

**BATTELLE MEMORIAL INSTITUTE, PACIFIC NORTHWEST DIVISION'S  
REQUEST FOR PROPOSAL NUMBER 746072  
Design and Fabrication of an Automated Soil Analysis Platform**

<b>Issued By:</b> Battelle Memorial Institute, Pacific Northwest Division 902 Battelle Boulevard Richland, WA 99352	<b>Contracts Specialist:</b> Name: Laurie Martin Telephone Number: 509/372-4071 Email: laurie.martin@pnnl.gov
<b>Ship To Address:</b> Contract Number: TBD Battelle for U.S. DOE 790 6th Street Richland, WA 99354 US	<b>Anticipated Freight Terms:</b> DOM FOB-Dest. Prepaid – Offeror shall be responsible for all delivery fees and retain ownership of the system until full commissioning is completed.
<b>Proposal Due Date:</b> June 9, 2023, 4:00 p.m. Pacific Time	<b>Anticipated Contract Term:</b> TBD, 2023 through TBD, 2025
<b>Questions Due Date:</b> May 26, 2023, 4:00 p.m. Pacific Time	<b>Intent to Propose Due Date:</b> May 26, 2023, 2023, 4:00 p.m. Pacific Time
A virtual pre-proposal conference will be held on <b>May 25, 2023 from 1:00 – 3:00 pm Pacific Time</b>	
<b>Anticipated Contract Type:</b> Firm Fixed Price	

**Proposal**

Offeror proposes to sell the goods and/or services (or alternates as specified) at the prices indicated in accordance with the General Provisions, Statement of Work, DRAFT Contract, and other provisions/documents of the Request for Proposal.

**Offeror shall sign and return this page with their proposal.**

<b>Firm Name:</b>	<b>Offeror's Point of Contact Name:</b>
<b>Title:</b>	<b>Telephone Number:</b>
<b>Email Address:</b>	<b>Proposal Date:</b>
<b>Payment Terms (check one or check and fill in "Other Discount"):</b> <input type="checkbox"/> 2% 15, Net 30 <input type="checkbox"/> 3% 15, Net 30 <input type="checkbox"/> Net 30 <input type="checkbox"/> Other Discount _____	<b>Signature:</b>

## 1. INTRODUCTION/BACKGROUND

Battelle Memorial Institute, Pacific Northwest Division (Battelle) operates the Pacific Northwest National Laboratory (PNNL) for the U.S. Department of Energy and is authorized to issue this Request for Proposal (RFP). Throughout this document, the term "Contract" is used to refer to any resultant Battelle Contract. Captions are included in this document and Battelle's General Provisions for convenience of reference only and in no other way define or delineate any of the provisions hereof or otherwise affect their construction or effect.

The Offeror shall propose its most favorable price and technical approach because of the possibility that award will be made without discussion of the proposal received.

Under no circumstances shall the recipient of this RFP contact any individual within Battelle (excluding contact with Battelle's Ombudsman [see RFP Additional Instructions/Information for Offeror section below]), other than the Contracts Specialist named above regarding this RFP.

### **VIRTUAL PRE-PROPOSAL CONFERENCE**

A virtual pre-proposal conference will be held on May 25, 2023 from 1:00 pm – 3:00 pm Pacific Time via Microsoft Teams. The purpose of this conference is to communicate particulars of the work scope and facility elements to aid offerors in the preparation of proposals. This event will provide the opportunity to receive answers to questions in real time.

**PLEASE SEND THE NAME OF ALL ATTENDEES WHO WISH TO RECEIVE A LINK TO THE TEAMS MEETING TO [laurie.martin@pnnl.gov](mailto:laurie.martin@pnnl.gov) ON OR BEFORE May 24, 2023.**

## 2. SCOPE OVERVIEW

Scope: This RFP is for the Design and Fabrication of an Automated Soil Analysis Platform.

### Milestone Delivery and Payment Schedule

Offerors shall provide a proposed firm fixed price for each task, and may provide priced sub-task milestones. Should the Offeror choose to provide priced sub-task milestones, a deliverable that demonstrates completion must be identified and the amount must represent the value of the deliverable being provided. The proposed fixed price per milestone or sub-task milestone is to be stated in the resultant contract where payment will be issued in accordance with the contract payment terms and only upon receipt of all deliverables deemed to be acceptable to Battelle.

Item No.	Material/Description	Due Date	Proposed Fixed Price
Task 1	Requirements Review – Report in accordance with the SOW	Award +1 month	\$
Task 2	Design Review– Report in accordance with the SOW	Award + 2 months	\$
Task 3	Software Installation - Report in accordance with the SOW	Completion of Task 2 + 1 month	\$
Task 4	Off-Site Assembly and Testing – Report in accordance with the SOW as well as photo/video demonstration of the system in operation	Completion of Task 2 + 9 months	\$
Task 5	Delivery, Installation, and Software/LIMS connection – Delivery of entire System/Software/LIMS Connection	Completion of Task 2 + 11 months	\$
Task 6	System Commissioning and Site Acceptance Testing (SAT) – Report documenting results of SAT	Completion of Task 2 + 12 months	\$
Task 7	Technical Support – Provide technical support as required in the SOW	Completion of Task 6 +12 months	\$
<b>Total Proposed Firm Fixed Price</b>			<b>\$</b>

DRAFT Contract: Offeror shall thoroughly review the attached DRAFT Contract and propose accordingly. It includes applicable language related to Scope, Environment, Safety, and Health Requirements and the role of the Technical Oversight Representative as well as other applicable language. The DRAFT Contract is provided for preliminary review purposes and is an example of what the final Contract will include. The content of the DRAFT Contract is subject to change prior to execution of the final Contract.

NAICS: The North American Industry Classification System (NAICS) Code for this RFP is 334516. The stated size standard is 1000 Employees. The stated size shall be the sole determining factor as to classification (small or large business) of an Offeror. It is the responsibility of the Offeror to certify its size on the Representations and Certifications in their proposal. If a manufacturing

NAICS code is used, a wholesale trade or retail trade business concern submitting a proposal is categorized as a "nonmanufacturer" and deemed small if it has 500 or fewer employees and meets the requirements of 13 CFR 121.406.

### **3. BASIS OF AWARD**

Contract Award (cl 600 revised - July 2020)

Battelle may evaluate proposals received in response to this RFP without discussion (initial proposal should contain the Offeror's best price and technical terms).

Selection Method: Contract award, if any, will be made to the responsive and responsible Offeror whose evaluated proposal provides for the lowest price after satisfying all the technical requirements of this RFP.

Rights Reserved: Battelle may:

- A. reject any or all proposals;
- B. request clarification of minor irregularities, informalities or apparent clerical mistakes;
- C. waive minor irregularities, informalities or apparent clerical mistakes in offers received;
- D. accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the RFP or the proposal;
- E. award multiple contracts as a result of this RFP;
- F. reject a proposal as non-responsive if the prices proposed are materially unbalanced between line items or sub-line items. A proposal is materially unbalanced when it is based on prices significantly less than prices for some items and prices which are significantly overstated in relation to prices for other items, and if there is a reasonable doubt that the proposal will result in the lowest overall price to Battelle even though it may be the lowest evaluated proposal, or if it is so unbalanced as to be tantamount to allowing an advance payment;
- G. conduct site visits to the home or field offices of Offeror (Offeror will be notified with the date and time of arrival, an outline of the duration of the visit, and any assistance/information required);
- H. require oral presentations from any or all Offerors, determined to be in the competitive range (Offerors will be notified of the time and place for such presentation);
- I. request oral and/or written discussions;
- J. determine a competitive range, including all proposals that are judged to have a reasonable chance of being selected for award, and negotiate with all Offerors within it. (In the event a competitive range is determined, it will be based solely on Battelle's judgment, and Best and Final Offers will be requested at the conclusion of negotiations);
- K. negotiate only with a single Offeror to further reduce the price paid if, in the judgment of Battelle after a review of the technical and price offers, only one Offeror has a reasonable chance of being selected for award.
- L. conduct a cost or price audit to facilitate a determination of price reasonableness; or
- M. re-solicit this requirement.

