



dig
Dolan Integration Group

Geochemistry for Energy

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p: 303.531.2030

**Hydrocarbon Gas Composition and Stable Isotopes
Data and Interpretation**

Job #: 240912516
Lab #: DIG-037188
Client: Olsson
Well Name: SCMW_092624
API #:

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| SAMPLE INFORMATION | | | | | | COMPLETE GAS ANALYSIS | | | | | | | | | | | | | | | | HYDROCARBON GAS ANALYSIS (normalized to total HC content) | | | | | | | | | | BTU CONTENT* | |
|--------------------|------------|-----------------|-------------|-------------|-------------|-----------------------|--------------------|-------------------------|---------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|---------------------|----------------------|-----------------------------------|--------|--------------------|---------------------|---|---------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|------------------------------|--|--|--------------|--|
| Job Number | Lab Number | Well Name | Sample Type | Sample Date | Sample Time | GC Date | N ₂ ppm | O ₂ + Ar ppm | CO ₂ ppm | C ₁ ppm | C ₂ ppm | C ₃ ppm | iC ₄ ppm | nC ₄ ppm | iC ₅ ppm | nC ₅ ppm | C ₆ + ppm | C ₂ H ₄ ppm | He ppm | H ₂ ppm | C ₁ mol% | C ₂ mol% | C ₃ mol% | iC ₄ mol% | nC ₄ mol% | iC ₅ mol% | nC ₅ mol% | C ₆ + mol% | Total Gas BTU/R ³ | | | | |
| 240912516 | DIG-037188 | SCMW_092624 Gas | Gas | 09/26/24 | 10:30 | 10/4/2024 | 409495 | 108635 | 1385 | 372603 | 58789 | 25511 | 3425 | 6348 | 1373 | 974 | 199 | | | 41270 | 79.4 | 12.53 | 5.44 | 0.73 | 1.35 | 0.29 | 0.21 | 0.04 | 594 | | | | |

