

### 3 - MACHINE SPECIFICATION

|                   |                          |       |            |
|-------------------|--------------------------|-------|------------|
| Client:           | University of Notre Dame |       |            |
| Quotation Number: | 16196                    | Date: | 19/04/2022 |
| Job Number:       | IN1288                   | Date: | 05/08/2022 |

| Ref No.                         | Product Description                                        | Required |
|---------------------------------|------------------------------------------------------------|----------|
| <b>HS2022 (continuous flow)</b> |                                                            |          |
| 20402/1                         | HS2022 Ref Gas + P Mag                                     |          |
| 20402/2                         | HS2022 Ref Gas + E-Mag                                     |          |
| 20402/3                         | HS2022 Ref Gas + Hd Collector + E-Mag                      |          |
| 20402/4                         | HS2022 Ref Gas + Hd Collector+E-Mag+Trap Loop              |          |
| 20501                           | Hd Collector Assy                                          | ***      |
| 50101/2                         | Trapping Loop Assy                                         |          |
| 70201-1                         | 70201-1 Analyser spares kit - Included                     |          |
| <b>EA Units</b>                 |                                                            |          |
| 10202/11                        | iso-EArth                                                  |          |
| 10202/13                        | iso-EArth+                                                 |          |
| 10202/14                        | iso-Earth HT Furnace Upgrade                               |          |
| 10202/15                        | Iso-Earth (Without Autosampler)                            |          |
| 11802/1                         | Earth+PC                                                   |          |
| 11802/2                         | EArth+Clarity+PC                                           |          |
| 70501-1                         | Consumables for C and N for Combustion Only                |          |
| 70501-11                        | Simultaneous CNS Consumables Kit (approx. 10000 analysis)  |          |
| 70501-3                         | Sample Prep Kit (inc)                                      |          |
| 70501-4                         | GSL Combustion and Gas C & N Start Up Kit                  |          |
| 70501-5                         | Simultaneous NCS Consumables Kit                           |          |
| 70501-6                         | C&N Combustion Only Consumables Kit (approx. 5000 samples) |          |
| 70501-8                         | Simultaneous CNS Consumables Kit (approx. 5000 samples)    |          |
| 70601-1                         | Sulphur Start Up Kit (Inc. with Sercon EA Systems)         |          |
| 70601-2                         | Sulphur Consumables Kit for 1000 Samples                   |          |
| 70601-4                         | Sulphur Consumables Kit (approx. 5000 Samples)             |          |
| 70801-2                         | Pyrolysis Consumables Kit-Low temp for Solids              |          |
| 71701-1                         | Sub Microgram Nitrogen Analysis Start Up Kit               |          |
| SI2040                          | PN150 Pneumatic Autosampler with one no.50 pos, carousel   |          |
| SI2345                          | ME Micro Balance                                           |          |
| SI2737/A                        | Sercon 50 Position Autosampler Assy                        |          |
| SI2789                          | Extra 50 Position Carousel                                 |          |
| SI2744                          | Automatic Liquid Sampler 15 Position                       |          |
| SI2743                          | Liquid Sampler Mounting Plate                              |          |
| <b>Headspace Equilibration</b>  |                                                            |          |
| 10202/10                        | XYZ Gas Sampling Control Box                               |          |
| 10302/1                         | Aqua System                                                |          |
| 11103                           | µCarbs for CF                                              |          |
| 11103-1                         | µCarbs for DI                                              |          |
| 11601                           | 200 Place Dual Heated Block 240 Volt                       |          |
| 11801                           | Sercon XYZ Gas Autosampler                                 |          |
| 71107-1                         | CF oxygen-18 equilibration kit                             |          |
| 71107-2                         | DI Oxygen-18 Equilibration kit                             |          |
| 71201-1                         | CF deuterium equilibration kit                             |          |
| 71201-2                         | DI Deuterium Equilibration kit                             |          |
| 71801-1                         | WES-DI start up kit (Inc. with WES-DI)                     |          |
| <b>GC Units</b>                 |                                                            |          |
| 10402/2                         | Orchid module 1500C (Will run Hd 70901-1 C Spares Kit Inc) |          |
| 10901                           | Nitrogen Option (71301-1 N Spares kit Included)            |          |
| HP7890/1                        | Agilent 7890B GC System                                    |          |
| HP7890/2                        | Agilent 7890B GC with Auto Injector                        |          |
| HP7890/3                        | Agilent 7890B GC + Auto Injector + 150 Vial Sample Tray    |          |
| SI2561                          | Nexis GC 2010 Plus                                         |          |

