ENVIRONMENTAL PROTECTION AGENCY

PROPOSAL INSTRUCTIONS

SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM

PHASE I BROAD AGENCY ANNOUNCEMENT

SOLICITATION

68HERC22R0180

ISSUE DATE: June 15, 2022

CLOSING DATE: August 23, 2022

IMPORTANT: Please read this entire solicitation carefully prior to submitting your proposal.

Proposals submitted in response to this solicitation will be valid for 300 days.

Your proposal (including all appendices) shall be submitted as a single PDF document that shall not exceed 25 pages. The proposal shall be received via FedConnect, through the response function, by 12:00 p.m. (noon) Eastern Daylight Time (EDT) on or before August 23, 2022. The PDF proposal shall be titled to include topic code and company name (see example below). Only proposals received via FedConnect, as ONE PDF adhering to the naming conventions & page limit, submitted as a response, by the deadline identified above, will be considered for award.

NOTE:

1. Any proposals submitted via messages through FedConnect, will not be consider for award. Any proposal submitted as multiple documents will not be consider for award. Any proposals received after the deadline identified above will not be considered for award. Email submission to the contracting officer is not allowed and will not be considered for award.
2. Any proposal that is identified as incomplete or not conforming to the requirements set forth in this document will be found to be "nonresponsive".
3. Proposals submitted via FedConnect shall have a file name that includes the topic code and company name. The PDF document naming convention shall follow this format. Topic code and then Company Name. Example: "Topic 1A – ABC, LLC".
4. Additionally, **each company may only submit one (1) proposal in response to this solicitation**. If multiple proposals are received only one (1) proposal will be considered for award.
5. FEDCONNECT – It is the responsibility of Offeror to submit their proposal in FedConnect with sufficient time to ensure it is received by the date and time specified. Only proposals received by the date and time specified via FedConnect will be considered for award. If you are unsure how to submit a proposal, please reach out to the FedConnect helpdesk.

Proposals shall be submitted via the FedConnect web portal (www.fedconnect.net). In order to submit proposals, offerors must register in FedConnect at www.fedconnect.net, see main page of FedConnect website for registration instructions. For assistance in registering or for other FedConnect technical questions please call the FedConnect Help Desk at (800) 899-6665 Opt #2 or email at fcsupport@unisonglobal.com.

It is the responsibility of the Offeror to submit proposals in FedConnect with sufficient time to ensure the proposal is received by the date and time specified. Offerors not already registered in SAM, FedConnect, and as a Small Business Concern with the SBA are encouraged to do so early in the process. This is to ensure registration delays do not prevent timely submission. Only proposals received by the date and time specified via FedConnect will be considered for award.

Please find the following websites mentioned above to aide in registration:

1. SAM: https://sam.gov/content/home
    - IMPORTANT: Make sure SAM registration is up to date, complete, and not expired. Ensure the full registration process is complete. The Government cannot make an award to an offeror with an incomplete SAM registration. Additionally, ensure your SAM profile allows for the award of "contracts" or "All Awards". The Government will be issuing a **contract** and not a grant in response to this BAA Solicitation.
2. FedConnect: https://www.fedconnect.net/FedConnect/Default.htm
3. SBA: https://www.sbir.gov/registration

The EPA has provided a checklist to aid the offeror in creation of a conforming proposal. Please see Appendix 5.

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PHASE I SOLICITATION FOR SMALL BUSINESS INNOVATION RESEARCH

I. SBIR PROGRAM DESCRIPTION

A. Purpose of EPA's SBIR Program

Every Federal agency with an extramural research and development (R&D) budget over $100 million is required by law to have a Small Business Innovation Research (SBIR) program. For the Environmental Protection Agency (EPA), the SBIR program provides one way it can directly award R&D funding to small businesses. The goal of EPA's SBIR Program is to support small businesses in the commercialization of innovative technologies that help support EPA's mission of protecting human health and the environment (www.epa.gov/sbir). EPA is especially interested in broadening participation in the program and encourages firms new to the program to consider applying. Each agency implements the program in a phased manner that follows the technology development continuum: research, development, demonstration, commercialization, and utilization. Generally, there are two phases: the first is for proof of concept, and the second is intended to move the technology as far as possible toward full-scale commercialization.

1. Importance of Commercialization

For EPA, success of its SBIR program means that the technologies it supports will in fact be used to solve the problems for which they are being developed; therefore, from the outset of the selection process, EPA will consider commercialization potential to be as important as technical potential, and it will evaluate proposals accordingly (see evaluation criteria in section V). An offeror is encouraged to conduct some market research before submitting their proposal to this solicitation to demonstrate that there is a viable market opportunity.

2. Importance of Life Cycle Impacts

In order to support the Agency's mission of protecting human health and the environment, the lifecycle environmental impacts of the technology, including (if applicable) minimizing resource use, minimizing toxicity of materials, efficient use of water and energy, minimizing pollution, and minimizing the impacts of disposal should be considered. A formal Life Cycle Analysis (LCA) is not required.

B. Phase I

The EPA anticipates making approximately twenty-five (25) Phase I awards, each in the amount up to $100,000 and not to exceed a six (6) month term of performance. It is anticipated that these contracts will be awarded with a contract start date of December 1, 2022. The Phase I effort is for "proof of concept" of the proposed technology. All companies that successfully complete Phase I are eligible to compete for Phase II which is to further develop and commercialize the technology.

C. Performance Benchmark Requirements for Phase I Eligibility

Companies with multiple SBIR/STTR (Small Business Technology Transfer) awards must meet minimum performance requirements to be eligible to apply for a new Phase I. The purpose of these requirements is to ensure that Phase I applicants that have won multiple prior SBIR/STTR awards are making progress towards commercializing the work done under those awards. The Phase I to Phase II Transition Rate addresses the extent to which an awardee progresses a project from Phase I to Phase II. The Commercialization Benchmark addresses the extent to which an awardee has moved past Phase II work towards commercialization.

Descriptions of these rates, and consequences of failure to meet these rates can be found on SBA's website at: https://www.sbir.gov/performance-benchmarks.

D. 2022-23 SBIR Phase I Research Topics

Given EPA's broad mission of protecting human health and the environment, there are a broad range of problems for which innovative technologies could provide solutions. Each year EPA's SBIR program selects specific topics to include in its Phase I solicitation. This solicitation is based upon the Federal Acquisition Regulation (FAR) established, Broad Agency Announcement (BAA) authority. BAAs allow for the solicitation and establishment of appropriate contracts to advance

and further the development and application of innovative and emerging technologies to meet specific federal government needs, which are defined within broad problem areas. An offeror's proposal must directly address one of the specific topics described below.

2022-2023 EPA SBIR Topics

1. CLEAN AND SAFE WATER

   Topic 1A: Decentralized wastewater treatment (septic system) technologies for intentional non-potable reuse
   Topic 1B: Technologies to process, sort and identify microplastics
   Topic 1C: In-stream aquatic trash capture technologies
   Topic 1D: Sensors to detect high priority contaminants of emerging concern (including PFAS)

2. AIR QUALITY & CLIMATE

   Topic 2A: Ambient air monitoring technology for air toxics
   Topic 2B: Continuous Emission Monitoring System for metal HAPs
   Topic 2C: Air monitoring technology for methane emissions from fugitive sources
   Topic 2D: Technologies that reduce exposure to radon in buildings
   Topic 2E: Technologies for improved recovery of refrigerant from air conditioning (AC) and refrigeration equipment.

3. HOMELAND SECURITY

   Topic 3A: Innovative technology solutions that build community resilience to disasters
   Topic 3B: Miniaturized oil spill droplet size sensor for emergency response underwater vehicles

4. CIRCULAR ECONOMY/SUSTAINABLE MATERIALS

   Topic 4A: Innovative technologies that help consumers prevent food waste in the acquisition, preparation, and storage of food
   Topic 4B: Innovative technologies or materials that will improve the U.S. recycling system
   Topic 4C: Innovative reduction, reuse, and recycling solutions to advance plastic circularity

5. SAFER CHEMICALS

   Topic 5A: PCB-free color
   Topic 5B: Rubber anti-degradant technologies for tires and other rubber products that are lower concern for human health and the environment
   Topic 5C: Innovative enhanced efficiency fertilizers

6. RISK ASSESSMENT

   Topic 6A: Software tools and machine-learning applications for systematic review in science assessment for chemical evaluation

1. CLEAN AND SAFE WATER

WATER REUSE

Increasing pressures on water resources has led to greater water scarcity and a growing demand for sufficient quantities of high-quality water for a variety of potable and non-potable purposes. The changing climate is creating additional long-term challenges to meeting water needs by redistributing precipitation patterns across geographies and time scales. EPA's overall goal with respect to water reuse is improving the quantity of high-quality water without creating other significant environmental impacts. Water reuse (also commonly known as water recycling or water reclamation) reclaims water from a variety of sources such as municipal wastewater, industrial and commercial process water, agricultural runoff, and stormwater. This water is treated and reused for beneficial purposes such as potable water supply augmentation or a

range of non-potable uses such as agriculture and landscape irrigation, industrial processes, environmental restoration, and saltwater intrusion barriers in coastal aquifers. Water reuse creates alternative sources of water that are generally far more reliable than traditional surface water or groundwater sources (https://www.epa.gov/waterreuse).

In support of these goals, EPA launched the National Water Reuse Action Plan (WRAP) in 2020, which helps drive progress on reuse by leveraging the expertise of scientists, policymakers, and local experts across the country to create a more resilient water future for communities of all sizes. The WRAP collaborative includes more than 100 organizations partnering on 50 actions in the plan to help to solve local water resource challenges through appropriate reuse practices. Since the inception of the WRAP, the EPA SBIR program has led efforts to advance water reuse technologies through WRAP Action 7.5: Coordinate and Promote Water Reuse Technology in Federal SBIR Programs.

Decentralized Non-Potable Water (DNW) reuse

EPA seeks to advance innovative Decentralized Non-Potable Water (DNW) reuse treatment technologies, which can be especially useful for disadvantaged communities. DNW reuse systems capture and treat water sources generated from within or surrounding a building, such as wastewater, air conditioning condensate, greywater, stormwater, or roof collected rainwater. The treated water is then reused onsite for various non-potable applications such as in a building, or at the local scale for other needs such as landscape irrigation, toilet flushing, and cooling. For this solicitation, EPA is interested in modular DNW technologies that intentionally reuse wastewater as an alternative to the conventional residential septic system. Over 20 percent of US households or over 60 million people depend on decentralized wastewater treatment (septic systems) to treat their wastewater. Some regions of the US such as New England and southeastern states depend more on decentralized wastewater treatment and are seeing the impacts of failing septic systems on disadvantaged communities.

Septic systems treat the wastewater from household plumbing fixtures through solids settling in a septic tank and minimal passive soil treatment via a drainfield. While properly designed and maintained septic systems can provide excellent wastewater treatment, system failure can occur in regions prone to frequent heavy rains and flooding. Climate change is exacerbating these precipitation impacts particularly for underserved communities that are disproportionately affected by failing wastewater treatment systems located in poorly drained soils and soils with high or rising water tables.

Intentional reuse of the wastewater through a redesign of the septic system into DNW reuse treatment technology is a potential solution for these communities. The failure mode for most septic systems is the passive soil drainage of the wastewater effluent, which could be reused for non-potable purposes after appropriate treatment. Conventional septic systems are regulated by state laws and permitted at the local level. There are currently no federal level standards for DNW reuse systems but a risk-based framework to develop public health guidance for all types of decentralized systems can be found here.

As resources, best practices for Onsite Non-potable Water Reuse can be found here; and EPA's ongoing onsite non-potable research is described here. Information about conventional septic systems is located here.

For these reasons, EPA is interested in the following topic.

Topic 1A: Decentralized wastewater treatment (septic system) technologies for intentional non-potable reuse. Modular DNW technologies that intentionally reuse wastewater as an alternative to the conventional residential septic system. Proposed technologies will need to comply with future state level treatment requirements to protect public health. Ideally, technologies would be passive requiring minimal maintenance by homeowners or renters. Innovation is needed to make the technologies cheaper, easier to operate and maintain, easier to monitor to ensure treatment effectiveness, minimize waste byproducts, increase energy efficiency and easier to retrofit into existing homes.

All technologies should consider their lifecycle impacts including energy efficiency, greenhouse gas emissions, use of chemicals, and waste generation. All technologies should consider solutions for or effects on historically marginalized communities (low-income, communities of color, or other communities suffering environmental injustice) likely to be

disproportionately affected by intersectional climate change impacts like drought, flooding in low-lying areas, and exacerbated health impacts due to proximity to pollution.

Aquatic Trash and Microplastics

Preventing trash from getting into waterways, or removing it once it is there, is the mission of EPA's Trash Free Waters program. Trash in waterways can have deleterious impacts on aquatic life, potentially impact human health, and make water-related recreational activities impossible or less enjoyable. Although reducing the production of trash – especially plastic waste – is a vital part of addressing this problem, EPA anticipates continuing needs to support partners interested in deploying in-stream trash capture technologies to ultimately remove trash that has already entered waterways.

Microplastics or plastic fragments (broadly defined as plastic particles less than 5mm in diameter) originate from a variety of sources either from degradation and fragmentation of larger plastics or by direct release into the environment (https://www.epa.gov/trash-free-waters/epa-reports). Microplastics may impact human health as they may be directly consumed from drinking water or ingested in fish and other marine life which accumulate these fragments. As the production of plastics continues to grow, EPA is looking for innovative technologies to efficiently detect and quantify microplastics.

