**THE CWLS LOG ANALYSIS EXAMPLE BOOK  
 – A PREVIEW**E. R. Crain, P.Eng  
CWLS Publications Chairman

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The CWLS Log Analysis Example Book is an ambitious project by the CWLS to provide examples of high quality log analysis for use by the oil and gas industry in Canada. The Handbook is intended to illustrate modern log evaluation methods, using computers and hand calculators, along with core, drill stem test, hydrocarbon mud log and production data. We hope that such examples will demonstrate the utility of log analysis in general, the wide range of methods available, and the accuracy of volumetric predictions made from log data. The project will be funded by the Corporate members fees and their contributions to date are sincerely appreciated.

The examples contained here are meant to illustrate the format of the book, and to encourage CWLS members to contribute worked examples for inclusion in the Handbook. Blank forms are available from the author, who is Chairman of the Handbook Sub-committee.

To date, some 25 examples have been completely or partially prepared. However, many more examples are needed as those created to date rely heavily on the authors own methodology. We would hope for a better balanced set of examples than this.

Publication of this Handbook was meant to coincide, both in timing and content with a companion volume of Oil and Gas Fields of Canada, to be created by the Canadian Society of Petroleum Geologists. Neither our Handbook nor the CSPG volume are on schedule, so we have elected to proceed separately until sufficient material is available for both projects to warrant further co-operation. We believe that ultimately the two companion volumes will be an ongoing effort, with new material and updates being provided by both societies at regular intervals.

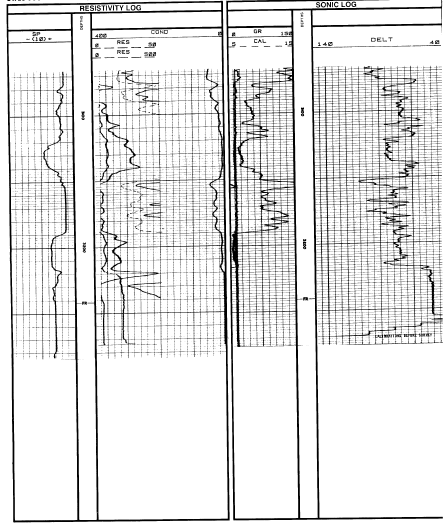
The expected publication date for the first 50 examples, in a loose leaf binder is the fall of 1983. Please consider contributing some examples from your own stock of interesting wells.  
  
Three examples are included below.

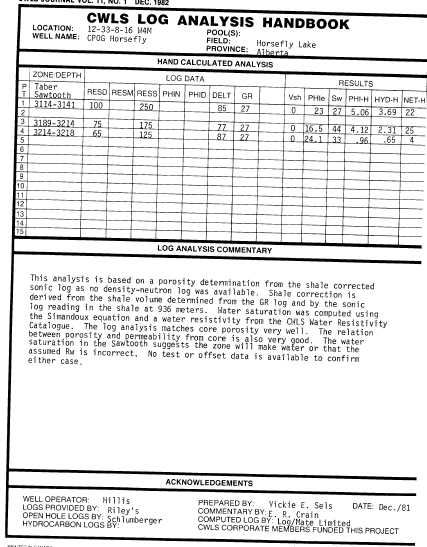
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CWLS LOG ANALYSIS HANDBOOK | | | | | | | | |
| LOCATION:  WELL NAME: | | | | | POOL(S):  FIELD:  PROVINCE: | | | |
| LOGS AVAILABLE | | | | | CORE AVAILABLE | | | |
|  | Type | | Interval |  | Interval |  | Recovery |  |
| 1 | Borehole Comp. Sonic | | 345-3244 | |  |  |  |  |
| 2 | Induction Electric | | 345-3244 | |  |  |  |  |
| 3 |  | |  | |  |  |  |  |
| 4 |  | |  | |  |  |  |  |
| 5 |  | |  | |  |  |  |  |
| 6 |  | |  | |  |  |  |  |
| LOG INTERPRETATION CONSTANTS | | | | | | | | |
| Depth | 3070-3230 |  |  |  | Depth |  |  |  |
| Rw @ 25oC | 0.500 | RHOma | 2.65 |  | Rw @ 25oC |  | RHOma |  |
| Rw @ FT | 0.397 | DELTma | 55.00 |  | Rw @ FT |  | DELTma |  |
| Rsh @ FT | 8.0 | RHOw | 1.00 |  | Rsh @ FT |  | RHOw |  |
| Rwb @ FT | 2.0 | DELTw | 188 |  | Rwb @ FT |  | DELTw |  |
| A | .620 | PHINsh | 30 |  | a |  | PHINsh |  |
| M | 2.150 | PHIDsh | 0 |  | M |  | PHIDsh |  |
| N | 2.000 | DELTsh | 95 |  | N |  | DELTsh |  |
| FT | 97.8 | Cp | 100 |  | FT |  | Cp |  |
| DST INFORMATION | | | | | | | | |
| UNITS: | * ENGLISH | | * METRIC | | UNITS: | * ENGLISH | * METRIC | |
| DST # |  | None |  |  | DST # |  |  |  |
| Interval |  |  |  |  | Interval |  |  |  |
| IHP |  |  |  |  | IHP |  |  |  |
| Preflow |  | ( min) |  |  | Preflow |  | ( min) |  |
| ISIP |  | ( min) |  |  | ISIP |  | ( min) |  |
| VO |  | ( min) |  |  | VO |  | ( min) |  |
| FSIP |  | ( min) |  |  | FSIP |  | ( min) |  |
| FHP |  |  |  |  | FHP |  |  |  |
| Recovery: |  |  |  |  | Recovery: |  |  |  |
| Comments: |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| PRODUCTION TEST RESULTS | | | | | | | | |
| PERF #1: 3121-3127  3 shots per foot  Frac. | | | | | | | | |