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| Ref No.                       | Product Description                                        | Required |
|-------------------------------|------------------------------------------------------------|----------|
| <b>GC Units continued</b>     |                                                            |          |
| SI2564                        | Nexis GC-2030                                              |          |
| 70901-3                       | GC Pyrolysis H and O Start Up Kit                          |          |
| 70901-4                       | GC Pyrolysis H Spares Kit                                  |          |
| 70901-5                       | GC Combustion C Spares Kit (approx. 5000 samples)          |          |
| 70901-6                       | GC Pyrolysis h Start Up Kit (approx. 5000 samples)         |          |
| 71301-1                       | GC N Spares kit                                            |          |
| <b>ABCA2 Units</b>            |                                                            |          |
| 10502/1                       | ABCA2 Sercon XYZ Autosampler                               |          |
| 10602                         | ABCA2 Gas Box                                              |          |
| 20602                         | Complete Sercon ABCA2 system                               |          |
| 20603                         | ABCA IR Analyser                                           |          |
| 70101-1                       | ABCA2 spares kit (Inc. With ABCA2)                         |          |
| 70101-2                       | ABCA2 Spares Kit for AB Analytica Systems                  |          |
| 70101-3                       | ABCA2 Autosampler Upgrade Kit                              |          |
| SI1767                        | CVL505 - Barcode Reader                                    |          |
| SC9973                        | 13C Urea breath test kit for Helicobacter pylori infection |          |
| SC9974                        | Helicobacter Test kit for children age 3-11 (45mg)         |          |
| <b>Integra2 Units</b>         |                                                            |          |
| 20802/4                       | Integra2                                                   | Y        |
| 70201-2                       | Integra2 analyser spares kit - Included                    | Y        |
| 70401-1                       | Integra-2 consumables (Inc. With Integra2)                 | Y        |
| 70601-3                       | Sulphur Option for Integra                                 | Y        |
| <b>Trace Gas Systems</b>      |                                                            |          |
| 10802/4                       | CryoPrep                                                   |          |
| 10802/5                       | Automated LN refiller                                      |          |
| 10802/6                       | CryoFlex (TOC)                                             |          |
| 10802/7                       | CryoGas                                                    |          |
| 10802/8                       | CryoFlex (LA)                                              |          |
| SI2533                        | Silicon Carbide Vertical Furnace                           |          |
| SI2731                        | 213nm Laser Ablation System                                |          |
| SI2733                        | isoScell 100 sampler chamber                               |          |
| 71001-1                       | Cryoprep Spares Kit                                        |          |
| 71001-5                       | CryoGas Consumables Kit                                    |          |
| <b>TOC Units</b>              |                                                            |          |
| 14001                         | Thermalox Environmental TOC-IRMS                           |          |
| 14002                         | Thermalox Environmental TOC-Standalone                     |          |
| 14003                         | Thermalox Environmental TOC-Standalone No Sampler          |          |
| SI2772                        | CO2 Detector, High sensitivity Option                      |          |
| SI2773                        | NOx detector Option                                        |          |
| SI2774                        | Vacuum pump Option                                         |          |
| SI2775                        | Stirred Vial rack Option                                   |          |
| 72101-1                       | TOC Start Up Kit                                           |          |
| 72101-2                       | TOC Chem Pack                                              |          |
| 72101-3                       | TOC & TN Instrument with heavy usage - one year            |          |
| 72101-4                       | TOC only - economy holding                                 |          |
| <b>GEO 20-22 (dual inlet)</b> |                                                            |          |
| 10702                         | GEO 20-22 Water Equilibration System (D & 18O)             |          |
| 21802/1                       | GEO 20-22                                                  |          |

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|          |                                                          |  |
|----------|----------------------------------------------------------|--|
| 21802/2  | GEO 20-22 + E-Mag                                        |  |
| 21802/3  | GEO 20-22 + E-Mag +Hd                                    |  |
| 21802/4  | GEO 20-22 Inlet                                          |  |
| 70301-1  | GEO start up kit - Included                              |  |
| 70301-3E | Comprehensive GEO 20-22 spares kit for 5 years operation |  |

|              |                                                               |  |
|--------------|---------------------------------------------------------------|--|
| <b>HT-EA</b> |                                                               |  |
| 11501/4      | HT-EA (With Autosampler)                                      |  |
| 11501/5      | HT-EA With Liquid Option                                      |  |
| 11501/6      | HT-EA Stand Alone                                             |  |
| 11501/7      | HT-EA (Without Autosampler)                                   |  |
| SI2622       | CTC PAL3-LSI-L-S                                              |  |
| SI2624       | CTC PAL3-Kit-Standalone                                       |  |
| 70801-1      | Pyrolysis Consumables Kit-High Temp for Solids                |  |
| 71501-1      | HT-EA Pyrolysis Start Up kit O and H                          |  |
| 71501-2      | HT-EA Pyrolysis Kit for Water injections                      |  |
| 71501-3      | HT-EA Sensitivity Start Up Kit for O & H in small samples     |  |
| 71501-4      | HT-EA Sensitivity Consumables Kit for O & H in small samples  |  |
| 71501-5      | HT-EA Sensitivity Kit for O&H in Small Samples (5000 samples) |  |
| 71501-7      | HT-EA Kit for Room Temp Equilibration                         |  |
| 71501-8      | HT-EA Pyrolysis Kit for Water injections (approx. 1 year kit) |  |