Topic 1B: Technologies to process, sort, and identify microplastics. Technologies to better characterize environmental samples of microplastics (5 mm – 1 nm or any defined subset) in environmental matrices such as water, wastewater, or soil. Technologies could include artificial intelligence or other methods to rapidly identify plastics. Of particular interest is the extraction and identification of nanoplastics from complex environmental matrices. Also of interest are the length of time and cost of each sample analysis associated with the proposed methods.

Topic 1C: In-stream aquatic trash capture technologies. Relatively low-cost technologies that can be used to capture trash in streams or rivers before ultimate removal from the environment. Technologies must be suitable for use by smaller municipalities or non-governmental organizations that may not have much experience with using such devices, and must therefore be easy to install, clean out and maintain. Relevant direction on conditions under which the technology would ideally be used (e.g., stream flow rate) or other needs for use (e.g., need for power source, space requirements, etc.) should be clearly specified.

Detection of Contaminants of Emerging Concern (including PFAS)

Contaminants of emerging concern (CECs) present a challenge to the protection of water resources as often their impacts are not fully understood. Due to the toxic nature and abundance of CECs in various environmental matrices, EPA is looking for innovative, robust, rapid, and sensitive methods that can precisely detect CECs in the field, with a specific focus on PFAS. Conventional measurement methods are challenged by the complexity of sample preparation, expensive instrumentation, and associated costs, and high analysis time.

CECs including per- and polyfluoroalkyl substances (PFAS) (e.g., perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)), pharmaceuticals, pesticides, stimulants (e.g., caffeine and illicit drugs), personal care products (PPCPs), engineered nanomaterials, and plasticizers (e.g., bisphenol A) have been ubiquitously detected in influents and effluents of wastewater treatment plants and other water resources. Recent evidence indicates that CECs may become disseminated in agricultural soils and crops, and can ultimately reach food products, posing health risks including developmental defects and cancer.

PFAS are an urgent public health and environmental issue facing communities across the United States. PFAS have been manufactured and used in a variety of industries in the United States and around the globe since the 1940s, and they are still being used today. Because of their persistence and breadth of use, PFAS can be found in surface water, groundwater, soil, and air—from remote rural areas to densely-populated urban centers. A growing body of scientific evidence shows that exposure at certain levels to specific PFAS can adversely impact human health and other living things.

Robust, accurate methods for detecting and measuring PFAS in are essential for understanding which PFAS are in the environment and how much are present. These methods are also essential for evaluating the effectiveness of different

technologies for removing PFAS. To advance approaches for detecting and measuring PFAS in water, EPA is interested in the following topic:

Topic 1D: Sensors to detect high priority contaminants of emerging concern (including PFAS). Innovative technologies for the rapid detection of contaminants of emerging concern in water. Contaminants of highest priority include total PFAS, pharmaceuticals, pesticides, and stimulants. Technologies should be field-deployable, cost-effective, robust, user-friendly, sensitive and capable of detecting CECs in complex water environments including drinking water, groundwater, surface water and wastewater. Ideally, PFAS sensor technologies should detect PFAS at levels comparable to (or below) existing EPA methods (e.g., Methods 533 and 537.1, SW-846 Method 8327, and draft Methods 1633 and 1621).

2. AIR QUALITY & CLIMATE

AIR MONITORING

Innovation in air monitoring technologies can significantly reduce monitoring costs, provide more detailed and timely information on ambient air quality, and provide opportunities for industry to address leaks and emissions before they become serious problems. Additionally, higher time resolution and more portable measurements can be useful for screening applications. The development and evaluation of advanced next-generation air monitoring technologies is an important priority for EPA and is emphasized in the FY19-22 Air and Energy Strategic Research Action Plan.

Air toxics, also known as toxic air pollutants or hazardous air pollutants, are those pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects (https://www.epa.gov/urban-air-toxics).

Air Toxics

Many air toxics issues are localized and may disproportionately affect communities, including minority, low-income, and indigenous communities. High-quality measurement data are needed to assess the management and mitigation of air toxics, which include dozens of volatile organic compounds (VOCs), heavy metals, and radionucleotides.

Reliable methods for measuring ethylene oxide (EtO) are of particular interest. EtO is a flammable, colorless gas used to make other chemicals that are used in making a range of products, including antifreeze, textiles, plastics, detergents, and adhesives. It is also used to sterilize equipment and plastic devices that cannot be sterilized by steam, such as medical equipment. It is one of 187 pollutants known as “air toxics” that EPA regulates under the Clean Air Act. The National Air Toxics Assessment (NATA), issued in August 2018, identified several areas as potentially having elevated cancer risks from long-term exposure (70 years) to EtO based on data from the 2014 National Emissions Inventory and the latest scientific information on air toxics and health. This is due to the revision of an EPA risk value that was updated in late 2016.

Volatile organic compounds are compounds that have a high vapor pressure and low water solubility. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants. VOCs typically are industrial solvents, such as trichloroethylene; fuel oxygenates, such as methyl tert-butyl ether (MTBE); or by-products produced by chlorination in water treatment, such as chloroform. VOCs are often components of petroleum fuels, hydraulic fluids, paint thinners, and dry-cleaning agents. VOCs are common ground-water contaminants.

VOCs can have both a direct health impact and contribute to the formation of ground-level ozone (smog). Exposure to ozone is linked to a wide range of health effects, including aggravated asthma, increased emergency room visits and hospital admissions, and premature deaths. Such emissions cause health and wellbeing concerns, especially for communities living near industry. (https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=23).

For these reasons, EPA is interested in the following topics:

Topic 2A: Ambient air monitoring technology for air toxics. New measurement technologies that can identify and quantify air toxic emissions. Technologies should provide real time, continuous measurements of concentrations with minimum detection limits below background concentrations or health risk-based thresholds. Additionally, new technology must be able to distinguish targets from potential interfering compounds. Technologies that can be used to detect or identify

sources of air toxic emissions would be useful for addressing neighborhood-level concerns, which may not be seen with the current regulatory monitoring network.

Continuous Emission Monitoring System for Metals

There is a need for cost-effective technologies for continuous emissions monitoring systems (CEMS) for hazardous air pollutant (HAP) metals emitted from industrial stacks. HAP metals of concern include arsenic, cobalt, lead, chromium, manganese, and mercury. For some industries, including hazardous waste combustors, secondary metal smelting operations, iron and steel industries and metal scrap recycling facilities, emissions of these and other metal HAPs can vary significantly over time due to parameters such as highly variable metal HAP content in the process input feed stream. In many cases, these facilities are located in environmental justice areas that have historically been disproportionately affected by air pollution.

Although EPA has promulgated regulations that support the alternative use of HAP metal CEMS for demonstrating compliance with emissions standards (including 40 CFR Part 63, Subpart EEE, NESHAP for Hazardous Waste Combustors), commercially available HAP metals CEMS technologies are currently limited and not widely adopted due to cost and other technical challenges. Inexpensive and reliable CEMS for HAP metals would be of interest to regulated industries, air permitting authorities and disproportionately affected communities. Such CEMS could be a practical alternative for assuring continuous compliance with applicable emissions limits for small and mid-size industries that often cannot afford the more expensive CEMS options.

For these reasons, EPA is interested in the following topic:

Topic 2B: Continuous Emission Monitoring System for metal HAPs. Cost-effective, reliable, and accurate CEMS for HAP metals from stacks at stationary sources. The proposed CEMS should provide continuous compliance with applicable limits for small and mid-size industries. Furthermore, such technology should provide continuous emissions rate data in terms of the applicable limit (rather than parametric data), thus enhancing practical enforceability of the emissions limit or standard. Technologies would demonstrate that a representative particulate and gaseous metal sample can be collected through the proposed technology's sample transport system. Technologies should significantly improve accuracy, reliability and effectiveness, and substantially lower capital and operating costs of existing technologies. Ideally, proposals would include laboratory demonstrations of the monitoring technology performance such as relative accuracy and detection limits.

Methane

In 2019, methane (CH_4) accounted for about 10 percent of all U.S. greenhouse gas emissions from human activities. Methane's lifetime in the atmosphere is much shorter than carbon dioxide (CO_2), but CH_4 is more efficient at trapping radiation than CO_2. Human activities emitting methane include fugitive emissions from oil and natural gas systems, the raising of livestock, and landfills. Methane is also emitted by natural sources such as natural wetlands. The largest industrial source of CH_4 in the U.S. is oil and gas systems.

Fugitive sources are often identified as potentially large sources of CH_4 emissions. These include production, processing, transport, and distribution of oil and natural gas, including from production site storage tanks, large animal feeding operations, and municipal landfills. Multiple measurement challenges inhibit more complete understanding of methane emissions, including safety issues related to making direct measurements from industrial sources, emission fluxes exceeding instrument capacity, intermittent timing and location of emission events, and site access or operator cooperation.

For these reasons, EPA is interested in the following topic:

Topic 2C: Air monitoring technology for methane from fugitive sources. New measurement technologies that provide continuous quantitative CH_4 emission rates (e.g., over timeframes of hours or days) to increase the number of measurement data points available across multiple locations and source types to improve characterization of methane

emissions. Estimating source emissions from nearby ambient monitoring measurements can require measurements of low methane concentrations and possibly simultaneous measurement of wind speed and direction. Important parameters include portability, measurement accuracy and repeatability, low cost of purchase and operation, ease of operation, and data recording and transmission capabilities.

Radon

Radon is a naturally occurring radioactive gas that comes from the natural decay of uranium that is found in nearly all soils (https://www.epa.gov/radon). It travels through the ground and infiltrates homes through cracks in the foundation and gaps and joints in building materials. The average indoor radon level is about 1.3 picocuries per liter (pCi/L) in air in the United States while the average outdoor level is about 0.4 pCi/L (https://www.epa.gov/indoor-air-quality-iaq/what-average-level-radon-found-homes-us-0). Radon can have detrimental health effects and is estimated to cause thousands of lung cancer deaths in the US each year. While there is no known safe level of radon, health effects can be reduced by lowering indoor radon levels. Radon reduction systems, typically venting technologies, can reduce radon levels by up to 99 percent. However, the cost of installing a radon mitigation system can be a barrier for some low-income homeowners, resulting in a potentially avoidable exposure to radon. Additionally, few low-cost radon mitigation systems are designed to be installed in multifamily housing units. Development of lower-cost technology may increase the ability of those in lower socioeconomic groups to address this problem.

Topic 2D: Technologies that reduce exposure to radon in buildings. Radon mitigation technologies using sub-slab depressurization have been demonstrated for many years but may not be practical for some applications due to cost or building characteristics. Of particular interest are alternatives to sub-slab depressurization radon mitigation strategies and technologies for low-income housing or for high-rise buildings, lower cost alternative materials for soil gas collection plenums in new construction, and effective methods for mitigating radon in well water. Important parameters include low cost of installation and operation, ease of maintenance and operation, and feasibility of retrofitting the proposed technology.

Refrigerant Recovery

The American Innovation and Manufacturing (AIM) Act provides EPA authority to promulgate regulations to maximize reclamation and minimize releases of HFCs and their substitutes from equipment. Much of the refrigerant contained in refrigeration and AC equipment contains hydrofluorocarbons (HFCs), which have high global warming potentials (GWP), or ozone depleting substances (ODS) with both high GWPs and damaging effects to the ozone layer. It is a violation of Sections 608 and 609 of the Clean Air Act to vent these refrigerants, but nevertheless they are often emitted during service of equipment or at equipment disposal.

Barriers to recovery of used refrigerant during equipment servicing include the necessity for technicians to carry and operate recovery equipment, the time required for equipment to recover refrigerant, and the transport and handling of the used refrigerant tanks to allow for reclamation or destruction. New technologies that would make the recovery easier, cheaper, or faster for service technicians and companies, e.g., dedicated mobile recovery units, faster or lighter recovery equipment, or mobile destruction equipment for refrigerant that cannot be economically reclaimed, could reduce GHG and ODS emissions.

Similarly, the additional time and effort required to recover the refrigerant from disposed AC and refrigeration units that arrive at waste sites still containing a refrigerant charge often means the refrigerant is not extracted from the equipment as required. New technologies that facilitate determining if discarded equipment still contains refrigerant, tracking and handling equipment that contains refrigerant; extracting refrigerant from equipment; or handling, transporting or destroying refrigerant after it is extracted could improve compliance with recovery requirements and reduce emissions.

Another avenue to increasing the percentage of used refrigerant that is recovered rather than vented is to increase the economic value of recovered refrigerant. Recovered refrigerant that can be filtered, separated, and/or blended to meet purity specifications can be re-sold, providing an incentive for recovery. Reclamation and reuse of refrigerant is also valuable because the production and import of virgin HCFCs is being phased out under the Clean Air Act and the production

and import of virgin HFCs is being phased down under the American Innovation in Manufacturing Act, so reclamation augments refrigerant supply as the supply of new refrigerant declines.

Separation of refrigerant components is currently accomplished primarily through distillation; however, depending on the components and condition of the used refrigerant, reclaim can be difficult and expensive. New technologies that would make the separation of blend components and thermal breakdown products more efficient or less costly, e.g., improved distillation techniques, semi-permeable membranes, ionic liquids, quaternary amine solutions, or use of absorption/adsorption media, could increase the recycling of refrigerant gases, reduce the amount of refrigerant that needs to be destroyed, and support reclaim.

Topic 2E: Technologies for improved recovery of refrigerant from air conditioning (AC) and refrigeration equipment. New technologies to help reduce GHG and ODS emissions by making the recovery of refrigerants easier, cheaper, and faster (e.g, mobile recovery units); new technologies for determining if discarded equipment still contains refrigerant; and new technologies for reclamation/recovery of refrigerants that are more efficient and affordable.

