

CLIENT DETAILS

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Project **217500-Lithgow SWF**
 Order Number **217500**
 Samples **1**

LABORATORY DETAILS

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SGS Reference **SE239188 R0**
 Date Received **17 Nov 2022**
 Date Reported **24 Nov 2022**

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES



Dong LIANG
 Metals/Inorganics Team Leader



Huong CRAWFORD
 Production Manager



Ly Kim HA
 Organic Section Head



Shane MCDERMOTT
 Inorganic/Metals Chemist



Teresa NGUYEN
 Organic Chemist

| | | | |
|-----------|-------|---------------|--------------|
| | | Sample Number | SE239188.001 |
| | | Sample Matrix | Water |
| | | Sample Date | 15 Nov 2022 |
| | | Sample Name | SW1 |
| Parameter | Units | LOR | |

Volatile Petroleum Hydrocarbons in Water Method: AN433 Tested: 22/11/2022

| | | | |
|------------|------|----|-----|
| TRH C6-C10 | µg/L | 50 | <50 |
| TRH C6-C9 | µg/L | 40 | <40 |

Surrogates

| | | | |
|-----------------------------------|---|---|------------|
| d4-1,2-dichloroethane (Surrogate) | % | - | 104 |
| d8-toluene (Surrogate) | % | - | 105 |
| Bromofluorobenzene (Surrogate) | % | - | 101 |

VPF F Bands

| | | | |
|----------------------------|------|-----|------|
| Benzene (F0) | µg/L | 0.5 | <0.5 |
| TRH C6-C10 minus BTEX (F1) | µg/L | 50 | <50 |

TRH (Total Recoverable Hydrocarbons) in Water Method: AN403 Tested: 22/11/2022

| | | | |
|-------------|------|-----|------|
| TRH C10-C14 | µg/L | 50 | <50 |
| TRH C15-C28 | µg/L | 200 | <200 |
| TRH C29-C36 | µg/L | 200 | <200 |
| TRH C37-C40 | µg/L | 200 | <200 |
| TRH C10-C40 | µg/L | 320 | <320 |

TRH F Bands

| | | | |
|---------------------------------|------|-----|------|
| TRH >C10-C16 | µg/L | 60 | <60 |
| TRH >C10-C16 - Naphthalene (F2) | µg/L | 60 | <60 |
| TRH >C16-C34 (F3) | µg/L | 500 | <500 |
| TRH >C34-C40 (F4) | µg/L | 500 | <500 |

OC Pesticides in Water Method: AN420 Tested: 22/11/2022

| | | | |
|-------------------------|------|-----|------|
| Hexachlorobenzene (HCB) | µg/L | 0.1 | <0.1 |
| Alpha BHC | µg/L | 0.1 | <0.1 |
| Lindane (gamma BHC) | µg/L | 0.1 | <0.1 |
| Heptachlor | µg/L | 0.1 | <0.1 |
| Aldrin | µg/L | 0.1 | <0.1 |
| Beta BHC | µg/L | 0.1 | <0.1 |
| Delta BHC | µg/L | 0.1 | <0.1 |
| Heptachlor epoxide | µg/L | 0.1 | <0.1 |
| o,p'-DDE | µg/L | 0.1 | <0.1 |
| Alpha Endosulfan | µg/L | 0.1 | <0.1 |
| Gamma Chlordane | µg/L | 0.1 | <0.1 |
| Alpha Chlordane | µg/L | 0.1 | <0.1 |
| trans-Nonachlor | µg/L | 0.1 | <0.1 |
| p,p'-DDE | µg/L | 0.1 | <0.1 |
| Dieldrin | µg/L | 0.1 | <0.1 |
| Endrin | µg/L | 0.1 | <0.1 |
| o,p'-DDD | µg/L | 0.1 | <0.1 |
| o,p'-DDT | µg/L | 0.1 | <0.1 |
| Beta Endosulfan | µg/L | 0.1 | <0.1 |
| p,p'-DDD | µg/L | 0.1 | <0.1 |
| p,p'-DDT | µg/L | 0.1 | <0.1 |
| Endosulfan sulphate | µg/L | 0.1 | <0.1 |
| Endrin aldehyde | µg/L | 0.1 | <0.1 |
| Methoxychlor | µg/L | 0.1 | <0.1 |
| Endrin ketone | µg/L | 0.1 | <0.1 |
| Isodrin | µg/L | 0.1 | <0.1 |
| Mirex | µg/L | 0.1 | <0.1 |
| Total OC | µg/L | 1 | <1 |
| Total OC | µg/L | 1 | <1 |

