

Replacing the Outdated Canopy Ventilation Exhaust with a More Health and Safety-Approved Fume Hood in Lab EN 4042

Tawfik Elshehabi, *Assistant Professor, Energy and Petroleum Engineering*
Total Amount Requested: \$45k

1. Project Description and Objectives

As an assistant professor, I began setting up my research lab in Spring 2023 in EN 4042. It was the only available space avoided by other faculty for years due to safety concerns as it still relies on an outdated canopy ventilation exhaust. The College kindly funded the replacement of the wood benchtops last year but could not cover the fume hood and ductwork, quoted at \$100k. The College nominated the fume hood proposal for the Heywood funding in March, but it was not granted. No alternative funding has been identified. To address this, Mr. Joe Rovani, the Facility Manager, communicated with UW Operations to develop a more feasible estimate for a smaller fume hood and without the ductwork. Fortunately, the new quote has been reduced to \$45k, attached below.

Figure 1 shows the canopy ventilation exhaust, which cannot contain hazardous emissions, exposing researchers to significant health and safety risks. The lab currently houses advanced equipment, including high-temperature, high-pressure viscometer, filter press, retorts, ovens, hazardous chemicals, flammable materials, and nanoparticles, all requiring proper containment. We received several complaints from fourth-floor residents about unpleasant smells coming from the lab when we mix oil-based samples. Hydrocarbon vapors may cause respiratory irritation, dizziness, and nervous system damage, while airborne nanoparticles, lingering for days, pose long-term respiratory hazards. Even with existing precautions, this deficiency jeopardizes our researchers' safety and hinders our research. This renovation will provide a critical protection layer, safeguard researchers, align the lab with health and safety standards, and enable high-quality research to advance the College's mission.



Figure 1—The left and right view of the outdated canopy ventilation exhaust in EN 4042, alongside ovens, retorts, high-temperature equipment, flammable chemicals, oil-based samples, and nanoparticles.

The lab renovation would also support Dr. Rasouli's "Top 5-in-5" initiative to position the Department among the top five petroleum engineering programs within five years. As the only drilling fluids research lab on campus supporting the new MEng or MS with a drilling focus, this lab is integral to drilling research and education. We host undergraduate drilling classes, offering our

students experience with advanced oil-based testing, which is unavailable in our teaching lab (EN4021). A modern fume hood will also expand our community engagement and outreach, allowing us to host programs like my ongoing "Energy 4 You" Engineering Summer Program. Unfortunately, due to these safety risks, we cannot host these events. Providing a safe, interactive learning environment can inspire Wyoming's future engineers and advance our STEM education.

2. Alignment with Tier 1 Engineering Initiative Goals

2.1. Excellence in Undergraduate Education:

Through my Mowry Shale project with the School of Energy Resources, I funded five undergraduates: three in Energy and Petroleum Engineering, one in Chemical Engineering and Chemistry, and one in Mechanical Engineering. In April 2024, one of these students won 1st place in a national competition by the American Association of Drilling Engineers (AADE), and two others submitted abstracts this year. In fall 2024, we hosted a limited training session by AES Fluids, providing hands-on experience with the potential for more sessions in the future. A modern fume hood will ensure a safer environment for undergraduates, facilitate experiments, build essential skills for Wyoming's energy sector, and strengthen UW's reputation as a leader in engineering.

2.2. World-Class Research and Graduate Education

For the current graduate researchers (one MS and two PhDs), a modern fume hood is essential for advancing nanoparticle applications and particle characterization research. Mixing and storing nanoparticles, as well as hazardous chemicals, require additional precautions to ensure safety. This setup will create a secure environment for advanced research on next-generation drilling and completion fluids and solid-based emulsions. With the "Top 5 in 5" initiative and new drilling specialization, graduate enrollment with a drilling focus is expected to grow and benefit from this lab. This upgrade will also support the University's research mission as an R1 Institution.