3. HOMELAND SECURITY

Under the National Response Framework, the U.S. EPA has one primary mission essential function - Respond to Environmental and Health Threats. As such, the Agency has responsibility to support prevention, limitation, mitigation, or containment of chemical, oil, radiological, biological, and/or natural or man-made disaster in designated zones of the United States, and provide environmental monitoring, assessment, and reporting in support of overall domestic incident management.

Community Resilience

EPA is interested in innovative technologies that can help build community resiliency to disasters and other threats and reduce the risk of contamination and remediate it once it has occurred.

Building resilience to disasters, homeland security threats, and extreme weather is an increasingly urgent need that communities face. These threats can be particularly devastating in under-resourced communities where there is limited staffing or money for hazard mitigation planning and implementation. While traditional resilience strategies have focused on advancements to infrastructure and the built environment, emerging research demonstrates that building social networks and collective action can be a powerful tool. Fostering grassroots networks and local initiatives increases community buy-in, which can often address issues of equity and social vulnerability. Community collectives, such as action teams, committees, and interest groups, can also provide spaces (virtual or in-person) where residents can voice their concerns and problem solve together. In recent years, there have also been creative applications of virtual technologies and social media to crowdsource disaster response efforts as demonstrated in the following resources/examples.

- https://www.epa.gov/communitywaterresilience
- https://www.epa.gov/emergency-response-research/environmental-resilience-tools-wizard
- https://www.dhs.gov/sites/default/files/publications/Social-Media-EM_0913-508_0.pdf
- https://ist.psu.edu/node/5794 (SensePlace2, a geoTwitter analytic tool developed by Penn State)
- https://www.ushahidi.com/ (a crowdsourcing technology that combines mapping and on-the-ground reports)

For these reasons, and to support EPA's Homeland Security Research, EPA is interested in the following topic:

Topic 3A: Innovative technology solutions that build community resilience to disasters. Solutions should foster social networking, collective action (e.g., citizen science, community-based disaster risk management, disaster preparedness committees), and or relationships that help community resilience especially in the context of disaster response and recovery. Disasters may include a variety of hazards such as extreme weather, chemical, biological, radiological, and nuclear (CBRN) incidents, earthquakes, wildfire, etc. Technologies should be innovative and perform more effectively and affordably than currently available technologies.

Oil Droplet Sensor

One of EPA's top priorities is to prevent, prepare for, and respond to oil spills that occur in and around inland waters of the U.S. (https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations). Chemical dispersants are used to treat oil spills, and oil droplet size serves as an indication of the dispersant's effectiveness. Miniaturization of sensors would allow for deployment on underwater vehicle and platforms for data collection over timescales appropriate for operational decision-making. Currently, droplet size sensors are larger than two feet in length and designed to be deployed and tethered from ships. Miniaturization would enable deployment from smaller underwater vehicle platforms capable of real-time data delivery.

Topic 3B: Miniaturized oil spill droplet size sensor for emergency response underwater vehicles. Technologies are needed to help assess the effectiveness of chemical dispersants used for treatment of for oil spills that occur in and around inland waters. Technologies should be able to sense oil droplets in the size range of 1-1000 um (micrometers), be deployable from small underwater vehicles/platforms and be capable of real-time data delivery.

4. CIRCULAR ECONOMY/SUSTAINABLE MATERIALS

A circular economy reduces material use, redesigns materials to be less resource intensive, and recaptures "waste" as a resource to manufacture new materials and products. EPA's 2021 National Recycling Strategy (Strategy) discusses recycling challenges facing the nation and ways to improve the system for the future. The Strategy identifies actions to address these challenges that build on the collaborative efforts by stakeholders from across the recycling system, which started under the 2019 National Framework for Advancing the U.S. Recycling System. The Strategy's goal is to create a stronger, more resilient, and cost-effective municipal solid waste (MSW) recycling system and is a critical effort to build a circular economy for all.

Circularity is embraced within the sustainable materials management (SMM) approach that the U.S. federal government has pursued since 2009. A circular economy approach under the SMM umbrella demonstrates continuity in our emphasis on reducing life cycle impacts of materials, including climate impacts, and reducing the use of harmful materials. The Strategy recognizes the need to implement a circular economy approach for all – reducing the creation of waste with local communities in mind and implementing materials management strategies that are inclusive of communities with environmental justice concerns.

Preventing Food Waste

Over one-third of the food produced in the U.S. is never eaten. The production and current management of food waste uses significant and limited resources and contributes to a broad range of environmental impacts, including climate change, air pollutants, water scarcity, reductions in biodiversity, and soil and water quality degradation. For example, producing, processing, distributing and retailing food that is ultimately wasted contributes greenhouse gas (GHG) emissions equivalent to that of 42 coal-fired power plants and requires enough water and energy to supply more than 50 million homes each year. When food is disposed of in a landfill, it produces methane, a potent greenhouse gas 28 to 36 times more effective than CO_2 at trapping heat in the atmosphere over a 100-year period. EPA estimates that over 35.3 million tons (24% of municipal solid waste or MSW) of food is sent to landfills. The EPA, USDA, and FDA are working together to help the U.S. meet its goal of reducing food loss and waste by 50 percent by 2030. Guided by EPA's Food Recovery Hierarchy, EPA is seeking innovative technologies to prevent food waste. Preventing food waste from being generated creates more benefits for the environment, society, and the economy than any end-of-life management strategy.

Consumers waste food due to a variety of reasons. Some drivers of food waste are associated with the built environment, such as in households (e.g., poor refrigerator design) and in retail stores (e.g., packaging that limits shelf life, portion sizes too large for small households). Other drivers of food waste are associated with a lack of knowledge (e.g., how to properly store food, how to assess food safety, or how to cook with what you have on hand) or busy lifestyles, for example.

To address these issues, EPA is interested in the following topic:

Topic 4A: Innovative technologies that help consumers prevent food waste in the acquisition, preparation, and storage of food. Such technologies could include but are not limited to apps and other devices to help consumers with awareness, planning, inventory management, and other behaviors related to food; smart appliances and improvements to refrigeration; and food packaging or storage that extends freshness and minimizes waste.

Recycling

The U.S. MSW recycling system currently faces several challenges, including confusion about what materials can be recycled, recycling infrastructure that has not kept pace with today's diverse and changing waste stream, reduced markets for recycled materials, and varying methodologies to measure recycling system performance. The National Recycling Strategy identifies actions to address these challenges that build on the collaborative efforts by stakeholders from across the recycling system that began under the 2019 *National Framework for Advancing the U.S. Recycling System*.

The *National Recycling Strategy* is aligned with and supports implementation of the National Recycling Goal to increase the U.S. recycling rate to 50 percent by 2030. The *National Recycling Strategy* is organized by five strategic objectives to create a more resilient and cost-effective national recycling system: improve markets for recycling commodities; increase collection and improve materials management infrastructure; reduce contamination in the recycled materials stream; enhance policies to support recycling; and standardize measurement and increase data collection.

It is noted that recycling efforts in the U.S. are inclusive of more than just the processing of MSW at material recovery facilities and include many other materials, such electronics, textiles, cement, concrete, and batteries.

For these reasons, EPA is interested in the following topics:

Topic 4B: Innovative technologies or materials that will improve the U.S. recycling system.
Technologies should support more efficient and effective collection, sortation, and processing of recycled materials and/or lead to the increased recyclability of products or increased recycled content within products.

Plastics

Over the last 20 years, the global annual production of plastics has more than doubled, reaching 460 million tons in 2019; subsequently, plastic waste also doubled reaching 353 million tons (OECD, 2022). Every year, millions of tons of plastics products end up in waste streams where they are mismanaged – either improperly disposed, burned, or leaked into the environment. This has detrimental effects on aquatic and marine ecosystems as well as negative consequences for the economy and human health. The current life cycle of plastics embodies a linear model in which environmental, economic, and social sustainability is challenged. It is projected that by 2050, there will be more plastics, by weight, in the oceans than fish (World Economic Forum et al., 2016).

In December 2020, the Save Our Seas 2.0 Act (SOS 2.0) was signed into law in response to the growing local, national, and international concerns over plastic pollution. SOS 2.0 is the most comprehensive legislation passed by Congress to improve efforts in combating marine debris.

In response to SOS 2.0, EPA is developing a series of strategies titled *Building a Circular Economy for All*. The Strategy is part one of the series primarily focusing on enhancing and advancing the national MSW recycling system. EPA will issue the National Strategy for Reducing Plastic and Other Waste in Waterways and Oceans, which will focus on reducing the amount of plastic waste entering U.S. waterways and the oceans.

A circular economy, as defined in the SOS 2.0, refers to an economy that uses a systems-focused approach and involves industrial processes and economic activities that are restorative or regenerative by design, enable resources used in such processes and activities to maintain their highest value for as long as possible, and aim for the elimination of waste through the superior design of materials, products, and systems (including business models). It is a change to the model in which resources are mined, made into products, and then become waste. A circular economy approach emphasizes a reduction of life-cycle impacts of materials, including climate impacts.

For these reasons, EPA is interested in the following topic:

Topic 4C: Innovative reduction, reuse, and recycling solutions to advance plastic circularity
Technology solutions to reduce the amount of plastic waste entering U.S. waterways and oceans with a focus on the incorporation of circular economy approaches which reduce material use, redesign materials to be less resource intensive, and recapture "waste" as a resource to manufacture new materials and products.

5. SAFER CHEMICALS

Chemicals can be found in products we use in our everyday lives. Some chemicals pose risks to humans and the environment. Under the Toxic Substances Control Act (TSCA) and the Pollution Prevention Act, EPA evaluates potential risks from new and existing chemicals and finds ways to prevent or reduce pollution before it gets into the environment (https://www.epa.gov/environmental-topics/chemicals-and-toxics-topics and https://www.epa.gov/p2/learn-about-pollution-prevention). Safer Chemicals research at EPA (https://www.epa.gov/chemical-research)) supports chemical risk-based decisions to protect human health and the environment.

Cleaner Manufacturing of Color

Polychlorinated biphenyls (PCBs) are extremely persistent in the environment, bioaccumulate and biomagnify in the food chain and humans, and have adverse human health effects (https://www.epa.gov/pcbs). In 1979 the U.S. banned their production under the Toxic Substances TSCA. However, PCBs continue to be generated and released into the environment as the unintended by-products of the manufacturing of certain pigments used in dyes, paints, and inks (http://ehp.niehs.nih.gov/121-a86/). Studies have detected these PCBs in wastewater, sediments, air and surface waterways across the U.S. Inadvertently generated PCBs (iPCBS) have also been positively identified in new products colored with pigments (https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=346285&Lab=NRMRL) and their presence in the environment can be attributed to the unintended production of PCBs as a byproduct in pigment manufacturing. Washington State is evaluating PCBs in paints and printing inks through the 2019 Safer Products for Washington law: https://ecology.wa.gov/Waste-Toxics/Reducing-toxic-chemicals/Safer-products.

This pollution source is contributing to water impairment and resulting in challenges to states and other entities in meeting water quality standards. Due to bioaccumulation and biomagnification, PCBs in waterways may affect sensitive populations including Tribes and other subsistence fishing communities.

For these reasons, EPA is interested in the following topic:

Topic 5A: PCB-free color. Development of pigments, dyes, paints, inks, or other methods of adding color to products that do not contain unintentional undesirable residuals/contaminants including PCBs and do not create undesirable byproducts including PCBs during the manufacturing process. These proposed products could employ processes that include innovative technologies for coloration such as biomimicry and structural color that do not require traditional pigments, dyes, paints, and inks or the generation of unintentional undesirable byproducts including PCBs. EPA is especially interested in supporting the development of new products that would meet the criteria for certification by EPA's Safer Choice program: https://www.epa.gov/saferchoice.

Rubber anti-degradants (that do not contain 6PPD-quinone)

A 2020 *Science* publication linked coho salmon death to an acutely toxic chemical, 6PPD-quinone, in stormwater (Tian et al., 2021). Concentrations in stormwater were found to be lethal for coho salmon following exposures lasting only a few hours. Subsequent work identified rainbow trout and brook trout as vulnerable to 6PPD-quinone (Brinkmann et al., 2022). These fish species have cultural, commercial, and ecological importance, and some coho salmon populations are endangered and threatened.

6PPD-quinone is a degradation product of 6PPD (N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD)), a rubber antidegradant. 6PPD provides antioxidant and anti-ozonant properties with high temperature, fatigue, and flex resistance for natural and synthetic rubber compounds under both static and dynamic operating conditions. This compound helps to

protect rubber against aging (OSPAR commission, 2005). Sources of 6PPD-quinone in stormwater include tire and road wear particles and may also include other sources containing recycled tire products (e.g., synthetic turf), as well as other sources.

Since the identification of 6PPD-quinone as a toxicant to fish, interest in identifying alternatives to 6PPD has grown. The State of California has proposed to list motor vehicle tires containing 6PPD as a Priority Product under that state's Safer Consumer Products (SCP) regulations. This process may lead to investigation of potential alternative tire rubber antidegradant chemicals.

For these reasons, EPA is interested in the following topic:

Topic 5B: Rubber anti-degradant technologies for tires and other rubber products that are lower concern for human health and the environment. Anti-ozonant/anti-oxidant products or technologies, compatible with natural and synthetic rubber materials, that do not create undesirable oxidation byproducts under ambient conditions (e.g., in tires driving on the road) or have other negative environmental or human health impacts but retain strong anti-degradant properties to be competitive with existing technologies.