### **4. PROPOSAL SUBMITTAL REQUIREMENTS**

General: Proposals should be prepared simply and economically, and provide a straightforward, concise delineation of the information required to be furnished. Emphasis should be on completeness and clarity. Elaborate brochures or other presentations are neither required nor desired. Offerors that fail to provide ALL items and quantities specified in this RFP may be deemed non-responsive in their entirety and may not be considered for award.

Questions: Should Offeror have questions on the RFP, they must be presented to the Contracts Specialist, in writing, by the Questions Due Date and Time provided on Page 1. Questions received late may not be answered. If applicable, the Questions should reference specific scope details. The Questions and Battelle's Answers will be transmitted in writing to all potential Offerors.

The contractor may contact the Battelle Contracts Specialist to identify alternatives or modifications to these requirements that improve system performance, safety, flexibility, and expandability and/or that decrease the cost of construction, operation, or maintenance. This includes the overall workflow control software stack.

Intent to Propose: Offeror shall complete the Notification of Intent (to Submit Proposal) (available at <https://www.pnnl.gov/contracts/contractdocuments.aspx>) by the Intent to Propose Due Date and Time provided on Page 1.

Submission of Proposal: Proposals are due by the Proposal Due Date and time provided on Page 1 of this RFP. Proposals must be submitted via email to [laurie.martin@pnnl.gov](mailto:laurie.martin@pnnl.gov) with a subject line that includes the words "Proposal to RFP 746072".

Proposal shall include:

- Price Proposal:
  - Provide a completed Milestone Delivery and Payment Schedule table (from Section 2 above).
- Technical Proposal:
  - Technical Proposal that provides, but is not limited to, the Offeror's approach to performance of the services outlined in the Statement of Work, dated April 11, 2023; key assumptions; proposed Key Personnel including labor category, educational and professional qualifications, home base, and availability; statement of location of services (city, state, zip code) where services will be performed; and Offeror's past experience in providing services of a similar nature and magnitude.
  - Warranty information on item/equipment (12 months or greater is preferred).
  - Past Performance: Provide 3 examples of completed projects of similar magnitude and complexity within the past 5 years. Examples shall include client name/contact information, start/end date of project, dollar value, brief description sufficient to demonstrate design/fabrication scope, and purpose of the automated system.
- Other Submittals:
  - Completed attached Representations and Certifications.
  - Proof of registration in the System for Award Management (SAM) at [www.sam.gov](http://www.sam.gov). Battelle prefers Offerors have an active SAM registration, however, if registration is not possible, then provide a completed MOSRC form (see attachment below).
  - Completed Employment Eligibility Verification (E-Verify) at [www.e-verify.gov](http://www.e-verify.gov) with proof of enrollment which can be provided by accessing "Edit Company Profile" in the navigation menu and printing the screen containing your company information.

- Copy of or link to Software License Agreement (SLA).
- Completed attached Hazard Form.
- Completed Small Business Subcontracting Plan, if applicable, in accordance with General Provisions 52.219-9 (template available at <https://www.pnnl.gov/contracts/contractdocuments.aspx>).
- Statement of acceptance of Battelle's General Provisions.
- Applicable Export Control Classification Number (ECCN) or International Traffic in Arms Regulations (ITAR) category for the item(s) proposed.

## **5. ADDITIONAL INSTRUCTIONS/INFORMATION FOR OFFEROR**

In addition to the requirements outlined herein, the Solicitation Provisions, Form A-609-SP, dated November 2014, apply to this RFP and are available at <https://www.pnnl.gov/contracts/contractdocuments.aspx>.

Proposal Validity Period: Unless otherwise stated in Offeror's proposal, the proposal validity period is 120 days from receipt of proposal.

Ombudsman Program: Offeror is hereby notified that issues/concerns relative to this RFP and/or any resulting Contract award that are not resolved by the Contracts Specialist identified herein shall be resolved through Battelle's Ombudsman Program by email at [acquisitionombudsman@pnnl.gov](mailto:acquisitionombudsman@pnnl.gov). Any issue/concern shall be submitted, in writing, no later than 15 calendar days after Contract award to be considered for review.

PNNL Vendor Portal Registration: Offeror must have an approved registration in the PNNL Vendor Portal to be awarded a Contract with PNNL. The successful Offeror will receive an invitation (sent from [PNNL@jaggaer.com](mailto:PNNL@jaggaer.com) or [support@sciquest.com](mailto:support@sciquest.com)) to register in the portal during the contracting award process, and no action is required before the invitation is sent. The Contracts Specialist for this RFP can be contacted if any assistance is needed with registering in the PNNL Vendor Portal.

## **6. FUNDING**

Funding is fully obligated for this action. However, Contract award is subject to availability of funds at the time of award.

## **7. REQUEST FOR PROPOSAL ATTACHMENTS**

- Draft Contract
- Representations and Certifications
- Hazard Form

**DRAFT CONTRACT**

<b>BATTELLE MEMORIAL INSTITUTE, PACIFIC NORTHWEST DIVISION'S</b> <b>CONTRACT NUMBER TBD</b> <b>Design and Fabrication of an Automated Soil Analysis Platform</b>	
<b>Issued By:</b> Battelle Memorial Institute, Pacific Northwest Division 902 Battelle Boulevard Richland, WA 99352	<b>Contractor:</b> TBD
<b>Contracts Specialist:</b> Name: Laurie Martin Telephone Number: 509/372-4071 Email: laurie.martin@pnnl.gov	<b>Contractor's Point of Contact:</b> Name: TBD Telephone Number: TBD Email: TBD
<b>Payment Terms:</b> TBD	<b>Contract Type:</b> Firm Fixed Price
<b>Contract Term:</b> TBD through TBD	<b>Total Amount of Contract:</b> \$TBD (USD)
<b>Freight Terms: DOM FOB-Dest. Prepaid</b> <b>Contractor shall be responsible for all delivery fees and retain ownership of the system until full commissioning is completed.</b>	<b>Ship To Address:</b> Contract Number: TBD Battelle for U.S. DOE 790 6th Street Richland, WA 99354 US
<b>Submit Invoices and Invoice/Payment Inquiries To <a href="mailto:ap.invoices@pnnl.gov">ap.invoices@pnnl.gov</a>.</b> Note: Invoices must list location(s) of service (U.S.: City, State; Foreign: Country).	
<b>Award</b> Battelle hereby awards this Contract to the Contractor subject to acceptance. The rights and obligations of the parties to this Contract are subject to and governed by this document and any documents attached or incorporated by reference.	<b>Contractor Agreement</b> Contractor accepts and agrees to furnish and deliver the items and/or perform the services to the extent stated in this document for the consideration stated in this Contract. The rights and obligations of the parties to this Contract are subject to and governed by this document and any documents attached or incorporated by reference.

