Community Outreach Strategy for Proposed Virginia Research and Education Reactor

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INTRODUCTION

A core part of any long-term scientific endeavor is the identification of stakeholders with an interest in the project. This is especially true for large-scale building projects, such as the construction of a research reactor. An oft-overlooked and underutilized demographic is the general public. Large-scale public support allows for increased funding and future workforce development, both critical aspects of building a research reactor facility.

We aimed to create a comprehensive public engagement plan for a proposed research reactor in Virginia. This Virginia Research and Education Reactor (VA-RER) is being developed by the nonprofit Virginia Innovative Nuclear Hub (VIN-Hub), alongside a coalition of Virginia Commonwealth University (VCU), University of Virginia (UVA), Virginia Polytechnic Institute (VT), and Liberty University. A well thought out public engagement strategy will allow the future VA-RER facility to maximize its benefit to surrounding communities, inspire growth in the universities' nuclear engineering programs, and form positive relationships with local governments.

BACKGROUND

Present Need

While public opinion of nuclear energy has improved in recent years, there are still significant misconceptions that act as barriers to the construction of new nuclear facilities [1]. To ensure the sustainable operation of a new facility, we must try our best to clear these misconceptions in the public consciousness. VA-RER is still in the earliest stages of development, yet early implementation of a public outreach program would be advantageous. Implementing this program as soon as possible would jump-start our ability to make siting decisions, grow our potential workforce, and give us valuable experience for future outreach efforts.

Goals

Our overall goal is to ensure positive sentiment for a new research reactor facility among Virginians, but there are several steps to take to accomplish this objective. We split our implementation strategy into three time periods: short term, pre-completion, and continuation.

The short term phase is the time period before the finalization of the technical specifications of the VA-RER facility. Within this time frame, we aim to reach out to high school students, young adults, and middle-aged adults to educate those demographics about the benefits of nuclear research. We also aim to spread our outreach program to many different cities in Virginia to maximize its potential. Accomplishing these goals will create a foundation for future outreach opportunities as we move to further phases.

We define the pre-completion phase as after we determine the technical specifications but before construction is completed. Within this time frame, we aim to educate the public about the VA-RER specifically. We also aim to address specific concerns about the research reactor facility. Input from the public is also paramount, helping ensure the reactor facility will act as a part of the community, rather than an unwanted outside influence. We also will continue the successful aspects of the short term phase, ensuring that we do not abandon those foundational principles.

Lastly, the continuation phase refers to the time period after the facility is fully operational. While previous phases aim to inspire public support for the facility, this phase will center around building on past momentum by creating a long-term, sustainable outreach strategy. We aim to use the facility as a center to grow interest among a future nuclear engineering workforce by targeting high school and college students. We also aim to continue involving the surrounding community, ensuring public sentiment remains positive and driving additional revenue to the VA-RER program.

PROPOSED IMPLEMENTATION

Short Term

Our short-term strategy primarily involves educational presentations. We will sponsor and present educational events about foundational nuclear science topics. Focusing on the basics of nuclear fission, power generation, reactor-based research, and reactor-based medical isotopes, these presentations aim to inform about the numerous benefits of research reactors. We will begin with a target demographic of high school students and young adults, increasing interest in each university's nuclear program and the VA-RER project in general. VCU has already created a synergistic pre-pilot program, Engineers2B to engage high

school students about engineering in the greater Richmond, VA, area [2].

These presentations will be developed, organized, and presented by both undergraduate and graduate volunteers at each of the involved universities. This will allow for the centralization of resources such as scripts, slide decks, and activity plans, while still allowing for a wide reach across Virginia. We will implement active learning into these events, helping cement the experience in the participants' minds more than a standard lecture format [3]. Obviously, no fission demonstration could take place with critical masses of nuclear material could take place due to radiation safety concerns, but approximations and thought experiments, such as the famed mousetrap chain reaction demonstration, can be used to encourage audience participation [4].

Our pilot program will take place in the Richmond public library system, beginning with Richmond Main Library in Fall 2026. We chose Richmond due to its proximity to VCU, who is leading the outreach efforts, and its diverse community, allowing for the assessment of our program's efficacy among a wide range of sociocultural backgrounds. Should the pilot program draw significant interest, we will reach out to the Science Museum of Virginia to host additional presentations, which would have a much wider reach than public library events. Afterwards, we will extend this program to public libraries in Charlottesville, Lynchburg, and Blacksburg, housing UVA, Liberty University, and VT, respectively. This will help us gain valuable experience in public communication which we can take to the future phases.