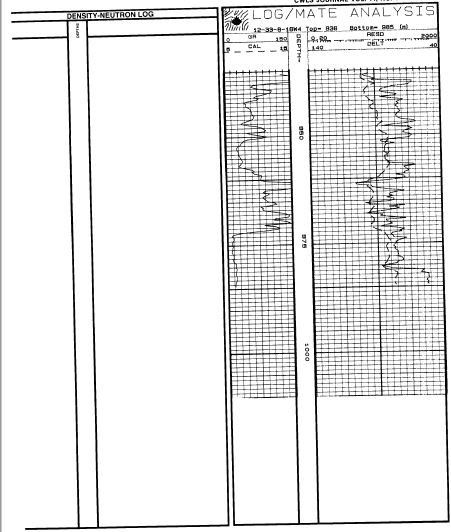
RESULTS OF THE STUDY

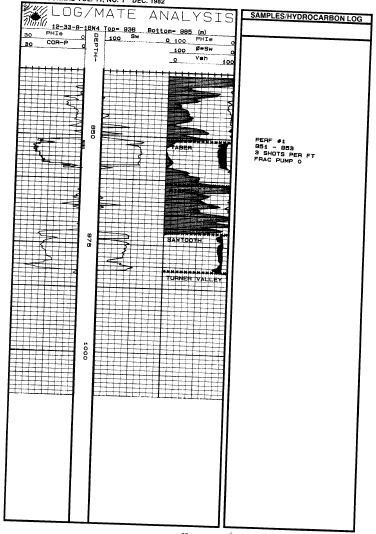
|  |  |  |
| --- | --- | --- |
| Formation Name | # Zones | Avg Net  Pay-Meters |
| Belly River | 1 | 8.5 |
| Bad Heart | 15 | 2.0 |
| Cardium | 35 |  |
| Dunvegan | 22 |  |
| Shaftesbury | 1 |  |
| Paddy/Cadotte | 35 |  |
| Spirit River | 30 |  |
| Bluesky/Gething | 31 |  |
| Cadomin | 17 |  |
| Nikanassin | 7 |  |
| Rock Creek/Nordegg | 6 |  |
| Total | 200 |  |
| Average Per Well | 4.9 | 58.8 |