2.3. K-14 STEM Education

This renovation will greatly expand our capacity for K-14 STEM education, supporting Tier 1's goal of strengthening Wyoming's STEM pipeline. Like the Drilling and Completion Simulation Facility, a safe and healthy lab environment will enable high school students to engage in real-world engineering tasks, fostering early STEM exposure. This outreach aligns with UW's mission to deliver transformative educational experiences for Wyoming's youth, building a foundation for high-impact careers that drive the state's economic future and empowering the next generation of innovators.

3. Broader Impact on Wyoming's Energy Vision

This project addresses critical safety concerns while advancing the University of Wyoming's energy vision and economic development goals. Our research in the Powder River Basin, particularly in the Mowry Shale and carbon storage, aligns with State and University priorities for sustainable energy. Creating a safe, collaborative space with high safety standards strengthens the College of Engineering's leadership in energy innovation and positions UW as a trusted partner for Wyoming businesses seeking R&D support in drilling and completion fluids. This focus on safety and excellence reinforces confidence in the University's vision and drives economic impact.

4. Budget Description

We confirmed the urgent need for this fume hood replacement in consultation with Mr. Rovani and Dr. Rasouli. The Department submitted a Request for Estimate (RfE) to Mr. Rovani, and UW Operations provided a quote of \$45,000 to "replace the outdated canopy ventilation exhaust with a more health and safety-approved fume hood, with dimensions to be determined by the available budget." The attached RfE (Parts I and II) outlines procurement, installation, and infrastructure upgrades to meet safety standards. Your consideration is greatly appreciated—*Tawfik Elshehabi*



UW Operations
 1000 E. University Ave, Dept 3227
 Laramie, WY 82071
 Phone 307-766-6225 Fax: 307-766-4040

Date Received:	11.20.24
AiM Project #:	25-12290

REQUEST FOR ESTIMATE

PART I:

INSTRUCTIONS FOR PART I (completed by department):

1. Complete ALL fields in Part I.
2. Obtain signature of authorizing departmental authority. Email signature is acceptable.
3. Forward to Heather Earl (hearl@uwyo.edu) at the Service Building. For additional information, call 766-6883.
4. Originator will be contacted by a UW Operations representative with additional information.

Request Date:	11/19/2024	Desired Project Completion Date:	3/15/2024
Originator:	Tawfik Elshehabi	Email Address:	telsheha@uwyo.edu
Department Name:	Energy and Petroleum Engineering	Phone Number:	307-766-4219
Job Location - Building:	Engineering Building	Job Location - Room:	4042
Job Description:	Replace the outdated canopy ventilation exhaust with a more health and safety-approved fume hood, with dimensions to be determined by the available budget.		

Vamegh Rasouli

Department Signature

Date: 11-19-2024

PART II:

ESTIMATED COSTS

(Completed by UW Operations)

Customer Contacted Date:

Estimator:		Date of Estimate:	12/10/24	Estimate is valid for 60 days
Estimator Phone Number:		Estimate Amount:	\$45,000	<input checked="" type="checkbox"/> Budgetary purposes only
Estimator Comments:	<input type="checkbox"/> See attached memo			
CEPS Engineering Initiative Funding				

Capital

Non-Capital (Department will be notified if project is classified as a capital project)

[Signature]
 Deputy Director, Facilities Engineering

Date: 12/10/24

PART III:

JOB AUTHORIZATION

INSTRUCTIONS FOR PART III (completed by department):

1. Complete ALL fields in Part III for entire estimated amount.
2. Obtain signature of authorizing departmental authority.
3. Forward to Estimator at the Service Building. ***** Please indicate which fiscal year funds are budgeted:** _____

Entity	Fund Class	Fund Source	Org	Exp Class	Program	Activity

 Dean, Director, or Dept. Head (Print Name)

 Dean, Director, or Dept. Head Signature

Date: _____

Admin Authorization Required

 Associate VP, UW Operations

Date: _____