Next Generation Fertilizers

Nitrogen and phosphorus fertilizers facilitate the growth of crops, including corn, at yields that provide sustained global food production. However, fertilizers applied without consideration of the appropriate rate, timing, source, and method, can have harmful effects on the environment and human health. Enhanced Efficiency Fertilizer (EEF) is a term for new formulations that control fertilizer release or alter reactions that reduce nutrient losses to the environment. EEFs and other next generation product technology innovations may be an important addition to a system of conservation practices that help reduce the impacts from row crop agriculture on the environment, while maintaining or increasing agricultural productivity and profitability. For more information, see:

- https://www.epa.gov/innovation/next-gen-fertilizer-challenges
- https://ifdc.org/2022/03/17/next-gen-fertilizer-challenges-showcasing-event-participant-videos/

To further these goals, EPA is interested in the following topic:

Topic 5C: Innovative enhanced efficiency fertilizers. Technologies that are affordable and will help reduce the environmental impacts of U.S. corn and other row crop production while maintaining or increasing crop yields. Ideally, technologies could be applicable to improve production of many crops in the U.S. and abroad. These technologies should maintain or increase yields relative to conventional fertilizers and come with a net reduction of nutrient losses (nitrogen and especially phosphorus) to the environment via leaching, runoff, ammonia volatilization, and nitrous oxide emissions.

6. RISK ASSESSMENT

Federal, state, and tribal decision-makers use risk assessments to characterize the nature and magnitude of risks to humans (e.g., residents, workers, vulnerable populations) and ecological receptors (e.g., birds, fish, wildlife) from chemical contaminants and other stressors that may be present in the environment. Science assessments form key components of the scientific foundation for risk assessment decisions and therefore must be high quality, transparent, consistent, and scientifically defensible (https://www.epa.gov/risk). Systematic review methodology is being embraced across the EPA to enhance transparency and defensibility of human health and environmental risk assessment activities.

Tools for chemical risk assessment

The use of specialized software tools (including artificial intelligence) to support systematic reviews has been demonstrated to increase the efficiency and transparency of producing science assessments while reducing costs.

To support risk assessments, EPA is interested in the following topic:

Topic 6A: Software tools and machine-learning applications for systematic review in science assessment for chemical evaluation. User friendly and interoperable tools to support greater automation of systematic review processes and improve consistency in the methods used in the evaluation of a chemical, its hazard, and risk from environmental health and safety scientific literature and regulatory data.

E. Additional Requirements

Each offeror submitting a Phase I proposal must qualify as a small business for research or R&D purposes at the time of award of the Phase I and Phase II funding agreements. In addition, the primary employment of the principal investigator must be with the small business firm, both at the time of contract award and during the conduct of the proposed research. Principal investigators who appear to be employed by a university must submit a letter from the university stating that the principal investigator, if awarded a SBIR contract, will become a less-than-half-time employee of the university.

Also, a principal investigator who appears to be a staff member of both the offeror and a second employer must submit a letter from the second employer stating that, if awarded a SBIR contract, s/he will become a less than half-time employee of the second employer. Letters demonstrating that these requirements have been fulfilled shall be included in the offeror's proposal. Failure to do so may jeopardize award. Also, for Phase I, the research or R&D work must be performed in the United States. (For the definition of the "United States", see Section II. II.J.)

F. Inquiries

All inquiries concerning this solicitation shall be submitted to the EPA Contracting Officer Matthew Huber at the following e-mail address huber.matthew@epa.gov. Inquiries must be received within two weeks of the date this solicitation was issued. The subject of the email must be titled "2022-23 EPA SBIR Phase I BAA Inquiry". Any questions submitted after this date will not receive a response. Questions submitted through FedConnect will not receive a response.

G. Fraud, Waste, and Abuse

To report fraud, waste, or abuse in EPA programs, contact the OIG Hotline by:

E-mail: OIG_Hotline@epa.gov

Postal Mail:
EPA Inspector General Hotline
1200 Pennsylvania Avenue NW Mail code 2431T

Phone: 1-888-546-8740
Fax: 1-202-566-2599

II. DEFINITIONS

For purposes of this solicitation, the following definitions apply:

A. Research or Research and Development (R/R&D)

Any Activity that is:

(1) A systematic, intensive study directed toward greater knowledge or understanding of the subject studied;
(2) A systematic study directed specifically toward applying new knowledge to meet a recognized need; or
(3) A systematic application of knowledge toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

B. Funding Agreement

Any contract, grant, or cooperative agreement entered into between any Federal Agency and any small business concern for the performance of experimental, developmental, or research work, including products or services, funded in whole or in part by the Federal Government.

C. Subcontract

Any agreement, other than one involving an employer-employee relationship, entered into by an awardee of a funding agreement for purpose of obtaining supplies or services for the performance of the original funding agreement.

D. Small Business Concern

A small business concern is one that, at the time of award of Phase I and Phase II contracts, meets all of the following criteria:

(1) Is registered in System for Award (SAM) under North American Industry Classification System (NAICS) code 541715.
(2) Is organized for profit, with a place of business located in the United States;
(3) Is more than 50 percent owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States, or by another for-profit business concern that is more than 50% owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States; and
(4) Has no more than 1000 employees, including affiliates;
(5) Is in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust, or cooperative, except that, where the form is a joint venture, there can be no more than 49 percent participation by business entities in the joint venture.

E. Socially and Economically Disadvantaged Small Business Concern

A socially and economically disadvantaged small business concern is one that is at least 51% owned and controlled by one or more socially and economically disadvantaged individuals, or an Indian tribe, including Alaska Native Corporations (ANCs), a Native Hawaiian Organization (NHO), or a Community Development Corporation (CDC). Control includes both the strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations. See 13 CFR 124.109, 124.110, and 124.111 for special rules pertaining to concerns owned by Indian tribes (including ANCs), NHOs, or CDCs, respectively.

F. Socially and Economically Disadvantaged Individual

A member of any of the following groups:

(1) Black Americans;
(2) Hispanic Americans;
(3) Native Americans (American Indians, Eskimos, Aleuts, or Native Hawaiians);
(4) Asian-Pacific Americans (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China (including Hong Kong), Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Fiji, Tonga, Kiribati, Tuvalu, or Nauru);
(5) Subcontinent Asian Americans (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal); and
(6) Other groups designated from time to time by SBA pursuant to Section 124.103(d) of the 13 CFR Ch.1 (1-1-02 Edition).

G. Woman-Owned Small Business Concern

A small business concern that is at least 51 percent owned by and controlled by a woman or women. Control includes both the strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations.

H. Historically Underutilized Business Zone (HUBZone)

A small business concern meeting the following requirements:

(1) It must be a small business by SBA standards;
(2) It must be owned and controlled at least 51% by U.S. citizens, or a Community Development Corporation, an agricultural cooperative, or an Indian tribe;

(3) Its principal office must be located within a "Historically Underutilized Business Zone," which includes lands considered "Indian Country" and military facilities closed by the Base Realignment and Closure Act;
(4) At least 35% of its employees must reside in a HUBZone.

I. Primary Employment

More than one-half of the principal investigator's time is spent in the employ of the small business concern.

J. United States

The 50 States, the Territories and possessions of the Federal Government, the Commonwealth of Puerto Rico, the District of Columbia, the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau.

K. Commercialization

The process of developing marketable products or services and producing and delivering products or services for sale (whether by the originating party or by others) to Government or commercial markets.

L. SBIR Technical Data

All data generated during the performance of a SBIR award.

M. SBIR Technical Data Rights

The rights a small business concern obtains in data generated during the performance of any SBIR Phase I, Phase II, or Phase III award that an awardee delivers to the Government during or upon completion of a Federally-funded project, and to which the Government receives a license.

III. CERTIFICATIONS

The Section K Representations and Certifications are located in Appendix 4. Refer to IV., Proposal Preparation Instructions and Requirements, Section IV.F. Attachment 3: Representations and Certifications for instructions on proposal preparation.

Please Note: Majority Ownership in Part by Multiple Venture Capital, Hedge Fund, and Private Equity Firms. The EPA's SBIR Program does not accept proposals from or make awards to small business concerns that are owned in majority part by multiple venture capital operating companies, hedge funds, or private equity firms. **Small business concerns with such ownership will not be considered for award under this solicitation.**

IV. PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

A. Proposal Page Limit and Cover Sheet

Proposals shall be submitted in Portable Document Form (PDF) in response to this Phase I solicitation. Proposals shall not exceed a total of **25 pages**, one side only. The **25 pages** shall include the cover page, budget, and all enclosures or attachments (including letters of support). Pages (including enclosures or attachments) should be of standard size (8 ½ in x 11 in; 21.6 cm x 27.9 cm) with 2.5 cm margins and type no smaller than 10-point font size. All pages shall be consecutively numbered.

Proposals in excess of the 25-page limitation shall not be considered for review or award. Your entire proposal (including appendices) shall be submitted through FedConnect as ONE document in PDF. Only proposals received as a "response" to the BAA Solicitation via FedConnect as ONE PDF by the deadline identified above will be considered for award.

Each Offeror **may only submit one proposal** in response to this BAA Solicitation. An offeror that submits multiple proposals will only have one proposal reviewed. If an offeror submits multiple proposals it is the sole discretion of the government which proposal will be reviewed.

Proposals submitted via FedConnect shall have a file name that includes the company name and topic code. An example of an acceptable file name is as follows: Topic 1A – ABC, LLC. Proposals shall be submitted via "response" in FedConnect and not through the message center (also in FedConnect). A proposal is a response to the Government's Solicitation. Any

proposal received through the message center function in FedConnect will not be evaluated for award. If an offeror is unsure or has questions on how to submit a proposal please contact the FedConnect helpdesk. It is encouraged you do not wait to the last minute to submit your proposal. There is often a small delay in your submission and it being officially "received" by the government. It is recommended to submit your proposal as far in advance of the deadline possible. Any inquiries to as the status of your submission should be made to the FedConnect helpdesk. The EPA will pull all the proposals from FedConnect that were submitted as a response and that were submitted by the deadline.

The offeror shall complete the Proposal Cover Sheet (Appendix 1) of this solicitation which has the relevant solicitation number and research topic codes and titles and use it as page 1 of the proposal. The offeror shall select one (and only one) research topic code on the cover sheet. It is the responsibility of offerors to select the best research topic code and title for their proposal. When downloading the solicitation, Appendix 1 may print on more than two pages, but will only count as one page. If Appendix 1 exceeds two pages, any additional pages will count toward the 25-page limitation. Offerors may reformat the forms to correct spacing and pagination errors; however, identical information shall be provided.

The cover sheet shall contain the signatures of the principal investigator and the corporate/business official authorized to sign the proposal. Electronic signatures are acceptable. The total costs requested on Appendix 1 (Proposal Cover Sheet) must match the total costs proposed on Appendix 3 (SBIR Proposal Summary Budget). The amount must not exceed $100,000 on Appendix 1 and 3. If your firm intends to incur any additional costs beyond the budget limitation of $100,000, please provide a statement indicating that your firm will be responsible for any additional cost beyond the budget limits. Failure to sign the cover sheet, or provide matching costs in Appendix 1 and 3, or provide a statement of explanation in cost exceeding $100,000 will result in the proposal being found non-responsive.

B. Project Summary

Each proposal must include a Project Summary which will be an important document in the review process. The offeror shall complete the Project Summary form (Appendix 2) and use it as page 2 of their proposal. Offerors shall properly enter their Phase I Research Topic Code and Topic Title on both their Proposal Cover Sheet (Appendix 1) and Project Summary (Appendix 2).

The Project Summary **shall** be limited to one page and shall not exceed 400 words. Any Project Summary over the 400-word limit will result in the proposal being found non-responsive. The Project Summary **shall** include the following information: Innovativeness of the proposed technology, technical feasibility, performance compared to current technologies, commercial potential (including applications and end users), and potential for environmental impact. The project summary is used extensively during the proposal evaluation process. The project summary and proposal title from Appendix 2 of the successful proposals will be published by EPA and, therefore, shall not contain proprietary information.

When downloading the solicitation, Appendix 2 may print on more than two pages, but Appendix 2 will only count as one page. Offerors may reformat the forms; however, identical information shall be provided. If Appendix 2 exceeds two pages, any additional pages will count toward the 25-page limitation.

C. Technical and Commercial Content: Phase I Proposal

The Phase I proposal requirements are described in this section. Begin the main body of the Phase I technical and commercial proposal on page 3, after the proposal cover sheet and project summary. Note that there are THREE attachments required as part of the complete Phase I proposal as follows:

Attachment 1: Phase I Quality Assurance Statement (See Section D);
Attachment 2: Cost Breakdown/Proposed Budget (See Section E);
Attachment 3: Representations and Certifications (See Section F).

Technical and Commercial Content

The main body of the technical and commercial proposal shall contain sections that respond to each of the following requirements. These requirements also correspond to the evaluation criteria. The offeror shall have matching titles in

their proposal as to those listed below in this section. **Failure to address each section will result in a proposal being found non-responsive**.

- **Technical Approach**
    - Describe the approach and key objectives needed to prove technical feasibility of the proposed concept in Phase I.
    - Describe the key performance characteristics, including costs, necessary to meet customer needs.
    - Describe the technical milestones needed to achieve each objective and provide a visual timeline of these objectives and milestones for the project. Describe how success will be assessed.
    - Describe the potential technical challenges for bringing the technology to market and how they will be overcome.

- **Company/Team (technical)**
    - Describe the expertise, experience, and collaborations of the company/team (including Principal Investigator (PI)) to carry out the proposed technical activities.