Sample Number SE239188.001
Sample Matrix Water
Sample Date 15 Nov 2022
Sample Name SW1

| Parameter | Units | LOR |
|-----------|-------|-----|
|-----------|-------|-----|

OC Pesticides in Water Method: AN420 Tested: 22/11/2022 (continued)

Surrogates

| | | | |
|---|---|---|----|
| Tetrachloro-m-xylene (TCMX) (Surrogate) | % | - | 52 |
|---|---|---|----|

OP Pesticides in Water Method: AN420 Tested: 22/11/2022

| | | | |
|-----------------------------------|------|-----|------|
| Dichlorvos | µg/L | 0.5 | <0.5 |
| Dimethoate | µg/L | 0.5 | <0.5 |
| Diazinon (Dimpylate) | µg/L | 0.5 | <0.5 |
| Fenitrothion | µg/L | 0.2 | <0.2 |
| Malathion | µg/L | 0.2 | <0.2 |
| Chlorpyrifos (Chlorpyrifos Ethyl) | µg/L | 0.2 | <0.2 |
| Parathion-ethyl (Parathion) | µg/L | 0.2 | <0.2 |
| Bromophos Ethyl | µg/L | 0.2 | <0.2 |
| Methidathion | µg/L | 0.5 | <0.5 |
| Ethion | µg/L | 0.2 | <0.2 |
| Azinphos-methyl | µg/L | 0.2 | <0.2 |

Surrogates

| | | | |
|------------------------------|---|---|----|
| 2-fluorobiphenyl (Surrogate) | % | - | 48 |
| d14-p-terphenyl (Surrogate) | % | - | 64 |

Total Phenolics in Water Method: AN295 Tested: 22/11/2022

| | | | |
|---------------|------|------|-------|
| Total Phenols | mg/L | 0.05 | <0.05 |
|---------------|------|------|-------|

Anions by Ion Chromatography in Water Method: AN245 Tested: 22/11/2022

| | | | |
|-------------------------|------|-------|-------|
| Nitrate Nitrogen, NO3-N | mg/L | 0.005 | 1.1 |
| Chloride | mg/L | 1 | 13 |
| Sulfate, SO4 | mg/L | 1 | 16 |
| Fluoride | mg/L | 0.1 | <0.10 |

| | | | |
|-----------|-------|---------------|--------------|
| | | Sample Number | SE239188.001 |
| | | Sample Matrix | Water |
| | | Sample Date | 15 Nov 2022 |
| | | Sample Name | SW1 |
| Parameter | Units | LOR | |

Ammonia Nitrogen by Discrete Analyser Method: AN291 Tested: 18/11/2022

| | | | |
|--|------|------|-----|
| Ammonia Nitrogen, NH ₃ as N | mg/L | 0.01 | 1.1 |
|--|------|------|-----|

Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 22/11/2022

| | | | |
|--|------|------|------|
| Total Phosphorus (Kjeldahl Digestion) as P | mg/L | 0.02 | 0.31 |
|--|------|------|------|

COD in Water Method: AN179/AN181 Tested: 22/11/2022

| | | | |
|------------------------|------|----|----|
| Chemical Oxygen Demand | mg/L | 10 | 42 |
|------------------------|------|----|----|

Forms of Carbon Method: AN190 Tested: 18/11/2022

| | | | |
|------------------------------|------|-----|----|
| Total Organic Carbon as NPOC | mg/L | 0.2 | 14 |
|------------------------------|------|-----|----|

pH in water Method: AN101 Tested: 17/11/2022

| | | | |
|------|---------|---|-----|
| pH** | No unit | - | 7.3 |
|------|---------|---|-----|

Conductivity and TDS by Calculation - Water Method: AN106 Tested: 17/11/2022

| | | | |
|---------------------|-------|---|-----|
| Conductivity @ 25 C | µS/cm | 2 | 250 |
|---------------------|-------|---|-----|

| | | | |
|-----------|-------|---------------|--------------|
| | | Sample Number | SE239188.001 |
| | | Sample Matrix | Water |
| | | Sample Date | 15 Nov 2022 |
| | | Sample Name | SW1 |
| Parameter | Units | LOR | |