<b>Battelle Memorial Institute, Pacific Northwest Division</b>	<b>Contractor shall sign and return a copy of this document</b>
Signature of person authorized to sign	Signature of person authorized to sign <b>NO SIGNATURE REQUIRED – EXAMPLE ONLY</b>
Name	Name
Laurie Martin	
Title	Title
Contracts Specialist	
Date	Date

Note: Captions in this document and in Battelle's General Provisions are included for convenience of reference only and in no other way define or delineate any of the provisions hereof or otherwise affect their construction or effect.

## 1. SCOPE AND PRICING

Scope: Contractor agrees to perform the scope outlined in the attached Statement of Work dated March 13, 2023 for this Contract (hereinafter referred to as "Contract").

Deliverable and Payment Schedule: Payment shall be made upon receipt of acceptable/demonstrated completion of ALL deliverables within a respective Task as outlined in the Statement of Work. The payment for all Tasks respectively shall be made upon concurrence by the Technical Oversight Representative (see below) or delegate. The following Payment Schedule shall apply throughout completion of all deliverables.

Item No.	Material/Description	Due Date	Fixed Price
Task 1	Requirements Review – Report in accordance with the SOW	Award +1 month	\$
Task 2	Design Review – Report in accordance with the SOW	Award + 2 months	\$
Task 3	Software Installation - Report in accordance with the SOW	Completion of Task 2 + 1 month	\$
Task 4	Off-Site Assembly and Testing – Report in accordance with the SOW as well as photo/video demonstration of the system in operation	Completion of Task 2 + 9 months	\$
Task 5	Delivery, Installation, and Software/LIMS connection – Delivery of entire System/Software/LIMS Connection	Completion of Task 2 + 11 months	\$
Task 6	System Commissioning and Site Acceptance Testing (SAT) – Report documenting results of SAT	Completion of Task 2 + 12 months	\$
Task 7	Technical Support – Provide technical support as required in the SOW	Completion of Task 6 +12 months	\$
<b>Total Firm Fixed Price</b>			<b>\$</b>

Currency: The currency of this Contract is U.S. Dollars with the amount fixed for the term of the Contract.

## 2. CONTRACT TERM/DELIVERY

Contract Term: The period of performance will be TBD.

Performance Schedule: Contractor shall provide a performance schedule identifying major production milestones and deliverables to accomplish the requirements of this Contract. Contractor



shall provide written, electronic status reports by the 15th of each succeeding month. If at any time the Contractor has reason to believe that a production milestone or delivery date may not be met, Contractor shall immediately notify the Battelle Contracts Specialist in writing, outlining the milestone or delivery date in jeopardy, the reasons, and steps the Contractor will take to recover the schedule in order to meet delivery requirements.

### **3. CONTRACTUAL REQUIREMENTS/INFORMATION**

Shipping Instructions: Contractor is responsible for proper packaging, marking and labeling to prevent deterioration, damage or loss of products in transit. The Contract number must be reflected on all containers and documents. A packing slip must accompany the box/container; the packing slip must show the Contract number, line item number, description of the item, and quantity of items in the box/container. Contractor is responsible for all shipping fees and retains ownership of the system until completion of the commissioning activity. Contractor must ensure the shipment stops at the ship-to address stated on page one, and then delivered to the EMSL facility as arranged by the Battelle TOR.

For shipments utilizing DOE tender rates, the packing slip shall state "Transportation is for the U.S. DOE and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the Government."

Insurance: As required in the referenced General Provisions, the Contractor must provide a valid insurance certificate prior to any work performed on-site.

No foreign travel is expected. In the unlikely event foreign travel is required, the following will apply. All foreign travel shall be approved in advance by Battelle, even if the Contract amount included foreign travel costs. Requests for approval of each separate trip shall be submitted to the Battelle Contracts Specialist no less than sixty days prior to a planned departure date. Contractor is then required to work with the Battelle Contracts Specialist and submit the names and contact information for each traveler to Battelle's Foreign Travel Office at [foreign.travel.office@pnnl.gov](mailto:foreign.travel.office@pnnl.gov).

Emergency evacuation insurance is required for all Contractors who plan foreign travel on behalf of DOE-funded projects.

#### Additional Requirements:

- Documentation, Installation, On-Site Training, and Acceptance Testing:

Prior to installation, on-site training and acceptance testing, the Offeror shall furnish two (2) printed copies of instruction manuals, parts lists, complete wiring diagrams, and one (1) copy of the original equipment manufacturers (OEM) instruction manuals. Additionally, the manuals shall be provided in a non-proprietary electronic format. All instruction manuals, parts lists, and wiring diagrams shall be printed in the English language.

The Offeror shall provide on-site installation at the Pacific Northwest National Laboratory (PNNL) in Richland, WA with installation to be completed no later than [Date]. All on-site installation technicians/engineers shall take PNNL's web-based safety training (approximately two hours per person) prior to initiating any on-site work. During the installation of the instrument, the Offeror shall:

- Perform the unpacking and movement of the instrument to its final location. The laboratory will be configured (by Battelle) for the laboratory service requirements (to be provided by the Offeror) of the instrument.

- Check conformity of laboratory and laboratory services required for proper instrument operations as outlined in the manufacturer provided site preparation guide.
- Perform the installation and connection of instrument peripherals.
- Perform the connection of all services to the instrumentation.
- Perform instrumentation start-up.
- Perform tuning and calibration of the equipment to meet specifications.

The Offeror shall provide on-site training of the instruments, software, and any third-part functionalities at PNNL as required in the Statement of Work. The training shall be provided within 30 calendar days of SAT completion. Detailed, up-to-date system schematics shall be provided with the training.

A full copy of the field engineer's acceptance testing performance criteria shall be provided. In addition to the Offeror's standard acceptance testing performance criteria, post installation validation/acceptance testing shall be conducted by the Offeror in accordance with the testing method and criteria as required in the Statement of Work.

Calibration Of Category 1 Measurement and Test Equipment (Minimal as-Found Data) (c/ QA-175a - May 2018)

- A. **Calibration Program/System:** The calibration system of the Contractor shall be subject to audit (right of access) by Battelle. The Contractor must notify Battelle Contracts Representative of any conditions that adversely impacts the Contractor's ability to maintain their quality system and, if applicable, the scope of accreditation.
1. The Contractor shall use a calibration system appropriate to the equipment that complies with ISO-IEC 17025 or ANSI/NCSL Z540-1 latest version and any additional calibration system as specified in the contract.
  2. When stated in the contract the Contractor shall conduct the calibration in accordance with the Contractor's accreditation (accreditation through an ILAC Mutual Recognition Arrangement signatory) and the accredited calibration report shall include the following in addition to the requirements of section C:
    - The Contractor's accreditation symbol to provide traceability that the service was performed under the scope of accreditation.
    - Identification of the Contractor's laboratory equipment/standards used (description, unique identification and expiration date).
- B. **Subcontracting:** The Contractor shall not use subcontractors to calibrate the unit under test.
- C. **Calibration Report/Certificate:** The Contractor shall deliver to Battelle a calibration report for each item calibrated which contains at a minimum the following::
1. a clear description and identification of the items calibrated including, but not limited to, the use of serial or unique identification numbers
  2. the parameters calibrated
  3. acceptance criteria/tolerance
  4. as-left data at each calibration point and characterization of the as-left condition (e.g. in-tolerance or out-of-tolerance)
  5. the Test Accuracy Ratio of 4:1, or the uncertainty of the calibration shall be to a known confidence level - usually 95%, or when this is not met, guard banding shall be used and the results documented on the calibration report
  6. identification of the calibration procedure used in performing the calibration
  7. the date of calibration

