**DELIBERATIVE, PRE-DECISIONAL, FOR INTERNAL COORDINATION ONLY**

Forest Service Briefing Memo

January 13, 2023

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**Topic:** Rocky Mountain Research Station New Missoula Lab Fire Burn Chamber

**To:**  Linda Heath, Acting Associate Deputy Chief, Research and Development

**From:** Monica Lear, RMRS Station Director

**Issue:** The Missoula Fire Sciences Laboratory needs additional combustion laboratory space to meet the growing and critical demand for experiment-based fire behavior research and retardant chemical testing. While improvements to the existing fire laboratory space have been made to increase some capacity and function, the existing and growing demand for space with more functionality is evident. Proposals for construction of additional combustion laboratory space have been submitted for funding since at least 2017, but the cost of the project and other factors have hindered its ability to effectively compete for funding through the agency’s standard proposal process.

**Background:** Supported by Fire and Aviation Management (FAM), the Missoula Fire Sciences Laboratory (Fire Lab) completed two conceptual designs for a new facility in 2016 and 2020. The original 2016 conceptual design was for a basic combustion chamber to meet the minimum requirements to conduct experiments needed at that time. In 2018, it was proposed that Fire Lab and National Technology Development Program (NTDP) develop a more comprehensive set of requirements that would not only meet current needs but provide capabilities for future laboratory-based fire research and retardant chemical testing. In Fiscal Year 2020, FAM provided additional funding to the Fire Lab and NTDP to further develop a set of plans for a state-of-the-art combustion laboratory facility.

The 2016 conceptual design had an estimated cost of $1.5 to $2 million, with inflation and other escalations its estimated at about $5 million dollars. The 2020 conceptual design had an estimated cost of $9 to $10 million, with inflation and other escalations its estimated at about $16 to $20 million. Full design costs are estimated to be an additional $2-4 million.

R&D has not received sufficient funding for the project. Over the last 10 years, R&D has received less than $5 million annually for large capital improvements and major maintenance projects with the maximum funding of $2.8 million for capital improvement projects.

**Inter-Agency Science and Other Collaboration:** The new burn facility at the Missoula Fire Lab offers numerous opportunities to enhance firefighter and community safety, understand fire behavior on wildfires and prescribed fires, study complex fire interactions including fuel treatment effectiveness, smoke emissions and climate change, and bolster science delivery and training opportunities.

The new facility will permit a broader range of larger-scale wildland fire experiments to be conducted under controlled conditions. Further, it will allow year-round testing of protective equipment for firefighters and advanced retardant products. Experiments would determine how wind and terrain controls fire spread, how fuel treatments modify fire behavior, how smoke and emissions can be reduced from prescribed burning, and how fire affects carbon and biomass consumption for climate change modeling. The existing wind tunnels and burn chamber were built in 1960. RMRS Scientists and staff at the Fire Lab have deep expertise in conducting experimental research using the wind tunnels and burn chamber to produce all the existing operational models and tools in the US for prediction, mitigation, training, and suppression. The expanded facilities will increase the number of collaborative research projects between the Forest Service and other Government Agencies (BLM, NIST, DOD, DOE), University cooperators from both natural resource and physical science/engineering programs, as well as training and education of State and Local fire agencies. The added space and capability of the new facility will stimulate opportunities to access new sources of competitive fire research funding with cooperators.

**Contracting Options:** There are two contracting options appropriate for this project.

* Traditional Design Bid Build, which is a multiple step process. The funding is obligated in phases. First at the design phase (3-5 months) and again at the construction phase (12 months from the award of the design).
* Design Build contract, which combines several steps together. This process would likely take 6 to 9 months to obligate the total project funds.

**Cost Estimate and Timeline:** Options for funding this project may include:

1). Expected project cost considering inflation $18M, including $2M for design. Timeline dependent on procurement vehicle, design-bid-build or design-build.

2). Standard CMFC funding by applying through the current NAMP process. This has been unsuccessful to date. This would require the building to be designed in its entirety, with the understanding that the construction would be occurring over a three-year period. The design and construction would require consideration for being able to construct the facility in three parts and would require for separate procurement actions. This will also add considerable cost to construction both in time and money.

• Design project (1 year at the cost of $3.5M)

• Construct the main combustion chamber (1.5 year at the cost of $9M)

• Construct all three floors of the staging area (1.5 year at the cost of $6M)

• Construct all three floors of the lab area (1.5 year at the cost of $7M)

Option 2 minimum total time required 5.5 years; Cost range $25.5M