Total and Volatile Suspended Solids (TSS / VSS) Method: AN114 Tested: 22/11/2022

| | | | |
|---|------|---|------------|
| Total Suspended Solids Dried at 103-105°C | mg/L | 5 | 320 |
|---|------|---|------------|

Alkalinity Method: AN135 Tested: 24/11/2022

| | | | |
|---------------------------------------|------|---|-----------|
| Total Alkalinity as CaCO ₃ | mg/L | 5 | 87 |
|---------------------------------------|------|---|-----------|

Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 18/11/2022

| | | | |
|---------------------------|------|-------|--------|
| Hexavalent Chromium, Cr6+ | mg/L | 0.004 | <0.004 |
|---------------------------|------|-------|--------|

Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 22/11/2022

| | | | |
|---------------|------|-----|------------|
| Calcium, Ca | mg/L | 0.2 | 25 |
| Magnesium, Mg | mg/L | 0.1 | 6.2 |
| Potassium, K | mg/L | 0.1 | 9.2 |
| Sodium, Na | mg/L | 0.5 | 12 |

Trace Metals (Dissolved) in Water by ICPMS Method: AN318 Tested: 18/11/2022

| | | | |
|-----------|------|-------|--------------|
| Aluminium | µg/L | 5 | 440 |
| Iron | mg/L | 0.005 | 0.52 |
| Manganese | mg/L | 0.001 | 0.005 |

Trace Metals (Total) in Water by ICPMS Method: AN022/AN318 Tested: 18/11/2022

| | | | |
|----------------|------|-------|--------------|
| Total Chromium | mg/L | 0.001 | 0.004 |
|----------------|------|-------|--------------|

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Alkalinity Method: ME-(AU)-[ENV]AN135

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---------------------------|-----------------|-------|-----|----|----------|------------------|
| Total Alkalinity as CaCO3 | LB264712 | mg/L | 5 | <5 | 8% | 107% |

Ammonia Nitrogen by Discrete Analyser Method: ME-(AU)-[ENV]AN291

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|--|-----------------|-------|------|-------|----------|------------------|-----------------|
| Ammonia Nitrogen, NH ₃ as N | LB264230 | mg/L | 0.01 | <0.01 | 3% | 101% | 99% |

Anions by Ion Chromatography in Water Method: ME-(AU)-[ENV]AN245

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|--------------------------------------|-----------------|-------|-------|--------|----------|------------------|-----------------|
| Nitrate Nitrogen, NO ₃ -N | LB264431 | mg/L | 0.005 | <0.005 | 0 - 1% | 100% | 95% |
| Chloride | LB264431 | mg/L | 1 | <1.0 | | 97% | |
| Sulfate, SO ₄ | LB264431 | mg/L | 1 | <1.0 | | 96% | |
| Fluoride | LB264431 | mg/L | 0.1 | <0.10 | | 99% | |

COD in Water Method: ME-(AU)-[ENV]AN179/AN181

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|------------------------|-----------------|-------|-----|-----|----------|------------------|
| Chemical Oxygen Demand | LB264512 | mg/L | 10 | <10 | 0 - 3% | 97% |

Conductivity and TDS by Calculation - Water Method: ME-(AU)-[ENV]AN106

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---------------------|-----------------|-------|-----|----|----------|------------------|
| Conductivity @ 25 C | LB264161 | µS/cm | 2 | <2 | 0 - 1% | 103% |

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Forms of Carbon Method: ME-(AU)-[ENV]AN190

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|------------------------------|--------------|-------|-----|------|----------|---------------|--------------|
| Total Organic Carbon as NPOC | LB264232 | mg/L | 0.2 | <0.2 | 3% | 91% | 95% |

Hexavalent Chromium in water by Discrete Analyser Method: ME-(AU)-[ENV]AN283

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---------------------------|--------------|-------|-------|--------|----------|---------------|
| Hexavalent Chromium, Cr6+ | LB264274 | mg/L | 0.004 | <0.004 | 0% | 107% |