8. the due date of the next calibration
  9. certification that the calibrations was accomplished using standards whose calibration is traceable to the International System of Units (SI) through a nationally or internationally recognized metrology institute (e.g., National Institute for Standards and Technology [NIST]) or by reference to a natural constant (the value of which is known and recommended by the General Conference of Weights and Measures and the International Committee for Weights and Measures).
  10. the signature, date, and function of the individual accepting responsibility for the content of the calibration report (identify if an electronic signature is used).
  11. The contract number
- D. **Calibration Stickers:** Calibration stickers are required and shall contain the unique identification number of the unit under test, the calibration date, and the due date of the next calibration. Limited calibration stickers shall be used for items that are not calibrated to manufacturer's specifications for all functions and ranges and shall list the limitations. If the unit under test cannot be brought into tolerance in the as-left state, a calibration sticker shall not be applied and a sticker stating "Cannot be Calibrated," or similar wording, shall be applied. It is preferred that this sticker be noticeable (e.g., large ~ 2 inches) and a bright color (e.g., red).
- Unless otherwise specified, Contractor shall provide all documents required by this contract to the Battelle Contracts Representative on or before the required due date for each contract deliverable. Battelle shall have the right to reject, as not in conformity with the requirements of this contract, any supplies or services for which all required reports, procedures, or certifications are not delivered.

**Pre-Award Evaluation Requirement:** A pre-award evaluation will be conducted of a prospective Contractor's documented Quality program/system including the Contractor's capability to deliver the technical and quality assurance services required by Battelle.

Source Inspection (c/ QA-178 - Dec 2013)

Contractor shall give Battelle ten (10) calendar days advance written notice of the date, time, and place the acceptance test and/or inspection is scheduled to be performed. Contractor shall in no event perform any such operation, inspection, or test prior to the date specified in its notice or change the date, time, or place specified therein without Battelle's prior written approval. Battelle's authorized representative may, but is not required to, be present. In the event said representative witnesses an operation, inspection, or test performed by Contractor or conducts an inspection, surveillance, or test on Battelle's behalf, Contractor shall be provided documentary evidence to such effect.

Software (c/ QA-197 - May 2014)

The Contractor shall conform to and have a software development and control program, as defined in the statement of work or specification. The Contractor shall provide manuals and procedures that implement the defined requirements and evidence of implementation.

*Unless otherwise specified, Contractor shall provide all documents required by this contract to the Battelle Contracts Representative on or before the required due date for each contract deliverable. Battelle shall have the right to reject, as not in conformity with the requirements of this contract, any supplies or services for which all required reports, procedures, or certifications are not delivered.*

**Pre-Award Evaluation Requirement:** A pre-award evaluation of the Contractor's documented program/system including the Contractor's capability to deliver the technical and quality assurance service required by Battelle will be conducted.

Environment, Safety and Health Requirements:

Offerors shall note that any resulting contract shall include the following provision:

Environment, Safety, and Health Requirements - PNNL Work Sites (AHA) (c/3113a -- Apr 2015)

1. In performing any work under this contract on property or facilities owned or controlled by Battelle that are identified as PNNL Work Sites (hereinafter "onsite"), the Contractor shall comply with all applicable federal, state and local environment, safety, and health laws and regulations. The Contractor shall also comply with 10 CFR 851, DOE Worker Safety and Health Program, and DEAR 970.5223-1, Integration of Environment, Safety and Health (ES&H) into Work Planning and Execution (Dec. 2000). In order to comply with the requirements of 10 CFR 851 and DEAR 970.5223-1, the Contractor shall be guided by the principles set forth below.
2. The Contractor shall perform work safely and in a manner that ensures adequate protection for employees, the public, and the environment, and shall be accountable for the safe performance of work. The Contractor shall exercise a degree of care commensurate with the work and the associated hazards. The Contractor shall ensure that management of ES&H functions and activities becomes an integral but visible part of the Contractor's work planning and execution processes. The Contractor shall, in the performance of work, ensure that-
  - Line management is responsible for the protection of employees, public, and the environment. Line management includes those contractor and subcontractor employees managing and supervising employees performing work.
  - Clear and unambiguous lines of authority and responsibility for ensuring (ES&H) are established and maintained at all organizational levels.
  - Personnel possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities, and shall retain records respecting such competency and qualifications, making them available upon request.
  - Resources are effectively allocated to address ES&H, programmatic, and operational considerations. Protecting employees, the public, and the environment is a priority whenever activities are planned and performed.
  - Before work is performed, the associated hazards are evaluated and a set of ES&H standards and requirements are established which, if properly implemented, provide adequate assurance that employees, the public, and the environment are protected from adverse consequences.
  - Administrative and engineering controls to prevent and mitigate hazards are tailored to the work being performed and associated hazards. Emphasis should be on designing the work and/or controls to reduce or eliminate the hazards and to prevent accidents and unplanned releases and exposures.
3. The Contractor, relative to the Statement of Work and contract specifications, shall be able to demonstrate through documentation and work practices that its performance of work under this contract -
  - Fulfilled the scope of work as outlined in this contract
  - Identified and analyzed specific, task-level hazards associated with the work
  - Developed and implemented hazard controls related to the hazards
  - Allowed the performance of work within the controls
  - Provided feedback to Battelle and Contractor employees on adequacy of hazard controls

4. The Contractor shall work in accordance with a DOE-approved Worker Safety and Health Program (also referred to in the DEAR as a Safety Management Plan) as described below:
  - The Contractor shall demonstrate well-established safety protocols applicable to the scope of work and consistent with the required elements stated in this clause. Prior to the initiation of any onsite work, the Contractor shall either-
    - Accept and incorporate Battelle's PNNL Contractor Environment Safety and Health (CES&H) Manual as its own. The Battelle Contracts Representative can provide a hard copy of the manual upon request. In those cases where the Contractor's onsite activities are limited to an office or meeting environment, with no additional or unusual hazards, the CES&H Manual requirements can be met through review of the Visitor Orientation Pamphlet. Both the CES&H Manual and the Visitor Orientation Pamphlet are available on-line at <https://www.pnnl.gov/contracts/Forms.aspx?area=Procurement>.
    - Submit its own 10 CFR 851 and DEAR 970.5223-1 compliant Worker Safety and Health Program (WSHP) document to the Battelle Contracts Representative. The Battelle Contracts Representative will coordinate the review and approval of the program document by DOE. The Contractor will be notified by the Battelle Contracts Representative of the program document's approval by DOE. Acceptance of the Contractor's program document will be at the sole discretion of DOE.
  - The Contractor will be provided a completed Acquisition Hazard Assessment (AHA) checklist by the Battelle Technical Oversight Representative prior to initiation of Contractor's onsite work. The AHA incorporates elements of effective job planning. Elements include identifying: the scope of work to be performed; potential hazards to Battelle and Contractor staff, the public and environment created by the work performed; hazard control methods and mitigation; and mechanisms to evaluate the adequacy of those controls. The AHA is a key control process in the safe conduct of work at Battelle. The Contractor is expected to possess the completed AHA in order to access Battelle property or facilities and initiate work.
5. The Contractor shall perform the following additional hazard identification tasks consistent with an approved WSHP:
  - The Contractor shall be responsible for identifying all potential occupational exposures that its employees and the employees of its lower-tier subcontractors will be exposed to while performing any work under this contract.
  - The Contractor shall assure that its employees and those of any lower-tiered subcontractor are medically qualified to perform work associated with any potential occupational exposures that have been identified. Medical qualification and medical surveillance programs are the sole responsibility of the Contractor. In addition, the Contractor is responsible for maintaining any records associated with the administration of these programs.
  - For each of its employees and each of its lower-tier subcontract employees that the Contractor has identified as having potential occupational exposures that require enrollment in a medical surveillance or medical qualification program, the Contractor shall provide its Occupational Medical provider with the following information:
    - Current information about actual or potential work-related site hazards (chemical, radiological, physical, biological, or ergonomic);
    - Employee job-task and hazard analysis information, including essential job functions;
    - Actual or potential work-site exposures of each employee; and

