Reservoir-Simulation Input Data

is a bilingual checklist of reservoir-simulation input data

The English version is based on a checklist provided by Ryder-Scott Company.

The Spanish version was developed by
Laine & Associates, Inc.
and
translated by Nestor Alirio Rivera

Reservoir simulation is a learning tool for better understanding oil and gas reservoir production.

This user guide is intended to report the status of the data-collection process.

The data-collection process draws input data from all relevant disciplines.

Data-collection delays can

1. Delay the simulation study (best outcome,) or

2. Nullify the simulation study (worst outcome.)

The data is often only available on paper.

Step one converts the hardcopy data into electronic form.

A computer is then used to re-format the data as required for the chosen simulation software.

The history-matching process calibrates the numerical model by resolving discrepancies between know performance results and simulated output.

The calibrated model is then used to predict future performance.

Laine & Associates, Inc. LICENSE AND WARRANTY NOTICE

LAINE & ASSOCIATES, INC. (Laine) LICENSES THIS SOFTWARE TO YOU ONLY UPON THE CONDITION THAT YOU ACCEPT ALL OF THE TERMS AND CONDITIONS CONTAINED IN THIS LICENSE AGREEMENT. PLEASE READ THESE TERMS CAREFULLY. IF YOU DO NOT AGREE TO THESE TERMS, PLEASE DESTROY THE DOCUMENT(S) YOU HAVE DOWNLOADED IMMEDIATELY.

The software and documents which accompany this license (Software) are the property of Laine or its licensors and is protected by copyright law. While Laine continues to own the Software, you will have certain rights to use the Software after your acceptance of this license.

Except as may be modified by a license addendum which accompanies this license, your rights and obligations with respect to the use of this Software are as follows:

YOU MAY:

(i) have limited permission to copy and distribute this Software, but only for non-profit, personal use, provided there is no charge, fee, etc. for said distribution, and further provided that all copyright marks and all references to Laine & Associates, Inc. and to www.EricLaine.com and to Eric Laine are included in the distribution;

(ii) agree that any decision to use some or all of the contents of this Software rests exclusively on your professional and competent judgment of the suitability of this Software for your intended purpose. Furthermore you understand and acknowledge that this Software was originally intended only to be useful to the author, and that you may experience difficulty understanding or using this Software; and,

(iii) use the Software on a network.

LIMITED WARRANTY:

Laine does not warrant that the Software will meet your requirements or that operation of the Software will be uninterrupted or that the Software will be error free. THIS SOFTWARE IS PROVIDED AS IS, WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF PERFORMANCE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY, OMISSIONS, COMPLETENESS, CURRENTNESS, AND NON-INFRINGEMENT. THE AUTHOR EXPRESSLY DISCLAIMS ANY REPRESENTATION OR WARRANTY, WHETHER WRITTEN OR ORAL, THAT THIS SOFTWARE WILL BE ERROR FREE OR UNAMBIGUOUS. YOU ACKNOWLEDGE THAT USE OF THIS SOFTWARE IS AT YOUR SOLE RISK, AND YOU AGREE THAT ANY INFORMATION, SERVICE OR PRODUCT, WHETHER BASED IN PART OR IN WHOLE ON THIS SOFTWARE, IS WITHOUT WARRANTY, EITHER EXPRESSED OR IMPLIED.

Laine & Associates, Inc. LICENSE AND WARRANTY NOTICE, continued

DISCLAIMER OF DAMAGES:

IN NO EVENT WILL LAINE BE LIABLE TO YOU FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT OR SIMILAR DAMAGES, INCLUDING ANY LOST PROFITS OR LOST DATA ARISING OUT OF THE USE OR INABILITY TO USE THE SOFTWARE, EVEN IF LAINE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. IN NO CASE SHALL LAINE'S LIABILITY EXCEED THE PURCHASE PRICE FOR THE SOFTWARE. THE DISCLAIMERS AND LIMITATIONS SET FORTH ABOVE WILL APPLY REGARDLESS OF WHETHER YOU ACCEPT THE SOFTWARE.

GENERAL:

The author has made a good faith effort to advise all vendors of the software used to develop this Software of his intention to share this Software with others. Those vendors have neither endorsed nor declined to endorse the contents of this Software.

Nothing in this Software will give you any right, title or interest in or to any of Laine's trademarks, trade names, service marks, insignia, labels or designs, or any of the same, except a mere privilege and license during its term, to display and use the same according to the foregoing limitations.

Any and all opinions found in this Software are of the author. The author reserves the right to modify any and all opinions as, if, and when new information is made available. Factual input, whether supportive and dissenting, is welcome. Your input will receive due consideration and will surely affect the author's future efforts. The author expresses advance appreciation for the time and effort you devote to your communications.

This is an agreement between you and the author regarding your use of this Software. You agree by your use or possession of any or all of this Software to the conditions and limitations of this agreement.