- **Impact/Relevance to topic**
    - Describe how the proposed technology address the solicitation topic and EPA priorities?
    - Describe the lifecycle (inputs, manufacture, use, and reuse/recycle/treatment/disposal, etc.) approach of the technology to solving the problem.

- **Innovation/Intellectual Property (IP)**
    - Describe how the proposed technology is innovative, potentially creating a new product or service.
    - Describe the technology's competitive advantage, in terms of both cost and performance.
    - Provide evidence of interest or support from potential customers or partners. (e.g., letters of support)
    - Describe the likelihood the competitive advantage will be sustainable over several years.
    - Describe the current and planned IP associated with this technology and how it is protected.

- **Market Opportunity**
    - Define and describe the target market for the technology— including basis of competition, size, market drivers, etc.
    - Describe how you validated the market opportunity by interviews with customers or end-users.
    - Describe and enumerate your potential end users/customers.
    - Describe the drivers and barriers in the target market, including regulatory.
    - Describe the value proposition.

- **Company/Team (Commercial)**
    - Describe the Relevant experience of the key participants (including PI, consultants, advisors, etc.).
    - Describe the relevant experience of external advisors, collaborators, or board of directors.
    - Describe the relevant current or past experience commercializing any similar technology.
    - Describe the human resources available to the company and/or plan to hire as needed
    - Describe the financial resources available and/or identified

- **Commercialization Approach**
    - Describe the major commercialization objectives, milestones, and sources/uses of funds required to achieve first product launch.
    - Describe the commercialization plan for taking the technology from its current stage of development to

market launch.

- Provide revenue and profit estimates and supporting rationale.
- Describe production and sales resources needed to implement the commercialization approach.
- Describe any additional commercial prospects/applications for the technology.

Other Requirements

(1) **Similar or Closely Related SBIR Awards.** If the small business concern has received ANY prior Phase I or Phase II award(s) from EPA or any Federal agency for similar or closely related research in the prior 5 fiscal years, submit the name of the awarding agency, date of award, funding agreement number, amount, topic or subtopic title, follow-on agreement amount, source and date of commitment and current commercialization status. Describe the technical differences and reasons why the proposed Phase I research is different from research conducted under prior SBIR awards. (This required proposal information **shall** be counted toward the 25-page proposal limitation.)

(2) **Duplicate or Equivalent SBIR Proposals.** A firm may elect to submit essentially equivalent work under other federal program solicitations. In these cases, a statement shall be included in each such proposal indicating: the name and address of the agencies to which proposals were submitted or from which awards were received; date of proposal submission or date of award; title, number, and date of solicitations under which proposals were submitted or awards received; specific applicable research topics for each proposal submitted or award received; titles of research projects; name and title of project manager or principal investigator for each proposal submitted or award received. (This required proposal information **shall** be counted toward the 25-page proposal limitation.)

D. Attachment 1: Phase I Quality Assurance Statement (QAS)

In your proposal, provide a Phase I Quality Assurance Summary. The QAS does not have a page limit, however this section does count to your page limit total. The QAS is subject to EPA QA review and approval. In the event EPA QA provides comment to the proposed QAS, the offeror must address those comments and resubmit a revised QAS prior to an award being made.

Offerors shall state how their proposal involves environmental data collection or processing, measurements, modeling, or the development of environmental technology (hardware-based (like a sensor or larger like an air scrubber) or software based (like an app) or via new techniques). The QAS describes the processes that will be used to assure that results of the research satisfy the intended project objectives. The EPA is particularly interested in the quality controls for data generation and acquisition, and how data validation and usability will be verified. **The QAS shall briefly address each of the sections below. If a section does not apply, provide a brief justification of why.**

(1) Identify the individual who will be responsible for the quality assurance (QA) and quality control (QC) aspects of the research along with a brief description of this person's functions, experience and authority within the organization. Describe the organization's policy for conducting quality research. (QA is a system of management activities to ensure that a process or product is of the type and quality needed for the project. QC is a system of activities that measure the attributes and performance of a process or product against the standards defined in the project to verify that they will meet those stated requirements.)

(2) Discuss project objectives, including quality objectives, any hypotheses to be tested, and the quantitative and/or qualitative procedures that will be used to evaluate the success of the project. Include any plans for peer or other reviews of the study design or analytical methods.

(3) Discuss the collection of new primary data, if applicable: (Note: In this case the word "sample" is intended to mean any finite part of a statistical population whose properties are studied to gain information about the whole. If certain attributes listed below do not apply to the type of samples to be used in the research, simply explain why those attributes are not applicable.)

   a. Discuss the plan for sample collection and analysis. As applicable, include sample type(s), frequency, locations, sample sizes, sampling procedures, and the criteria for determining acceptable data quality (e.g., precision, accuracy, representativeness, and completeness, comparability, or data quality objectives).

b. Describe the procedures for the handling and custody of samples including sample collection, identification, preservation, transportation, storage and how the accuracy of test measurements will be verified.
c. Describe or reference each analytical method to be used, any QA or QC checks or procedures with the associated acceptance criteria, and any procedure that will be used in the calibration and performance evaluation of the analytical instrumentation.

(4) Discuss the procedures for overall data reduction, analysis, and reporting. Include a description of all statistical methods to make inferences and conclusions, acceptable error rates and any statistical software to be used. (Note: Data collected for use in method development or evaluation (Section 5), the development or refinement of models (Section 6), the development or evaluation of technology (Section 7) should be described as per the guidance in Sections 3 and/or 4.)

(5) Discuss method development.
a. Describe the scope and application of the method, any tests (and measurements) to be conducted to support the method development, the type of instrumentation that will be used and any required instrument conditions (e.g., calibration frequency), planned QC checks and associated criteria (e.g., spikes, replicates, blanks)
b. Describe tests to verify the method's performance.

(6) Discuss development or refinement of models.
a. Discuss the scope and purpose of the model, key assumptions to be made during development/refinement, requirements for code development and how the model will be documented.
b. Discuss verification techniques to ensure the source code implements the model correctly.
c. Discuss validation techniques to determine that the model (assumption and algorithms) captures the essential phenomena with adequate fidelity.
d. Discuss plans for long-term maintenance of the model and associated data.

(7) Discuss development or operation of environmental technology (physical or electronic).
a. Describe the overall purpose and anticipated impact of the technology.
b. Describe the technical and quality specifications of each technology component or process that is to be designed, fabricated, constructed and/or operated.
c. Discuss the procedure to be used for documenting and controlling design changes.
d. Discuss the procedure to be used for documenting the acceptability of processes and components.
e. Discuss how the technology will be benchmarked and its effectiveness determined.
f. Discuss the documentation requirements for operating instructions/guides for maintenance and use of the system(s) and/or process(s).

(8) Discuss the use, source, and parameters of existing/secondary data (i.e., data previously collected for other purposes or from other sources).

(9) Discuss the use of surveys including population parameters and question scripts.

(10) Discuss data verification and validation processes to be used.

(11) Discuss data management activities (e.g., record types, record-keeping procedures, data-handling procedures, and the approach used for data storage and retrieval on electronic media).

Statement of laboratory competency (If applicable): More information on this policy can be found at: https://www.epa.gov/measurements-modeling/ensuring-measurement-competency#acquisition

E. Attachment 2: SBIR Proposal Summary Budget

Complete the budget form in Appendix 3 and incorporate the budget form bearing the signature immediately after Attachment 1: Phase I Quality Assurance Statement. The completed budget form will count as one page in the 25-page limit. If budget explanation pages are included, they will count toward the 25-page limit.

Technical and Business Assistance (TABA): In accordance with the 2020 SBIR/STTR Policy Directive, the EPA is able to provide discretionary commercialization assistance (also known as TABA) to SBIR Phase I awardees. The Agency may provide up to $6,500 of SBIR funds for technical assistance per Phase I award. The EPA intends to provide Phase I awardees with technical assistance through an EPA vendor. For Phase I, this assistance will be in addition to the award amount. If

you wish to receive commercialization assistance from the EPA vendor, you do not need to include this in your budget. If you are awarded a Phase I contract, you will receive notification from EPA and follow-up contact from an EPA-funded vendor on what services are available to you and how to obtain these services at no cost to your small business.

F. Attachment 3: Representations and Certifications

Appendix 4 is a Representations and Certifications Package. Fill out completely, sign, and return with the proposal. **Failure to complete Appendix 4 will result in a proposal being found non-responsive** (This required proposal information **shall not** be counted toward the 25-page proposal limitation).

V. METHOD OF SELECTION AND EVALUATION CRITERIA

Proposals passing this initial screening will be reviewed by internal and external reviewers using the evaluation criteria described below. Programmatic balance, Agency priorities, and available funding may also be used in the selection process. EPA is under no obligation to fund any proposal or any specific number of proposals in a given topic. It also may elect to fund several or none of the proposed approaches to the same topic or subtopic.

A. Evaluation Process

All Phase I proposals determined responsive to the solicitation will be evaluated on a competitive basis by reviewers from inside and outside of the EPA for technical quality, relevance to the topic, and commercial potential. All reviewers will be required to sign an agreement to protect the confidentiality of all proposal material and certify that no conflict of interest exists between them and the offeror. Because there is no common statement of work, each proposal will be evaluated on its own merits rather than against other proposals responding to this BAA Solicitation. EPA plans to make selections for award those proposals that deliver technological innovation, contribute to EPA's mission and demonstrate potential for commercialization.

Phase I Evaluation Criteria

1. Proposal Responsiveness Review

Proposals must be conforming to the requirements set forth in the solicitation. Any proposal that is found not conforming to the requirements set forth in the solicitation will be determined to be non-responsive. A proposal that is found to be non-responsive will not receive a Technical Review.

The following criteria will be used to conduct a technical evaluation of the Phase I proposals. These criteria directly align with the requirements in the solicitation. Address all the criteria to the best of your ability.

2. Technical Review Criteria (1/3 of overall score):

- **Technical Approach** – Degree to which proposal presents an innovative and sound approach to proving the technical feasibility of the proposed concept, assessing success; and addressing potential technical challenges.
- **Company/Team (technical)** – Degree to which proposing company/team (including Principal Investigator (PI)) have the essential elements, including expertise, experience and collaborations to carry out the proposed technical activities.

Relevancy Review Criteria (1/3 of overall score):

- **Impact/Relevance to topic** - Potential of the technology to meet Agency program priorities as addressed in the solicitation topic and to do so using a lifecycle approach to solving the problem.

Commercial Review Criteria (1/3 of overall score):

- **Innovation/Intellectual Property (IP) –** Degree to which the proposed technology is innovative. Strength of intellectual property (IP).
- **Market Opportunity** – Degree to which there is a clearly described market opportunity and company describes its competitive advantage and capability to address this opportunity.

- **Company/Team (Commercial)** –Degree to which proposing company/team has access to resources that could lead to successful commercialization.

- **Commercialization Approach** – Degree to which proposal presents a convincing commercialization approach/business model that can successfully take the technology to market.

B. Company Registry Requirements

(1) The Small Business Administration (SBA) maintains and manages a Company Registry at www.sbir.gov to track ownership and affiliation requirements for all companies applying to the SBIR Program. The SBIR Policy Directive requires each small business concern (SBC) applying for a Phase I or Phase II award to register in the Company Registry prior to submitting a proposal.

(2) Offerors must include their SBA Small Business Control (SBC) number on page 2 of Appendix 1. **Failure to include the SBC number will result in a proposal being found non-responsive**.

(3) All SBCs shall report and/or update ownership information to SBA prior to each SBIR proposal submission or if any information changes prior to award. For example, if a concern that registers on the Company Registry becomes majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms after the time it submitted its initial proposal (or other formal response) to a Phase I or Phase II SBIR announcement or solicitation, the SBC must update the Company Registry.

VI. CONSIDERATIONS

A. Awards

The EPA anticipates the award of approximately twenty-five (25) SBIR Phase I firm-fixed-price contracts of up to $100,000 each, including profit. It is expected that these contracts will be awarded with a contract start date of December 1, 2022. The period of performance for the contracts should not exceed six (6) months. The primary consideration in selecting proposals for award will be the technical and commercial merit of the proposal. Proposals shall be evaluated in accordance with the Technical Evaluation Criteria as stated above. Source selection will not be based on proposed price. However, price will be evaluated to determine whether the price, including any proposed profit, is fair and reasonable (profit is not to exceed 10% of value of contract), and whether the offeror is capable of performing the work described in their proposal.

The EPA's obligation under this contract is contingent upon the availability of appropriated funds.

B. Phase I Contract Reporting Requirements

Phase I Reporting Requirements (including monthly and final reports) will be provided in the contract.

C. Payment Schedule

Monthly Phase I progress payments will be made at 85% of actual monthly expenses upon receipt and acceptance of a proper invoice with each of the first five monthly reports. The remainder shall be paid upon receipt and acceptance of the final report. Pursuant to the provisions of FAR 52.232-25, PROMPT PAYMENT (JAN 2017), payment will be rendered within thirty (30) days after receipt of a proper invoice for each reporting period. Appropriate provisions will be included in the contract.

All vendors shall submit invoices via the IPP System and in accordance with EPAAR Clause 1552.232-70 (May 2019) SUBMISSION OF INVOICES.

D. Innovations, Inventions, and Patents

LIMITED RIGHTS INFORMATION AND DATA

(a) PROPRIETARY INFORMATION.

Information contained in unsuccessful proposals will remain the property of the offeror. The EPA may, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing

statutory and regulatory requirements.