- Personnel actions resulting in a change of job functions such that a change of hazards, or exposures results.
  - For each of its employees and each of its lower-tier subcontract employees, a copy of the exposure information provided to the Contractor's occupational medical provider shall be submitted to the Battelle Contracts Representative and approved by Battelle before any of these employees begin work under this contract.
6. The Contractor shall notify the Battelle Contracts Representative immediately of any OSHA-recordable injuries/illnesses, any "off-normal occurrences," or Government property damaged, that the Contractor determines to have occurred in the course of operations onsite and shall furnish such further information as the Battelle Contracts Representative may require. An "off-normal occurrence" is any unplanned or unexpected event, including near misses, or the discovery of a deficiency in a procedure, plan, or system that has real or potentially undesirable consequences to personnel, equipment, facilities, the environment, and/or programs.
7. The Contractor's onsite ES&H activities will be subject to review by the Technical Oversight Representative of this contract. Other representatives of Battelle may conduct periodic inspections of the Contractor's equipment, work and storage areas for compliance with the applicable ES&H requirements. The Battelle Contracts Representative will notify the Contractor by a written Notice of Non-compliance of any observed non-compliance with applicable ES&H requirements. The Contractor shall immediately take appropriate corrective action. The Contractor shall advise the Battelle Contracts Representative, in writing, within five (5) working days of the corrective action taken on any safety non-compliance noted on the written Notice of Non-compliance. If the Contractor fails or refuses to correct the safety non-compliance, Battelle may perform, or cause to be performed, the necessary corrective work and unilaterally charge the Contractor for the cost thereof. Such charges will be deducted from payments otherwise due the Contractor under this contract.
8. The Contractor shall promptly evaluate and resolve any non-compliance with applicable ES&H requirements. If the Contractor fails to provide resolution or if, at any time, the Contractor's acts or failure to act causes substantial harm or an imminent danger to the environment, or health and safety of employees or the public, the Battelle Contracts Representative may issue an order stopping work in whole or in part and the Contractor shall be liable for the delay and any costs thereby incurred. Any stop-work order issued by Battelle under this clause (or issued by the Contractor to a subcontractor in accordance with this clause) shall be without prejudice to any other legal or contractual rights of Battelle. In the event that the Battelle Contracts Representative issues a stop-work order, an order authorizing the resumption of the work may be issued at the discretion of the Battelle Contracts Representative. The Contractor shall not be entitled to an extension of time, or additional cost or fee, or damages by reason of, or in connection with, any work stoppage ordered in accordance with this clause.
9. Employee Concerns Program
- The Contractor, its agents, employees or subcontractors, are entitled to use the Battelle Employee Concerns Program and Hotline (509) 375-3999. The Hotline operates 24 hours per day, 7 days a week. Messages may be left anonymously, and all concerns are handled with confidentiality to the maximum extent possible. Employee concerns may also be submitted in writing to the Battelle Employee Concerns Office, Battelle, Pacific Northwest National Laboratory, P.O. Box 999, K1-42, Richland, Washington, 99352, or in person at the Staff Concerns Office, Battelle's Research Operation Building during normal business hours, Monday through Friday 7:30 a.m. to 4:30 p.m.

- For the purpose of this document, allegations, concerns, and complaints are handled in a like manner and are referred to collectively as "employee concerns." A concern can consist of a declaration, statement, or assertion of impropriety or inadequacy on the part of one's employer or others at a DOE Site that has affected (or threatens to affect) aspects of operations, such as the environment, health, safety, quality, or security, and may include fraud, mismanagement, waste, or abuse of authority.
  - No retaliation or retribution shall be taken toward any individual as a result of filing an employee concern consistent with 10 CFR 708.
10. Civil Penalties and Indemnification
- The 2002 Bob Stump National Defense Authorization Act amended the Atomic Energy Act by adding section 234C "Worker Health and Safety Rules for Department of Energy Nuclear Facilities." It required DOE to promulgate a worker safety and health rule, published in the Federal Register on February 9, 2006, as 10 CFR 851. It establishes worker safety and health requirements that govern the conduct of contractor activities at both nuclear and non-nuclear DOE Sites. Contractors that fail to comply with the Rule are subject to civil penalties or contract penalties.
  - The Contractor assumes full responsibility and shall indemnify, hold harmless, and defend Battelle, its directors, officers, and employees from any civil or contractual liability under section 234C of the Atomic Energy Act of 1954, as amended, or the implementing regulations, arising out of the activities of the Contractor, its subcontractors, suppliers, agents, employees, and their officers, or directors. The Contractor's obligation to indemnify and hold harmless shall expressly include attorney fees and other reasonable costs of defending any action or proceeding instituted under section 234C or DOE's implementing regulations.
11. Contractor is responsible to ensure that its direct hired and Subcontractor employees who will work on the Site be free of physical or cognitive impairment resulting from the use of alcohol or drugs, including legal drugs, when working or involved in any activity on Battelle/PNNL premises. In order to achieve the federal Drug Free Workplace Act standards, Battelle/PNNL prohibits its non-staff and subcontractors from illegally manufacturing, distributing, selling, possessing, or using illegal drugs, including marijuana, or being under the influence of alcohol while on Battelle/PNNL premises or during PNNL activities. Individuals suspected of being under the influence of any substance, legal or illegal, that may impair their ability to perform their duties are subject to termination of their work agreements and/or having access to the Battelle/PNNL premises revoked. If Battelle, or the Contractor or Subcontractor believes that a Contractor or Subcontractor employee's job performance is being adversely affected by drug or substance (including alcohol) use, Battelle may direct the Contractor to remove the employee. Examples of behavior or circumstances indicating possible drug or substance abuse are observed use, possession, sale or delivery, or credible information that an individual is using suspected of being impaired by drugs or abusing alcohol, or an accident or injury.
12. The Contractor is responsible for its subcontractors' compliance with the ES&H requirements of this contract. The Contractor shall include a clause substantially the same as this clause in lower-tier subcontracts involving work at on property or facilities owned or controlled by Battelle that are identified as PNNL Work Sites. Such subcontracts shall provide for the right to stop work under the conditions described herein.

#### **4. CONTRACT ADMINISTRATION**

Battelle Contracts Specialist: The Battelle Contracts Specialist, Laurie Martin, is the sole point of contact for any contractual/administrative communications or questions regarding this acquisition. Contact information is on Page 1.

Technical Oversight Representative: All technical questions should be directed to the Technical Oversight Representative (TOR), TBD at TBD or via email at TBD. The TOR cannot modify this Contract. The Project Subject Matter Expert is TBD who may be reached at TBD or via email at TBD.