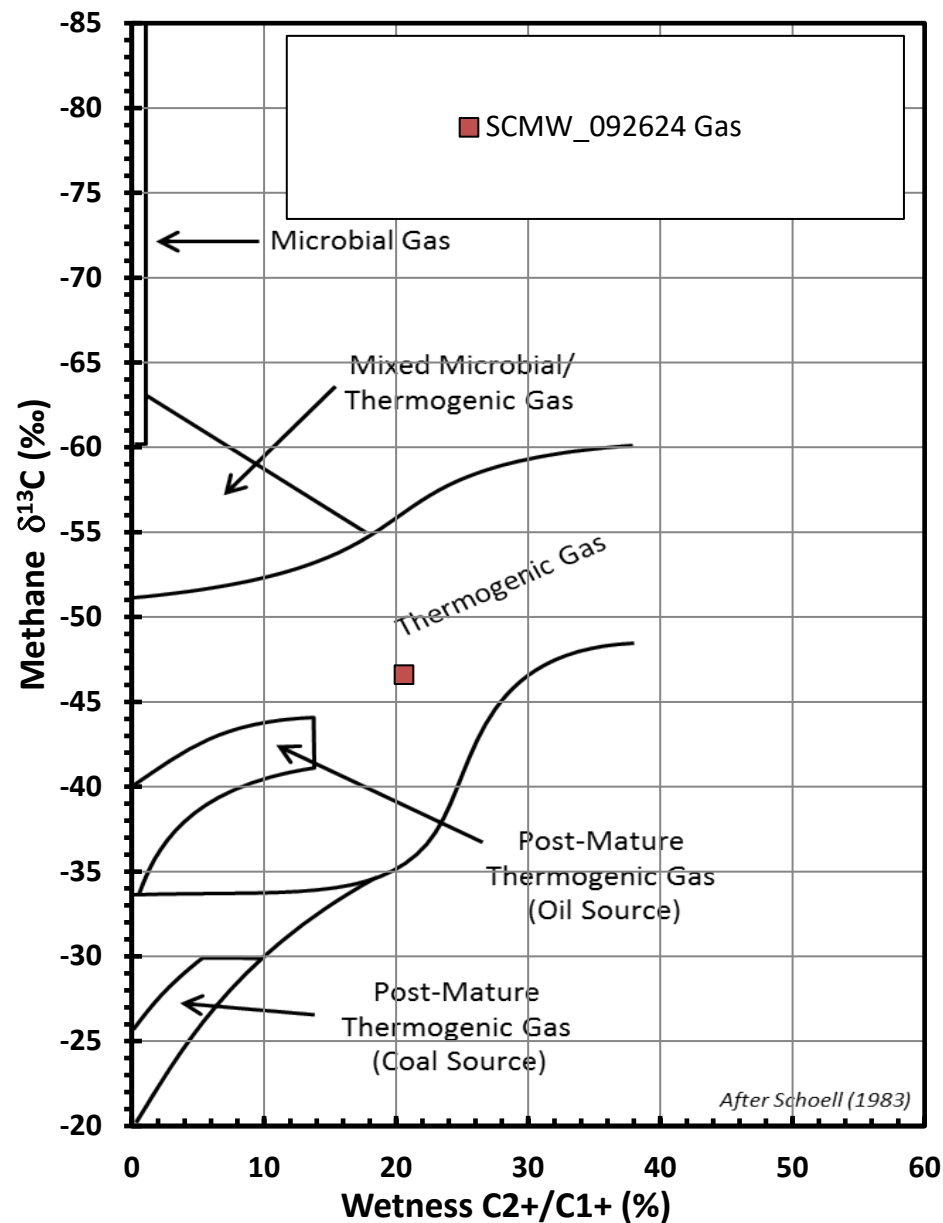
| SAMPLE INFORMATION | | | | | | HYDROCARBON RATIOS | | | | STABLE ISOTOPE ANALYSIS | | | | | | | | | | | |
|--------------------|------------|-----------------|-------------|-------------|-------------|--------------------|--|--|--|-------------------------|---------------------------------------|---------------------------------------|---------------------------------------|--|--|--|--|--|------------|----------|--|
| Job Number | Lab Number | Well Name | Sample Type | Sample Date | Sample Time | Total HC ppm | Wetness % C ₂ to C ₆ | C ₁ /C ₂ +C ₃ mol/mol | Balance Ratio C ₁ +C ₂ /C ₃ -C ₅ | Mass Spec Date | δ ¹³ C ₁ ‰ VPDB | δ ¹³ C ₂ ‰ VPDB | δ ¹³ C ₃ ‰ VPDB | δ ¹³ iC ₄ ‰ VPDB | δ ¹³ nC ₄ ‰ VPDB | δ ¹³ iC ₅ ‰ VPDB | δ ¹³ nC ₅ ‰ VPDB | δ ¹³ CO ₂ ‰ VPDB | δD ‰ VSMOW | Comments | |
| 240912516 | DIG-037188 | SCMW_092624 Gas | Gas | 09/26/24 | 10:30 | 469222 | 20.6 | 4.4 | 11.5 | 10/5/2024 | -46.6 | -32.5 | -28.9 | | -27.2 | | | | | -257 | |

Stable isotope results based on multi-point laboratory calibration
Values in red represent low signal; interpret with caution
Precision δ13C < 0.5 ‰
Precision δD < 5 ‰
* As ideal gas, with gas concentrations normalized to 100%;
caculations based on GPA 2145-09 physical constants.