Pre-Completion

In the pre-completion phase, we will publish a public announcement with an overview of the reactor capabilities, proposed research, and technical specifications. We will continue doing the informational sessions implemented in the short-term phase, However, we will include more detailed information about the VA-RER specifically. By emphasizing its specifications and research capabilities, we can inform the public about its safety characteristics and the community benefit. These informational sessions will expand to the locations surrounding potential sites for the facility, gauging public interest in hosting the facility within their community.

Alongside these information sessions, we will host question-and-answer sessions to allow concerned members of the public to voice their worries. At this point, it is critical that we take each concern seriously, helping clarify any misconceptions that worried citizens may have. We will focus these efforts around potential sites for the reactor facility, as well as the cities that host each university. These Q&A sessions will be held regularly throughout the entire design and construction process, ensuring transparency between the VA-RER program and the surrounding public. Early on, these Q&A sessions will likely attract those with the strongest opinions, namely academics in the nuclear science field and individuals holding strong anti-nuclear beliefs. To ensure we serve each demographic, we must have individuals present with significant technical knowledge to communicate with academia, as well as foundational knowledge and communication skills developed in the previous phase to seriously address the concerns of the anti-nuclear demographic.We also will set up online forms and an email contact for concerned individuals to have their worries addressed even if they cannot make the Q&A sessions.

Alongside informational sessions, we also want to include the wider community directly in the design of the facility. We must ensure that the design is aesthetically pleasing both inside and out, helping integrate it into the surrounding community. To facilitate this, we will host mural contests where community members can submit their art concepts to be painted directly onto the final facility. Similarly, we will host infographic contests to be implemented into the interior of the facility as educational materials. Both of these will help create a bond between community members and the facility. We also will release renders of the facility before construction begins, addressing any public concerns about the aesthetics of the facility itself.

Throughout construction, we will also create newsletters bi-monthly informing the public of the construction progress, as well as disseminating more information about nuclear science and the VA-RER. After the facility is completed but the reactor is not operational, inspired by Abilene Christian University, we will reach out to popular educational content creators to tour the facility and discuss our reactor's capabilities [5]. This will extend our informational reach beyond the local community, ensuring we can reach a wide audience to inspire interest in the facility.

Inspired by Pennsylvania State University's Radiation Science & Engineering Center, we will implement an outreach lab, designed to offer hands-on activities surrounding nuclear science [6]. This will provide a space for interactive demonstrations of nuclear science. During construction, we will begin determining the specific capabilities of the outreach lab and begin designing each demonstration. We also will create free online educational modules, covering similar topics as our information sessions, but more in depth. We can introduce these modules to public schools, allowing for integration into science education curriculum.

Continuation

Overall, this phase will primarily involve streamlining our existing outreach programs, converting them into events offered in-house instead of at other locations, and developing public tours. After the facility is fully operational, we will slow down external outreach activities,

focusing on outreach programs centered around the completed facility. We will develop tour programs, implementing both free events for the public and paid private tours, creating another stream of revenue. We will also continue to develop our outreach lab capabilities and online modules to be as expansive as possible, positioning ourselves as an educational pillar in the Virginia nuclear community.

It is important that the public receives as much benefit from the reactor as possible. To facilitate this, we will streamline our process for requesting reactor time and offer reactor time to high school and college students for education-related projects. We will also reach out to Girl Scout and Boy Scout troops across the state to offer the nuclear science merit badges that both organizations provide. We will also leverage our relationship with public libraries and public school systems to offer field trips to students, inspiring interest in nuclear science early into their academic careers. Using these relationships, we can also identify other community organizations to reach out to, such as religious youth groups or social clubs, to further involve the public in the facility.

CONCLUSIONS

This comprehensive plan addresses several key stakeholders within the public: K-12 students, college students, young adults, concerned adults, academics, and educators. By educating the public about the benefit of a research reactor in Virginia, addressing concerns and misconceptions, and actively involving the community, we aim to ensure public sentiment for the VA-RER project is as positive as possible. This will allow the VA-RER facility to be an educational hub for nuclear science in Virginia, integrated into the surrounding community rather than forced upon it. By building and leveraging relationships with pillars of the Virginia community, such as libraries, schools, and youth groups, we can ensure the VA-RER facility remains approachable to the public. A continued effort to inform the public and address misconceptions about nuclear science will not only provide long-term stability and support for the VA-RER, but will help grow the nuclear science field within Virginia.

ACKNOWLEDGEMENTS

This work was performed with the support of the Virginia Innovative Nuclear Hub, coordinating the research efforts among Virginia Commonwealth University College of Engineering, Virginia Tech Engineering, University of Virginia School of Engineering & Applied Science, and Liberty University School of Engineering and Computational Science.

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