

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:

Validation report not required for EES samples.

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148055

WORK ORDER:

| | <u>AS PLANNED</u> | <u>AS COLLECTED</u> | | <u>AS PLANNED</u> | <u>AS COLLECTED</u> |
|---------------------------------|-----------------------|---------------------|----------------------|-----------------------|---------------------|
| Date Collected (MM/DD/YYYY): | 11/9/2017 | OK | FIELD MATRIX: | WG | OK |
| TIME COLLECTED (HH:MM): | 1337 | | MEDIA: | OK | |
| PRS ID: | NA | | SAMPLE TECH CODE: | GSP | |
| LOCATION ID: | MCOI-6 | | FIELD PREP: | F | |
| LOCATION TYPE: | NA | | FIELD QC TYPE: | REG | |
| TOP DEPTH: | ↓ | | SAMPLE USAGE: | INV | ↓ |
| BOTTOM DEPTH: | ↓ | ↓ | EXCAVATED: | | YES / NO / (NA) |

| PRIORITY | ORDER | CONTAINER | # | PRESERVATIVE | COLLECTED Y/N | SPECIAL INSTRUCTIONS |
|----------|----------------------------------|-----------------------|---|--------------|---------------|----------------------|
| NA | WSP-All Metals | 1 LITER POLY | 1 | HNO3 ICE | Y | NA |
| ↓ | WSP-CR52/53 | 1 LITER POLY | 1 | ICE | ↓ | ↓ |
| ↓ | WSP- GENINORG+PerChlorat e | 1 LITER POLY | 1 | ICE | ↓ | ↓ |
| ↓ | WSP-N15/O18- NO3 | 40 mL Glass | 2 | ICE | ↓ | ↓ |
| ↓ | WSP- NH3+NO3/NO2+PO4 | 500 ML AMBER GLASS | 1 | H2SO4 | ↓ | ↓ |

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

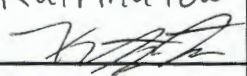
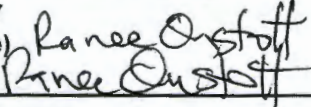
FIELD PARAMETERS:

Sample Time _____ HH:MM _____ Discharge Rate _____ Dissolved Oxygen _____
 Groundwater Elevation _____ Oxidation-Reduction Potential _____ Period Purge Volume _____
 pH _____ Purge Volume _____ Specific Conductance _____
 Temperature _____ Total Volume Pumped _____ Turbidity _____

KT KT 11/9/17
 11/9/17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148055**WORK ORDER:**

COLLECTED BY (PRINT): T. Vander Vis & T. Bonham

| | | | | | |
|---|--|-------------------------------------|---|---|-------------------------------------|
| RELINQUISHED BY (Printed Name) (Signature) | Katrina Tow  | Date/Time 11/9/17 1435 | RECEIVED BY (Printed Name) (Signature) | Ranee Oystoff  | Date/Time 11/9/17 1435 |
| RELINQUISHED BY (Printed Name) (Signature) | | Date/Time | RECEIVED BY (Printed Name) (Signature) | | Date/Time |

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148056

WORK ORDER:

| | <u>AS PLANNED</u> | <u>AS COLLECTED</u> | | <u>AS PLANNED</u> | <u>AS COLLECTED</u> |
|---------------------------------|-----------------------|---------------------|----------------------|-----------------------|----------------------|
| Date Collected (MM/DD/YYYY): | 11/9/2017 | OK | FIELD MATRIX: | WG | OK |
| TIME COLLECTED (HH:MM): | 1033 | | MEDIA: | OK | |
| PRS ID: | NA | | SAMPLE TECH CODE: | GSP | |
| LOCATION ID: | R-1 | | FIELD PREP: | F | |
| LOCATION TYPE: | NA | | FIELD QC TYPE: | REG | |
| TOP DEPTH: | | | SAMPLE USAGE: | INV | |
| BOTTOM DEPTH: | | | EXCAVATED: | | YES / NO / <u>NA</u> |

| PRIORITY | ORDER | CONTAINER | # | PRESERVATIVE | COLLECTED Y/N | SPECIAL INSTRUCTIONS |
|----------|----------------------------------|-----------------------|---|--------------|---------------|----------------------|
| NA | WSP-All Metals | 1 LITER POLY | 1 | HNO3 ICE | Y | NA |
| | WSP-CR52/53 | 1 LITER POLY | 1 | ICE | | |
| | WSP- GENINORG+PerChlorat e | 1 LITER POLY | 1 | ICE | | |
| | WSP-N15/O18- NO3 | 40 mL Glass | 2 | ICE | | |
| | WSP- NH3+NO3/NO2+PO4 | 500 ML AMBER GLASS | 1 | H2SO4 | | |