If proprietary information is provided by an offeror in a proposal, which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting the national security, it will be treated in confidence, to the extent permitted by law. This information must be clearly marked by the offeror with the term "confidential proprietary information" and the following legend must appear on the cover page of the proposal:

> "This proposal contains information that shall not be disclosed outside the Federal Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than evaluation of this proposal, unless authorized by law The Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract if award is made as a result of the submission of this proposal. The information subject to these restrictions are contained on all pages of the proposal except for pages [*insert page numbers or other identification of pages that contain no restricted information*."

Any other legend may be unacceptable to the EPA and may constitute grounds for removing the proposal from further consideration, without assuming any liability for inadvertent disclosure. The EPA will limit dissemination of such information to within official channels.

(b) ALTERNATIVE TO MINIMIZE PROPRIETARY INFORMATION. **Offerors shall limit proprietary information to only that which is absolutely essential to their proposal.**

(c) RIGHTS IN DATA DEVELOPED UNDER SBIR FUNDING AGREEMENTS.

(1) The Contractor is authorized to affix the following "SBIR Rights Notice" to SBIR data delivered under this contract and the Government will thereafter treat the data within the provisions of FAR 52.227-20, RIGHTS IN DATA--SBIR PROGRAM (MAY 2014). If the Contractor does not affix the Notice to data delivered to the Government in performance of the contract, the Government will have unlimited rights to all data delivered, except for copyright data approved by the Contracting Officer and registered under Title 17 U.S.C. 401 or 402. If the claim to copyright data is made, the Contractor shall affix the applicable copyright notice. The SBIR RIGHTS NOTICE (DEC 2007) is as follows:

> "These SBIR data are furnished with SBIR rights under Contract No._____ (and Subcontract if appropriate). For a period of four (4) years, unless extended in accordance with FAR 27.409(h), after acceptance of all items to be delivered under this contract, the Government agrees to use these data for Government purposes only, and they shall not be disclosed outside the Government (including disclosure for procurement purposes) during such period without permission of the Contractor, except that, subject to the foregoing use and disclosure prohibitions, these data may be disclosed for use by support Contractors. After the protection period, the Government has a paid-up license to use, and to authorize others to use on its behalf, these data for Government purposes, but is relieved of all disclosure prohibitions and assumes no liability for unauthorized use of these data by third parties. This Notice shall be affixed to any reproductions of these data, in whole or in part."

(2) SBIR technical data rights apply to all SBIR awards, including subcontracts to such awards, that fall within the statutory definition of Phase I, II, or III of the SBIR Program, as described in §4 of this Policy Directive. The scope and extent of the SBIR technical data rights applicable to Federally-funded Phase III awards is identical to the SBIR data rights applicable to Phases I and II SBIR awards. The data rights protection period lapses only:

(i) upon expiration of the protection period applicable to the SBIR award; or
(ii) by agreement between the awardee and the agency.

(d) COPYRIGHTS. With prior written permission of the Contracting Officer, the Awardee normally may copyright and publish (consistent with appropriate national security considerations, if any) material developed with EPA support. The EPA receives a paid-up license for the Federal Government and requires that each publication contain an

appropriate acknowledgment and disclaimer statement.

(e) PATENTS. Small business concerns normally may retain the principal worldwide patent rights to any invention developed with Government support. The EPA receives a paid-up license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, the Government will not make public any information disclosing a Government-supported invention for a four-year period to allow the Awardee a reasonable time to pursue a patent.

(f) Invention reporting. Include requirements for reporting inventions. Include appropriate information concerning the reporting of inventions, for example:

"SBIR awardees must report inventions to the awarding agency within 2 months of the inventor's report to the awardee. The reporting of inventions may be accomplished by submitting paper documentation, including fax."

Note: Some agencies provide electronic reporting of inventions through the NIH iEdison Invention Reporting System (iEdison System). Use of the iEdison System satisfies all invention reporting requirements mandated by 37 CFR part 401, with particular emphasis on the Standard Patent Rights Clauses, 37 CFR 401.14. Access to the system is through a secure interactive Internet site, http://www.iedison.gov, to ensure that all information submitted is protected. All agencies are encouraged to use the Edison System. In addition to fulfilling reporting requirements, the Edison System notifies the user of future time sensitive deadlines with enough lead-time to avoid the possibility of loss of patent rights due to administrative oversight.

E. Cost Sharing

Cost sharing is permitted for proposals under this Program Solicitation; however, cost sharing is neither required nor will it be an evaluation factor when considering your proposals.

F. Profit or Fee

Reasonable fee (estimated profit) will be considered under this solicitation. For guidance purposes, the amount of profit shall not exceed 10 percent (10%) of total project costs.

G. Joint Ventures or Limited Partnerships

Joint ventures and limited partnerships are eligible provided the entity created qualifies as a small business concern as defined in this Program Solicitation.

H. Research and Analytical Work

(1) For a SBIR Phase I proposal, a minimum of two-thirds of the research and/or analytical effort, as measured by the budget, must be performed by the proposing small business concern, and the balance of one third may be outsourced to a consultant or subcontract or a combination of the two.

(2) For a Phase II proposal, a minimum of one-half of the research and/or analytical effort, as measured by the budget, must be performed by the proposing small business concern and the balance of one-half may be outsourced to a consultant or subcontract or a combination of the two.

I. Contractor Commitments

Upon award of a contract, the Awardee will be required to make certain legal commitments through acceptance of numerous clauses in the Phase I funding agreements.

J. Additional Information

(a) The Program Solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR contract, the terms of the contract shall be controlling.

(b) Before making an award of an SBIR funding agreement, the EPA may request the offeror to submit certain organizational, management, personnel, and financial information to assure the responsibility of the offeror.

(c) The EPA is not responsible for any monies expended by the offeror before award of any contract and these costs cannot be billed to the government, even if an award is made.

(d) This Program Solicitation is not an offer by the EPA and does not obligate the EPA to make any specific number of awards. Also, awards under the SBIR program are contingent upon the availability of funds.

(e) The EPA SBIR program is not a substitute for existing unsolicited proposal mechanisms. Unsolicited proposals shall not be accepted under the EPA SBIR program in either Phase I or Phase II.

(f) If an award is made pursuant to a proposal submitted under this Program Solicitation, the Contractor will be required to certify that s/he has not previously been, and is not currently being, paid for essentially equivalent work by any agency of the Federal Government.

(g) Notwithstanding the relatively broad definition of R/R&D in Section II, Definitions, hereof, awards under this solicitation are limited to APPLIED forms of research. Proposals that are surveys, including market, state-of the-art, and/or literature surveys, which should have been performed by the offeror prior to the preparation of the proposal, or the preparation of allied questionnaires and instruction manuals, shall not be accepted. If such proposals are submitted, they shall not be considered in compliance with the solicitation intent and, therefore, they shall be considered technically unacceptable.

(h) The requirement that the offeror designate a topic, and only one topic, (see Section IV.A above) is also mandatory. The EPA receives hundreds of proposals each year, and it has special groups of reviewers for review of each research topic. In order to assure that proposals are evaluated by the correct reviewers, it is the complete responsibility of the offeror to select and identify the best topic.

(i) **PRINCIPAL INVESTIGATOR (PI) SUBSTITUTION DUE TO DEATH, RESIGNATION, OR ILLNESS (Special Contract Requirement)**

Every effort should be made by an offeror to retain the Principal Investigator (PI) initially identified in its proposal for the duration of the period of performance. When circumstances occur beyond an offeror's control, such as death, illness, or resignation of a PI, the offeror shall provide acceptable documentation that could include a letter of resignation, copy of an obituary, or a signed statement by the PI that s/he is unable to perform based on medical reasons, etc. An offeror, upon notification that its proposal is being considered for award, will be required to agree to the alternate evaluation of the substitute PI, and will have an opportunity to submit a timely resume for a qualified substitute PI. Note, however, that the evaluation of a substitute PI will not improve an offeror's rating and could actually result in an offeror's failure to receive an award based on inadequate substitute PI qualifications.

(j) **DEBRIEFING REQUEST**

An offeror, upon its written request received by the agency within 7 days after the date on which that offeror has received notification of contract award via EPA Public Notice, FedConnect announcement, or email from the Contracting Officer – whichever occurs first - shall be furnished with basis for the selection decision and contract award. To the maximum extent practicable, EPA debriefing should occur within 14 days after receipt of the written request. Debriefings will only be provided via an email response. Untimely debriefing requests shall not be accommodated. Debriefings shall consist of one or more of the following:

1) Reason(s) for ineligibility for review/award;

2) Proposal evaluation feedback; or

3) Notice of Non-Recommendation

Debriefing request should be made to the Contracting Officer: huber.matthew@epa.gov.

VII. SUBMISSION OF PROPOSALS

Your proposal (including all appendices) **shall be submitted as a single document PDF that shall not exceed 25 pages. The proposal shall be received via FedConnect, through the response function, by 12:00 p.m. (noon) Eastern Daylight Time (EDT) on August 23, 2022. The PDF shall be titled to include topic code and company name (see example below).** Only proposals received via FedConnect as ONE PDF (adhering to the naming conventions and page limit) and submitted as a response by the deadline identified above will be considered for award. Additionally, each company may only submit one (1) proposal in response to this solicitation. If multiple proposals are received only one (1) proposal will be considered for award.

Proposals shall be submitted via the FedConnect web portal (www.fedconnect.net). **In order to submit proposals, offerors must register in FedConnect at** www.fedconnect.net, **see main page of FedConnect website for registration instructions. For assistance in registering or for other FedConnect technical questions please call the FedConnect Help Desk at (800) 899-6665 or email at** support@fedconnect.net.

Proposals submitted via FedConnect shall have a file name that includes the topic code and company name. The PDF document naming convention shall follow this format. Topic code and then Company Name. Example: "Topic 1A – ABC, LLC".

IMPORTANT: Please note Section VI., Paragraph J.j, Federal Acquisition Regulation Clause 52.215(c)(3), "Instructions to Offerors – Competitive Acquisitions" concerning Late Proposals, Modification of Proposals and Withdrawal of Proposals.

It is the responsibility of Offerors to submit proposals in FedConnect with sufficient time to ensure they are received by the date and time specified. Only proposals received by the date and time specified via FedConnect will be considered for award.

VIII. SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

The following resources are referenced in Section I.A. 2022-23 SBIR Phase I Research Topics. The purpose of these resources is to provide more information on some of the specific topics.

All references are listed below by topic.

CLEAN AND SAFE WATER

Water Reuse

- https://www.epa.gov/waterreuse
- https://www.epa.gov/waterreuse/water-reuse-action-plan
- https://www.epa.gov/waterreuse/national-water-reuse-action-plan-online-platform?action=7.5
- https://watereuse.org/wp-content/uploads/2019/11/Risk-Based-Framework-for-DNWS-Report_FINAL.pdf
- http://uswateralliance.org/initiatives/commission
- https://www.epa.gov/water-research/onsite-non-potable-water-reuse-research
- https://www.epa.gov/septic/septic-systems-overview

Microplastics

- https://www.epa.gov/trash-free-waters
- https://www.epa.gov/trash-free-waters/epa-reports

Contaminants of Emerging Concern

- https://www.epa.gov/wqc/contaminants-emerging-concern-including-pharmaceuticals-and-personal-care-products

- https://www.epa.gov/pfas
- https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

AIR QUALITY AND CLIMATE

Air Monitoring

- https://www.epa.gov/research/air-and-energy-strategic-research-action-plan-2019-2022
- https://www.epa.gov/urban-air-toxics

Air Toxics

- https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=23

Methane

- https://www.epa.gov/gmi/importance-methane

Radon

- https://www.epa.gov/radon
- https://www.epa.gov/indoor-air-quality-iaq/what-average-level-radon-found-homes-us-0

Refrigerants

- https://www.epa.gov/climate-hfcs-reduction
- https://www.epa.gov/ghgemissions/understanding-global-warming-potentials
- https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances

HOMELAND SECURITY

Community Resilience

- https://www.epa.gov/communitywaterresilience
- https://www.epa.gov/emergency-response-research/environmental-resilience-tools-wizard
- https://www.dhs.gov/sites/default/files/publications/Social-Media-EM_0913-508_0.pdf
- https://ist.psu.edu/node/5794
- https://www.ushahidi.com/

Oil Droplet Sensor

- https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations

CIRCULAR ECONOMY/SUSTAINABLE MATERIALS

Preventing Food Waste

- https://www.epa.gov/land-research/farm-kitchen-environmental-impacts-us-food-waste
- https://www.epa.gov/sustainable-management-food
- https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy
- https://www.epa.gov/recycle/preventing-wasted-food-home

Recycling

- https://www.epa.gov/recyclingstrategy
- https://www.epa.gov/system/files/documents/2021-11/final-national-recycling-strategy.pdf

Circular Economy/Plastics

- https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data#:~:text=EPA%20does%20not%20include%20plastics,items%20such%20as%20shower%20curtains
- https://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf

SAFER CHEMICALS

- https://www.epa.gov/environmental-topics/chemicals-and-toxics-topics
- https://www.epa.gov/p2/learn-about-pollution-prevention
- https://www.epa.gov/chemical-research

PCB-free Color

- https://www.epa.gov/pcbs
- http://ehp.niehs.nih.gov/121-a86/
- https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=346285&Lab=NRMRL
- https://ecology.wa.gov/Waste-Toxics/Reducing-toxic-chemicals/Safer-products
- https://www.epa.gov/saferchoice

Rubber anti-degradants (that do not contain 6PPD-quinone)

- https://www.science.org/doi/10.1126/science.abd6951
- https://pubs.acs.org/doi/10.1021/acs.estlett.2c00050
- https://www.ospar.org/docnts?v=7029
- https://dtsc.ca.gov/scp/motor_vehicle_tires_containing_6ppd/

Next Gen Fertilizers

- https://www.epa.gov/innovation/next-gen-fertilizer-challenges
- https://ifdc.org/2022/03/17/next-gen-fertilizer-challenges-showcasing-event-participant-videos/

RISK ASSESSMENT

- https://www.epa.gov/risk

IX. SUBMISSION FORMS AND CERTIFICATIONS

The attached forms (listed below) should be completed as indicated under Section IV, Proposal Preparation Instructions and Requirements. Include Appendix 1 as the first page of your proposal and Appendix 2 as the second page of your proposal.