Lower-tier Subcontractors: The following Lower-tier Subcontractors have been pre-approved by Battelle. Any new Lower-tier Subcontracts require the prior written approval of the Battelle Contracts Specialist.  
TBD

#### **5. TERMS AND CONDITIONS**

The General Provisions for Fixed-Price Other than Commercial Items - Supplies/Services, Form A-409.30-FP dated July 2022, apply and may be viewed at <https://www.pnnl.gov/contracts/contractdocuments.aspx>.

#### **6. CONTRACT ATTACHMENTS**

In addition to the above, the Contract consists of:

- Statement of Work - dated April 11, 2023
- Representations and Certifications
- Map of Battelle Campus/Badging

#### **7. ENTIRE AGREEMENT**

This Contract contains the entire agreement and understanding between the parties, and there are no agreements, understandings or representations not set forth or incorporated by reference herein. This Contract supersedes all prior proposals, understandings and agreements, whether oral or written, between the parties with respect to the subject matter hereof. No subsequent Modifications of this Contract shall be of any force or effect unless in writing by authorized representatives of each party to this Contract. No communications, written or oral, by other than a Battelle Contracts Specialist shall be effective to modify or otherwise affect the provisions of this Contract.



## ATTACHMENT TO RFP

**The following detailed sections are provided for informational purposes only and do not represent firm requirements of this RFP.**

### **Section 1**

The EMSL ASAP team identified a customizable system that appears to offer many of the capabilities required for Tasks 4.3 and 4.4 (below). Attachment 3 in Section 9.3 provides the information available to the EMSL ASAP team at the time the SOW attached to this RFP was written. This information is not an endorsement for this or any product, only a disclosure of potentially useful information in the possession of the EMSL ASAP team.

Following is a link to a pdf of the ASAP system concept design and a video overview of the ASAP system. Note that the concept design is generalized and may not include all the necessary detail, the SOW in the latest version of the RFP takes precedence and shall govern in the event of contradictory information.

<https://www.emsl.pnnl.gov/basic/request-for-proposals-for-automated-soil-analysis-platform/15023>

### **Section 2**

The following are links to example 22-micron filter (hydrophilic, e.g., mixed cellulose esters (MCE) in 24- and 96-well formats.

- [Pall AcroPrep 96 from Fisher Scientific](#)
- [24-well membrane filter plates from Analytical Sales](#)
- [96-well filter plates from Millipore Sigma](#)
- [Nunc filter plates from ThermoFisher](#)
- [Corning 96-well filter plates from Fisher Scientific](#)

### **Section 3**

This attachment provides information on potentially useful devices and consumables available to the EMSL ASAP team at the time this RFP was published. This information is not an endorsement for this or any product, only a disclosure of potentially useful information in the possession of the EMSL ASAP team.

The Hamilton Microlab Star system can be customized for:

- Multichannel pipetting (eight solvents at a time)
- Positive pressure filtration in multiple formats
- Rotary “shaking” of tubes
- On-deck pH measurements
- N<sub>2</sub> dry-down
- Movement to off-deck centrifuge.

Here are some videos showing the function of some components of the Microlab Star

#### 1. STAR DeCapper Video:

<https://www.dropbox.com/s/vm1tpjt3w9w53im/Decapping%20STAR.mp4?dl=0>

#### 2. STAR in Operation:

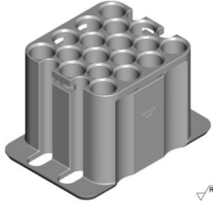
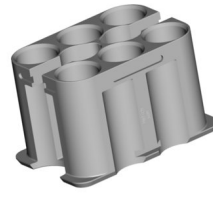
<https://www.dropbox.com/s/b7f131kr8wen4x5/Microlab%20Star%20Line%20-%20Video%20%281%29.m4v?dl=0>

## 3. Spinner Channel:

<https://www.dropbox.com/s/cdcem9furvfe7xz/Spinner%20Channel%2050mL%20Tubes.MOV?dl=0>

4. 3.5 mL Pipetting Channels: [https://www.youtube.com/watch?v=KZ\\_fh3B7RpU](https://www.youtube.com/watch?v=KZ_fh3B7RpU)**Tube Racks**



Hettich manufactures a large variety of centrifuges for use in life sciences applications. Many of their products are compatible with SBS-format labware. As part of their standard offering, they sell SBS-format tube racks that can hold 15 mL and 50 mL centrifuge tubes, such as the two Olympus tubes described above. Hettich have integrated these tube racks on prior automation projects. The tube racks are detailed below.



	<b>15 mL Tube Rack</b> <ul style="list-style-type: none"> <li>• Hettich 4492</li> <li>• Compatible with Olympus 28-103 15 mL tube</li> <li>• Holds 18× sample tubes</li> <li>• Height with tubes = <u>120.5 mm</u></li> <li>• Estimated mass with sample tubes* = <u>440 g</u></li> </ul>
	<b>50 mL Tube Rack</b> <ul style="list-style-type: none"> <li>• Hettich 4491</li> <li>• Compatible with Olympus 28-106 50 mL tube</li> <li>• Holds 6× sample tubes</li> <li>• Height with tubes = <u>115.5 mm</u></li> <li>• Estimated mass with sample tubes* = <u>481 g</u></li> </ul>

\*Assumptions: Sample volume = working volume of tube, solvent density = 1 g/ml, 4491 = 6× 1 g soil sample, 4492 = 18 × 0.25 g soil sample

**Deep-well Microtiter Plates**



Manipulation of deep-well microtiter plates by robotic arms is common within the life sciences space. Deep-well plates are a convenient option to consider where smaller sample volumes would be possible. They have broad compatibility with SBS-format devices and offer a variety of closure options that are automation-compatible, such as foil seals and lids. A few examples of deep-well microtiter plates from Agilent are detailed below.

	<b>1 mL Deep-well Microtiter Plate</b> <ul style="list-style-type: none"> <li>• <a href="#">Agilent 5043-9305</a></li> <li>• 96× sample wells, 1 mL per well</li> <li>• Polypropylene labware material</li> <li>• Height = 32 mm</li> <li>• Estimated mass with samples** = 100 g</li> </ul>
	<b>2 mL Deep-well Microtiter Plate</b> <ul style="list-style-type: none"> <li>• <a href="#">Agilent 5043-9302</a></li> <li>• 96× sample wells, 2 mL per well</li> <li>• Polypropylene labware material</li> <li>• Height = 45 mm</li> <li>• Estimated mass with samples** = 200 g</li> </ul>

	<b>10 mL Deep-well Microtiter Plate</b> <ul style="list-style-type: none"> <li>• <a href="#">Agilent 202061-100</a></li> <li>• 24× sample wells, 10 mL per well</li> <li>• Polypropylene labware material</li> <li>• Height = 44 mm</li> <li>• Estimated mass with samples** = 250 g</li> </ul>
	<b>47 mL Deep-well Microtiter Plate</b> <ul style="list-style-type: none"> <li>• <a href="#">Agilent 201284-100</a></li> <li>• 6× sample wells, 47 mL per well</li> <li>• Polypropylene labware material</li> <li>• Height = 44 mm</li> <li>• Estimated mass with samples** = 300 g</li> </ul>