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time _____ HH:MM _____ Discharge Rate _____ Dissolved Oxygen _____
 Groundwater Elevation _____ Oxidation-Reduction Potential _____ Period Purge Volume _____
 pH _____ Purge Volume _____ Specific Conductance _____
 Temperature _____ Total Volume Pumped _____ Turbidity _____

KT 11/9/17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

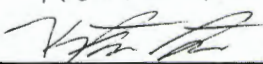
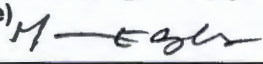
EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148056

WORK ORDER:

COLLECTED BY (PRINT): T. Bonham + T. Vander Vis

| | | | | | |
|--|--|------------------------------|--|--|------------------------------|
| RELINQUISHED BY (Printed Name) (Signature) | Katrina Tow  | Date/Time 11/9/17 1435 | RECEIVED BY (Printed Name) (Signature) | MATT ENGLERT  | Date/Time 11-9-17 1435 |
| RELINQUISHED BY (Printed Name) (Signature) | | Date/Time | RECEIVED BY (Printed Name) (Signature) | | Date/Time |

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148108

WORK ORDER:

| | AS PLANNED | AS COLLECTED | | AS PLANNED | AS COLLECTED |
|---------------------------------|---------------|--------------|----------------------|---------------|-----------------|
| Date Collected (MM/DD/YYYY): | 11/9/2017 | OK | FIELD MATRIX: | WG | OK |
| TIME COLLECTED (HH:MM): | 1033 | | MEDIA: | OK | |
| PRS ID: | NA | | SAMPLE TECH CODE: | GSP | |
| LOCATION ID: | R-1 | | FIELD PREP: | F | |
| LOCATION TYPE: | NA | | FIELD QC TYPE: | FD | |
| TOP DEPTH: | | | SAMPLE USAGE: | QC | |
| BOTTOM DEPTH: | | | EXCAVATED: | | YES / NO / (NA) |

| PRIORITY | ORDER | CONTAINER | # | PRESERVATIVE | COLLECTED Y/N | SPECIAL INSTRUCTIONS |
|----------|------------------------------|-----------------------|---|--------------|---------------|----------------------|
| NA | WSP-All Metals | 1 LITER POLY | 1 | HNO3 ICE | Y | NA |
| | WSP-CR52/53 | 1 LITER POLY | 1 | ICE | | |
| | WSP- GENINORG+PerChlorate | 1 LITER POLY | 1 | ICE | | |
| | WSP-N15/O18- NO3 | 40 mL Glass | 2 | ICE | | |
| | WSP- NH3+NO3/NO2+PO4 | 500 ML AMBER GLASS | 1 | H2SO4 | | |

SAMPLE COMMENTS: None


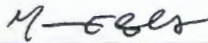
LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time _____ HH:MM _____ Discharge Rate _____ *KT 11/9/17* Dissolved Oxygen _____
 Groundwater Elevation _____ Oxidation-Reduction Potential _____ Period Purge Volume _____
 pH _____ Purge Volume _____ Specific Conductance _____
 Temperature _____ Total Volume Pumped _____ Turbidity _____

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148108**WORK ORDER:**

COLLECTED BY (PRINT): T. Borham & T. Vander Vis

| | | | | |
|---|--|-------------------------------------|---|-------------------------------------|
| RELINQUISHED BY (Printed Name) (Signature) | Katrina Tow  | Date/Time 11/9/17 1435 | RECEIVED BY MATT ENGLERT (Printed Name) (Signature)  | Date/Time 11-9-17 1435 |
| RELINQUISHED BY (Printed Name) (Signature) | | Date/Time | RECEIVED BY (Printed Name) (Signature) | Date/Time |

[illegible]