| Ref No.          | Product Description                                                             | Required            |
|------------------|---------------------------------------------------------------------------------|---------------------|
| <b>Upgrades</b>  |                                                                                 |                     |
| 12101            | Evacuation System ***                                                           |                     |
| 12102            | 2 Ref Gas+ Dilutor Box ***                                                      |                     |
| 20101            | Standard Source Assy ***                                                        |                     |
| 20102            | HS Source Assy ***                                                              | Y                   |
| 20301            | Standard Collector Assy ***                                                     |                     |
| 30202/1          | System Control Upgrade (Pmag) installation not included                         | Edwards Or Pfeiffer |
| 30202/2          | System Controller Upgrade (Emag) installation not included                      | Edwards Or Pfeiffer |
| 10202/7          | Preparation PCB Upgrade                                                         |                     |
| 30202/3          | Hijack Box ***                                                                  |                     |
| 30302/4          | nEXT85 Edwards Pumping System Upgrade Single - installation not included        |                     |
| 30302/5          | nEXT85 Edwards Pumping System Upgrade Dual - installation not included          |                     |
| 30302/6          | nEXT85 Edwards Pumping System Upgrade Triple- installation not included         |                     |
| SI2542           | ABCA2 Upgrade Kit                                                               |                     |
| CALLISTOW        | Callisto software upgrade ***                                                   |                     |
| <b>Specials</b>  |                                                                                 |                     |
| 11702            | LC-I interface                                                                  |                     |
| 12202            | Leco Interface Unit                                                             |                     |
| SI2320           | Agilent 1260 Series Refractive Index Detection HPLC System                      |                     |
| 71401-1          | ABCA-G Start Up/Spares Kit                                                      |                     |
| 71401-2          | ABCA-G Equilibration Spares Kit - Room temp O only                              |                     |
| 71401-3          | ABCA-G Equilibration Spares Kit - Room Temp O & H                               |                     |
| 71601-1          | LC Interface Spares Kit                                                         |                     |
| <b>ADDITIONS</b> |                                                                                 |                     |
| PC               | Windows 7 based PC System with Callisto Software                                | Y                   |
| Printer          | Printer                                                                         |                     |
| INST1            | Installation and start up training at customer's site by <b>Sercon</b> Engineer | Y                   |
| INST2            | Installation and start up training at customer's site by <b>Agents</b> Engineer |                     |
| WARR             | 1 year warranty                                                                 |                     |
| WARR2            | 2 year warranty                                                                 | Y                   |
| TRAIN            | Training in UK for one person for 3 days                                        |                     |
| SCONTRACT        | Maintenance Service Contract - 1 year                                           |                     |

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| SPECIFICATION REQUIREMENTS |                                                    |   |
|----------------------------|----------------------------------------------------|---|
| Voltage                    | 110 Volts 50/60Hzs                                 | Y |
| Plug Type                  | SI2510 3 Metre USA/Japan plug to IEC C 13          | Y |
|                            | SI2511 2.5 Metre Australian plug to IEC C 13       |   |
|                            | SI2512 3 Metre UK 13 amp Fused plug to IEC C 13    |   |
|                            | SI2523 3metre Schuko (Euro) Plug to IEC C13 Socket |   |
|                            | SI2514 2.5 metre Chinese mains to IEC C13          |   |
| Pallet                     | Stamped for export heat treated for 30 min @ 56 °C | Y |
|                            | Complies with all Export Requirements              |   |

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|                                           |                  |
|-------------------------------------------|------------------|
| Approved by Sales: <i>Garry Armstrong</i> | Date: 30/08/2022 |
| Approved by Tech.: Mark O'Connor          | Date: 30/08/2022 |