Metals in Water (Dissolved) by ICPOES Method: ME-(AU)-[ENV]AN320

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---------------|--------------|-------|-----|------|----------|---------------|
| Calcium, Ca | LB264415 | mg/L | 0.2 | <0.2 | 0% | 99% |
| Magnesium, Mg | LB264415 | mg/L | 0.1 | <0.1 | 0% | 95% |
| Potassium, K | LB264415 | mg/L | 0.1 | <0.1 | 1 - 2% | 96% |
| Sodium, Na | LB264415 | mg/L | 0.5 | <0.5 | 0 - 1% | 97% |

OC Pesticides in Water Method: ME-(AU)-[ENV]AN420

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|-------------------------|--------------|-------|-----|------|---------------|
| Hexachlorobenzene (HCB) | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Alpha BHC | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Lindane (gamma BHC) | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Heptachlor | LB264421 | µg/L | 0.1 | <0.1 | 108% |
| Aldrin | LB264421 | µg/L | 0.1 | <0.1 | 92% |
| Beta BHC | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Delta BHC | LB264421 | µg/L | 0.1 | <0.1 | 109% |
| Heptachlor epoxide | LB264421 | µg/L | 0.1 | <0.1 | NA |
| o,p'-DDE | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Alpha Endosulfan | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Gamma Chlordane | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Alpha Chlordane | LB264421 | µg/L | 0.1 | <0.1 | NA |
| trans-Nonachlor | LB264421 | µg/L | 0.1 | <0.1 | NA |
| p,p'-DDE | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Dieldrin | LB264421 | µg/L | 0.1 | <0.1 | 113% |
| Endrin | LB264421 | µg/L | 0.1 | <0.1 | 117% |
| o,p'-DDD | LB264421 | µg/L | 0.1 | <0.1 | NA |
| o,p'-DDT | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Beta Endosulfan | LB264421 | µg/L | 0.1 | <0.1 | NA |
| p,p'-DDD | LB264421 | µg/L | 0.1 | <0.1 | NA |
| p,p'-DDT | LB264421 | µg/L | 0.1 | <0.1 | 109% |
| Endosulfan sulphate | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Endrin aldehyde | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Methoxychlor | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Endrin ketone | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Isodrin | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Mirex | LB264421 | µg/L | 0.1 | <0.1 | NA |
| Total OC | LB264421 | µg/L | 1 | <1 | |
| Total OC | LB264421 | µg/L | 1 | <1 | |

Surrogates

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|--------------|-------|-----|------|---------------|
| Tetrachloro-m-xylene (TCMX) (Surrogate) | LB264421 | % | - | 105% | 100% |

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Water Method: ME-(AU)-[ENV]AN420

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|-----------------------------------|-----------------|-------|-----|------|------------------|
| Dichlorvos | LB264421 | µg/L | 0.5 | <0.5 | 93% |
| Dimethoate | LB264421 | µg/L | 0.5 | <0.5 | NA |
| Diazinon (Dimpylate) | LB264421 | µg/L | 0.5 | <0.5 | 92% |
| Fenitrothion | LB264421 | µg/L | 0.2 | <0.2 | NA |
| Malathion | LB264421 | µg/L | 0.2 | <0.2 | NA |
| Chlorpyrifos (Chlorpyrifos Ethyl) | LB264421 | µg/L | 0.2 | <0.2 | 92% |
| Parathion-ethyl (Parathion) | LB264421 | µg/L | 0.2 | <0.2 | NA |
| Bromophos Ethyl | LB264421 | µg/L | 0.2 | <0.2 | NA |
| Methidathion | LB264421 | µg/L | 0.5 | <0.5 | NA |
| Ethion | LB264421 | µg/L | 0.2 | <0.2 | 82% |
| Azinphos-methyl | LB264421 | µg/L | 0.2 | <0.2 | NA |

Surrogates

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|------------------------------|-----------------|-------|-----|-----|------------------|
| 2-fluorobiphenyl (Surrogate) | LB264421 | % | - | 68% | 70% |
| d14-p-terphenyl (Surrogate) | LB264421 | % | - | 76% | 80% |

pH in water Method: ME-(AU)-[ENV]AN101

| Parameter | QC Reference | Units | LOR | LCS %Recovery |
|-----------|-----------------|---------|-----|------------------|
| pH** | LB264161 | No unit | - | 100% |