This agreement is an integral part of this Software. Failure to include this entire agreement in any and all distributions of this Software shall be a breach of this license agreement, and shall not sever, void, or nullify the meaning or the intention of this agreement.

This Agreement will be governed by the laws of the State of Texas. This Agreement may only by modified by a license addendum which accompanies this license or by a written document which has been signed by both you and Laine.

	A	B	C	D	E	F
1		Reservoir Simulation Data Check List			D=desirable data R=REQUIRED DATA	
2		Item		ck	Describe Source (Software, Format, Availability, etc.)	
3					1st preference: spreadsheets (diskette, e-mail, etc.)	
4		Well Name			2nd preference: ascii files (fixed-width columns or comma-separated-variables)	
5					3rd preference: other electronic files (diskette, e-mail, etc.)	
6	I.	GEOLOGY and GEOPHYSICS			4th preference: complete set of paper files	
7		either Top of Structure Map for top layer only*	R			
8		plus: Gross Thickness Map for each Pay Interval*	R			
9		plus: Net-to-Gross Map for each Pay Interval*	R			
10		or Top of Structure Map for each Pay Interval*	R			
11		plus: Net Thickness Map for each Pay Interval*	R			
12		Fault Locations	R			
13		Fluid Contacts [(water-oil & gas-oil) or (water-gas)]	R			
14		Well Logs (Original)	R			
15		Well Logs (Interpreted)	R			
16		Fault Sealing Factors	D			
17		Description of Depositional Environment / Features	D			
18		Description of Pay Continuity / Connectivity	D			
19		Core Data (Original)	D			
20		Core Data (Interpreted)	D			
21		Seismic Sections	D			
22		Original-in-Place Fluid Volumes	D			
23		Any Existing Reports and/or Documentation	D			
24						
25	II.	PETROPHYSICS				
26		Horiz. Permeability for each Pay Interval (maps desirable)	R			
27		Ratio Vertical to Horizontal Permeability	R			
28		Porosity for each Pay Interval (maps desirable)	R			
29		Connate Water Saturation for each Pay Interval	R			
30		Relative Permeability Curves for Main Rock Types	R			
31		Capillary Pressure Curves for Main Rock Types	D			
32		Information on Variability of Porosity and Permeability	D			
33		Any Existing Reports and/or Documentation	D			
34						
35						
36						
37		* Maps may be contour or mesh				
38						
39		page 1 of 2. English reservoir simulation data list originally prepared by Ryder Scott Company 31Mar00. Revised by Laine & Associates, Inc.				
40						

	A	B	C	D	E	F
42						
43						
44						
45		Well Name				
46						
47	IIIa.	FLUID PROPERTIES - BLACK OIL				
48		Tables (Bo, Bg, Rs, vis-o, vis-g)	R			
49		PVT Reports (CCE, DL, Separator)	D			
50		Any Existing Reports and/or Documentation	D			
51						
52	IIIb.	FLUID PROPERTIES - DRY GAS				
53		Specific gravity	R			
54		Any Existing Reports and/or Documentation	D			
55						
56	IIIc.	FLUID PROPERTIES - RETROGRADE, VOLATILE OIL, WET GAS				
57		Fluid Compositions	R			
58		PVT Reports (CCE, CVD, Swelling)	R			
59		Calculated separator & gas-plant products	R			
60		Equation of State	D			
61		Any Existing Reports and/or Documentation	D			
62						
63	IV.	WELL PERFORMANCE DATA				
64		Production and Injection Rates	R			
65		Completion Data and History	R			
66		Well Event History (Workovers, Downtime etc.)	R			
67		Well Trajectories / Coordinates	R			
68		Wellbore Diameter	R			
69		Static Bottom Hole Pressures	R			
70		Production and Injection Logs	D			
71		Tubing Head Pressures	D			
72		Shut In Casing Pressures	D			
73		Flowing Bottom Hole Pressures	D			
74		Known Damage/Stimulation Skin Factors	D			
75		Tubing Dimensions	D			
76		Vertical Lift Performance Tables (or Curves)	D			
77		Buildup, Drawdown, Drill-Stem Tests (original)	D			
78		Buildup, Drawdown, Drill-Stem Tests (interpreted)	D			
79						
80	V.	OTHER AVAILABLE DATA (describe)				
81		Reservoir Pressure History	R			
82						
83						
84		page 2 of 2. English reservoir simulation data list originally prepared by Ryder Scott Company 31Mar00. Revised by Laine & Associates, Inc.				
85						