Los Alamos National Laboratory

EES-14 Hydrology, Geochemistry, and Geology Laboratory

MS-D469, Building 494, Los Alamos, NM. 87545

| REQUEST | LAB_SAMPLE_ID | LAB_RECEIPT_D | ANALYSIS_METHOD | ANALYTE_COD | RESULT | UNCERTAINTY | QC_TYPE | ANALYSIS_DATE |
|----------|----------------|---------------|--------------------------------|-------------|----------|-------------|---------|---------------|
| 2018-841 | CAMO-18-148055 | 11/13/2017 | Generic:Oxygen Isotope Ratio-2 | O18O16-NO3 | 7.519499 | | INIT | 12/15/2017 |
| 2018-841 | CAMO-18-148055 | 11/13/2017 | Generic:Nitrogen Isotope Ratio | N15N14 | -25.7212 | | INIT | 12/15/2017 |
| 2018-841 | CAMO-18-148056 | 11/13/2017 | Generic:Oxygen Isotope Ratio-2 | O18O16-NO3 | -6.20817 | | INIT | 12/15/2017 |
| 2018-841 | CAMO-18-148056 | 11/13/2017 | Generic:Nitrogen Isotope Ratio | N15N14 | 4.067356 | | INIT | 12/15/2017 |
| 2018-841 | CAMO-18-148108 | 11/13/2017 | Generic:Oxygen Isotope Ratio-2 | O18O16-NO3 | -4.77532 | | INIT | 12/15/2017 |
| 2018-841 | CAMO-18-148108 | 11/13/2017 | Generic:Nitrogen Isotope Ratio | N15N14 | 4.600507 | | INIT | 12/15/2017 |

Nitrate calibrated data

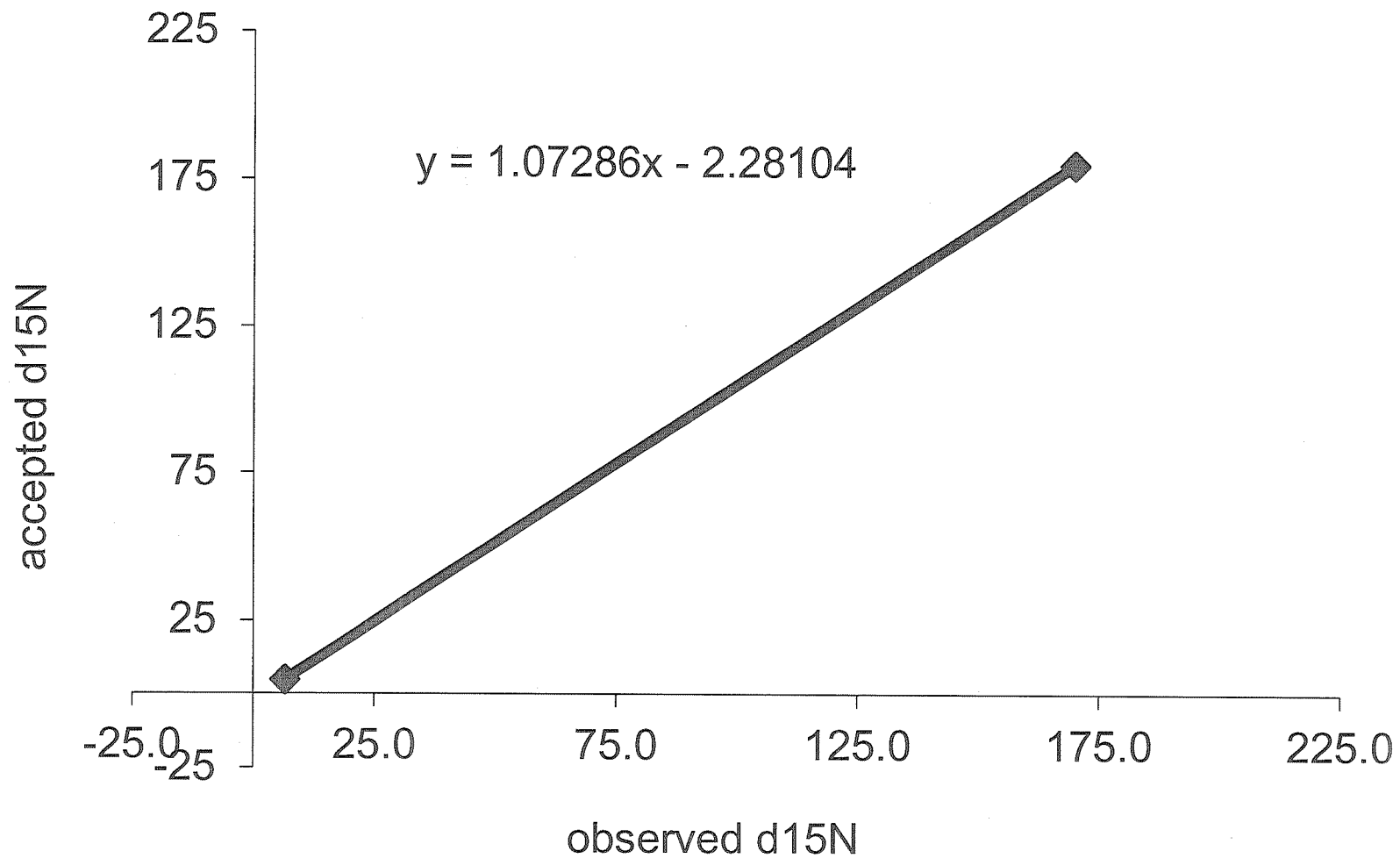
Date analyzed: 12/15/2017
 Operator: George Perkins
 Isoprime data file: Nitrate Bugs 12/15/201

