| NULTI-POINT BACK PRESSURE TEST FOR GAS, WELLS 49         MULTI-POINT BACK PRESSURE TEST FOR GAS, WELLS 49         Hevised 12         Pool  |   |                   | a to be a state                                | NEW           | MEXICO                          | OIL CONS  | ERVATION   | COMMISSI   | IUN               |                                  | Form C-122      |
|--|---|-------------------|--|---------------|---------------------------------|---|--|--|-------------------|----------------------------------|-----------------|
| FOOL       Ensemt       Formation       S. Haversing Ocurty       Les         Initial       "z       Annual       Special       Date of Test 6-4-56         Company       Amorada Petroleun Corporation Lease       Weir       Weil       No.       4         Unit       Formation       Special       Purchaser       Postian Eastin Pipe Liue         Casing 6-5/8"       Mt. 20.0%       I.D. 6.099"       Set at 3615'       Perf. 2890'       To 3630'         Tubing 2.875"       Wt. 6.5%       I.D. 2.441"       Set at 3935'       Perf. 3932'       To 3935'         Gas Pay:       From 3430'       To 3620'       L 1904'       xG 0.672       TGL       Bar.Press. 13.4         Producing Thru:       Casing       Tubing       Type Well       Casend-G. Cor G. O. Dual         Date of Completion:       B-20-53       Packer       3649       Reservoir Temp.       B9         OBSERVED DATA       Type Taps       Pipe       Flow       Durat       OF       Single-Br. tenhead-G. G. or G. O. Dual         No.       (Line)       (Orifice)       Press.       Diff. Temp.       Press.       Temp.       Durat       OF         Size       Size       Sigl h, O'P.       psigl O'P.       psigl O'P. <t< td=""><td></td><td>144 H (1</td><td>, 1<br/>- , , , , , , , , , , , , , , , , , , ,</td><td>. Jaker</td><td></td><td></td><td>102</td><td></td><td>)</td><td></td><td></td></t<>   |   | 144 H (1          | , 1<br>- , , , , , , , , , , , , , , , , , , , | . Jaker       |                                 |   | 102  |  | )                 |                                  |                 |
| Pool   |   |                   | ,s <sup>-</sup>                                | MULTI-        | -POINT B.                       | ACK PRES  | SURE TES   | T FOR GAS  | WELLS A           |                                  | Revised in I >> |
| Company Amergala Petroleum Corporation Lease       Weir       Weil No.       4         Unit       Pesc. 35       Twp. 19-S       Rge. 36-E       Purchaser Permian Easin Pipe Line         Casing 6-5/8" Wt. 20.0% I.D. 6.099" Set at 3815' Perf. 2890'       To       3630'         Tubing 2.875" Wt. 6.5% I.D. 2.441" Set at 3935' Perf. 3932'       To       3935'         Gas Pay:       From 3430' To       3620'       1904' xG 0.672 _GL  | Pool  | Eumont            |  | Fc            | ormation                        | S. Rin  | rer s 19576  | een  | _County           | Les                              |                 |
| Company Amerada Petroleum Corporation Lease       Weir       Weil No.       4         Unit       F       Sec. 35       Twp.       19-S       Rge.       26-E       Purchaser       Permian Easin Pipe Line         Casing 6-5/8"       Wt. 20.0%       I.D. 6.099"       Set at 2815!       Perf.       2890!       To       3630!         Tubing 2.875"       Wt. 6.5%       I.D. 2.441"       Set at 3935!       Perf.       3932!       To       3935!         Gas Pay:       From 3430!       To       3620!       1 1904!       xG 0.672       GL       Bar.Press.       13.4         Producing Thru:       Casing       Tubing       Type Well Gage-011 Dual       Single-Br. tenhead-G. G. or C.O. Dual       Date of Completion:       8-20-53       Packer       3649       Reservoir Temp.       89°         OBSERVED DATA         Type Taps       Pipe         Flow Data       Tubing Data       Casing Data       0.6 (7.0 (7.0 (7.0 (7.0 (7.0 (7.0 (7.0 (7.0  | Initial   | <u> </u>          | Annua  | al            |                                 | Spec  | ial  |  | Date of           | Test_(                           | 5-4-56          |