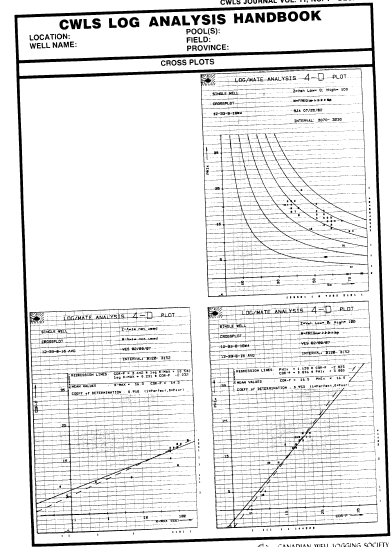
CONCLUSIONS



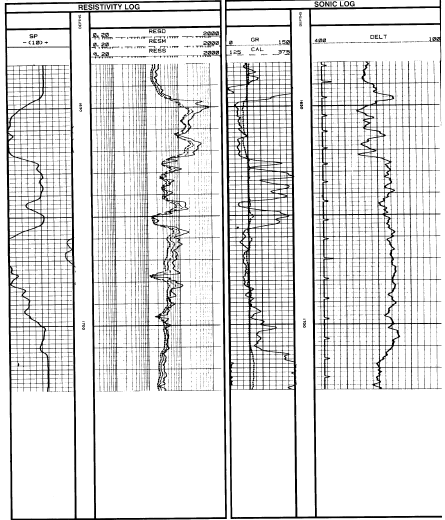


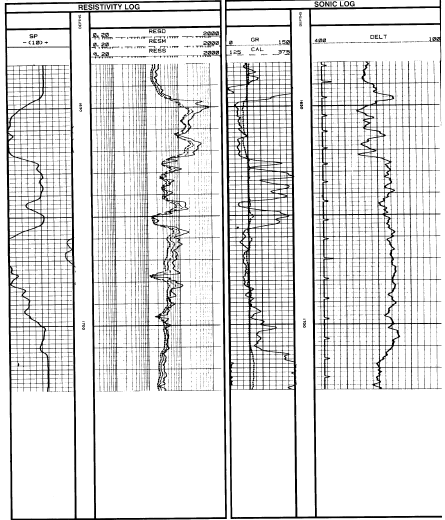


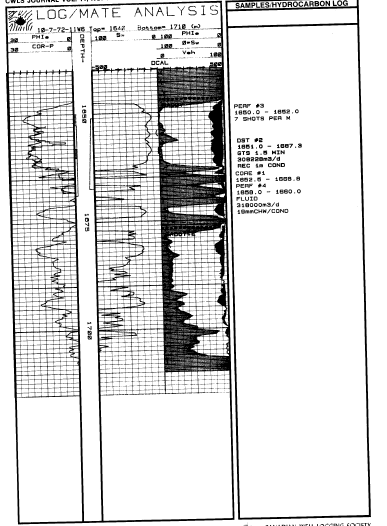


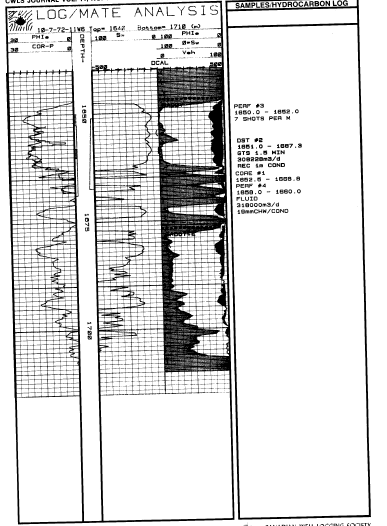


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| CWLS LOG ANALYSIS HANDBOOK | | | | | | | | |
| LOCATION: Dome Total Goodfare  WELL NAME: 10-7-72-11W6 | | | | | POOL(S): Paddy Cadotte  FIELD: Goodfare  PROVINCE: Alberta | | | |
| LOGS AVAILABLE | | | | | CORE AVAILABLE | | | |
|  | Type | | Interval |  | Interval |  | Recovery |  |
| 1 | DIL/SFL | | 230-2037 | | 1851-1867.3 |  | 16.3m |  |
| 2 | BHCS-GR | | “ | |  |  |  |  |
| 3 | CNL/FDC-GR | | “ | |  |  |  |  |
| 4 |  | |  | |  |  |  |  |
| 5 |  | |  | |  |  |  |  |
| 6 |  | |  | |  |  |  |  |
| LOG INTERPRETATION CONSTANTS | | | | | | | | |
| Depth | 1640-1710 |  |  |  | Depth n/a |  |  |  |
| Rw @ 25oC | -- | RHOma | 1690 |  | Rw @ 25oC |  | RHOma |  |
| Rw @ FT | 0.197 | DELTma | 180 |  | Rw @ FT |  | DELTma |  |
| Rsh @ FT | 20 | RHOw | 1000 |  | Rsh @ FT |  | RHOw |  |
| Rwb @ FT | -- | DELTw | 616 |  | Rwb @ FT |  | DELTw |  |
| A | 0.62 | PHINsh | 27 |  | a |  | PHINsh |  |
| M | 2.15 | PHIDsh | 2 |  | M |  | PHIDsh |  |
| N | 2.00 | DELTsh | 252 |  | N |  | DELTsh |  |
| FT | 62 | Cp | 1.0 |  | FT |  | Cp |  |
| DST INFORMATION | | | | | | | | |
| UNITS: | * ENGLISH | | X METRIC | | UNITS: | * ENGLISH | * METRIC | |
| DST # | 2 |  |  |  | DST # | n/a |  |  |
| Interval | 1651.0 – 1667.3 | |  |  | Interval |  |  |  |
| IHP |  |  |  |  | IHP |  |  |  |
| Preflow |  | ( min) |  |  | Preflow |  | ( min) |  |
| ISIP |  | ( min) |  |  | ISIP |  | ( min) |  |
| VO |  | ( min) |  |  | VO |  | ( min) |  |
| FSIP |  | ( min) |  |  | FSIP |  | ( min) |  |
| FHP |  |  |  |  | FHP |  |  |  |
| Recovery: | CST 1.5 Min@ 308, 228 m3/dlm condensate | | | | Recovery: |  |  |  |
| Comments: |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| PRODUCTION TEST RESULTS | | | | | | | | |
| GAS WELL | | | | | | | | |