| Generation of calibrati | | $\delta^{15}\text{N}$ Value | | $\delta^{18}\text{O}$ | $\delta^{18}\text{O}$ | $\delta^{17}\text{O}$ |
|--------------------------------|----------|-----------------------------|--------|-----------------------|-----------------------|-----------------------|
| | | actual | obs | actual | measured | actual |
| KNO ₃ | USGS35 | 2.7 | | 57.5 | | 51.5 |
| KNO ₃ | USGS32 | 180.0 | 169.90 | 25.7 | | |
| KNO ₃ | IAEA-NO3 | 4.7 | 6.51 | 25.6 | 21.29 | |
| KNO ₃ | USGS34 | -1.8 | | -27.9 | -26.47 | 4.29 |
| slope | | | | | | b-int. |
| $\delta^{18}\text{O}= 1.1202$ | | | | | | 1.75 |
| $\delta^{15}\text{N}= 1.07286$ | | | | | | -2.28 |
| N-linearity | | -0.0302 | | | | |
| O-linearity | | 0.0000 | | | | |

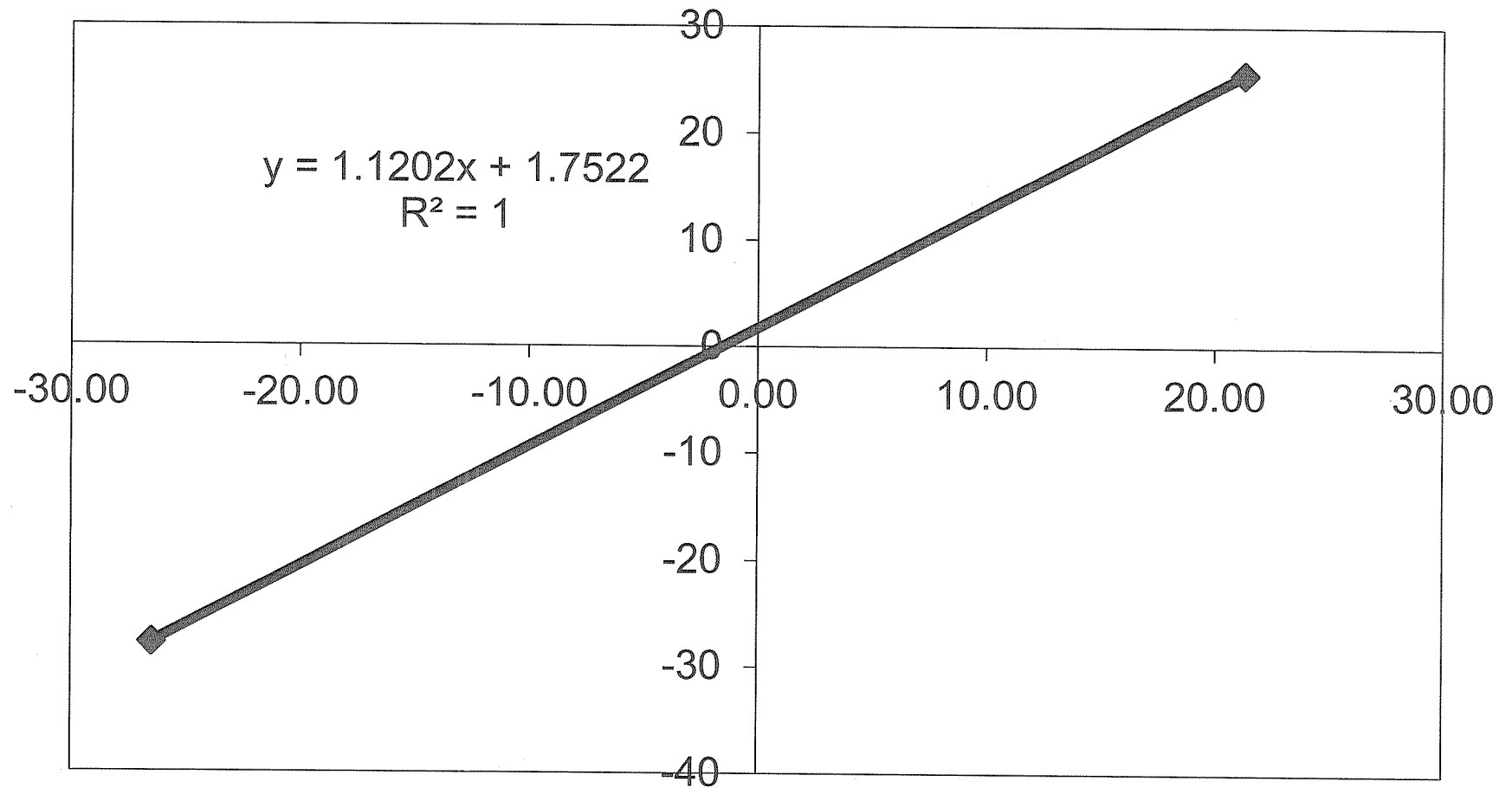
| Sample # | Sample Name | RT | Pk Ht | Raw d15N | Raw d18O | Corr d15N | Corr d18O | corr. d15N | corr. d18O | Comment |
|---------------|-------------------------------------|----------|-------------|----------|----------|-----------|-----------|------------|------------|---------|
| Sample Number | Name | RT (Sec) | Height (nA) | 15N | 18O | #VALUE! | #VALUE! | #VALUE! | #VALUE! | |
| 6 | air-1 12-15-2017.raw | ##### | 254.9 | 0.03 | 105.17 | 211.19 | | | | |
| 7 | IAEA-NO3-1 12-15-2017.raw | ##### | 246.5 | 7.46 | 6.63 | 21.49 | 4.83 | 25.82 | 4.83 | 25.82 |
| 8 | IAEA-NO3-2 12-15-2017.raw | ##### | 245.1 | 7.90 | 6.38 | 21.75 | 4.57 | 26.12 | 4.60 | 26.12 |