\*\* Sample volume = working volume of tube, solvent density = 1 g/ml





### 1.1.1. Miscellaneous Other SBS-Format Labware


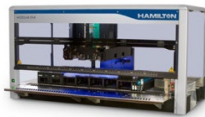
	<b>50 mL Tube Plate</b> <ul style="list-style-type: none"> <li>• <a href="#">Clickbio XBLOCK650</a></li> <li>• 6× sample wells, 50 mL per well</li> <li>• Unknown labware material</li> <li>• Height = unknown</li> <li>• Estimated mass with samples** = 350 g</li> </ul>
	<b>Filter Plate</b> <ul style="list-style-type: none"> <li>• <a href="#">Pall AcroPrep 97017</a></li> <li>• Positive pressure, centrifugation, or vacuum can be used to pull the sample through the 0.2 µm filter on the bottom of the well</li> <li>• 24× sample wells, 7 mL per well</li> <li>• Polypropylene labware material</li> <li>• Height = 39 mm</li> <li>• Height with collection plate = 75 mm</li> <li>• Estimated mass with samples** = 200 g</li> </ul>






\*\* Sample volume = working volume of tube, solvent density = 1 g/ml




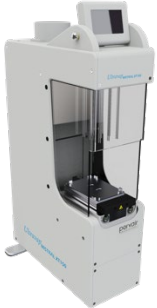
### 1.1.2. Devices

Capability	Recommended Device Requirements	Off-the-Shelf Device Examples	
<b>Sample Handling</b>	<ul style="list-style-type: none"> <li>• Collaborative or industrial robotic arm</li> <li>• Payload capacity larger than heaviest labware</li> </ul>	<a href="#">Precise Automation PF400</a> (Collaborative)	

	<ul style="list-style-type: none"> <li>• Large enough work envelope to reach all devices required within the work cell</li> <li>• Automated finger swapping or robots dedicated to the loading of specific devices may be required in the case where special robot fingers are needed</li> </ul>	<a href="#">Precise Automation DD4</a> (Collaborative)	
		<a href="#">Denso VS-087</a> (Industrial)	
<b>Ambient Storage</b>	<ul style="list-style-type: none"> <li>• Enough storage positions to support any input, output, and buffering needs</li> <li>• Convenient user access for loading and unloading samples</li> <li>• Ability to quickly scan all labware barcodes actively held by the device</li> <li>• Efficient sample retrieval based on sample location or barcode information</li> </ul>	<a href="#">HighRes AmbiStore</a>	
<b>Fridge</b>	<ul style="list-style-type: none"> <li>• Enough storage positions to support any input, output, and buffering needs</li> <li>• Convenient user access for loading and unloading samples</li> <li>• Ability to quickly scan all labware barcodes actively held by the device</li> <li>• Efficient sample retrieval based on sample location or barcode information</li> <li>• Minimal deviation from setpoint temperature of +4 °C</li> <li>• Uniform temperature distribution throughout internal chamber</li> <li>• Humidity control to limit condensation</li> </ul>	<a href="#">HighRes SteriStore</a>	

<b>Deep Freezer</b>	<ul style="list-style-type: none"> <li>• Enough storage positions to support any input, output, and buffering needs</li> <li>• Convenient user access for loading and unloading samples</li> <li>• Ability to quickly scan all labware barcodes actively held by the device</li> <li>• Efficient sample retrieval based on sample location or barcode information</li> <li>• Minimal deviation from setpoint temperature of <math>-80^{\circ}\text{C}</math></li> <li>• Uniform temperature distribution throughout internal chamber</li> <li>• Humidity control to limit condensation</li> <li>• Thawing considerations</li> </ul>	<a href="#">Hamilton SAM HD</a>	
<b>Solvent Addition</b>	<ul style="list-style-type: none"> <li>• Chemically compatible with all required solvents. Currently known solvents:             <ul style="list-style-type: none"> <li>• ultrapure water</li> <li>• Oxalate</li> <li>• Methanol</li> <li>• Ethanol</li> <li>• 0.5 M HCl</li> <li>• 0.25 M hydroxylamine solution (0.25 M <math>\text{NH}_2\text{OH}</math> + 0.25 M HCl)</li> <li>• HCl-dithionite (57.4 mM sodium dithionite shakes overnight, then rinses with the 0.05 M HCl for 1 hour and centrifuges again. Supernatants from both extractions were combined)</li> <li>• 0.1 M sodium pyrophosphate</li> </ul> </li> <li>• Ability to load and prime multiple solvents at once</li> <li>• Priming waste from multiple solvents must remain separated</li> <li>• Ability to extract any toxic fumes created by the solvents</li> <li>• Capable of opening and closing sample closures</li> </ul>	<a href="#">Hamilton Microlab STAR</a>	

	<ul style="list-style-type: none"> <li>Accurate and repeatable dispense volume in the range of 0.5 <math>\mu</math>L to 5 mL</li> </ul>		
<b>Tube Labeling</b>	<ul style="list-style-type: none"> <li>Ability to print and apply labels to labware</li> </ul>	<a href="#">Scinomix Sci-Print VX2</a>	
<b>Agitation</b>	<ul style="list-style-type: none"> <li>Repetitive sample motion pattern (orbital, linear, tilt, or other) with enough power to sufficiently agitate and suspend samples in solution after solvent addition</li> <li>No risk of sample or closure damage during agitation</li> </ul>	<a href="#">Q.Instruments BioShake</a>	
<b>Agitation (Aggressive)</b>	<ul style="list-style-type: none"> <li>Sample homogenizer</li> </ul>	<a href="#">Modified SPEX Geno/Grinder 2030</a>	
<b>Centrifugation</b>	<ul style="list-style-type: none"> <li>Capable of 4000 RPM (RCF should be confirmed)</li> <li>Ability to change counterbalances (automatically or manually) when labware of different masses must be spun</li> <li>Minimal increase in sample temperature during a 10 min 4000 RPM spin cycle</li> <li>Refrigeration not required</li> </ul>	<a href="#">Hettich Rotanta 460 Robotic</a>	
<b>Supernatant Aspiration</b>	<ul style="list-style-type: none"> <li>Chemically compatible with all required solvents. See "Solvent Addition" above for listing of solvents</li> <li>Ability to extract any toxic fumes created by the solvents</li> <li>Capable of opening and closing sample closures</li> <li>Ability to sense different fractions within a sample and to aspirate only the required layers</li> </ul>	<a href="#">Hamilton Microlab STAR</a>	

	<ul style="list-style-type: none"> <li>Limited carryover and crossover contamination between samples. Aspiration volume in the range of 0.5 <math>\mu</math>L to 5 mL</li> </ul>		
<b>Filtration</b>	<ul style="list-style-type: none"> <li>Ability to efficiently collect samples after passing through a 0.22 <math>\mu</math>m filter</li> <li>Capable of opening and closing sample closures</li> <li>Uniform application of pressure (positive or vacuum) across all samples within an SBS object</li> <li>Limited carryover and crossover contamination between samples</li> </ul>	<a href="#">Hamilton [MPE]<sup>2</sup></a>	
<b>pH Measurement</b>	<ul style="list-style-type: none"> <li>Ability to efficiently, accurately, and repeatably measure the pH of a sample</li> <li>Capable of opening and closing sample closures</li> <li>Limited carryover and crossover contamination between samples</li> </ul>	<a href="#">Unchained Labs Junior</a>	
	<ul style="list-style-type: none"> <li>Alternative pH meter, directly integrated with Hamilton liquid handler</li> </ul>	<a href="#">Hamilton ApH</a>	
<b>Evaporation</b>	<ul style="list-style-type: none"> <li>Ability to efficiently evaporate liquid samples</li> <li>Capable of opening and closing sample closures</li> <li>Limited carryover and crossover contamination between samples</li> </ul>	<a href="#">Porvair Ultravap Mistral XT150</a>	

#### **Section 4**

Below is an example of an automation-friendly SPE solution from Agilent.