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total and Volatile Suspended Solids (TSS / VSS) Method: ME-(AU)-[ENV]AN114

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|--------------|-------|-----|----|----------|---------------|
| Total Suspended Solids Dried at 103-105°C | LB264422 | mg/L | 5 | <5 | 2% | 88% |

Total Phenolics in Water Method: ME-(AU)-[ENV]AN295

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|---------------|--------------|-------|------|-------|----------|---------------|--------------|
| Total Phenols | LB264426 | mg/L | 0.05 | <0.05 | 0% | 100% | 100% |

Total Phosphorus by Kjeldahl Digestion DA in Water Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|--|--------------|-------|------|-------|----------|---------------|--------------|
| Total Phosphorus (Kjeldahl Digestion) as P | LB264470 | mg/L | 0.02 | <0.02 | 0 - 1% | 100% | 97% |

Trace Metals (Dissolved) in Water by ICPMS Method: ME-(AU)-[ENV]AN318

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|-----------|--------------|-------|-------|--------|----------|---------------|
| Aluminium | LB264177 | µg/L | 5 | <5 | | 103 - 104% |
| Iron | LB264177 | mg/L | 0.005 | <0.005 | 4 - 5% | 96 - 97% |
| Manganese | LB264177 | mg/L | 0.001 | <0.001 | 0% | 102 - 103% |

Trace Metals (Total) in Water by ICPMS Method: ME-(AU)-[ENV]AN022/AN318

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|----------------|--------------|-------|-------|--------|----------|---------------|--------------|
| Total Chromium | LB264179 | mg/L | 0.001 | <0.001 | 28% | 95% | NA |

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

TRH (Total Recoverable Hydrocarbons) in Water Method: ME-(AU)-[ENV]AN403

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|-------------|-----------------|-------|-----|------|----------|------------------|
| TRH C10-C14 | LB264421 | µg/L | 50 | <50 | 0% | 92% |
| TRH C15-C28 | LB264421 | µg/L | 200 | <200 | 0% | 121% |
| TRH C29-C36 | LB264421 | µg/L | 200 | <200 | 0% | 113% |
| TRH C37-C40 | LB264421 | µg/L | 200 | <200 | 0% | NA |
| TRH C10-C40 | LB264421 | µg/L | 320 | <320 | 0% | NA |

TRH F Bands

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---------------------------------|-----------------|-------|-----|------|----------|------------------|
| TRH >C10-C16 | LB264421 | µg/L | 60 | <60 | 0% | 102% |
| TRH >C10-C16 - Naphthalene (F2) | LB264421 | µg/L | 60 | <60 | 0% | NA |
| TRH >C16-C34 (F3) | LB264421 | µg/L | 500 | <500 | 0% | 125% |
| TRH >C34-C40 (F4) | LB264421 | µg/L | 500 | <500 | 0% | 117% |

Volatile Petroleum Hydrocarbons in Water Method: ME-(AU)-[ENV]AN433

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|------------|-----------------|-------|-----|-----|----------|------------------|-----------------|
| TRH C6-C10 | LB264444 | µg/L | 50 | <50 | 0% | 108% | 93% |
| TRH C6-C9 | LB264444 | µg/L | 40 | <40 | 0% | 105% | 97% |

Surrogates

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|-----------------------------------|-----------------|-------|-----|------|----------|------------------|-----------------|
| d4-1,2-dichloroethane (Surrogate) | LB264444 | % | - | 104% | 5% | 98% | 86% |
| d8-toluene (Surrogate) | LB264444 | % | - | 99% | 7% | 109% | 102% |
| Bromofluorobenzene (Surrogate) | LB264444 | % | - | 100% | 7% | 116% | 115% |

VPH F Bands

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|----------------------------|-----------------|-------|-----|-----|----------|------------------|-----------------|
| Benzene (F0) | LB264444 | µg/L | 0.5 | | 0% | NA | NA |
| TRH C6-C10 minus BTEX (F1) | LB264444 | µg/L | 50 | <50 | 0% | 105% | 88% |