Appendix 1:	Proposal Cover Sheet (Number as Page 1)
Appendix 2:	Project Summary (Number as Page 2)
Appendix 3:	SBIR Proposal Summary Budget
Appendix 4:	Representations and Certifications

APPENDIX 1

U.S. ENVIRONMENTAL PROTECTION AGENCY
SBIR PHASE I BROAD AGENCY ANNOUNCEMENT (SOLICITATION) NO. 68HERC22R0180
PROPOSAL COVER SHEET

Proposal Title

Company Name | Number of Previous SBIR Awards

Street Address

City | State | ZIP+4

$ (Amount Requested (Not to exceed $100,000. Amount must match proposal summary budget)) | Website | 6 Months (Proposed Duration (Phase I)) | No. of Employees

******Proposals submitted in response to this solicitation will be valid for 300 days*******

Research Topic Code and Topic Title (select only one)

- ☐ 1A: Decentralized wastewater treatment (septic system) technologies for intentional non-potable reuse
- ☐ 1B: Technologies to process, sort and identify microplastics
- ☐ 1C: In-stream aquatic trash capture technologies
- ☐ 1D: Sensors to detect high priority contaminants of emerging concern (including PFAS)
- ☐ 2A: Ambient air monitoring technology for air toxics
- ☐ 2B: Continuous Emission Monitoring System for metal HAPs
- ☐ 2C: Air monitoring technology for methane emissions from fugitive sources
- ☐ 2D: Technologies that reduce exposure to radon in buildings
- ☐ 2E: Technologies for improved recovery of refrigerant from air conditioning (AC) and refrigeration equipment.
- ☐ 3A: Innovative technology solutions that build community resilience to disasters
- ☐ 3B: Miniaturized oil spill droplet size sensor for emergency response underwater vehicles
- ☐ 4A: Innovative technologies that help consumers prevent food waste in the acquisition, preparation, and storage of food
- ☐ 4B: Innovative technologies or materials that will improve the U.S. recycling system
- ☐ 4C: Innovative reduction, reuse, and recycling solutions to advance plastic circularity
- ☐ 5A: PCB-free color
- ☐ 5B: Rubber anti-degradant technologies for tires and other rubber products that are lower concern for human health and the environment
- ☐ 5C: Innovative enhanced efficiency fertilizers
- ☐ 6A: Software tools and machine-learning applications for systematic review in science assessment for chemical evaluation

Certification and Authorizations (Check Y [Yes] or N [No])

☐Y ☐N The above concern certifies that it is a small business concern and meets the definition as stated in the program solicitation.

☐Y ☐N The above concern certifies that a minimum of 2/3 of the research and/or analytical effort will be performed by the proposing firm.

☐Y ☐N The above concern certifies that it is a woman owned small business concern and meets the definition as stated in the solicitation.*

☐Y ☐N The above concern certifies that it is a socially and economically disadvantaged small business concern and meets the definition as stated in the solicitation.*

☐Y ☐N The above concern certifies that the principal investigator is a woman and meets the definition as stated in the solicitation.*

☐Y ☐N The above concern certifies that is a socially and economically disadvantaged individual and meets the definition as stated in the solicitation.*

☐Y ☐N The above concern certifies it is a HUBZone small business concern and meets the definition as stated in the solicitation.*

*For Statistical Purposes only.

Do you plan to send, or have you sent this proposal or a similar one to any other federal agency? ☐ Yes ☐ No

_____

If yes, which? Use acronym(s) for each agency, (e.g., DOD, NIH, DOE, NASA, etc.)

Choose one of the following to describe your organization type:

☐ Individual ☐ Partnership ☐ Corporation ☐ LLC

Please provide the following information:

Tax Identification Number	Unique Entity Identifier Number (UEI) obtained from sam.gov	Small Business Concern (SBC) Control ID (registration from SBIR.gov)

The Offeror is in full agreement with the terms, conditions and provisions included in this solicitation, as evidenced by signatures below.

Contact Information

Principal Investigator			Business Representative		
First Name	MI	Last Name	First Name	MI	Last Name
Title			Title		
Telephone			Telephone		
Email Address			Email Address		
Signature		Date	Signature		Date

Proprietary Notice

This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed—in whole or in part—for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of—or in connection with—the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained on pages_____; of this proposal.

APPENDIX 2

U.S. ENVIRONMENTAL PROTECTION AGENCY
SBIR PHASE I BROAD AGENCY ANNOUNCEMENT (SOLICITATION) NO. 68HERC22R0180
PROJECT SUMMARY

Company Name

Street Address

City | State | ZIP+4

Proposal Title

Research Topic Code and Topic Title

Principal Investigator | Telephone | Email Address

Project Summary

The project summary shall be limited to one page <u>not to exceed 400 words</u>, must be publishable, i.e., not proprietary, and should address the following: Innovativeness of the proposed technology, technical feasibility, performance compared to current technologies, commercial potential (including applications and end users), and potential for environmental impact.

APPENDIX 3

U.S. ENVIRONMENTAL PROTECTION AGENCY
SBIR PHASE I BROAD AGENCY ANNOUNCEMENT (SOLICITATION) NO. 68HERC22R0180
SBIR PROPOSAL SUMMARY BUDGET

INSTRUCTIONS FOR APPENDIX 3

The purpose of this form is to provide a vehicle whereby the offeror submits to the Government a pricing proposal of estimated costs with detailed information for each cost element, consistent with the offeror's cost accounting system.

If the completed summary is not self-explanatory and/or does not fully document and justify the amounts requested in each category, such documentation should be contained, as appropriate, on a budget explanation page immediately following the budget in the proposal.

A. Direct Labor – List individually all personnel included, the estimated hours to be expended and the rates of pay (salary, wages, and fringe benefits).

B. Overhead - Specify current rate(s) and base(s). Use current rate(s) negotiated with the cognizant federal negotiating agency, if available. If no rate(s) has (have) been negotiated, a reasonable rate(s) may be requested for Phase I which will be subject to approval by EPA. Offerors may use whatever number and types of overhead rates that are in accordance with their accounting systems and approved by the cognizant federal negotiating agency, if available.

C. Other Direct Costs - List all other direct costs which are not otherwise included in the categories described above, i.e., computer services, publication costs, subcontracts, etc. List each item of permanent equipment to be purchased, its price, and explain its relation to the project.

D. Travel - Address the type and extent of travel and its relation to the project.

E. Consultants - Indicate name, daily compensation, and estimated days of service.

F. General and Administrative (G&A) - Same as B. Above.

G. Profit - Reasonable fee (estimated profit) will be considered under this solicitation. For guidance purposes, the amount of profit should not exceed 10% of total project costs.

Total Project Price (Total Costs + Profit) – The total costs proposed on Appendix 3 **must** match the total costs requested on Appendix 1.

If the proposed budget exceeds the maximum amount, or the amount requested in Appendix 3, a detailed explanation of funding source(s) for the additional proposed costs must be provided. Additionally, a proposal that submits a budget that exceeds the maximum amount, or the amount requested must affirmatively state they the offeror understands that no award will exceed the maximum amount or the amount requested. Offerors are further advised that if the proposed budget is less than the maximum award or the amount requested, an award would provide only the budgeted amount. The failure to explain additional cost proposed and/or acknowledgment that the offeror understands no award will exceed the maximum will result in the ***REJECTION OF THE OFFER****.*

APPENDIX 3

SBIR PROPOSAL SUMMARY BUDGET

(See Instructions on previous age)

A. DIRECT LABOR (PI and other staff, list separately) Hours times Est. Rate:	$
B. OVERHEAD	$
C. OTHER DIRECT COSTS: (list separately)	$
D. TRAVEL: List purpose and individuals and or title	$
E. CONSULTANTS: (List daily compensation and est. days of service)	$
F. GENERAL AND ADMINISTRATIVE:	$
TOTAL COSTS (Total of A thru F above)	$
G. PROFIT (_____%) Not to exceed 10% of total project costs	$
TOTAL PROJECT PRICE (Total costs + Profit)	$

(Total costs proposed must match the total costs requested on Appendix 1)

_____ _____

PRINT NAME TITLE

_____ _____

SIGNATURE DATE SUBMITTED

This proposal is submitted in response to EPA SBIR Program Solicitation No. 68HERC22R0180 reflects our best estimate as of this date.

Appendix 4
REPRESENTATIONS AND CERTIFICATIONS

4.1 52.204-8 — ANNUAL REPRESENTATIONS AND CERTIFICATIONS. (MAR 2020)

Fill out completely, sign, and return with the proposal. It does not count towards the 25-page limit. Please read this entire section carefully and complete all required questions.

(a)

(1) The North American Industry Classification System (NAICS) code for this acquisition is 541715 Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology).

(2) The small business size standard is 1,000 *employees*.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b)

(1) If the provision at 52.204-7, System for Award Management, is included in this solicitation, paragraph (d) of this provision applies.

(2) If the provision at 52.204-7, System for Award Management, is not included in this solicitation, and the Offeror has an active registration in the System for Award Management (SAM), the Offeror may choose to use paragraph (d) of this provision instead of completing the corresponding individual representations and certifications in the solicitation. The Offeror shall indicate which option applies by checking one of the following boxes:

(i) ☐ Paragraph (d) applies.

(ii) ☐ Paragraph (d) does not apply and the offeror has completed the individual representations and certifications in the solicitation.

(c)

(1) The following representations or certifications in SAM are applicable to this solicitation as indicated:

(i) 52.203-2, Certificate of Independent Price Determination. This provision applies to solicitations when a firm-fixed-price contract or fixed-price contract with economic price adjustment is contemplated, unless–

(A) The acquisition is to be made under the simplified acquisition procedures in part 13;

(B) The solicitation is a request for technical proposals under two-step sealed bidding procedures; or

(C) The solicitation is for utility services for which rates are set by law or regulation.

(ii) 52.203-11, Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions. This provision applies to solicitations expected to exceed $150,000.

(iii) 52.203-18, Prohibition on Contracting with Entities that Require Certain Internal Confidentiality Agreements or Statements-Representation. This provision applies to all solicitations.

(iv) 52.204-3, Taxpayer Identification. This provision applies to solicitations that do not include the provision at 52.204-7, System for Award Management.

(v) 52.204-5, Women-Owned Business (Other Than Small Business). This provision applies to solicitations that-

(A) Are not set aside for small business concerns;

(B) Exceed the simplified acquisition threshold; and

(C) Are for contracts that will be performed in the United States or its outlying areas.

(vi) 52.204-26, Covered Telecommunications Equipment or Services-Representation. This provision applies to all solicitations.

(vii) 52.209-2, Prohibition on Contracting with Inverted Domestic Corporations-Representation.

(viii) 52.209-5, Certification Regarding Responsibility Matters. This provision applies to solicitations where the contract value is expected to exceed the simplified acquisition threshold.

(ix) 52.209-11, Representation by Corporations Regarding Delinquent Tax Liability or a Felony Conviction under any Federal Law. This provision applies to all solicitations.

(x) 52.214-14, Place of Performance-Sealed Bidding. This provision applies to invitations for bids except those in which the place of performance is specified by the Government.

(xi) 52.215-6, Place of Performance. This provision applies to solicitations unless the place of performance is specified by the Government.

(xii) 52.219-1, Small Business Program Representations (Basic, Alternates I, and II). This provision applies to solicitations when the contract will be performed in the United States or its outlying areas.

(A) The basic provision applies when the solicitations are issued by other than DoD, NASA, and the Coast Guard.

(B) The provision with its Alternate I applies to solicitations issued by DoD, NASA, or the Coast Guard.

(C)The provision with its Alternate II applies to solicitations that will result in a multiple-award contract with more than one NAICS code assigned.

(xiii) 52.219-2, Equal Low Bids. This provision applies to solicitations when contracting by sealed bidding and the contract will be performed in the United States or its outlying areas.

(xiv) 52.222-22, Previous Contracts and Compliance Reports. This provision applies to solicitations that include the clause at 52.222-26, Equal Opportunity.

(xv) 52.222-25, Affirmative Action Compliance. This provision applies to solicitations, other than those for construction, when the solicitation includes the clause at 52.222-26, Equal Opportunity.

(xvi) 52.222-38, Compliance with Veterans' Employment Reporting Requirements. This provision applies to solicitations when it is anticipated the contract award will exceed the simplified acquisition threshold and the contract is not for acquisition of commercial items.

(xvii) 52.223-1, Biobased Product Certification. This provision applies to solicitations that require the delivery or specify the use of USDA–designated items; or include the clause at 52.223-2, Affirmative Procurement of Biobased Products Under Service and Construction Contracts.

(xviii) 52.223-4, Recovered Material Certification. This provision applies to solicitations that are for, or specify the use of, EPA–designated items.

(xix) 52.223-22, Public Disclosure of Greenhouse Gas Emissions and Reduction Goals-Representation. This provision applies to solicitations that include the clause at 52.204-7.)

(xx) 52.225-2, Buy American Certificate. This provision applies to solicitations containing the clause at 52.225-1.