| 9 | USGS32-1 12-15-2017.raw | ##### | 245.1 | 7.67 | 169.90 | 24.44 | 180.00 | 29.13 | 180.06 | 29.13 |
| 10 | USGS34-1 12-15-2017.raw | ##### | 252.0 | 7.33 | -0.38 | -26.47 | -2.69 | -27.90 | -2.60 | -27.90 |
| 11 | LG-WS-5-72717 12-15-2017.raw | ##### | 246.7 | 19.88 | 99.37 | 97.60 | 104.33 | 111.08 | 104.45 | 111.08 |
| 12 | RI-T2-Precip1-72717 12-15-2017.raw | ##### | 245.9 | 16.38 | -4.58 | 53.93 | -7.19 | 62.16 | -7.04 | 62.16 |
| 13 | RI-T2-W3-5-72717 12-15-2017.raw | ##### | 243.9 | 19.91 | 76.29 | 61.83 | 79.57 | 71.01 | 79.75 | 71.01 |
| 14 | RI-T2-W3-6-72717 12-15-2017.raw | ##### | 243.2 | 19.90 | 28.59 | 15.35 | 28.39 | 18.94 | 28.60 | 18.94 |
| 15 | CAMO-18-148057 12-15-2017.raw | ##### | 244.8 | 8.61 | 6.10 | -5.64 | 4.27 | -4.56 | 4.51 | -4.56 |
| 16 | RI-W3-T2-1-090517 12-15-2017.raw | ##### | 246.4 | 0.11 | 53.41 | 92.28 | 55.02 | 105.13 | 55.29 | 105.13 |
| 17 | IAEA-NO3-4 12-15-2017.raw | ##### | 242.5 | 6.94 | 6.01 | 21.26 | 4.17 | 25.57 | 4.47 | 25.57 |
| 18 | Blank 12-15-2017.raw | ##### | 224.1 | 0.12 | 523.75 | 970.16 | 559.63 | 1088.53 | 559.96 | 1088.53 |
| 19 | RI-W3-T2-2-090517 12-15-2017.raw | ##### | 243.2 | 0.13 | 46.12 | 85.29 | 47.20 | 97.29 | 47.56 | 97.29 |
| 20 | CAMO-18-148058 12-15-2017.raw | ##### | 257.3 | 17.38 | 5.83 | -3.54 | 3.97 | -2.22 | 4.37 | -2.22 |
| 21 | RI-T2-ISCO1-5-100517 12-15-2017.raw | ##### | 253.6 | 19.86 | 5.56 | -9.44 | 3.68 | -8.82 | 4.11 | -8.82 |