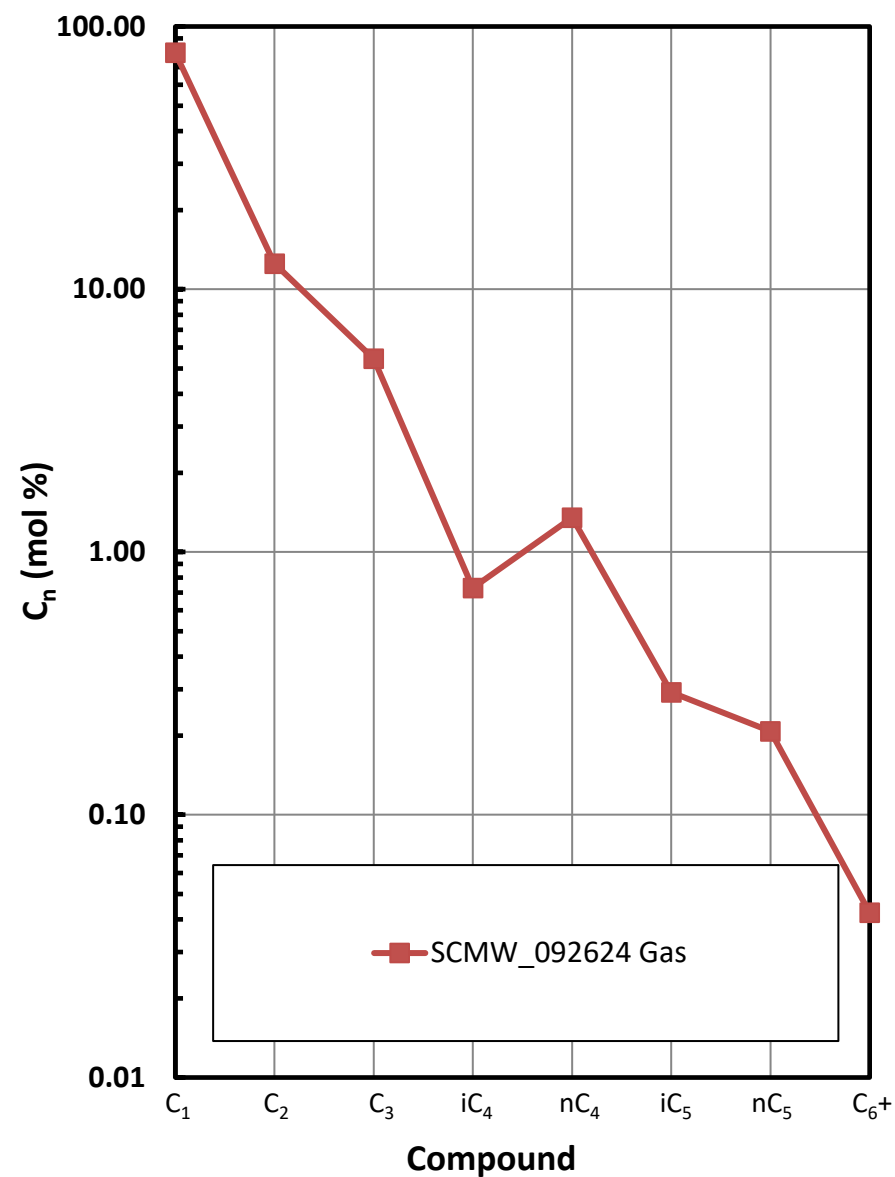
| SPECIFIC GRAVITY* | |
|---------------------|--------------------|
| Total Gas Spec Grav | HCs only Spec Grav |
| 0.860 | 0.708 |