## 4 - LOG SHEET

|                   |                          |       |            |
|-------------------|--------------------------|-------|------------|
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| Date      | Action Taken                                                                                                                                                                                                                                 | By Whom |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 7/11/22   | UNIT P.A.T. TESTED.                                                                                                                                                                                                                          | P.H.    |
| 9/11/22   | UNIT MAINS + PUMP MAINS WIRED WRONG. REWIRED                                                                                                                                                                                                 | P.H.    |
| 9/11/22   | UNIT PUMPED DOWN WITHOUT SOURCE PIPE.                                                                                                                                                                                                        | PH.     |
| 21 Nov 22 | Filled Combustion + Reduction tubes<br>Filled Water scrubber + EMA scrub traps<br>Established the flows, coupled lines<br>Flow meter not responding.<br>Heated up Furnaces.<br>Baked out GC @ 140°C overnight                                | DJH     |
| 22 Nov 22 | Vented instrument. Production filled<br>bblon source line/inlet. Re-pumped.<br>Fails pressure test. Found damaged<br>Valve (V6) replaced for new                                                                                             | DJH     |
| 23 Nov 22 | Pressure test passes upto V4<br>SM found leak on trapping loop                                                                                                                                                                               | DJH     |
| 24 Nov 22 | Trapping loop leaks approx 4 min<br>after trapping loop is closed. Tightened<br>connections. Big leak on Isolation valve<br>power flow. Replaced nut as thread gone<br>Adjusted magnet & tuning. N <sub>2</sub> peak<br>shape & stability OK | DJH     |
| 24 Nov 22 | Odd flash runs occur. Furnace<br>temp dropped by 10°C and then<br>re-turned to 1800°C                                                                                                                                                        | DJH     |
| 26 Nov 22 | Flow meter cable wired, wrong. Rewired                                                                                                                                                                                                       | DJH     |
| 28 Nov 22 | UNIT CONVERTED TO SULPHUR (COPPER) COMBUSTION<br>TUBE THIN 'ABCA SIZE' HAYCEP & COLUMN                                                                                                                                                       | LM      |
| 29 Nov 22 | ANM SULPHATE PRODUCING 50% BUT PROTEIN<br>NOT COMBUSTING                                                                                                                                                                                     | LM      |
| 01 DEC 22 | ISSUE WAS THAT THE PROTEIN SAMPLE EMA P-2 DOESN'T<br>CONTAIN SULPHUR. OTHER PROTEIN DOTS. BATCH SET OFF                                                                                                                                      | LM      |







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### HS20-22

#### Reference Gas Precision (n=5)

|                 |                    |      |  |
|-----------------|--------------------|------|--|
| <sup>13</sup> C | (CO <sub>2</sub> ) | 0.06 |  |
| <sup>15</sup> N |                    | 0.06 |  |
| <sup>18</sup> O | (CO <sub>2</sub> ) | 0.06 |  |
| <sup>34</sup> S | (SO <sub>2</sub> ) | 0.1  |  |
| <sup>2</sup> H  |                    | 0.4  |  |

#### Reference Gas Linearity

|                 |           |  |
|-----------------|-----------|--|
| <sup>13</sup> C | ≤0.02‰/nA |  |
| <sup>15</sup> N | ≤0.02‰/nA |  |

### IsoEarth & IsoEarth+

#### Combustion (n=5)

|                 |          |      |  |          |      |  |
|-----------------|----------|------|--|----------|------|--|
| <sup>13</sup> C | 100 µg C | 0.1  |  | 10 µg C  | 0.8  |  |
| <sup>15</sup> N | 100 µg N | 0.15 |  | 10 µg N  | 1.5  |  |
| <sup>34</sup> S | 25 µg S  | 0.3  |  | 10 µg S  | 1.0  |  |
| Dual            | 400 µg C | 0.1  |  | 100 µg N | 0.15 |  |

### Integra2

|                 |                     |            |               |
|-----------------|---------------------|------------|---------------|
| <sup>13</sup> C | 100 µg C            | 0.2        |               |
| <sup>15</sup> N | 100 µg N            | 0.3        |               |
| Dual            | 100 µg N & 400 µg C | 0.4 & 0.15 | 0.07 + 0.05 ✓ |
| <sup>34</sup> S | 30 µg S             | 0.5        | 0.3 ✓         |
| <sup>18</sup> O | 100 µg O            | 0.5        |               |



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### HT-EA

#### Pyrolysis (n=5)

|                 |                        |     |  |
|-----------------|------------------------|-----|--|
| <sup>18</sup> O | 100 µg O or 1 µl water | 0.3 |  |
| <sup>2</sup> H  | 200 µg H or 1 µl water | 1.0 |  |

### Aqua, µCarbs & GasBox

#### Equilibrations (n=5)

|                 |              |     |  |
|-----------------|--------------|-----|--|
| <sup>18</sup> O | 0.2 ml water | 0.1 |  |
| <sup>2</sup> H  | 0.2 ml water | 2.0 |  |

#### Carbonates (n=5)

|                 |                          |      |  |
|-----------------|--------------------------|------|--|
| <sup>13</sup> C | 100 µg CaCO <sub>3</sub> | 0.08 |  |
| <sup>18</sup> O | 100 µg CaCO <sub>3</sub> | 0.1  |  |