## IMPROVE YOUR AUTOMATED SAMPLE PREP

The Measure of Confidence.



### Agilent VersaPlate 96-well Solid Phase Extraction and Solid Supported Liquid Extraction (SPE/SLE)

#### Streamline SPE with VersaPlate to process more samples in less time with less waste

It's no secret that proper sample preparation is essential to successful analysis. But sometimes even proper sample prep isn't enough to solve problems like low throughput, product waste, and cross-contamination that can occur in your lab. That's where VersaPlate can help. In its 96-well format, tubes are removable making this system easier to implement, simpler to use, and far more flexible than conventional fixed products.

Ease-of-use is just one aspect of what VersaPlate can offer your lab. Its flexible format allows you to create your own customized SPE plates. This means that whether you need to speed the processing of hundreds of samples, validate just a few samples, or develop a new method, you can customize the configuration to meet your needs. This flexibility allows you to get the job done quickly and at a lower overall cost without wasting sample preparation cartridges while still using a 96-well format.

#### VersaPlate is your customized sample prep solution to:

- **Increase throughput** – choose the level of automation that best suits your needs while you use the 96-well plate format or create your own customized plates.
- **Speed method development** – develop an SPE method faster using liquid handling automation or multi-channel pipettes, or use individual tubes to quickly work out method conditions and transfer to 96-well processing.
- **Eliminate waste** – use only the number of tubes you need for each run to save on sample preparation costs while still enjoying all the benefits of automation.
- **Avoid cross contamination** – increased well depth reduces the risk of overflow and flangeless, beveled rims provide a tight fit.



#### After Sample Prep, choose the right GC and LC columns and supplies for your analyses

Now it's easy to find the right GC or LC columns and supplies with Agilent selection tools.

*Find it with ease. Find it with confidence.*

Go to [agilent.com/chem/finditnow](http://agilent.com/chem/finditnow)



**Agilent Technologies**



## Solve your sample prep problems with a customized VersaPlate solution

Choose yours here:

### VersaPlate Customized Configurations

Bond Elut Silica SPE VersaPlate Configurations		
Description	Part Number Assembled VersaPlate	Part Number 96 Tubes Only
C2, 50 mg		75511050
C2, 100 mg	7541101C	7551101C
C8, 25 mg	75403025	75503025
C8, 50 mg	75403050	75503050
C8, 100 mg	7540301C	7550301C
C8, 200 mg	7540302C	
C18, 25 mg	75401025	75501025
C18, 50 mg	75401050	75501050
C18, 100 mg	7540101C	7550101C
C18, 200 mg	7540102C	7550102C
C18, 50 mg, High Flow		75502050
C18, 100 mg, High Flow	7540201C	7550201C
C18 EWP, 100 mg	7542601C	
C18 EWP, 300 mg	7540103C	7550103C
C18OH, 100 mg	7541601C	7551601C
C18OH, 300 mg	7542703C	
CBA, 50 mg	75406050	
CBA, 100 mg	7540601C	7550601C
Certify, 25 mg	75409025	75509025
Certify, 50 mg	75409050	75509050
Certify, 100 mg	7540901C	7550901C
Certify II, 100 mg	7541801C	7551801C
CN-E, 50 mg		75504050
CN-E, 100 mg	7540401C	7550401C
CN-U, 100 mg	7541401C	7551401C
DEA, 50 mg		75517050
DEA, 100 mg	7541701C	7551701C
DEA, 200 mg	7541702C	
Diol, 100 mg		7552501C
NH <sub>2</sub> , 50 mg	75405050	75505050
NH <sub>2</sub> , 100 mg	7540501C	7550501C
NH <sub>2</sub> , 250 mg	7540502C	
PBA, 100 mg	7541201C	7551201C
PH, 100 mg	7541501C	7551501C
PH, 200 mg	7541502C	
PRS, 100 mg	7542401C	7552401C
PSA, 100 mg	7542101C	7552101C
SAX, 25 mg		75508025
SAX, 50 mg	75408050	75508050
SAX, 100 mg	7540801C	7550801C
SAX, 200 mg	7540802C	
SCX, 25 mg		75507025
SCX, 50 mg		75507050
SCX, 100 mg	7540701C	7550701C
SCX, 200 mg		7550702C
SCX, 400 mg		7550704C
SCX, 500 mg	7542305C	
SI, 100 mg	7541301C	7551301C
SI, 250 mg	7542502C	

Bond Elut Polymeric SPE VersaPlate Configurations		
Description	Part Number Assembled VersaPlate	Part Number 96 Tubes Only
FOCUS, 10 mg		A5206010
LMS, 50 mg		75510050
LMS, 200 mg	7541002C	7551002C
NEXUS, 10 mg		75520010
NEXUS, 30 mg		75520030
NEXUS, 60 mg		75520060
NEXUS, 300 mg		7552003C
Plexa, 30 mg	75490030	75590030
Plexa, 60 mg	75490060	75590060 (100/pk)
Plexa PAX, 30 mg	5982-0601	5982-0602
Plexa PCX, 30 mg	75580030	
Plexa PCX, 60 mg	75480060	75580060
PPL, 100 mg	7541901C	7551901C

Bond Elut Specialty SPE VersaPlate Configurations		
Description	Part Number Assembled VersaPlate	Part Number 96 Tubes Only
AL-B, 100 mg		7552301C
AL-N, 100 mg		7552201C

OMIX Micro-Volume SPE VersaPlate Configurations		
Description	Part Number Assembled VersaPlate	Part Number 96 Tubes Only
C4	A57109	A57109A
C18	A57103	A57103A
MP1	A57111	A57111A

Chem Elut SLE VersaPlate Configurations		
Description	Part Number Assembled VersaPlate	Part Number 96 Tubes Only
Chem Elut, 260 mg	75430260	75530260

VersaPlate Accessories	
Description	Part Number
Base Plate, empty	75400000
Captiva 96-deep well collection plates, 1 mL	A696001000
Disposable reservoir trays for 96-well manifold	5185-5782
Round-well collection plates, 1 mL	5132101
Square-well collection plates, 350 µL	5133007
Square-well collection plates, 1 mL	5133008
Square-well collection plates, 2 mL	5133009
VersaPlate manifold, acetal, white, bottom	12236103
VersaPlate manifold, bottom replacement gasket	12236105
VersaPlate sealing strips	12236108
VersaPlate tube removal tool	12236107
VersaPlate vacuum manifold	12236101

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## Section 5 Description of NEXUS

Our LIMS solution, which is currently under development, follows a distributed system design utilizing a cloud-native architecture, allowing flexibility in the deployment of distinct analytical workflows, including data processing and analysis software, and helping orchestrate data storage and archiving process.

At the core of our system are multiple REST APIs (Flask, FastAPI, etc.) interfacing with relational databases such as Postgres and MySQL. These APIs are used to manage the experimental design, analysis, and data processing metadata and use internal cloud-based storage to store instrument and data processing and analytical results.

NEXUS is the face of the EMSL user program, allowing researchers to access their sample metadata, projects, and analytical results. It also provides staff-level access to scheduling tools for managing instrumentation and resources within the facility. In addition to the outward-facing user interface, NEXUS also provides lower-level RESTful APIs, which other systems and workflows can use to move and store information. These APIs were constructed in a modular fashion so that new facets can be added to the system as the need presents itself.