| | | | | | | | | | | | |
|----|----------------------------------|---------------|-------|-------|--------|-------|--------|-------|--------|-------|--|
| 22 | RI-T2-W1-8-101817 12-15-2017.raw | ##### | 247.2 | 19.94 | 92.73 | 80.46 | 97.20 | 91.88 | 97.66 | 91.88 | |
| 23 | RI-T2-W1-9-101817 12-15-2017.raw | ##### | 245.7 | 17.63 | 4.29 | -9.90 | 2.32 | -9.34 | 2.81 | -9.34 | |
| 24 | RI-T2-W2-2-101817 12-15-2017.raw | ##### | 244.7 | 6.38 | 3.36 | -5.96 | 1.32 | -4.92 | 1.84 | -4.92 | |
| 25 | IAEA-NO3-5 12-15-2017.raw | 16/12/17 0:01 | 244.2 | 7.76 | 6.08 | 20.65 | 4.24 | 24.88 | 4.79 | 24.88 | |
| 26 | CASA-18-147991 12-15-2017.raw | 16/12/17 0:28 | 243.7 | 19.65 | 5.16 | -6.90 | 3.26 | -5.98 | 3.83 | -5.98 | |
| 27 | RI-T2-W3-8-101817 12-15-2017.raw | 16/12/17 0:54 | 243.0 | 5.62 | 5.04 | -3.46 | 3.12 | -2.12 | 3.73 | -2.12 | |
| 28 | CAMO-18-148055 12-15-2017.raw | 16/12/17 1:20 | 243.5 | 7.90 | -22.44 | 5.15 | -26.36 | 7.52 | -25.72 | 7.52 | |
| 29 | CAMO-18-148056 12-15-2017.raw | 16/12/17 1:47 | 242.8 | 10.39 | 5.30 | -7.11 | 3.40 | -6.21 | 4.07 | -6.21 | |
| 30 | CAMO-18-148108 12-15-2017.raw | 16/12/17 2:13 | 241.6 | 7.99 | 5.77 | -5.83 | 3.91 | -4.78 | 4.60 | -4.78 | |
| 31 | Malink-2 12-15-2017.raw | 16/12/17 2:40 | 241.4 | 7.67 | 3.55 | 13.17 | 1.53 | 16.51 | 2.26 | 16.51 | |
| 32 | IAEA-NO3-6 12-15-2017.raw | 16/12/17 3:06 | 205.8 | 0.05 | | | -2.28 | 1.75 | -1.53 | 1.75 | |
| 33 | USGS32-2 12-15-2017.raw | 16/12/17 3:32 | 205.1 | 0.02 | | | -2.28 | 1.75 | -1.50 | 1.75 | |
| 34 | USGS34-2 12-15-2017.raw | 16/12/17 3:59 | 203.0 | 0.01 | | | -2.28 | 1.75 | -1.47 | 1.75 | |
| | | | | | | | 3.11 | 20.83 | 3.43 | 20.83 | |