#### Gas Analysis (n=5)

|                 |                       |     |  |                          |     |  |
|-----------------|-----------------------|-----|--|--------------------------|-----|--|
| <sup>13</sup> C | 5% CO <sub>2</sub>    | 0.1 |  | Air CO <sub>2</sub>      | 0.1 |  |
| <sup>18</sup> O | 5% CO <sub>2</sub>    | 0.1 |  | Air CO <sub>2</sub>      | 0.2 |  |
| <sup>2</sup> H  | 0.5 ml H <sub>2</sub> | 1.5 |  |                          |     |  |
| <sup>15</sup> N | 0.5 ml N <sub>2</sub> | 0.1 |  | 100 ppm N <sub>2</sub> O | 0.5 |  |
| <sup>13</sup> C | Breath (12 ml)        | 0.1 |  |                          |     |  |

#### DIC (n=5)

|                 |               |      |  |
|-----------------|---------------|------|--|
| <sup>13</sup> C | 15ppm (0.5ml) | 0.15 |  |
|-----------------|---------------|------|--|

### LC-I

#### (n=5)

|                 |  |     |  |
|-----------------|--|-----|--|
| <sup>13</sup> C |  | 0.2 |  |
|-----------------|--|-----|--|



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### GC Orchid

Combustion (n=3 for each analyte)

|                 |           |          |     |  |         |     |  |
|-----------------|-----------|----------|-----|--|---------|-----|--|
| <sup>13</sup> C | 3 Alkanes | 100 ng C | 0.2 |  | 10 ng C | 0.5 |  |
| <sup>15</sup> N | 2 Amines  | 100 ng N | 0.5 |  | 14 ng N | 1.5 |  |

Pyrolysis (n=3 for each analyte)

|                 |           |          |     |  |         |      |  |
|-----------------|-----------|----------|-----|--|---------|------|--|
| <sup>2</sup> H  | 3 Alkanes | 250 ng H | 3.0 |  | 25 ng H | 10.0 |  |
| <sup>18</sup> O | 3 FAMES   | 100 ng O | 0.5 |  | 20 ng O | 2.0  |  |

Water pyrolysis (n=5)

|                 |              |     |  |  |  |  |  |
|-----------------|--------------|-----|--|--|--|--|--|
| <sup>2</sup> H  | 0.1 µl water | 3.0 |  |  |  |  |  |
| <sup>18</sup> O | 0.1 µl water | 0.4 |  |  |  |  |  |

### CryoRange

(n=5)

|                 |                            |      |  |                              |     |  |
|-----------------|----------------------------|------|--|------------------------------|-----|--|
| <sup>13</sup> C | Air CO <sub>2</sub> (12ml) | 0.1  |  | Air CH <sub>4</sub> (125ml)  | 0.2 |  |
| <sup>15</sup> N | Air N <sub>2</sub> (1ml)   | 0.1  |  | Air N <sub>2</sub> O (125ml) | 0.4 |  |
| <sup>18</sup> O | Air CO <sub>2</sub> (12ml) | 0.15 |  | Air N <sub>2</sub> O (125ml) | 0.7 |  |
| <sup>18</sup> O | Air O <sub>2</sub> (1ml)   | 0.1  |  |                              |     |  |
| <sup>2</sup> H  | Air CH <sub>4</sub>        | 3.0  |  |                              |     |  |
| <sup>13</sup> C | TOC (5ppm)                 | 0.4  |  |                              |     |  |
| <sup>13</sup> C | Laser                      |      |  |                              |     |  |



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| Geo2                                         |                         |       |  |
|----------------------------------------------|-------------------------|-------|--|
| Internal precision (no change overs)         |                         |       |  |
| <sup>2</sup> H                               | 200 Bar µl              | 0.15  |  |
| <sup>13</sup> C                              | 100 Bar µl              | 0.01  |  |
| <sup>15</sup> N                              | 100 Bar µl              | 0.01  |  |
| <sup>18</sup> O                              | 100 Bar µl              | 0.015 |  |
| <sup>34</sup> S                              | 100 Bar µl              | 0.015 |  |
| Single cold finger volumes (10 change overs) |                         |       |  |
| <sup>13</sup> C                              | 20 Bar µl               | 0.01  |  |
| <sup>18</sup> O                              | 20 Bar µl               | 0.015 |  |
| <sup>13</sup> C                              | 3 Bar µl                | 0.02  |  |
| <sup>18</sup> O                              | 3 Bar µl                | 0.03  |  |
| CAPS (n=5)                                   |                         |       |  |
| <sup>13</sup> C                              | 50 µg CaCO <sub>3</sub> | 0.03  |  |
| <sup>18</sup> O                              | 50 µg CaCO <sub>3</sub> | 0.06  |  |
| WES (n=5)                                    |                         |       |  |
| <sup>2</sup> H                               |                         | 1.0   |  |
| <sup>18</sup> O                              |                         | 0.05  |  |
| Manifold (10 tubes)                          |                         |       |  |
| <sup>2</sup> H                               |                         | 0.5   |  |
| <sup>13</sup> C                              |                         | 0.02  |  |
| <sup>15</sup> N                              |                         | 0.02  |  |
| <sup>18</sup> O                              |                         | 0.03  |  |
| <sup>34</sup> S                              |                         | 0.03  |  |