| Unit       F       Sec. 35       Twp. 19-S       Rge. 36-S       Purchaser       Pormian Basin Pipe Line         Casing 6-5/8" Wt. 20.0%       I.D. 6.099" Set at 3815'       Perf. 2890'       To 3630'         Tubing 2,875" Wt. 6.5#       I.D. 2.441" Set at 3935'       Perf. 3932'       To 3935'         Gas Pay:       From 3430'       To 3620'       1904'       xG 0.672       GL       Bar.Press. 13,4         Producing Thru:       Casing       Tubing       Type Well Ges-011 Dual       Single-Br. tenhead-G. G. or G.O. Dual         Date of Completion:       8-20-53       Packer 3649       Reservoir Temp. 89         OBSERVED DATA         Type Taps Pipe         Plow Data       Tubing Data       Casing Data         (Prover)       (Choke)       Press.       Diff. Temp.       Press.       Temp.       Ourat         No.       (Line)       (Orifice)       Press.       Diff.       Temp.       Press.       Temp.       Ourat         Size       Size       psig       N.       97.       psig       27.       Hr.         Size       Size       psig       N.       75.       3056.0       24.       24.         A.       *       *<  |   |                   |  |               |                                 |   |  |  |                   |                                  |                 |
| Casing 6-5/8" Wt. 20.0% I.D. 6.099" Set at 38151 Perf. 28901 To 36301         Tubing 2.875" Wt. 6.5% I.D. 2.441" Set at 39351 Perf. 39321 To 39351         Gas Pay: From 34.301 To 36201 L 19041 xG 0.672 -GL Bar.Press. 13.4         Producing Thru: Casing I Tubing Type Well Gas-011 Dual         Single-Br. tenhead-G. G. or G.O. Dual         Date of Completion: 8-20-53 Packer 3649 Reservoir Temp. 89         OBSERVED DATA         Tested Through (Docean) (Otobers) (Meter)         Flow Data       Tubing Data Casing Data         No. (Line) (Orifice) Press. Diff. Temp. Press. Temp. Press. Temp. Or F.         Size       Size         Size       Size         Size       Size         Size       Size         No. (Line) (Orifice) Press. Diff. Temp. Press. Temp. Or F.         Size       Size         Size       Size         Size       Size         Size       Size         No. (Line) (Orifice) Press. Diff. Temp. Press. Temp. Press. Temp. Or F.         Size       Size         Size       Size         Size       Size         No. (Line) (Orifice) Press. Diff. Temp. Press. Temp. Press. Temp. Or F.         Size       Size         Size       Size         Size       Size         Size  |   |                   |  |               |                                 |   |  |  |                   |                                  |                 |
| Tubing 2.675" Wt. 6.5# I.D. 2.441" Set at 39351 Perf. 39321 To 39351       Form 34301 To 36201 L 19041 xG 0.672 GL Bar. Press. 13,4         Gas Pay: From 34301 To 36201 L 19041 xG 0.672 GL Bar. Press. 13,4       Froducing Thru: Casing Tubing Type Well Gea-Ofl Dual Single-Br. tenhead-G. G. or G.O. Dual Date of Completion: 8-20-53 Packer 3649 Reservoir Temp. 89         Date of Completion: 8-20-53 Packer 3649 Reservoir Temp. 89       Single-Br. tenhead-G. G. or G.O. Dual Date Of Completion: 8-20-53 Packer 3649 Reservoir Temp. 89         OBSERVED DATA         Toge 7 Pipe         OBSERVED DATA         Toge 7 Pipe         Pipe         OBSERVED DATA         Toge 7 Pipe         Pipe         OBSERVED DATA         Toge 7 Pipe         Pipe         Pipe         Pipe         Pipe         OBSERVED DATA         No. (Cline) (Choke) Press. Diff. Temp. Press. Temp. Press. Temp. Or Fig. 0 of F         Size Size psig h <sub>w</sub> °F. psig °F. Hr.         Size Size psig h <sub>w</sub> °F. psig °F. Pipe         Size Size Size Pig. No. (Choke) Press. Pig. No. (Choke) Press. Pig. Pig. Pig. Pig. Pig. Pig. Pig. Pig   |   | _                 |  |               |                                 |   |  |  |                   |                                  |                 |