(xxi) 52.225-4, Buy American-Free Trade Agreements-Israeli Trade Act Certificate. (Basic, Alternates I, II, and III.) This provision applies to solicitations containing the clause at 52.225-3.

(A) If the acquisition value is less than $25,000, the basic provision applies.

(B) If the acquisition value is $25,000 or more but is less than $50,000, the provision with its Alternate I applies.

(C) If the acquisition value is $50,000 or more but is less than $83,099, the provision with its Alternate II applies.

(D) If the acquisition value is $83,099 or more but is less than $100,000, the provision with its Alternate III applies.

(xxii) 52.225-6, Trade Agreements Certificate. This provision applies to solicitations containing the clause at 52.225-5.

(xxiii) 52.225-20, Prohibition on Conducting Restricted Business Operations in Sudan-Certification. This provision applies to all solicitations.

(xxiv) 52.225-25, Prohibition on Contracting with Entities Engaging in Certain Activities or Transactions Relating to Iran-Representation and Certifications. This provision applies to all solicitations.

(xxv) 52.226-2, Historically Black College or University and Minority Institution Representation. This provision applies to solicitations for research, studies, supplies, or services of the type normally acquired from higher educational institutions.

(2) The following representations or certifications are applicable as indicated by the Contracting Officer:

[Contracting Officer check as appropriate.]

__ (i) 52.204-17, Ownership or Control of Offeror.

__ (ii) 52.204-20, Predecessor of Offeror.

__ (iii) 52.222-18, Certification Regarding Knowledge of Child Labor for Listed End Products.

__ (iv) 52.222-48, Exemption from Application of the Service Contract Labor Standards to Contracts for Maintenance, Calibration, or Repair of Certain Equipment- Certification.

__ (v) 52.222-52, Exemption from Application of the Service Contract Labor Standards to Contracts for Certain Services-Certification.

__ (vi) 52.223-9, with its Alternate I, Estimate of Percentage of Recovered Material Content for EPA–Designated Products (Alternate I only).

__ (vii) 52.227-6, Royalty Information.

__ (A)Basic.

__ (B)Alternate I.

__ (viii) 52.227-15, Representation of Limited Rights Data and Restricted Computer Software.

(d) The offeror has completed the annual representations and certifications electronically in SAM website accessed through https://www.sam.gov. After reviewing the SAM information, the offeror verifies by submission of the offer that the representations and certifications currently posted electronically that apply to this solicitation as indicated in paragraph (c) of this provision have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below [offeror to insert changes, identifying change by clause number, title, date]. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

FAR Clause # Title Date Change

_____

Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted on SAM.

4.2 REPRESENTATION BY CORPORATIONS REGARDING DELINQUENT TAX LIABILITY OR A FELONY CONVICTION UNDER ANY FEDERAL LAW. (FAR 52.209-11) (FEB 2016)

(a) As required by sections 744 and 745 of Division E of the Consolidated and Further Continuing Appropriations Act, 2015 (Pub. L. 113-235), and similar provisions, if contained in subsequent appropriations acts, the Government will not enter into a contract with any corporation that—

(1) Has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, where the awarding agency is aware of the unpaid tax liability, unless an agency has considered suspension or debarment of the corporation and made a determination that suspension or debarment is not necessary to protect the interests of the Government; or

(2) Was convicted of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency is aware of the conviction, unless an agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government.

(b) The Offeror represents that—

(1) It is ☐ is not ☐ a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability; and

(2) It is ☐ is not ☐ a corporation that was convicted of a felony criminal violation under a Federal law within the preceding 24 months.

4.3 ORGANIZATIONAL CONFLICT OF INTEREST CERTIFICATION (EPAAR 1552.209-72) (APR 1984)

The offeror [ ] is [ ] is not aware of any information bearing on the existence of any potential organizational conflict of interest. If the offeror is aware of information bearing on whether a potential conflict may exist, the offeror shall provide a disclosure statement describing this information.

4.4 SOCIAL SECURITY NUMBERS OF CONSULTANTS AND CERTAIN SOLE PROPRIETORS AND PRIVACY ACT STATEMENT (EPAAR 1552.224-70) (APR 1984)

(a) Section 6041 of Title 26 of the U.S. Code requires EPA to file Internal Revenue Service (IRS) Form 1099 with respect to individuals who receive payments from EPA under purchase orders or contracts. Section 6109 of Title 26 of the U.S. Code authorizes collection by EPA of the social security numbers of such individuals for the purpose of filing IRS Form 1099. Social security numbers obtained for this purpose will be used by EPA for the sole purpose of filing IRS Form 1099 in compliance with Section 6041 of Title 26 of the U.S. Code.

(b) If the offeror or quoter is an individual, consultant, or sole proprietor and has no Employer Identification Number, insert the offeror's or quoter's social security number on the following line.

4.5 SIGNATURE BLOCK

I hereby certify that the responses to the above Representations, Certifications and other statements are accurate and complete.

Signature: _____

Title: _____

Date: _____

4.6 CONGRESSIONAL DISTRICT/DUN AND BRADSTREET NUMBER

A. Congressional district for offeror's place of business: _____

Congressional district for offeror's place(s) of performance: _____

B. Dun and Bradstreet Number: _____

C. Tax Identification Number: _____

4.7 SBIR FUNDING AGREEMENT CERTIFICATION

All small businesses that are selected for award of an SBIR/STTR Funding Agreement must complete this certification at the time of proposal submission and any other time set forth in the Funding Agreement that is prior to performance of work under this award. This includes checking all of the boxes and having an authorized officer of the Awardee sign and date the certification each time it is requested.

Please read carefully the following certification statements. The Federal Government relies on the information to determine whether the business is eligible for a Small Business Innovation Research (SBIR) program or Small Business Technology Transfer (STTR) program award. A similar certification will be used to ensure continued compliance with specific program requirements during the life of the Funding Agreement. The definitions for the terms used in this certification are set forth in the Small Business Act, SBA regulations (13 CFR part 121), the SBIR/STTR Policy Directive and also any statutory and regulatory provisions referenced in those authorities.

If the Funding Agreement officer believes that the business may not meet certain eligibility requirements at the time of award, they are required to file a size protest with the U.S. Small Business Administration (SBA), which will determine eligibility. At that time, SBA will request further clarification and supporting documentation in order to assist in the verification of any of the information provided as part of a protest. If the Funding Agreement officer believes, after award, that the business is not meeting certain Funding Agreement requirements, the agency may request further clarification and supporting documentation in order to assist in the verification of any of the information provided.

Even if correct information has been included in other materials submitted to the Federal Government, any action taken with respect to this certification does not affect the Government's right to pursue criminal, civil or administrative remedies for incorrect or incomplete information given in the certification. Each person signing this certification may be prosecuted if they have provided false information.

The undersigned has reviewed, verified and certifies that (<u>all boxes must be checked unless otherwise directed</u>):

(1) ☐ The Awardee business concern meets the ownership and control requirements set forth in 13 CFR 121.702.

(2) If a corporation – all corporate documents(namely: articles of incorporation and any amendments, articles of conversion, by-laws and amendments, shareholder meeting minutes showing director elections, shareholder meeting minutes showing officer elections, organizational meeting minutes, all issued stock certificates, stock ledger, buysell agreements, stock transfer agreements, voting agreements, and documents relating to stock options, including the right to convert non-voting stock or debentures into voting stock) must evidence that the corporation meets the ownership and control requirements set forth in 13 CFR 121.702. (Check one box).

☐ Yes ☐ N/A Explain why N/A:

(3) If a partnership -- the partnership agreement evidences that it meets the ownership and control requirements set forth in 13 CFR 121.702. (Check one box).

☐ Yes ☐ N/A Explain why N/A:

(4) If a limited liability company – the articles of organization and any amendments, and operating agreement and amendments, evidence that it meets the ownership and control requirements set forth in 13 CFR 121.702. (Check one box).

☐ Yes ☐ N/A Explain why N/A:

(5) The birth certificates, naturalization papers, or passports show that any individuals it relies upon to meet the eligibility requirements are U.S. citizens or permanent resident aliens in the United States. (Check one box).

☐ Yes ☐ N/A Explain why N/A:

(6) ☐ The Awardee business concern has no more than 500 employees, including the employees of its Affiliates.

(7) ☐ SBA has not issued a size determination currently in effect finding that this business concern exceeds the 500 employee size standard.

(8) During the performance of the award, the Principal Investigator/Project Manager will spend more than one half of his/her time (based on a 40 hour workweek) as an employee of the Awardee (or Research Institution – STTR only) or has requested and received a written deviation from this requirement from the Funding Agreement officer. (Check one box).

☐ Yes ☐ Deviation approved in writing by Funding Agreement officer: ___%

(9) All Essentially Equivalent Work, or a portion of the work, proposed under this project (check applicable line):

☐ **Has not** been submitted for funding to this Agency or another Federal agency.

☐ **Has** been submitted for funding to this Agency or another Federal agency **but has not** been funded under any other grant, contract, subcontract or other transaction

☐ A portion has been funded by another grant, contract, or subcontract as described in detail in the proposal and approved in writing by the Funding Agreement officer.

(10) During performance of award, the Awardee will perform the applicable percentage of work unless a deviation from this requirement is approved in writing by the Funding Agreement officer (check applicable line and fill in if needed):

☐ SBIR Phase I: at least two-thirds (66% or 2/3) of the research.

☐ SBIR Phase II: at least half (50%) of the research.

☐ Deviation approved in writing by the funding agreement officer:__%

(11) During performance of award, the R/R&D will be performed in the United States unless a deviation is approved in writing by the Funding Agreement officer (check one box).

☐ Yes ☐ Waiver has been granted

(12) ☐ During performance of award, the R/R&D will be performed at the Awardee's facilities by the Awardee's employees, except as otherwise indicated in the SBIR/STTR application and approved in the Funding Agreement.

(13) The SBIR Awardee has registered itself on SBA's database as majority-owned by venture capital operating companies, hedge funds or private equity firms (check one box).

☐ Yes ☐ No ☐ N/A Explain why N/A: _____

(14) The SBIR Awardee is a Covered Small Business Concern (a Small Business Concern that: (a) was not majority-owned by multiple venture capital operating companies (VCOCs), hedge funds, or private equity firms on the date on which it submitted an application in response to an SBIR solicitation; and (b) on the date of the SBIR award, which is made more than 9 months after the closing date of the solicitation, is majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms). (Check one box).

☐ Yes ☐ No

(15) ☐ I will notify this Agency immediately if all or a portion of the work authorized and funded under this award is subsequently funded by another Federal Agency.

(16) ☐ I understand that the information submitted may be given to Federal, State, and local agencies for determining violations of law and other purposes.

(17) ☐ I am an officer of the business concern authorized to represent it and sign this certification on its behalf. By signing this certification, I am representing on my own behalf, and on behalf of the business concern that the information provided in this certification, the application, and all other information submitted in connection with this application, is true and correct as of the date of submission. I acknowledge that any intentional or negligent misrepresentation of the information contained in this certification may result in criminal, civil or administrative sanctions, including but not limited to: (1) fines, restitution and/or imprisonment under 18 U.S.C. 1001; (2) treble damages and civil penalties under the False Claims Act (31 U.S.C. 3729 et seq.); (3) double damages and civil penalties under the Program Fraud Civil Remedies Act (31 U.S.C. 3801 et seq.); (4) civil recovery of award funds, (5) suspension and/or debarment from all Federal procurement and nonprocurement transactions (FAR subpart 9.4 or 2 CFR part 180); and (6) other administrative penalties including termination of SBIR/STTR awards.

Date: _____

Signature: _____

Print Name (First, Middle, Last): _____

Title: _____

Business Name: _____

Appendix 5

EPA SBIR PHASE I PROPOSAL CHECKLIST

(This checklist is for offeror's use and **should not** be included with the proposal)

The intent of this page is to serve as a self-check tool for offerors. This is to aid offerors in ensuring proposals are conforming to the requirements set forth in solicitation. This checklist is not intended to cover every requirement in the solicitation but does cover the most common mistakes. Any "No" response will find the offerors proposal non-responsive and will not be considered for award. It is highly encouraged that this self-checklist is used to prior to submission of a proposal.

EPA SBIR Phase I Proposal Preparation Checklist		
	Counts towards Page limit	Y/N
Proposal is submitted as a single PDF & Proposal is 25 pages or less		
Proposal file name has naming convention	N/A	N/A
Only one proposal submitted per company		
Appendix 1 "Proposal Cover Sheet" is used as the cover sheet (pg. 1) of the proposal, is signed, complete, and includes SBC number	1	
Amount on Appendix 1 matches amount on Appendix 3		
Dollar amount requested is $100,000 or less		
Profit does not exceed 10% of value of contract. Max Profit: $10,000		
Appendix 2 "Project Summary" is provided as the second section of the proposal and is 400 words or less	1	
Technical and Commercial Content: Phase I Proposal	As needed	
The Technical Proposal contains each of the following sections:		
Technical Approach		
Company/Team (technical)		
Impact/Relevance to topic		
Innovation/Intellectual Property (IP)		
Market Opportunity		
Company/Team (commercial)		
Commercialization Approach		
Similar or Closely Related SBIR Awards		
Duplicate or Equivalent SBIR Proposals		
Quality Assurance Statement (QAS) is included & addresses all required sections	As needed	
Appendix 3: SBIR Proposal Summary Budget is included	1	
Appendix 4: Representations and Certifications are included and complete (does not count towards page limit) Sections 4.1 through 4.7	0	
SAM registration: Make sure SAM registration is up to date. Ensure your SAM profile allows for the award of "contracts" (this is a contract, not a grant!).	N/A	N/A