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| --- | --- |
| CWLS LOG ANALYSIS HANDBOOK | |
| LOCATION:  WELL NAME: | POOL(S):  FIELD:  PROVINCE: |
| HAND CALCULATED ANALYSIS | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ZONE/ DEPTH | LOG DATA | | | | | | | RESULTS | | | | | |
| PT | Paddy/ Cadotte | RESD | RESM | RESS | PHIN | PHID | DELT | GR | VSH | PHIe | Sw | PHI-H | HYD-H | NET-H |
| 1 | 1649-1653 | 175 | 200 | 400 | 11 | 24 | 280 | 22 | 0 | 19 | 18 | .76 | .62 | 4 |
| 2 | 1653-1656 | 150 | 150 | 300 | 15 | 18 | 280 | 30 | 6 | 16 | 23 | .48 | .37 | 3 |
| 3 | 1656-1663 | 175 | 225 | 400 | 12 | 20 | 280 | 25 | 2 | 16 | 21 | .96 | .76 | 6 |
| 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 | 1672-1674 | 80 | 120 | 260 | 10 | 17 | 240 | 29 | 5 | 13 | 38 | .26 | .16 | 2 |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 | 1680-1683 | 45 | 65 | 100 | 9 | 19 | 220 | 32 | 7 | 14 | 47 | .42 | .22 | 3 |
| 8 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9 | 1685-1688 | 33 | 43 | 60 | 12 | 8 | 215 | 38 | 12 | 8.3 | 94 | .36 | .02 | 0 |
| 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11 | 1693-1694 | 40 | 48 | 60 | 11 | 16 | 228 | 45 | 18 | 12.0 | 58 | .18 | .08 | 1 |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13 | Net Pay Calculated using 0 = 9 SW = 60 | | | | |  |  |  |  |  |  |  |  |  |
| 14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| LOG ANALYSIS COMMENTARY | | | | | | | | | | | | | | |
| The interval is typical of the best Paddy/Cadotte intervals in the Deep Basin area of Alberta. Density-Neutron log crossover due to gas is present, and rough hole conditions invalidate the density log in a few places. The Gamma Ray and Density-Neutron separation are good shale indicators, as in the SP except for the rounded derived from the density-neutron crossplot, and matches core if the density log is offset by a matrix value of 2690 Kg/m3 instead of the more usual 2650 value used in most sands. This is true for many sands in the deeper and older Cretaceous section including the Basal Quartz further south in Alberta. Water saturation can be calculated from the Simandoux or Dual Water method with fair reliability, using a water resistivity of 0.20 at formation temperature (this is an “area average” for the zone. The higher saturations in the Cadotte reflect the finer grained, higher clay content of the sand. | | | | | | | | | | | | | | |
| ACKNOWLEDGEMENTS | | | | | | | | | | | | | | |
| WELL OPERATOR: Dome Petroleum Ltd. PREPARED BY: E.R. Crain / V. Sels Date: 15/09/82  LOGS PROVIDED BY: Riley’s Data Share COMMENTARY BY: E.R. Crain  OPEN HOLE LOGS BY : Schlumberger COMPUTED LOG BY: Log/Mate Limited  HYDROCARBON LOGS BY: n/a CWLS CORPORATE MEMBERS FUNDED THIS PROJECT | | | | | | | | | | | | | | |