| Gas Pay:       From <u>14301</u> To <u>36201</u> L <u>19041</u> xG <u>0.672</u> _GL Bar.Press. <u>13,1</u> Producing Thru:       Casing <u>x</u> Tubing Type Well <u>Gas-Oil Dual</u> Date of Completion: <u>8-20-53</u> Packer <u>3649</u> Reservoir Temp. <u>899</u> DESERVED DATA         Tope Well <u>Gas-Oil Dual</u> OBSERVED DATA         Tested Through ( <u>Broserov</u> ) ( <u>Meter</u> )         Type Taps Pipe         Plow Data  |   |                   |  |               |                                 |   |  |  |                   |                                  |                 |
| Producing Thru:Casing  | Tubing 2.87   | 5" Wt. 6          | 5 <u>,5</u> #_I.                               | .D. <u>2.</u> | 41" Set                         | t at <u>39</u>  | 9351 Pe:   | rf. <u>39</u> 2  | 321               | To                               | 39351           |
| Date of Completion:B-20-53Packer 3649Reservoir Temp.87OBSERVED DATATested Through (Bacagear) (Obobes) (Meter)Tubing DataCasing DataPlow DataTubing DataCasing DataNo.(Choke)Press.Diff. Temp.Press.Temp.Press.Tubing DataCasing DataNo.(Choke)Press.Diff. Temp.Press.Temp.Press.Temp.(Choke)Press.Diff.Temp.Press.Temp.Our at a star of press.No.(Choke)Press.Diff.Temp.Press.Temp.DuratOf FSize </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td>   |   |                   |  |               |                                 |   |  |  |                   | -                                |                 |
| Date of Completion:B-20-53Packer 3649Reservoir Temp.87OBSERVED DATATested Through (Bacagear) (Obobes) (Meter)Tubing DataCasing DataPlow DataTubing DataCasing DataNo.(Choke)Press.Diff. Temp.Press.Temp.Press.Tubing DataCasing DataNo.(Choke)Press.Diff. Temp.Press.Temp.Press.Temp.(Choke)Press.Diff.Temp.Press.Temp.Our at a star of press.No.(Choke)Press.Diff.Temp.Press.Temp.DuratOf FSize </td <td>Producing [</td> <td>Thru: Ca</td> <td>asing</td> <td>X</td> <td>Tut</td> <td>oing</td> <td>······</td> <td>Type We</td> <td>11</td> <td>11 Dual</td> <td></td>  | Producing [   | Thru: Ca          | asing  | X             | Tut                             | oing  | ······   | Type We  | 11                | 11 Dual                          |                 |
| $\begin{array}{c c} \mbox{Description} \mbo$   | Date of Com   | mpletion:         | 8-20-5   | 3             | Packer                          | 3649  | Sinį<br>)  | gle-Br. le<br>Reservo  | ir Temp.          | G. or G<br><b>89<sup>0</sup></b> | •0. Dual        |
| Tested Through(Browner)(Meter)Type TapsPipeFlow DataTubing DataCasing DataNo.(Line)(Orifice)Press.Diff. Temp.Press.Temp.Press.Temp.No.(Line)(Orifice)psighw $^{\circ}$ F.psig $^{\circ}$ F.psig $^{\circ}$ F.Hr.SizeSizepsighw $^{\circ}$ F.psig $^{\circ}$ F. $^{\circ}$ F.Hr.SizeSizepsighw $^{\circ}$ F.psig $^{\circ}$ F. $^{\circ}$ F.Hu2.4750459.46.008282823.024J.H473.120.0072788.324J.H473.120.0072788.324J.No.PressureFlow Temp.GravityCompress.Rate of FlNo.(24-Hour)VhwPfpsiaFlow Temp.FactorFgJ.73.1   |   | •                 | ببشير  |               |                                 |   |  |  | • -               |                                  |                 |
| Flow DataTubing DataCasing DataNo.(Choke)Press.Diff.Temp.Press.Temp.Press.Temp.DuratNo.(Line)(Orifice)psig $h_w$ $^{O}F.$ psig $^{O}F.$ psigpsigpsigpsigpsigpsigpsigpsigpsigpsigpsigpsigpsigpsigpsigpsigpsig <td>m+</td> <td></td> <td></td> <td></td> <td></td> <td>ODOLLA.</td> <td>ED DAIA</td> <td></td> <td></td> <td>_</td> <td></td>  | m+  |                   |  |               |                                 | ODOLLA.   | ED DAIA  |  |                   | _                                |                 |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $   | Tested Inro   |                   |  |               | (Meter)                         |   |  |  | Туре Тар          | s                                |                 |
| No.       (Line)<br>Size       (Orifice)<br>Size       psig       hw       OF.       psig       OF.       psig <td>(Prov</td> <td></td> <td></td> <td></td> <td>Diff</td> <td>Temp</td> <td></td> <td></td> <td></td> <td></td> <td>Duration</td>   | (Prov   |                   |  |               | Diff                            | Temp  |  |  |                   |                                  | Duration        |
| SI       342.4       71-3/4         1.       4"       2.750       459.4       6.0       82       823.0       24         2.       n       n       466.0       12.3       75       806.4       24         3.       n       n       466.0       12.3       75       806.4       24         3.       n       n       478.1       20.0       72       788.3       24         4.       n       500.0       32.8       72       756.0       24         5.       90.0       32.8       72       756.0       24         5.       90.0       32.8       72       756.0       24         5.       90.0       32.8       72       756.0       24         6.       91.00       91.00       92.0       92.0       92.0       92.0       92.0       92.0         1.       73.11       53.26       472.6       0.9795       0.9450       1.054       5438.43         3.       n       70.37       479.2       0.9887       n       1.055       7068.50         3.       n       99.26       91.3       0.9887       n  | No. (Lir  | ne) (Ori          | ifice)   |               |                                 |   |  | _  |                   |                                  | of Flow         |
| 1. $4^{m}$ 2.750       459.4       6.0       82       623.0       24         2.       m       m       466.0       12.3       75       306.4       24         3.       m       m       478.1       20.0       72       788.3       24         4.       m       m       500.0       32.8       72       756.0       24         5.       .       .       m       500.0       32.8       72       .       756.0       24         5.       .       .       .       m       500.0       32.8       72       .       756.0       24         5.       . <td></td> <td>2e 3</td> <td>Size</td> <td>psig</td> <td>h<sub>w</sub></td> <td>°F•</td> <td>psig</td> <td>°F.</td> <td></td> <td>F.</td> <td>······</td>   |   | 2e 3              | Size   | psig          | h <sub>w</sub>                  | °F•   | psig   | °F.  |                   | F.                               | ······          |
| 3.       #       473.1       20.0       72       785.3       24         4.       #       #       500.0       32.8       72       756.0       24         5.       FLOW CALCHEATIONS       Flow Temp.       7756.0       24         5.       FLOW CALCHEATIONS       Factor       Factor       9         No.       Coefficient       Pressure       Flow Temp.       Gravity       Compress.       Rate of Fl         Vo.       (24-Hour)       V       hwpf       psia       .       Ft       .       Fg       Fpv.       @ 15.025 p         1.       73.11       53.26       472.6       0.9795       0.9450       1.054       3292.64         2.       #       76.37       479.2       0.9859       #       1.054       5438.31         3.       #       99.26       491.3       0.9887       #       1.055       7068.30         4.       #       129.15       513.2       0.9837       #       1.056       9196.77         FRESSURE CALCU ATIONS         Freessure calcu Ations   | 1. <u>4</u> "   | 2.7               | 750  | 459.4         | 6.0                             | 82  |  |  |                   |                                  |                 |
| 4.       *       500.0       32.8       72       756.0       24         5.       FLOW CALCULATIONS         FLOW CALCULATIONS         No.       Coefficient       Pressure       Flow Temp. Gravity Compress. Rate of Fl         No. $(24-Hour)$ $\sqrt{h_w P_f}$ psia       . Ft       . Fg       Fpv.       @ 15.025 p         1.       73.11       53.26 $472.6$ 0.9795       0.9450       1.054       3292.64         2.       n       76.37 $479.2$ 0.9659       *       1.054       5438.51         3.       n       99.26 $491.3$ 0.9687       *       1.054       5438.51         4.       n       129.15       513.2       0.9637       *       1.056       9196/77         PRESSURE CALCULATIONS         PRESSURE CALCULATIONS         Specific Gravity Separator Gas f   | 2. H  |                   |  |               |                                 |   |  |  |                   | <u> </u>                         | 24              |