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| Special tests                     |
|-----------------------------------|
|                                   |
| So2 to be ran                     |
| Cystine ran at Spec amount - 0.5% |
|                                   |
|                                   |
|                                   |
|                                   |

|                                     |                       |
|-------------------------------------|-----------------------|
| Sales Signature: <i>[Signature]</i> | Date: <i>21/12/22</i> |
| Test Signature: <i>[Signature]</i>  | Date: <i>22/12/22</i> |



## 7: ASSEMBLY AND TEST RECORD

|                   |                          |       |            |
|-------------------|--------------------------|-------|------------|
| Client:           | University of Notre Dame |       |            |
| Quotation Number: | 16196                    | Date: | 19/04/2022 |
| Job Number:       | IN1288                   | Date: | 05/08/2022 |

PRODUCT:

INTEGRA 2

SERIAL NUMBER:

20802/4-2022/IN1288

 ASSEMBLED:  
 (Name)

James Ham

Date:

14/11/22

 PRE-TEST  
 INSPECTION:  
 (Production name)

James Ham

Date:

21/11/22

 PRE-TEST  
 INSPECTION:  
 (Test name)

S. Moss

Date:

22/11/22

 SYSTEM TEST:  
 (Name)

S. Moss

Date:

22/12/22

 PRE-DESPATCH  
 INSPECTION:  
 (Name)

James Ham

Date:

06/12/22

### P.A.T. Test results

 In compliance with Low Voltage directive 73/23/EEC  
 To Low Voltage standard EN61010 – 1:1993

Earth Continuity

0.086
 $\Omega$ 

Insulation

>172
 $M\Omega$ 

Earth Leakage Current

1.25

mA. @

0.05

kVA.

Tested by:

P. Hays

Date:

14/11/22



## 8 - Serial Numbers Record Document

|                   |                          |       |            |
|-------------------|--------------------------|-------|------------|
| Client:           | University of Notre Dame |       |            |
| Quotation Number: | 16196                    | Date: | 19/04/2022 |
| Job Number:       | IN1288                   | Date: | 05/08/2022 |

| Units               | S/N               |
|---------------------|-------------------|
| MS/ABCA             |                   |
| Integra 2           | 20802/4-2022/1288 |
| Prep Unit 1         |                   |
| Prep Unit 2/Misc    |                   |
| Electronics Upgrade |                   |
| CETAC               |                   |
| Gas Box             |                   |
| Autosampler         | 42662             |
| BCR                 |                   |
| Dual Heater Block   |                   |

| Pump Kit and Optics | S/N          |
|---------------------|--------------|
| Turbo pump S        | 220773818    |
| Turbo pump A        |              |
| Rotary Pump         | 220205724    |
| Voltage             | 110 / 240    |
| Gauge S             | 220405176    |
| Gauge A             |              |
| Source              | 20102 MS-202 |
| Collector 1         | 20301-122    |
| Collector 2         |              |
| Magnet              | 23/5/22 ©    |

| Parts   | S/N |
|---------|-----|
| Fan PSU |     |
| 24V PSU |     |

| PCBs             | S/N      |
|------------------|----------|
| Electronics Box  | 20220011 |
| Prep PCB         |          |
| VFC PCB          |          |
| Watchdog PCB     |          |
| Head Amp PCB 1   | 22004    |
| Head Amp PCB 2   |          |
| Electromagnet RP |          |

| Furnaces   | S/N |
|------------|-----|
| Combustion |     |
| Reduction  |     |
| HT-EA      |     |
| GC Oven    |     |
| Furnace 1  |     |
| Furnace 2  |     |

| PC      | S/N                                     |
|---------|-----------------------------------------|
| PC      | <del>6W2DQ2</del> <sup>H2</sup> 6W2DQ23 |
| Monitor | 09WCM1-FCC00-238                        |
| Printer |                                         |

### Key

|                  |                                                       |
|------------------|-------------------------------------------------------|
| Pumps:           | E: Edwards<br>P: Pfeiffer                             |
| Furnaces:        | V/S: Vecstar<br>E: Elite                              |
| Magnet:          | E: Electromagnet<br>S: Standard                       |
| Turbos & Gauges: | S: Source<br>A: Analyser                              |
| Collectors:      | Std: Standard<br>S: Sulphur<br>HD: Hydrogen Deuterium |

### Additional System Info:





## COLLECTION NOTE

Job Number: **IN1288**  
Customer: University of Notre Dame  
Contact: **Dana Biasatti**

Collection on  
Date:

12/12/22

No.  
of boxes:

2

By:

Company:

TRILOGY

Vehicle

Reg No.