INTERPRETIVE PLOTS

Methane $\delta^{13}\text{C}$ vs Wetness Genetic Classification Plot

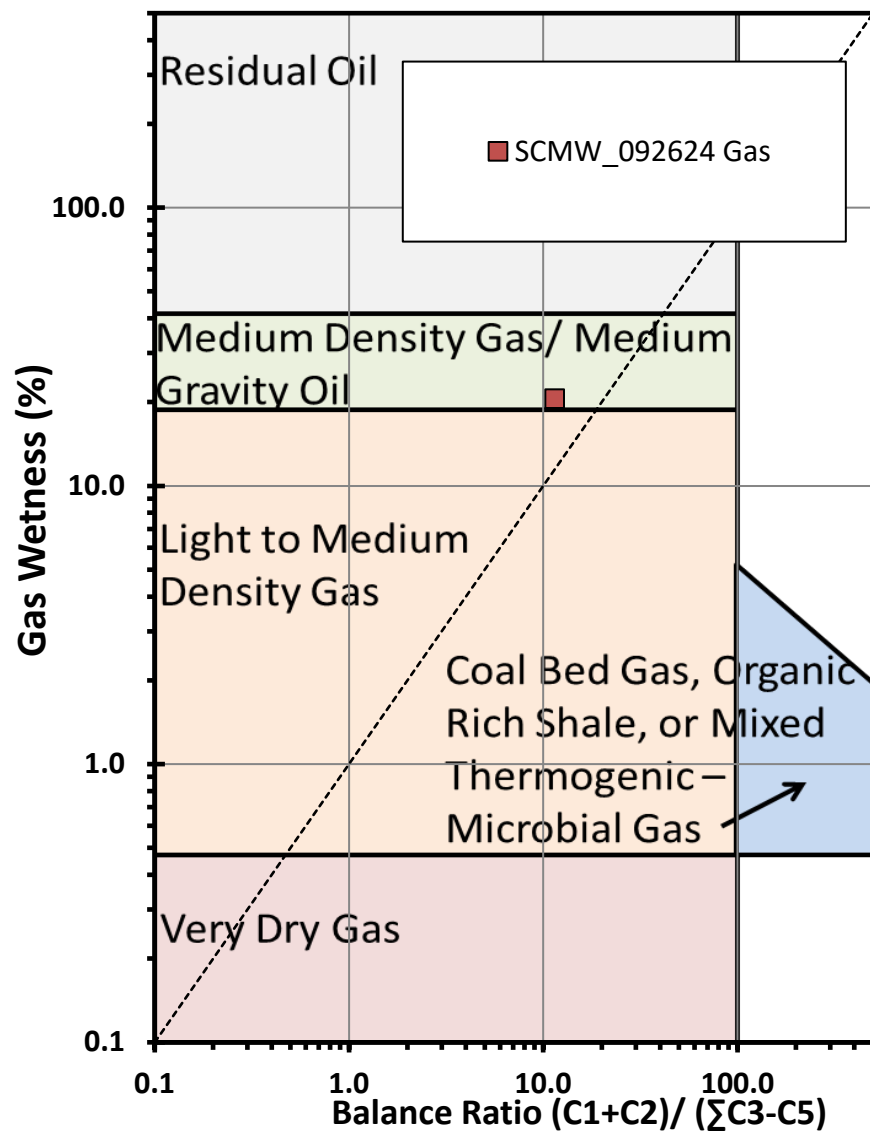


Hydrocarbon Composition Plot

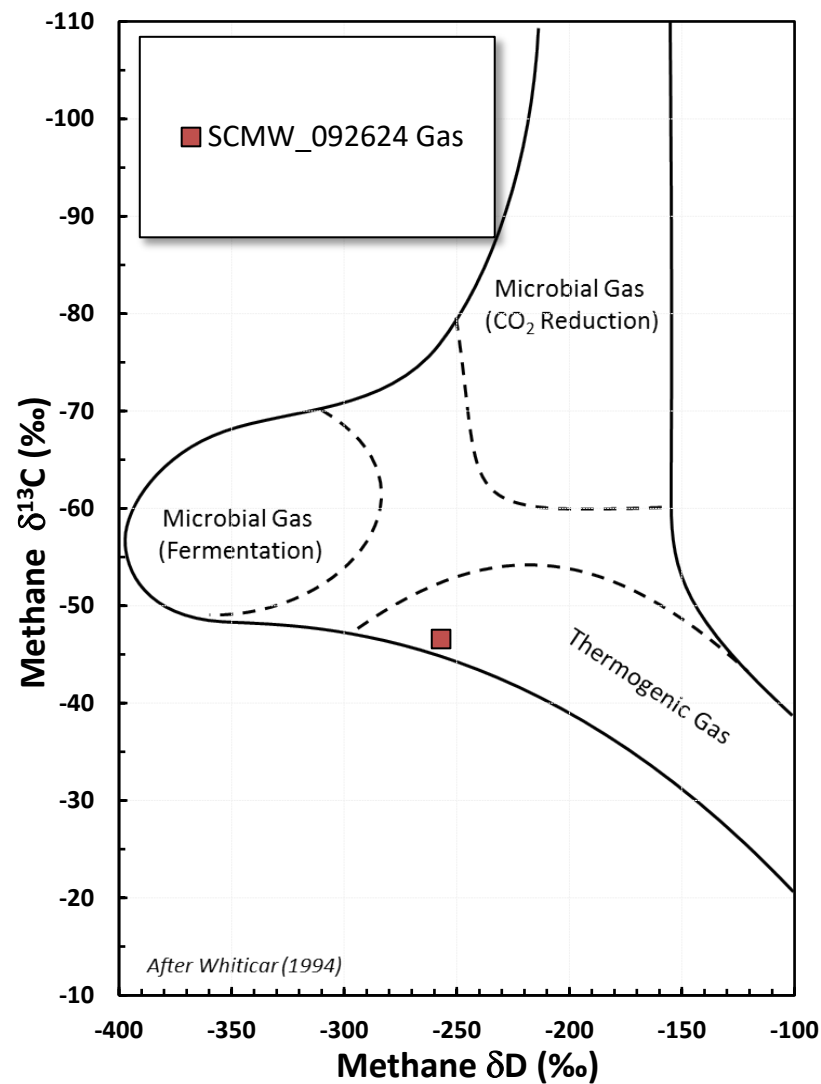


INTERPRETIVE PLOTS

Haworth Ratio Plot - Characterization of Hydrocarbon Type

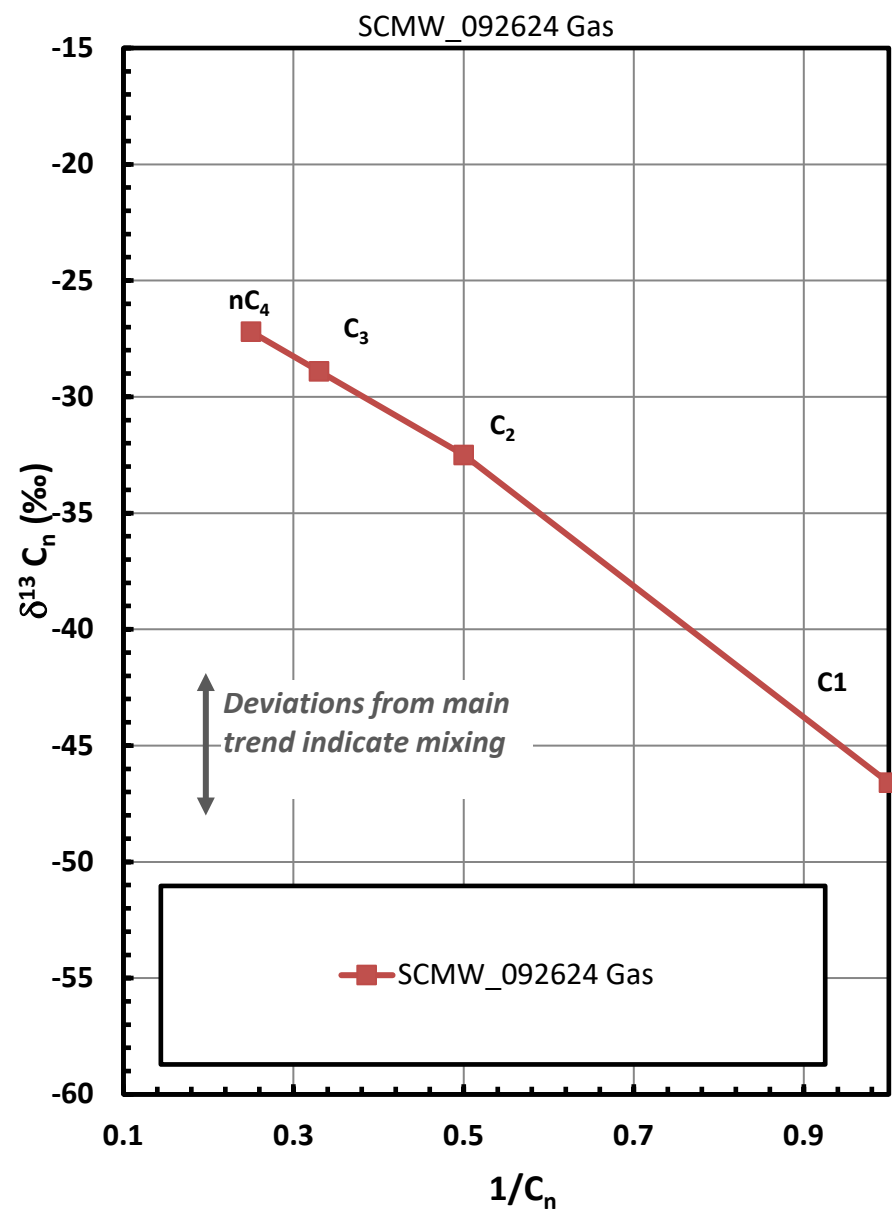


Methane $\delta^{13}C$ vs δD Genetic Classification Plot

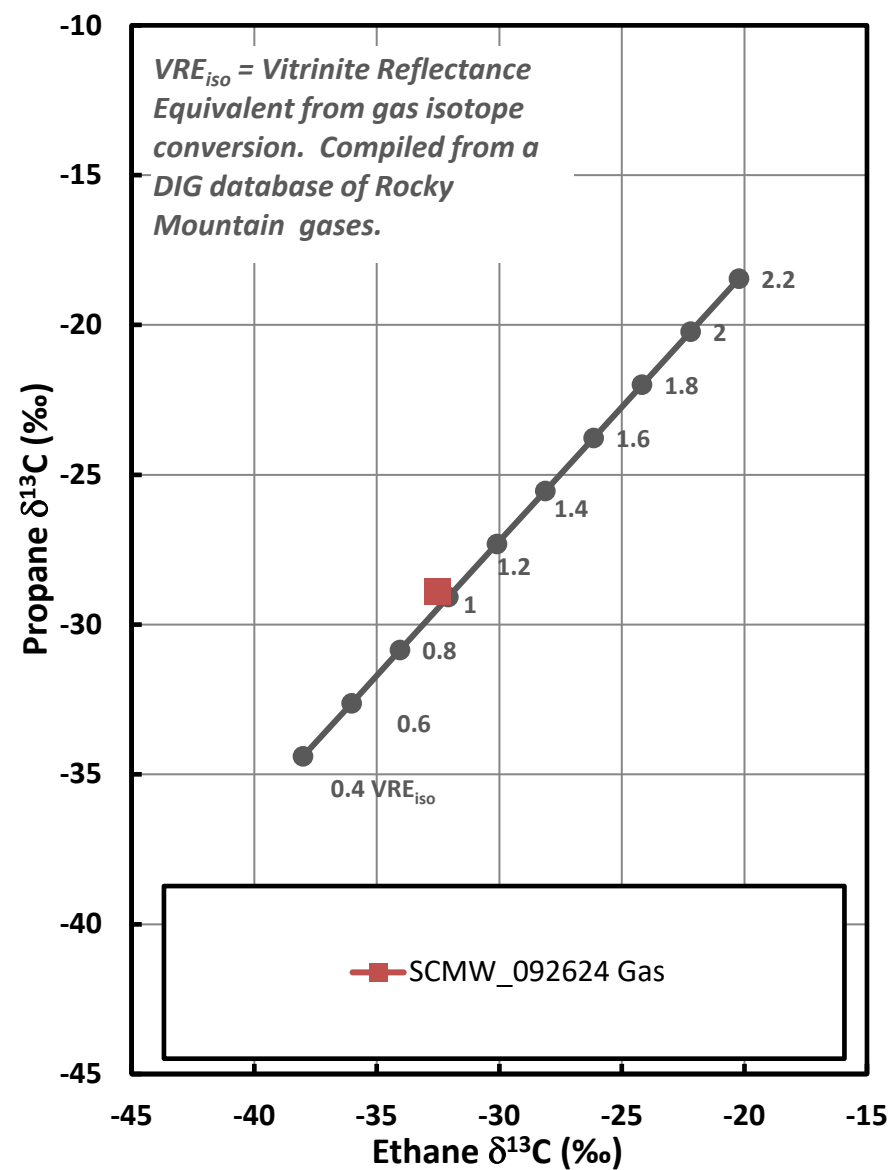


INTERPRETIVE PLOTS

Mixing Plot

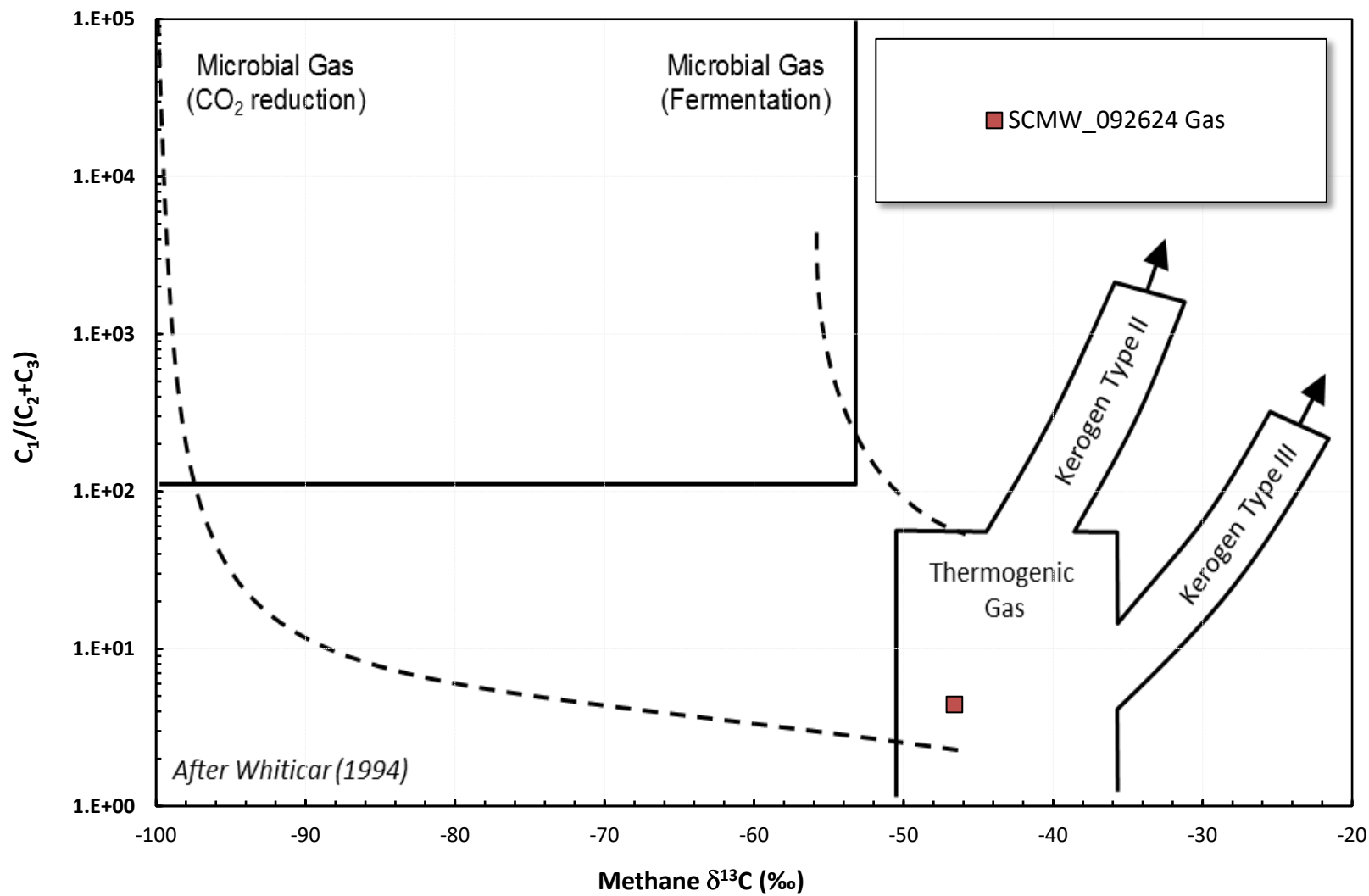


Ethane - Propane Maturity Plot



INTERPRETIVE PLOTS

Methane $\delta^{13}\text{C}$ vs $\text{C}_1/(\text{C}_2+\text{C}_3)$ Genetic Classification Plot