	A	B	C	D	E	F
86						
87		Lista de datos de Simulación de Yacimientos			D=datos deseable R=DATOS REQUERIDO	
88		Descripción		ck	Descripción de la fuente de información (Programa, Formato, Disponibilidad, etc.)	
89					Primera preferencia: hojas de cálculo (discos, correo electrónico, etc.)	
90		Nombre de Pozo			Segunda preferencia: archivos ascii (columnas de ancho fijo o variables separados por comas	
91					Tercera preferencia: Otros archivos electrónicos (discos, correo electrónico, etc.)	
92	I.	GEOLOGIA Y GEOFISICA			Cuarta preferencia: Conjunto completo de archivos impresos en papel	
93		O: Mapa estructural del estrato superior, solamente	R			
94		mas: Mapa de espesores para cada intervalo productor	R			
95		mas: Mapa de relación neto/bruto para cada intervalo	R			
96		O: Mapa estructural de cada estrato	R			
97		mas: mapa de espesores netos para cada intervalo	R			
98		Mapa de Posición de fallas	R			
99		profundidad de contactos de los fluidos [(agua-aceite & aceite-gas) o (agua-gas)]	R			
100		Registros eléctricos (Originales)	R			
101		Registros eléctricos (Interpretados)	R			
102		factores de transmisibilidad de las fallas sellantes	D			
103		Descripción del ambiente deposicional /caracteristicas	D			
104		Descripción de la continuidad de los intervalos / Conectividad	D			
105		Datos de núcleos (corazones) (Originales)	D			
106		Datos de núcleos (corazones) (Interpretados)	D			
107		Secciones sismicas	D			
108		Volumen de fluidos originales	D			
109		Todos los archivos y documentos disponibles	D			
110						
111	II.	PETROFISICA				
112		Permeabilidad horizontal para cada zona productiva (deseable mapas)	R			
113		Relación de permeabilidad vertical a horizontal	R			
114		Porosidad para cada zona productiva (deseable mapas)	R			
115		Saturación de agua connata para cada arena productiva	R			
116		Curvas de permeabilidad relativa para los principales tipos de roca	R			
117		Curvas de presión capilar para los principales tipos de roca	D			
118		Información sobre la variabilidad de la permeabilidad y porosidad	D			
119		Todos los archivos y documentos disponibles	D			
120						
121		* Los mapas pueden ser de contornos o rejillas			Translated by Nestor Alirio Rivera	
122						
123		páginma 1 de 2. La lista de datos de simulación de yacimientos original en inglés fue preparada por Ryder Scott Company 31Mar00. Revisada por Laine & Associates, Inc.				
124						

	A	B	C	D	E	F
126						
127		Nombre de Pozo				
128						
129	IIIa.	PROPIEDADES DE FLUIDOS - PETROLEO NEGRO				
130		Tablas (Bo, Bg, Rs, vis-o, vis-g)	R			
131		Reportes PVT (CCE, DL, Separador)	D			
132		Todos archivos y / u documentos	D			
133						
134	IIIb.	PROPIEDADES DE FLUIDOS - GAS SECO				
135		Gravedad específica	R			
136		Todos los archivos y documentos disponibles	D			
137						
138	IIIc.	PROPIEDADES DE FLUIDOS - GAS CONDENSADO, ACEITE VOLATIL, GAS HUMEDO				
139		Composiciones de fluidos	R			
140		Reportes PVT(CCE, CVD, Hichamiento)	R			
141		Cálculos de separador y productos de planta de gas	R			
142		Ecuación de estado	D			
143		Todos los archivos y documentos disponibles	D			
144						
145	IV.	DATOS DE POZOS				
146		Tasas de inyección y producción	R			
147		Historia de completamientos	R			
148		Historia de eventos (trabajos de rehabilitación, cierres de pozos)	R			
149		Trayectorias y coordenadas de los pozos	R			
150		Diámetros de los pozos	R			
151		Presiones estáticas de fondo	R			
152		registros de producción y de inyección	D			
153		presiones de tuberia en superficie	D			
154		Presiones de cierre en el revestimiento	D			
155		Presión de flujo en fondo	D			
156		Factores de daño y/o estimulación	D			
157		Dimensiones de las tuberia de producción	D			
158		Tablas de flujo vertical - (o curvas)	D			
159		Datos originales de cierres, flujos y pruebas en hueco abierto	D			
160		Datos Interpretados de cierres, flujos y pruebas en hueco abierto	D			
161		Todos los archivos y documentos disponibles	D			
162						
163	V.	OTROS DATOS DISPONIBLES (DESCRIBIRLOS)				
164		Historia de presiones del yacimiento	R			
165						
166		página 2 de 2. La lista de datos de simulación de yacimientos original en inglés fue preparada por Ryder Scott Company 31Mar00. Revisada por Laine & Associates, Inc.				
167					Translated by Nestor Alirio Rivera	

Reservoir simulation is a learning tool for better understanding oil and gas reservoir production.

This user guide is intended to report the status of the data-collection process.

The data-collection process draws input data from all relevant disciplines.

Data-collection delays can

1. Delay the simulation study (best outcome,) or

2. Nullify the simulation study (worst outcome.)

The data is often only available on paper.

Step one converts the hardcopy data into electronic form.

A computer is then used to re-format the data as required for the chosen simulation software.

The history-matching process calibrates the numerical model by resolving discrepancies between know performance results and simulated output.

The calibrated model is then used to predict future performance.