MVB94ZE

Signature:

P. Wyke

Print:

P. WYKE



Sercon Ltd  
Unit 3B Crewe Trade Park  
Gateway, Crewe, Cheshire  
CW1 6JT U.K.  
Registered in England and Wales: 4290072

Phone: +44 (0) 1270 580008  
Fax: +44 (0) 1270 252310  
sales@sercongroup.com  
**www.sercongroup.com**  
VAT No.: 771 1100 74  
19/01/2017

261001

COLLECTION NOTE

12/15/12

254444

261001

12/15/12

261001

## Packing List

**Customer Reference:** P2061175

**Shipper / Exporter:**

Sercon Limited  
Unit 3B Crewe Trade park  
Gateway  
Crewe  
CW1 6JT  
UK

Tel: +44 (0)1270 580008  
Reference: IN1288

**Consignee:**

University of Notre Dame  
Environmental Science & Tech  
B21A Fitzpatrick HL Engrng  
Building FITZ  
Notre Dame, IN 46556-5637  
USA

Contact Name: Dana Biasatti  
Contact Tel Number: 001-574-631-7062

### BOX: Dimensions and weights

|       | <u>L</u>   |   | <u>W</u>  |   | <u>H</u>   |    |                  |
|-------|------------|---|-----------|---|------------|----|------------------|
| Box 1 | <u>69</u>  | x | <u>60</u> | x | <u>110</u> | cm | gw <u>78</u> kg  |
| Box 2 | <u>100</u> | x | <u>86</u> | x | <u>107</u> | cm | gw <u>157</u> kg |





Sercon Ltd, Unit 3B Crewe Trade Park, Gateway  
Crewe, Cheshire CW1 6YY, UK  
Tel: +44 (0)1270 580008 Fax: +44 (0)1270 252310  
Company Registration No. 4290072 Vat No. 771 1100 74

## Installation report - 11

### 11 – Installation Report

|                   |                                                             |       |            |
|-------------------|-------------------------------------------------------------|-------|------------|
| Client:           | University of Notre Dame, Environmental Science & Tech, USA |       |            |
| Quotation Number: | 16196                                                       | Date: | 19/04/2022 |
| Job Number:       | IN1288                                                      | Date: | 05/08/2022 |

#### Faults and Shortages:

N/A

#### Follow up:

Engineer: Robert Kameny

Date: 17.2.2023

Signed:

*Kameny R.*

*Don BGS*



## 11 – Installation Report

|                   |                                                             |       |            |
|-------------------|-------------------------------------------------------------|-------|------------|
| Client:           | University of Notre Dame, Environmental Science & Tech, USA |       |            |
| Quotation Number: | 16196                                                       | Date: | 19/04/2022 |
| Job Number:       | IN1288                                                      | Date: | 05/08/2022 |

|                |               |                |
|----------------|---------------|----------------|
| Contact:       | Dana Biasatti |                |
| Date of Visit: | 13-17.2.2023  | No. of Days: 5 |
| Engineer:      | Robert Kameny |                |

### Details of visit:

#### Day 1

- Unit moved to desired location
- Comms on
- Pumps on
- Tubes set up S (isoeath+ packing excluded reduction stage)
- GC column (fast run GC)
- Temps: 1000, 860, 60 celsius
- Filament power on at 2e-07mBar
- Pumping overnight

#### Day 2

- Vacuum after pumping overnight 1.7e-08mBar
- Pressure test AM: pass (held 24psi/5 mins)
- N2 peak shape (pass): HT3860, HP 5, Focus 82, Trap 600, eV -85, IR 31.0 (2095)
- CO2 peak shape (pass): HT2503, HP 45, Focus 84, Trap 150, eV -80, IR 9.0 (405)
- SO2 peak shape (pass): HT1711, HP 49, Focus 88, Trap 600, eV -80, IR -7.0 (1602)
- SO2 2/1 stability: Pass
- 1mg of Cystine achieved signal: 1e-08 (64)
- Blank (1.64e-10) mass 28 :pass
- SO2 only precision (30ug S) cystine achieved 0.05std

#### Day 3

- Pressure test am : pass (held 24psi/5mins)
- SO2 peak shape and stability : pass
- SO2 precision: 0.05 std
- 0.300mg achieved 2.7nAmps