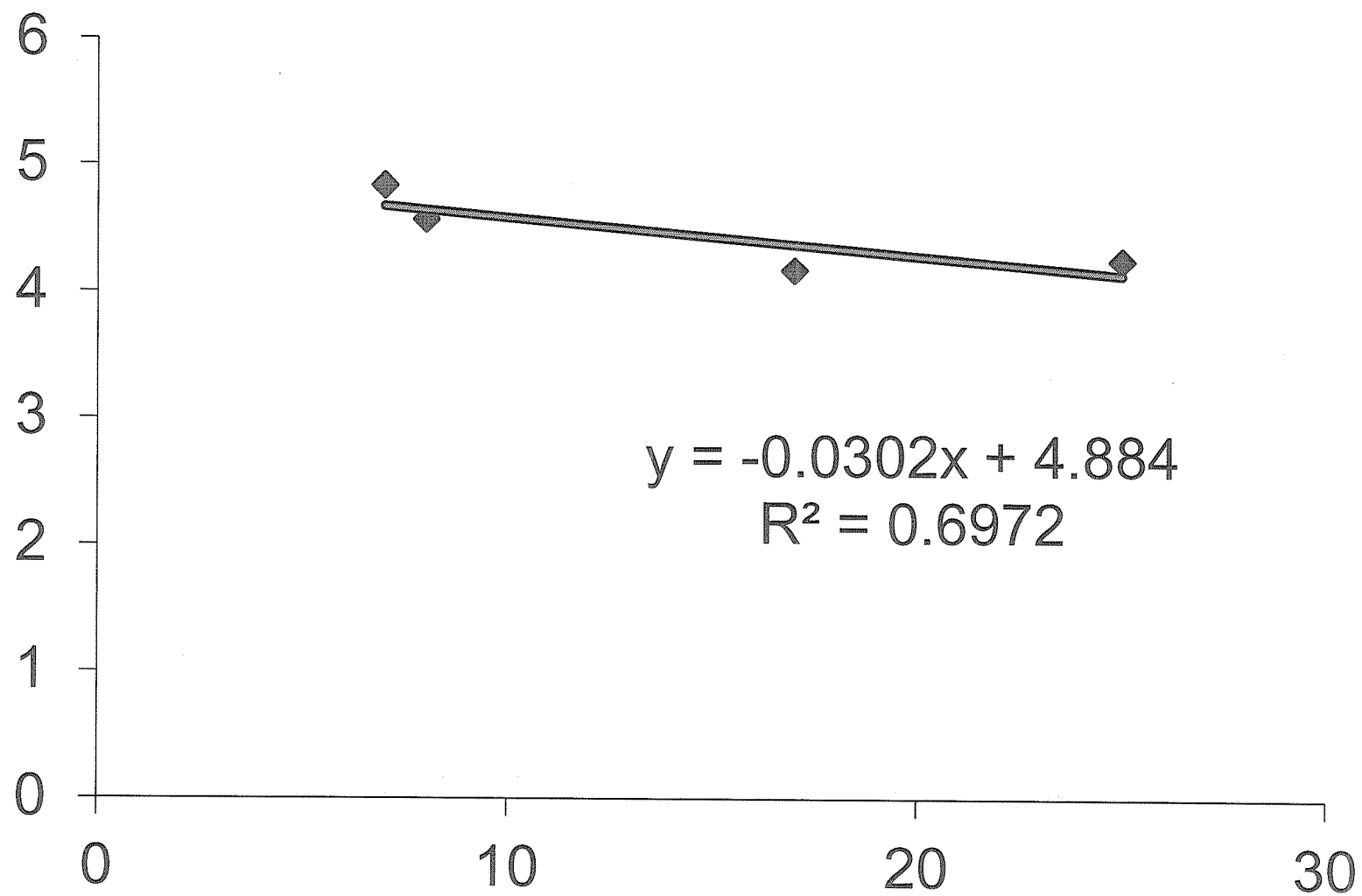
d15N calibration



d18O Calibration



N Linearity



O Linearity