METHOD

METHODOLOGY SUMMARY

| | |
|-------------|---|
| AN020 | Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B. |
| AN022 | The water sample is digested with Nitric Acid and made up to the original volume similar to APHA3030E. |
| AN022/AN318 | Following acid digestion of un filtered sample, determination of elements at trace level in waters by ICP-MS technique, referenced to USEPA 6020B and USEPA 200.8 (5.4). |
| AN101 | pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+. |
| AN106 | Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Total Dissolved Salts can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. SGS use 0.6. Reference APHA 2510 B. |
| AN106 | Salinity may be calculated in terms of NaCl from the sample conductivity. This assumes all soluble salts present, measured by the conductivity, are present as NaCl. |
| AN114 | Total Suspended and Volatile Suspended Solids: The sample is homogenised by shaking and a known volume is filtered through a pre-weighed GF/C filter paper and washed well with deionised water. The filter paper is dried and reweighed. The TSS is the residue retained by the filter per unit volume of sample. Reference APHA 2540 D. Internal Reference AN114 |
| AN135 | Alkalinity (and forms of) by Titration: The sample is titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135 |
| AN181 | Analysis of COD by Semi Closed Reflux: The sample is refluxed with strong acid and a known excess of oxidant. After digestion the unreacted oxidant is back titrated to determine the amount of oxidant consumed. The chemically oxidised matter is calculated in terms of oxygen equivalents. Reference APHA 5220 B. |
| AN190 | TOC and DOC in Water: A homogenised micro portion of sample is injected into a heated reaction chamber packed with an oxidative catalyst that converts organic carbon to carbon dioxide. The CO ₂ is measured using a non-dispersive infrared detector. The process is fully automated in a commercially available analyser. If required a sugar value can be calculated from the TOC result. Reference APHA 5310 B. |
| AN190 | Chemical oxygen demand can be calculated/estimated based on the O ₂ /C relation as 2.67*NPOC (TOC). This is an estimate only and the factor will vary with sample matrix so results should be interpreted with caution. |
| AN245 | Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO ₂ , NO ₃ and SO ₄ are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B |

METHOD

METHODOLOGY SUMMARY

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|---------------------|---|
| AN279/AN293(Sydney) | The sample is digested with Sulphuric acid, K ₂ SO ₄ and CuSO ₄ . All forms of phosphorus are converted into orthophosphate. The digest is cooled and placed on the discrete analyser for colorimetric analysis. |
| AN283 | Hexavalent Chromium via DA: Soluble hexavalent chromium forms a red/violet colour with diphenylcarbazide in acidic solution. This procedure is very sensitive and nearly specific for Cr ⁶⁺ . If total chromium is also measured the trivalent form of chromium Cr ³⁺ can be calculated from the difference (Total Cr - Cr ⁶⁺). Reference APHA3500CrB. |
| AN291 | Ammonia in solution reacts with hypochlorite ions from Sodium Dichloroisocyanate, and salicylate in the presence of Sodium Nitroprusside to form indophenol blue and measured at 670 nm by Discrete Analyser. |
| AN295 | The water sample or extract of sample is distilled in a phosphoric acid stream. Phenolic compounds in the distillate react with a reagent stream of potassium hexacyanoferrate(III) and 4-Amino-2,3-dimethyl-5-pyrazolin-5-one in an alkaline medium to form a coloured complex which is analysed spectrophotometrically onboard a continuous flow analyser. |
| AN318 | Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4). |
| AN320 | Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components . |
| AN320 | Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B. |
| AN403 | Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used. |
| AN403 | Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents. |
| AN403 | The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B. |
| AN420 | SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D). |

METHOD

AN433

METHODOLOGY SUMMARY

VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

Calculation

Free and Total Carbon Dioxide may be calculated using alkalinity forms only when the samples TDS is <500mg/L. If TDS is >500mg/L free or total carbon dioxide cannot be reported . APHA4500CO2 D.

FOOTNOTES

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|-----|--|-----|--|
| IS | Insufficient sample for analysis. | LOR | Limit of Reporting |
| LNR | Sample listed, but not received. | ↑↓ | Raised or Lowered Limit of Reporting |
| * | NATA accreditation does not cover the performance of this service. | QFH | QC result is above the upper tolerance |
| ** | Indicative data, theoretical holding time exceeded. | QFL | QC result is below the lower tolerance |
| *** | Indicates that both * and ** apply. | - | The sample was not analysed for this analyte |
| | | NVL | Not Validated |

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.

Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- 1 Bq is equivalent to 27 pCi
- 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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