#### Day 4

- Background scan day 4 am: pass
- Training AM/PM
- Demo SO2 precision

#### Day 5

- Training AM/PM

### Recommendations:

- Consider purchase of Service contract
- Consider purchase consumables for NC and S analysis





Sercon Ltd, Unit 3B Crewe Trade Park, Gateway  
Crewe, Cheshire CW1 6YY, UK  
Tel: +44 (0)1270 580008 Fax: +44 (0)1270 252310  
Company Registration No. 4290072 Vat No. 771 1100 74

Certificate - 12

## 12 – Installation Acceptance and Warranty Certificate

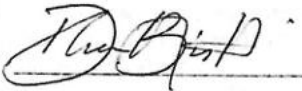
|                   |                                                            |       |            |
|-------------------|------------------------------------------------------------|-------|------------|
| Client:           | University of Notre Dame Environmental Science & Tech, USA |       |            |
| Quotation Number: | 16196                                                      | Date: | 19/04/2022 |
| Job Number:       | IN1288                                                     | Date: | 05/08/2022 |

|                    |                            |
|--------------------|----------------------------|
| Contact:           | Dana Biasatti              |
| System:            | Integra 2 (sulphur option) |
| Software:          | Calisto v40.5.6            |
| Engineer:          | Robert Kameny              |
| Installation Date: | 13-17.2.2023               |

|                     |           |
|---------------------|-----------|
| Warranty commences: | 17.2.2023 |
| Warranty Expires:   | 16.2.2025 |

### Customer Acceptance:

Name: Dana Biasatti

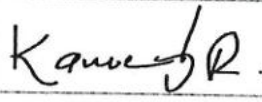
Signature: 

Date: 17.2.2023

### Engineer's Signature:

On behalf of Sercon Limited

Name: Robert Kameny

Signature: 

Date: 17.2.2023

Notes:



## 12 – Installation Acceptance and Warranty Certificate

|                   |                                                            |       |            |
|-------------------|------------------------------------------------------------|-------|------------|
| Client:           | University of Notre Dame Environmental Science & Tech, USA |       |            |
| Quotation Number: | 16196                                                      | Date: | 19/04/2022 |
| Job Number:       | IN1288                                                     | Date: | 05/08/2022 |

|                    |                            |
|--------------------|----------------------------|
| Contact:           | Dana Biasatti              |
| System:            | Integra 2 (sulphur option) |
| Software:          | Calisto v40.5.6            |
| Engineer:          | Robert Kameny              |
| Installation Date: | 13-17.2.2023               |

|                     |           |
|---------------------|-----------|
| Warranty commences: | 17.2.2023 |
| Warranty Expires:   | 16.2.2025 |

### Customer Acceptance:

Name: Dana Biasatti

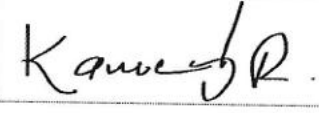
Signature: 

Date: 17.2.2023

### Engineer's Signature:

On behalf of Sercon Limited

Name: Robert Kameny

Signature: 

Date: 17.2.2023

Notes:



## 11 – Installation Report

|                   |                                                             |       |          |
|-------------------|-------------------------------------------------------------|-------|----------|
| Client:           | University of Notre Dame, Environmental Science & Tech, USA |       |          |
| Quotation Number: | 15196                                                       | Date: | 19/04/22 |
| Job Number:       | 1N1288                                                      | Date: | 05/08/22 |

|                |               |                |
|----------------|---------------|----------------|
| Contact:       | Dana Biasatti |                |
| Date of Visit: | 13-17.2.2023  | No. of Days: 5 |
| Engineer:      | Robert Kameny |                |

### Details of visit:

#### Day 1

- Unit moved to desired location
- Comms on
- Pumps on
- Tubes set up S (isoearth+ packing excluded reduction stage)
- GC column (fast run GC)
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#### Day 2

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- SO2 peak shape (pass): HT1711,HP 49,Focus 88,Trap 600, eV -80,IR -7.0 (1602)
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- SO2 peak shape and stability : pass
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#### Day 4

- Background scan day 4 am: pass
- Training AM/PM
- Demo SO2 precision

#### Day 5

- Training AM/PM

### Recommendations:

- Consider purchase of Service contract
- Consider purchase consumables for NC and S analysis



## 11 – Installation Report

|                   |                                                             |       |          |
|-------------------|-------------------------------------------------------------|-------|----------|
| Client:           | University of Notre Dame, Environmental Science & Tech, USA |       |          |
| Quotation Number: | 15196                                                       | Date: | 19/04/22 |
| Job Number:       | 1N1288                                                      | Date: | 05/08/22 |

### Faults and Shortages:

N/A

### Follow up:

Engineer: Robert Kameny

Date: 17.2.2023

Signed:

