GEL Laboratories

# Sample Packing Checklist

**Use this checklist to properly pack your GEL sample cooler**

- During sample collection, use caution to avoid flushing away preservative from preserved bottles by over filling. The chain of custody (COC) should be completed with sample IDs, dates, and times as well as the sample labels affixed to the containers during collection. Ensure the COC and the information on the sampling containers match.

- Prior to packing, verify the COC has been completed including analyses requested, expected turnaround time, potential sample hazards, project name, PO or quote reference. We encourage the use of an electronic COC for legibility and ease of importing into our LIMS system. Please include a hard copy in the shipping container as well as email the electronic version to your Project Management team.

- Insert absorbent pad and then insert a plastic liner when packaging aqueous samples or using wet ice for temperature preservation.

- Ensure all lids are securely tightened. If samples were collected in glass containers, place container inside plastic bubble wrap bag. Place all containers inside cooler. When possible, try to alternate glass and plastic containers to prevent breakage.

- Surround all samples with wet ice within the plastic liner. We recommend using double re-sealable bags to contain the ice. Make sure the ice is distributed throughout the cooler and sufficient enough to cool all samples during transit. Refer to our sample analysis guide below to ensure you are shipping your sample containers per analysis requirements. If in doubt, contact your project manager for support.

- Add more bubble wrap or padding to fill the remaining space inside the cooler to prevent breakage.

- Relinquish the hardcopy COC, place inside ziplock bag with any other supporting documentation including data on chemical, biological, radioactive or other potential hazards. Contact your project manager with any hazard or radioactive information prior to shipping as approval must be granted for these shipments from GEL. Place COC and supporting document on top of samples or tape to the lid.

- If the shipping container is to be returned, ensure the correct address is written on the container itself.

- Close cooler. Tape around the cooler, top and bottom, several times to prevent the cooler from leaking. Affix any shipping labels required for transport in accordance with the Department of Transportation regulation.

## *APPENDIX J: SAMPLE STORAGE AND PRESERVATION REQUIREMENTS*
## *STORAGE AND PRESERVATION*
## *Appendix J, QAP Rev 33, March 2019*

| Parameter | Container [1] | Preservation | Holding Time[2] | Min. Volume[5] |
|---|---|---|---|---|
| **INORGANICS** | | | | |
| Acidity | P,G | 0 ≤ 6° C | 14 days | 25 mL / NA |
| Adsorbable Organic Halides (AOX) | G, amber | 0 ≤ 6° C, $HNO_3$ to pH < 2, zero headspace | >3 days and < 6 months from collection | 50 mL / 1 g |
| Alkalinity | P,G | 0 ≤ 6° C | 14 days | 50 mL / NA |
| **Biochemical Oxygen Demand (BOD) and Carbonaceous Oxygen Demand (CBOD)** | **P,G** | **0 ≤ 6° C** | **48 hours** | **500 mL / NA** |
| Bromide | P,G | None required | 28 days | 10 mL / 4 g |
| **Carbon Dioxide** | **P,G** | **0 ≤ 6° C** | **Immediate** | **50 mL / NA** |
| Chemical Oxygen Demand (COD) | P,G | 0 ≤ 6° C, $H_2SO_4$ to pH < 2 | 28 days | 2 mL / NA |
| Chlorine by Bomb Calorimeter | P,G | 0 ≤ 6° C | None | NA / 0.5 g |
| Chloride | P,G | None required | 28 days | 10 mL / 4 g |
| **Color** | **P,G** | **0 ≤ 6° C** | **48 hours** | **50 mL / NA** |
| Conductivity | P,G | 0 ≤ 6° C | 28 days | 25 mL / NA |
| **Corrosivity by pH** | **P,G** | **None** | **Immediate** | **25 mL / 5 g** |
| Corrosivity to Steel | P,G | None | None | 290 mL / NA |
| Cyanide amenable to chlorination | P,G | 0 ≤ 6° C, NaOH to pH > 12, 0.6 g ascorbic acid [3] | 14 days [4] | 50 mL / NA |
| Cyanide, Reactive Releasable | G, amber | Zero headspace | 7 days liquids, 28 days solids | 10 mL / 10 g |
| Cyanide, total, available, free or Weak Acid Dissociable | P,G | 0 ≤ 6° C, NaOH to pH > 12, 0.6 g ascorbic acid [3] | 14 days [4] | 50 mL / 1 g |
| Density | P,G | 0 ≤ 6° C | 7 days | NA / 10 g |
| **Dissolved Oxygen** | **G (bottle and top)** | **None, Zero headspace** | **Immediate** | **300 mL / NA** |
| **Extractable Organic Halides (EOX)** | G, amber | Zero headspace, 0 ≤ 6° C | **28 days** | **25 mL** |
| Flashpoint | Metal, G | None | None | 25 mL / 2 g Setaflash |
| Fluoride | P,G | None Required | 28 days | 25 mL / 4 g |
| Fluorine by Bomb | P,G | 0 ≤ 6° C | None | NA/ 0.5 g |
| Hardness (EDTA titration) | P,G | 0 ≤ 6° C, $HNO_3$ to pH < 2 | 6 months | 50 mL / NA |
| Hardness (calculation) | P,G | $HNO_3$ to pH < 2 | 6 months | 50 mL / NA |
| Heating Value | P,G | 0 ≤ 6° C | None | 1 mL / 0.5 g |
| Nitrogen-Ammonia | P,G | 0 ≤ 6° C, $H_2SO_4$ to pH< 2 | 28 days | 20 mL / 5 g |
| **Nitrate – Liquids** | **P,G** | **0 ≤ 6° C** | **48 hours** | **10 mL** |
| Nitrate – Solids | P,G | 0 ≤ 6° C | 28 days for extraction, 48 hrs from extraction to analysis | 4 g |
| **Nitrite - Liquids** | **P,G** | **0 ≤ 6° C** | **48 hours** | **10 mL** |
| Nitrite - Solids | P,G | 0 ≤ 6° C | 28 days for extraction, 48 hrs from extraction to analysis | 4 g |

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| Nitrate/Nitrite | P,G | 0 ≤ 6° C, $H_2SO_4$ to pH < 2 | 28 days | 4 mL / 4 g |
| Nitrogen - Total Kjeldahl and Organic | P,G | 0 ≤ 6° C, $H_2SO_4$ to pH < 2 | 28 days | 20 mL / 5 g |
| Oil and Grease | G | 0 ≤ 6° C, HCl or $H_2SO4$ to pH < 2 | 28 days | 1000 mL |
| **Orthophosphate -Liquids** | **P,G** | **Field filter immediately, 0 ≤ 6° C** | **48 hours** | **10 mL** |
| Orthophosphate – Solids | P,G | 0 ≤ 6° C | 28 days for extraction, 48 hrs from extraction to analysis | 4 g |
| Paint Filter Liquids Test | Any | None | None | 100 g |
| Percent (%) Moisture | P,G | 0 ≤ 6° C | None | 2 mL / 5 g |
| Perchlorate by Ion Chromatography | P,G | 0 ≤ 6° C | 28 days | 10 mL / 4g |
| Total Phenols | G, | 0 ≤6° C, $H_2SO_4$ to pH < 2 | 28 days | 50 mL / 1 g |
| **pH** | **P,G** | **None if within 15 mins of collection,** 0 ≤ 6° C when shipped to lab | **Immediate** | **25 mL / 5 g** |
| Total Phosphorus | P,G | 0 ≤ 6° C, $H_2SO_4$ to pH < 2 | 28 days | 20 mL / 1 g |
| **Residual Chlorine** | **P,G** | **None Required** | **Immediate** | **25 mL / NA** |
| Residue, Total | P,G | 0 ≤ 6° C | 7 days | 100 mL / NA |
| Residue, Filterable (TDS) | P,G | 0 ≤ 6° C | 7 days | 70 mL / NA |
| Residue, NonFilterable (TSS) | P,G | 0 ≤ 6° C | 7 days | 1000 mL |
| Residue, Volatile and Fixed (% Ash) | P,G | 0 ≤ 6° C | 7 days | 25 mL / 1 g |
| Salinity | P,G | 0 ≤ 6° C | 28 days | 25 mL / NA |
| Specific Gravity | P,G | 0 ≤ 6° C | 7 days | 50 mL / NA |
| Sulfate | P,G | 0 ≤ 6° C | 28 days | 10 mL / 4 g |
| Sulfide | P,G | 0 ≤ 6° C, add ZnAc and NaOH to pH > 9 | 7 days | 200 mL / 20 g |
| Sulfide, Reactive Releasable | G, amber | Zero headspace, 0 ≤ 6° C | 7 days liquids, 28 days solids | 10 mL / 10 g |
| Sulfide, Acid-Soluble | P,G | Zero headspace, 0 ≤ 6° C Liquids: ZnAc and NaOH to pH > 9. Solids: Fill surface with 2N ZnAc | 7 days liquids, 365 days solids | 200 mL / 20 g |
| **Sulfite** | **P,G** | **EDTA[9]** | **Immediate** | **50 mL / NA** |
| Sulfur by Bomb | P,G | 0 ≤ 6° C | None | NA / 0.5 g |
| **Surfactants** | **P,G** | **0 ≤ 6° C** | **48 hours** | **100 mL / NA** |
| Total Organic Carbon (TOC), also applies Dissolved Organic Carbon (DOC), Total Carbon (TC) and Total Inorganic Carbon (TIC) | G, amber | 0 ≤ 6° C, HCl or $H_2SO_4$ to pH < 2 | 28 days | 50 mL / 5 g |
| Total Organic Halides (TOX) | G | 0 ≤ 6° C, $H_2SO_4$ to pH < 2, Zero headspace | 28 days | 50 mL / 1 g |
| Total Petroleum Hydrocarbons | G | 0 ≤ 6° C, $H_2SO_4$ to pH < 2 | 28 days | 1000 mL / NA |
| TCLP (Toxicity Characteristic leaching Procedure) and Synthetic Precipitation Leaching Procedure (SPLP) | P,G depending on test | 0 ≤6° C, depends on test | 14 days, VOA 14 days, SVOA 28 days Mercury 180 days non-Hg metals | 105 g or 130 g for full TCLP list |
| **Turbidity** | **P,G** | **0 ≤ 6° C** | **48 hours** | **50 mL / NA** |

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|---|---|---|---|---|
| Viscosity | P,G | 0 ≤ 6° C | None | 7 mL |
| Metals – Liquids (except chromium VI, Boron, Silica and mercury) | P, (G as long as no B or Si is required) | $HNO_3$ to pH < 2 | 6 months | 20 mL |
| Boron-Liquids | P, Teflon or Quartz | $HNO_3$ to pH <2 | 6 months | 50 mL |
| Silica- Liquids | P or Quartz | 0 ≤ 6° C | 28 days | 50 mL |
| Metals – Solids[8] (except chromium VI and mercury) | P, (G as long as no B or Si is required) | None | 6 months | 2 g |
| **Chromium VI – Liquids** | **P,G** | **0 ≤ 6° C** | **24 hours** | **25 mL** |
| Chromium VI - Liquids | P,G | 0 ≤ 6° C, $(NH_4)_2SO_4$, pH = 9.3 to 9.7 | 28 days | 25 mL |
| Chromium VI - Solids[8] | P,G | 0 ≤ 6° C | 30 days to digestion, 7 days from digestion to analysis | 1 g |
| Mercury - Liquids | P,G | $HNO_3$ to pH < 2 | 28 days | 50 mL |
| Mercury - Solids[8] | P,G | 0 ≤ 6° C | 28 days | 2 g |
| Mercury – Low Level Liquids | P,G | HCl or BrCl | 90 days when preserved w/in 48 hrs or oxidized w/in 28 days | 50 mL |

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| **ORGANICS** | | | | |
| Method AK101-Solids[7] | Amber G | 4 ± 2 °C, zero headspace, methanol | 14 days | 4 oz[7] |
| Method AK101-Liquids | Amber G | 4 ± 2 °C, HCl < 2 | 14 days | 3x40 mL |
| Method AK102-Liquids | Amber G | 4 ± 2 °C, HCl or $H_2SO_4$ to pH < 2 | 14 days | 1000 mL |
| Method AK102/103-Solids | Amber G | 4 ± 2 °C | 14 days for extraction 40 days after extraction for analysis | 4 oz |
| MADEP EPH - Liquids | Amber G | 4 ± 2 °C, HCl < 2 | 14 days | 4 oz |
| MADEP EPH – Solids | Amber G | 4 ± 2 °C | 14 days | 1000 mL |
| MADEP VPH – Liquids (ambient purge) Trip Blank Required | G, teflon-lined septum | 4 ± 2 °C, HCl < 2 | 14 days | 3x40 mL |
| MADEP – VPH Liquids (Heated Purge) Trip Blank Required | G, teflon-lined septum | 4 ± 2 °C, Add 0.40 – 0.44g trisodium phosphate dodecahydrate to pH>11 | 14 days | 3x40 mL |
| MADEP VPH – Solids Trip Blank Required | G, Teflon-lined septum | 1mL MeOH/g sample at sampling or within 48 hrs, 4 ± 2 °C | 28 days | 60mL vials add 25g sample, 40 mL vials add 15 g sample |
| BTEX – Liquids | G, Teflon-lined septum | 0 ≤ 6° C, zero headspace, HCl to pH < 2, 0.008% $Na_2S_2O_3$ [3] | 14 days [6] | 3x40 mL |
| **BTEX - Solids[8]** | **G, Teflon-lined septum** | **0 ≤ 6° C** | **48 hours for preservation and 14 days for analysis** | **3x5 g EnCores or 2 low and 1 high level vials** |

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| Volatiles - Drinking Water, Wastewater/groundwater (except 2-CLEVE, acrolein, and acrylonitrile) | G, Teflon-lined cap | 0 ≤ 6° C, zero headspace, HCl to pH < 2 | 14 days | 3x40 mL |
| Volatiles (including 2 CLEVE) - Wastewater | G, Teflon-lined cap | 0 ≤ 6° C, zero headspace, unpreserved | 7 days [6] | 3x40 mL |
| Volatiles - (acrolein and acrylonitrile) | G, Teflon-lined cap | 0 ≤ 6° C, zero headspace, unpreserved | 3 days [6] by EPA 624.1<br>7 days [6] by EPA 8260 | 3x40 mL |
| **Volatiles - Solids[8]** | **EnCore Sampler** | **0 ≤ 6° C** | **48 hours for preservation 14 days for analysis** | **3x5 g EnCores** |
| Volatiles - Concentrated Waste | G, teflon-lined septum | None | 14 days | 1x40 mL |
| Base/Neutral and Acid Extractables and 1,4-Dioxane – Liquids | Amber G, Teflon-lined cap | 0 ≤ 6° C, 0.008% $Na_2S_2O_3$ [3] | 7 days for extraction 40 days after extraction for analysis | 1000 mL / 50 g |
| Base/Neutral and Acid Extractables and 1,4-Dioxane-Solids[8] | G, Teflon-lined cap | 0 ≤ 6° C | 14 days for extraction 40 days after extraction for analysis | 1000 mL / 50 g |
| Base/Neutral and Acid Extractables - Concentrated Waste | G, Teflon-lined cap | None | 7 days for extraction 40 days after extraction for analysis | 1000 mL / 50 g |
| TPH-GRO | G, Teflon-lined cap | 0 ≤ 6° C, HCl to pH < 2, zero headspace | 14 days | 3x40 mL |
| TPH-DRO | G, Teflon-lined cap | 0 ≤ 6° C, HCl to pH < 2 | 7 days for extraction (Liquids)<br>14 days for extraction (Solids)<br>40 days after extraction to analysis | 1000 mL / 50 g |
| Chlorinated Herbicides - Liquids | Amber G, Teflon-lined cap | 0 ≤ 6° C, 0.008% $Na_2S_2O_3$ [3] | 7 days for extraction 40 days after extraction for analysis | 1000 mL |
| Chlorinated Herbicides - Solids[8] | G, Teflon-lined cap | 0 ≤ 6° C | 14 days for extraction 40 days after extraction | 50 g |
| Organochlorine Pesticides by SW-846 EPA 8081 Liquids | Amber G, Teflon-lined cap | 0 ≤ 6° C, 0.008% $Na_2S_2O_3$ | 7 days for extraction 40 days after extraction for analysis | 1000 mL |
| Organochlorine Pesticides by SW-846 EPA 8081 Solids | G, Teflon-lined septum | 0 ≤ 6° C | 14 days for extraction 40 days after extraction for analysis | 50g |
| **Organochlorine Pesticides and PCBS by EPA 608.3 only** | Amber G, Teflon-lined cap | 0 ≤ 6° C, 0.008% , $Na_2S_2O_3$ [3], NaOH and $H_2SO_4$preserve to pH 5.0 -9.0 ( for prep >72 hrs and < 7 days) | **Unpreserved Prep within 72 hrs**<br>Preserved prep within 7 days<br>40 days after extraction for analysis | **1000 mL / NA** |
| PCBs- Liquids | Amber G, Teflon-lined cap | 0 ≤ 6° C, 0.008% $Na_2S_2O_3$ [3] | 365 days for extraction 40 days after extraction for analysis | 1000 mL |

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| PCBs- Solids | Wide-mouth glass | 0 ≤ 6° C | 365 days for extraction 40 days after extraction for analysis | 50g |
| PCBs in Oil | G, Teflon-lined cap | None | 365 days for extraction 40 days after extraction for analysis | 1x40 mL |
| Solvents, Glycols, Alcohols and Acetates -- Liquid | G, Teflon-lined septum | 0 ≤ 6° C, zero headspace<br>or<br>0 ≤ 6° C, zero headspace HCl to pH < 2 | 7 days unpreserved<br><br>14 days preserved | 1 x 40mL |
| Solvents, Glycols, Alcohols and Acetates -- Solids | G, Teflon-lined septum | 0 ≤ 6° C | 14 days | 10g |
| Industrial Solvents | G, Teflon-lined septum | 0 ≤ 6° C | 14 days | 1x40 mL |
| 1,4-Dioxane in Drinking Water by EPA 522 | G, Teflon-lined septum | <10ºC during transport, Sodium sulfite (50mg/L), sodium bisulfate (1g/L) | 28 days for extraction at 0 ≤ 6° C (not frozen)<br>and 28 days after extraction for analysis at -5º C, protected from light | 100 mL to 500 mL |
| Dioxin Screen | G, Teflon-lined cap | 0 ≤ 6° C | 7 days for extraction<br>40 days after extraction for analysis | 1000 mL / 50 g |
| EDB and DBCP | G, Teflon-lined septum | 0 ≤ 6° C,<br>0.4% $Na_2S_2O_3$ | 14 days | 3x40 mL / NA |
| Polynuclear Aromatic Hydrocarbons | Amber G, Teflon-lined septum (Liquids), Teflon-lined cap (Solids) | 0 ≤ 6° C | 7 days for extraction (Liquids)<br>14 days to extraction (Solids)<br>40 days to analysis after extraction | 1000 mL / 30 g |
| Nitroaromatics and Nitroamines | Amber G, Teflon-lined septum | 0 ≤ 6° C | 7 days for extraction<br>40 days after extraction for analysis | 1000 mL / 2 g |
| Nitroaromatics and Nitroamines by MIS Prep (solid samples) | Protect from light | 0 ≤ 6° C until air drying<br>22 ± 4° C (or cooler) after drying | 14 days for extraction,<br>40 days after extraction for analysis | Entire Sample |
| RDX Breakdown | Amber G, Teflon-lined septum for liquids and Teflon-lined cap for solids | 0 ≤ 6° C | 7 days to extraction for liquids<br>14 days to extraction for solids<br>40 days to analysis after extraction | 1000 mL / 2 g |
| Low Level Perchlorate | P | 0 ≤ 6° C , headspace required | 28 days | 10 mL / 2 g |

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| Haloacetic Acids | G, amber, Teflon-lined septum | 0 ≤ 6° C , zero headspace, ammonium chloride | 14 days to extraction, 7 days after extraction for analysis | 3x40 mL |
| Dissolved Gases | G, Teflon-lined septum | 0 ≤ 6° C, HCl to pH < 2, zero headspace | 7 days if unpreserved, 14 days if preserved | 2x40 mL |
| Perfluorinated Alkyl Acids PFAS | HDPE Bottle - unlined polyethylene screw cap | 0 ≤ 10° C for liquids, 0 ≤ 6° C for solids, 1.25g Trizma® (Drinking Water only) | 14 days from collection to extraction, 28 days from extraction to analysis (liquids) 28 days from collection to extract and analyze (solids) | 250 mL/10 g |
| **RADIOCHEMISTRY** | | | | |
| Americium – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Americium – Solids[8] | P,G | None | 6 months | 20 g |
| Calcium-45 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 500 mL |
| Calcium-45 - Solids[8] | P,G | None | 6 months | 20 g |
| Carbon-14 Liquids & Solids[8] | P,G | None | 6 months | 500 mL / 20 g |
| Cesium 134 – Drinking Water | P,G | HCl to pH < 2 | 6 months | 2000 mL |
| Chlorine-36 Liquids & Solids[8] | P,G | None | 6 months | 500 mL / 20 g |
| Curium - Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Curium - Solids[8] | P,G | None | 6 months | 20 g |
| Gamma Isotopes - Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 2000 mL |
| Gamma Isotopes - Solids[8] | P,G | None | 6 months | 200 g |
| Gross Alpha & Beta – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 500 mL |
| **Gross Alpha & Beta, Rapid - Liquids** | **P,G** | **$HNO_3$ or HCl to pH < 2** | **48 – 72 hrs** | **500 mL** |
| Gross Alpha & Beta - Solids[8] | P,G | None | 6 months | 20 g |
| Iodine-129 - Liquids & Solids[8] | P,G | None | 6 months | 1000 mL / 50 g |
| **Iodine -131 - Liquids** | **P,G** | **None** | **8 days** | **1000 mL** |
| Iron 55 -Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 500 mL |
| Iron 55 - Solids[8] | P,G | None | 6 months | 20 g |
| Lead-210 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Lead-210 - Solids[8] | P,G | None | 6 months | 200 g |
| Neptunium - Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Neptunium - Solids[8] | P,G | None | 6 months | 20 g |
| Nickel-59 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Nickel-59 – Solids[8] | P,G | None | 6 months | 20 g |
| Nickel-63 - Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Nickel-63 - Solids[8] | P,G | None | 6 months | 20 g |
| Phosphorus-32 –Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Phosphorus-32 - Solids[8] | P,G | None | 6 months | 20 g |
| Plutonium – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Plutonium - Solids[8] | P,G | None | 6 months | 20 g |
| Polonium - Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Polonium - Solids[8] | P,G | None | 6 months | 20 g |
| Promethium-147/Samarium-151 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Promethium-147/Samarium-151 - Solids[8] | P,G | None | 6 months | 20 g |
| Radium-223 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 2000 mL |

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| Radium-224 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 2000 mL |
| Radium-226 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Radium-228 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| **Radon-222 – Liquids** | **G** | **None, Zero headspace** | **4 days** | **2x40 mL** |
| Selenium-79 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 500 mL |
| Selenium-79 - Solids[8] | P,G | None | 6 months | 20 g |
| Strontium-89/90 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Strontium-89/90 - Solids[8] | P,G | None | 6 months | 20 g |
| Sulfur-35 - Liquids | P,G | None | 6 months | 500 mL |
| Sulfur-35 - Solids[8] | P,G | None | 6 months | 20 g |
| Technetium-99 – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Technetium-99 – Solids[8] | P,G | None | 6 months | 20 g |
| Thorium – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Thorium - Solids[8] | P,G | None | 6 months | 20 g |
| Total Activity Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 100 mL |
| Total Activity - Solids[8] | P,G | None | 6 months | 20 g |
| Total Alpha Radium – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 500 mL |
| Total Alpha Radium - Solids[8] | P,G | None | 6 months | 20 g |
| Total Uranium - Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 100 mL |
| Total Uranium - Solids[8] | P,G | None | 6 months | 20 g |
| Tritium – Drinking Water | G | None | 6 months | 250 mL |
| Tritium – Liquids & Solids[8] | P,G | None | 6 months | 250 mL / 20 g |
| Uranium – Liquids | P,G | $HNO_3$ or HCl to pH < 2 | 6 months | 1000 mL |
| Uranium - Solids[8] | P,G | None | 6 months | 20 g |

**[1]** P = Polyethylene; G = Glass

**[2]** Samples should be analyzed as soon as possible after collection. The holding times listed are maximum times that samples may be held before analysis and be considered valid.

**[3]** Used only in the presence of residual chlorine.

**[4]** Maximum holding time is 24 hours when sulfide is present. All samples may be tested with lead acetate paper before pH adjustments in order to determine if sulfide is present. If present, remove by adding cadmium nitrate powder until a negative spot test is obtained. Filter sample and add NaOH to pH 12.

[5] Minimum amount of sample needed to prepare and analyze for the parameter. Some parameters may be combined into one analysis, others may need additional amount if quality control is being requested for site-specific samples. Please check with GELs Project Manager for proper sample amounts based on project specific requirements.

[6] Volatiles Groundwater/Wastewater: If samples are to be analyzed for vinyl chloride, styrene, or 2-chloroethylvinyl ether (2-CLEVE) for soil or water, separate samples must be collected without acid preservation and analyzed within 7 days. For aqueous samples to be analyzed for acrolein and acrylonitrile, by EPA Method 624.1, the samples are not to be acidified and must be analyzed within 3 days of collection.

[7] Solids Method AK101 2-4 oz amber wide-mouth jars tared and labeled, 1-4 oz amber wide-mouth jar labeled (evaporative loss), 2-25 mL 2.5 ppm surrogated P/T methanol tubes.

[8] Solids matrix typically applies to soils, sludges and sediments. Some tests have been developed for filters, miscellaneous solid waste, plant and animal tissue, also referred to as solids. Contact GEL to verify a particular matrix for the test of interest.

[9] 1mL of 2.5% EDTA solution per 100mL sample