPWISE CALCULATION
(SUBSURFACE) PRESSURE (P_f & P_s)
~~(SURFACE) PRESSURE~~

Form C-122-E
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 H 7413 Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 % CO₂ .010105 % N₂ 669 % H₂S 382

d 1.995 F_i .01823 Q_m 5.514 M²-cfd (L/H) (F_i Q_m)² .010105 P_{cr} 669 T_{cr} 382

TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	3638		7276		Delta P = 3 (37.5 GH)				
2	GH		0	2452.74		4905.48		I _c + 4 I ₁ + I ₂				
3	37.5GH		0	91,978		183,956						
4	P _c or P _n		2164.2	2506.2	2509.2	2854.2	2860.2		= 3 (183,956)			
5	P _r		3.24	3.75	3.75	4.27	4.28		134.402 + 528.716 + 129.856			
6	T		540	566	566	591	591		= 551,868			
7	T _r		1.41	1.48	1.48	1.55	1.55		792.974			
8	Z		.709	.760	.760	.803	.804					
9	P/Z P/Z		3052.5	3299.4	3301.6	3554.4	3559.7		= 696.0			
10	P/TZ		9.6	5.8293	5.8332	6.0143	6.0231					
11	(P/TZ) ² /1000	(10) ² /1000	.031953	.033980	.034026	.036171	.036278		P _s = P _c + Delta P			
12	L/(H(F _i Q _m) ²)		.010105	.010105	.010105	.010105	.010105					
13			.042058	.044085	.044131	.046276	.046383		= 2164.2 + 696.0			
14	I _n		134.402	132.227	132.179	129.964	129.856					
15	M=P _n -P _{n-1}		342	345	345	351			= 2860.2			
16	N=I _n +I _{n-1}		266.629	266.581	262.144	262.035						
17	M x N	15 x 16	91,971	91,971		91,974						
18	Σ (M x N)	Σ 17	91,971			183,945						

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P_f & P_s)
~~SURFACE~~ ~~SURFACE~~

Form G-122-E
 Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 Section 2 Township 22S Range 23E

L. 7413 H. 7413 L/H 1.000 G. .6742 % CO₂ % N₂ % H₂S
 d 4.000 F_i 0042753 Q_m 5.514 M²cf/d (L/H) (F_iQ_m)² .000556 P_{cr} 669 T_{cr} 382
TABLE IX & X TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	7	8	9	10
1	H		7276	7413							
2	GH		4905.48	4997.85							
3	37.5GH		183,956	187,419							
4	P _c or P _n		2860.2	2871.2							
5	P _f		4.28	4.29							
6	T		591	592							
7	T _f		1.55	1.55							
8	Z		.804	.804							
9	P/Z P/Z	$\frac{4}{8}$	3559.7	3571.1							
10	P/TZ	$\frac{9}{6}$	6.0231	6.0323							
11	(P/TZ) ² /1000	$(\frac{10}{2})^2/1000$	.036278	.036389							
12	L/H(F _i Q _m) ²		.000556	.000556							
13		$\frac{11}{1} + \frac{12}{1}$	.036834	.036945							
14	I _n	$\frac{10}{13}$	165.520	163.278							
15	M=P _n -P _{n-1}		11								
16	N=I _n +I _{n-1}		328.798								
17	M x N	$\frac{15 \times 16}{1}$	3,617								
18	$\sum (M \times N)$	$\sum \frac{17}{1}$	183,956	187,573							

WORK SHEET FOR STEPWISE CALCULATION
(SUBSURFACE) PRESSURE (P_c & P_w)
(SURFACE)

Form C-122-E
Adopted 9-1-65

COMPANY Monsanto Company LEASE Conoco-State WELL NO. 1 DATE 6-21-66

LOCATION: Unit 7413 Section 2 Township 22S Range 23E

L 7413 H 7413 L/H 1.000 G .6742 %CO₂ 0 %N₂ 0 %H₂S 382

d 0 Fr 0 Q_m 0 M²cf/d (L/H) (F_rQ_m)² 0 P_{cr} 669 T_{cr} 382

TABLE IX B X TABLE IX B X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7413	3706.5		0		Delta P	(37.5 GH)			
2	GH		4997.85	2498.92		0		I _S + 4	I ₁ + I ₂			
3	37.5GH		187,419	93,710		0		= 3 (187,419)				
4	P _c or P _n		2871.2	2588.2	2589.2	2307.2		165.774 +	665.412 +	166.223		
5	P _r		4.29	3.87	3.87	3.45		= 562,257				
6	T		592	566	566	540		997.409				
7	T _r		1.55	1.48	1.48	1.41						
8	Z		.804	.761	.761	.710						
9	P/Z P/Z	4/8	3571.1	3401.1	3402.4	3248.7		= 3248.7				
10	P/TZ	9/6	6.0323	6.0089	6.0113	6.016		P _w = P _s + Delta P				
11	(P/TZ) ² /1000	(10) ² /1000										
12	L/H(F _r Q _m) ²							= 2871.2 -	563.7			
13		I ₁ + I ₂										
14	I _n	I ₀ + I ₃	165.774	166.420	166.353	166.223						
15	M = P _n - P _{n-1}		283	282	282	282		= 2307.5				
16	N = I _n + I _{n-1}		332.194	332.127	332.576							
17	M x N	I ₅ x I ₆	93,660	93,786								
18	Σ (M x N)	Σ I ₇	93,759									