[illegible]



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| Send Data to: | Send Invoice to (if different): | Additional Information: |
|---|---------------------------------|-------------------------------------|
| Name: Trent Watne | Name: | AFE #: BCDJ21330 |
| Company: Olsson | Company: | Project: Sand Creek Monitoring Well |
| Address: 1525 Raleigh Street, Suite 400 | Address: | PO #: |
| City, State: Denver, CO 80203 | City, State: | Location: Greeley, CO |
| Phone: 303-503-5140 | Phone: | Sampled By: TWatne |
| Email: twatne@olsson.com | Email: | API #: |

Turnaround Time**:

| | | |
|--|--|--|
| <input checked="" type="radio"/> Standard (≤ 10 Business days) | <input type="radio"/> Rush (≤ 5 Business days) | <input type="radio"/> Expedited Rush (≤ 3 Business days) |
|--|--|--|

| Container Number | Sample Identification | Date Sampled | Time | Sample Type* | Gas Composition | d13C of Methane (C1) | d13C of Ethane (C2) | d13C of Propane+ (C3+) | d13C of Carbon Dioxide (CO2) | δD of Methane (C1) | Whole Oil Gas Chromatography | δ18O and δD Isotopes of Water | RSK 175 Dissolved Gas Quantification |
|------------------|-----------------------|--------------|------|--------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------------|-------------------------------|--------------------------------------|
| | SCMW 092624 | 09/26/24 | | Other | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
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| | | | | Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | |
|-------------------------|-----------|
| Chain of Custody Record | Comments: |
|-------------------------|-----------|

| Relinquished by Signature | Company | Date | Time | Received by Signature | Company | Date | Time |
|---------------------------|---------|---------|------|-----------------------|---------|---------|------|
| | Olsson | 9/27/24 | 1113 | | DIG | 9/27/24 | 1113 |
| | | | | | | | |

*Gas composition vs RSK-175 - Gas composition is a basic analysis of the concentration (ppm) of gases within the headspace of the sample (headspace is created at the lab). RSK-175 is a specific analysis technique combined with calculations to give the total dissolved gas of each species in the water sample (mg/L). Why one or the other? Gas composition gives us a quick, general look at relative concentrations and ratios (e.g., gas wetness). RSK-175 gives us an exact total of gas present in the sample (headspace and dissolved in the water). Questions? Give us a call at 303-531-2030.

** Rush and Expedited Rush turnaround time analysis will incur additional costs at 2x and 3x the standard turnaround time pricing.