| FLOW CALCULATIONS         No.       Coefficient       Pressure       Flow Temp.       Gravity       Compress.       Rate of Fl         No. $(24-Hour)$ $\sqrt{h_w p_f}$ psia       . Ft       Fg       Fpv.       @ 15.025 p         1.       73.11       53.26       472.6       0.9795       0.9450       1.054       3292.64         2.       n       76.37       479.2       0.9859       n       1.054       5438.31         3.       n       99.26       491.3       0.9887       n       1.055       7068.30         4.       n       129.15       513.2       9.9837       n       1.056       9196/77         PRESSURE CALCULATIONS         Sas Liquid Hydrocarbon Ratio Dry Gas       cf/bbl.       Specific Gravity Separator Gas G   | 4. <b>n</b>   |                   |  | 500.0         | 32.8                            | 72  |  |  |                   |                                  | 21              |
| No.Coefficient<br>$(24-Hour)$ Pressure<br>$h_w p_f$ Flow Temp.<br>psiaGravity<br>FactorCompress.<br>FactorRate of Fl<br>Q-MCFPD1.73.1153.26472.60.97950.94501.0543292.642.#76.37479.20.9859#1.0543292.643.#99.26491.30.9887#1.0557068.304.#129.15513.20.9887#1.0569196/775.Specific Gravity Separator Gas C  | 5.1   |                   |  |               |                                 |   |  |  | 9                 |                                  | <u> </u>        |
| No. $(24-Hour)$ $\sqrt{h_w p_f}$ psia       Factor       Factor       Factor       Factor $Factor$   |   | <u> </u>          | ····   | /             |                                 | and the second se | the second s | the second s |                   |                                  |                 |
| 1.       73.11       53.26       472.6       0.9795       0.9450       1.054       3292.64         2.       n       76.37       479.2       0.9859       n       1.054       5438.81         3.       n       99.26       491.3       0.9887       n       1.055       7068.30         4.       n       129.15       513.2       0.9837       n       1.056       9196/77         5.         129.15       513.2       0.9837       n       1.056       9196/77         PRESSURE CALCULATIONS         Gr/bbl.   |   | licient           |  | Pressure      |                                 |   | - I  | Factor   | , -               | 1                                |                 |
| 2.       N       76:37       479:2       G. 9859       N       1.054       5438.81         3.       N       99:26       491.3       0.9887       N       1.055       7068.30         4.       N       129.15       513.2       0.9837       N       1.056       9196.77         5.       PRESSURE CALCULATIONS         Gras Liquid Hydrocarbon Ratio Dry Gas   |   |                   |  |               |                                 |   |  | Fg   | F <sub>pv</sub> . |                                  | @ 15.025 psia   |
| 3.         N         99.26         491.3         0.9387         N         1.055         7068.30           4.         N         129.15         513.2         0.9837         N         1.056         9196/77           5.         PRESSURE CALCULATIONS           PRESSURE CALCULATIONS           Gas Liquid Hydrocarbon Ratio Dry Gas cf/bbl.   | 2.  |                   |  |               |                                 |   |  |  |                   |                                  |                 |
| PRESSURE CALCULATIONS<br>Gas Liquid Hydrocarbon Ratio <u>Dry Gas</u> cf/bbl. Specific Gravity Separator Gas  | 3.  | n 99              |  | 26            | 491.3 0.98                      |   | 87 1   |  | 1.0               | 255                              | 7068.30         |
| Gas Liquid Hydrocarbon Ratio_D <b>ry Gas</b> cf/bbl. Specific Gravity Separator Gas  | 5.  |                   |  |               | 513.2                           | <u>0.988</u>  | 7  | <u></u>  | 1.0               | 56                               | 9196/77         |
| TAVILY OF LIQUID EVEROCATIONS 🗰 deg. Specific Gravity Flowing Fluid  |   |                   |  |               |                                 | cf/bbl.   | ALCULATIO  | Speci  |                   |                                  |                 |
| $r_{c}$ 1.041 $(1-e^{-5})$ .125 $P_{c}$ 855.6 $P_{c}^{2}$ 732.1  |   |                   |  |               | .125                            | deg.  |  |  |                   |                                  |                 |
|  |   |                   |  |               |                                 |   |  | <b>U</b>   |                   |                                  |                 |
| No. $\begin{array}{c c} P_{W} \\ P_{t} (psia) \end{array}$ $\begin{array}{c c} P_{t}^{2} \\ P_{t} (psia) \end{array}$ $\begin{array}{c c} P_{t}^{2} \\ P_{t} (psia) \end{array}$ $\begin{array}{c c} P_{t}^{2} \\ P_{c} P_{t}^{2} \end{array}$ $\begin{array}{c c} (F_{c}Q)^{2} \\ (I-e^{-s}) \end{array}$ $\begin{array}{c c} P_{W}^{2} \\ P_{w}^{2} \end{array}$ $\begin{array}{c c} P_{c}^{2} - P_{W}^{2} \\ P_{w} \end{array}$ $\begin{array}{c c} P_{W} \\ P_{w} \end{array}$ $\begin{array}{c c} P_{W} \\ P_{w} \end{array}$ $\begin{array}{c c} P_{W} \\ P_{c} \end{array}$ $\begin{array}{c c} P_{w} \\ P_{w} \end{array}$ $\begin{array}{c c} P_{w} \\ P_{c} \end{array}$ $\begin{array}{c c} P_{w} \\ P_{w} \end{array}$ $\begin{array}{c c} P_{w} \\ P_{c} \end{array}$ $\begin{array}{c c} P_{w} \\ P_{w} \end{array}$ $\begin{array}{c c} P_{w} \\ P_{c} \end{array}$ $\begin{array}{c c} P_{w} \\ P_{w} \end{array}$ $\begin{array}{c c} P_{w} \end{array}$ | No.   | sia) F            | Pt <sup>2</sup> Fc                             | Q             | (F <sub>c</sub> Q) <sup>2</sup> | (F<br>(1  | $\left[e^{Q}\right]^{2}$   | Pw2  | $P_c^2 - P_w^2$   | Ca                               | 1. Pw           |
| 1. 836.2 699.2 3.43 11.67 1.47 700.7 31.0 837.4 97.87  | 1. 836.   | 2 699             |  |               |                                 | 1.  | 47   |  |                   | 837.                             | 97.87           |
|  | and the second se |                   |  |               |                                 |   |  |  |                   |                                  |                 |
|  | 4. 769.   |                   |  |               |                                 |   |  |  | • · · ·           |                                  |                 |
| Absolute Potential:       39,000 MCFD       MCFPD; n       8.76         COMPANY       Amerada Petrolaum Corporation         ADDRESS       Drewer D - Monument, New Mexico         AGENT and TITLE       W. G. Abbett - Dist. Engineer       W.M. C. M.M.         WITNESSED   | Absolute Po<br>COMPANY<br>ADDRESS<br>AGENT and T<br>WITNESSED   | Amerada<br>Drawer | D - More<br>G. Abbel                           | tt - Di       | New Mex                         | l co<br>ineer   |  | abbi   |                   |                                  |                 |

REMARKS

## INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

## NOMENCLATURE

- Q  $\equiv$  Actual rate of flow at end of flow period at W. H. working pressure (P<sub>W</sub>). MCF/da. @ 15.025 psia and 60° F.
- P<sub>c</sub>I 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia
- P<sub>w</sub>: Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia
- Pt Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia
- Pf Meter pressure, psia.
- hw= Differential meter pressure, inches water.
- Fg= Gravity correction factor.

| Ft Flowing temperature correction factor.    |   | r | • |
|--|---|---|---|
| n <i>A</i>                                   |   | 4 | e |
| F <sub>pv</sub> Supercompressability factor. | N | F | 1 |

n \_ Slope of back pressure curve.

Note: If  $P_W$  cannot be taken because of manner of completion or condition of well, then  $P_W$  must be calculated by adding the pressure drop due to friction within the flow string to  $P_+$ .