

The Environmental Challenge

...a competition for University students

The Environmental Challenge (EC) is proudly hosted by the Pacific Northwest International Section (PNWIS) of the Air & Waste Management Association (www.pnwis.org).

THE PURPOSE

The EC Program is a student team competition to prepare and present an optimal solution to a complex “true-to-life” environmental problem. The program presented is of current value, representative of the conference, and requires multi-disciplinary approaches for success. The EC Program is designed to promote formation of student teams with the broadest feasible range of environmental disciplines including, but not limited to, engineering, planning, policy, and economics. Teams must research the problem background as well as the technical, social, economic, and political aspects of the situation. Teams must stay apprised of ongoing events related to the problem by adjusting their solutions appropriately leading up to and during the conference.

The challenge seeks not only technical and scientific analyses, but solutions that are presented in conjunction with the development of appropriate regulatory approaches and resolution of political and community issues. We do not give you a lot of numbers to crunch. We are more interested to hear how you dissect the issues involved, interpret the problem, arrive at your conclusions, and communicate your thoughts. We want you to have fun!

The EC gives student teams an opportunity to develop solutions to a mock environmental problem and have the experience of presenting their solution to a panel of environmental professionals. This exercise gives all conference attendees a chance to participate and gets the professionals of tomorrow interacting with the professionals of today.

The goals of the EC are to:

- Involve students in the PNWIS Annual Conference of the Air & Waste Management Association.
- Be a premier networking event for students to connect with internship and job opportunities.
- Provide experience in solving complex environmental situations in a fun and supportive atmosphere.
- Give students opportunities to display their talents.

Although winning solutions to the challenge must have sound engineering and technical bases, the solution generally does not require a full engineering design presentation. Similarly, all problems pose economic and political issues that must be addressed. Solutions are expected to provide reasonable resolutions applying basic engineering and scientific knowledge to research scenarios and critical questions.

Once teams reach the conference, preparation will be the key to a successful competition; so be sure to obtain broad background knowledge of the EC topic! Role players in the EC problem will be identified and available for students to ask questions and consult for opinions. Role players are made up of conference attendees and professionals in the environmental field; they provide a key interaction point for the EC participants by giving feedback on their solutions, asking questions to prepare the students for the project presentations, and enhancing the networking experience at the PNWIS Annual Conference. The role players also are critically involved in a “Tweak” (added complication to the problem) that tests the students’ knowledge of the challenge topic.

THE CHALLENGE

Welcome to the small town of Coastalville! Located on a meandering peninsula along the Agate Sound of beautiful Warsheenton. This town has historically been a contributor to the lumber industry. Steadfast Sawmill has been in operation since the 1910s, and continues to offer several hundreds of jobs to the ecosystem that is Coastalville. Without the sawmill operating, many residents would not be able to support themselves, or would have to move elsewhere, away from their family and friends, to find consistent work.

Residents are lucky to have a thought-to-be-pristine aquifer located just below their town. Various water supply wells are in use at the southern part of town, and much of Coastalville's residents rely on these for their drinking water. The wells are screened in an unconfined sandy aquifer. Some residents of the northern side of town had been complaining about the quality of their well water. Some have noted a salty, greasy, perfumed, moth-ball like smell coming from their tap. Because of this, the regional environmental agency of Warsheenton, the Department of Ecoremedies (Ecoremedies) collected water samples from upgradient monitoring wells on the north side of town. Ecoremedies representative Tootie Watersbey indicated they found several contaminants of concern with concentrations above the applicable regulatory levels. Watersbey suspects that the contaminants may already be present in the various drinking water supply wells at the southern side of the community. Ecoremedies has also identified an additional confined aquifer located approximately 1,000 feet below the bottom the town's many drinking water supply wells, with potentially favorable water quality. Ecoremedies is unsure of the total extent of the contamination. To be sure they do not miss anything in their analysis, they have included potential contaminants of concern:

- Metals
- TPH-D, TPH-G
- Polycyclic aromatic hydrocarbons
- Nitrates
- Volatile and semi volatile organic compounds
-

The aquifer flow direction is generally north to south, and encompasses all of Coastalville before it reaches the town's drinking water supply wells. In case this situation with the sawmill was not egregious enough, Ecoremedies has identified a few other potential sources of contamination to Coastalville's aquifer! It is unclear if these sources have infringed the groundwater of the region. Additional potential sources include:

- An abandoned gas station and petroleum storage facility
- An unlined landfill used by local industries and the public that was closed and capped in the early 2000s.
- A shooting range.
- Multiple dry cleaners.
- Retail outlets.
- Neighborhoods.
-

The unconfined aquifer is located beneath all previously mentioned structures. See Figure 1 for a layout of the region. Thanks to the advent of remote work for office employees, Coastalville has grown tremendously and demand for fresh water has increased dramatically. Combined with hotter, drier summers and changing weather patterns, the town officials have noticed the aquifer water level has been trending down. Additionally, the residents of Coastalville have complained of saltier-tasting water in the last few years.

Coastalville's mayor, Mercer Eslander, recognizes that something must be done regarding the town's water supply system, but the town simply does not have enough funding. Luckily, a well-to-do Tech CEO, Morgan Sealth, who grew up in Coastalville, has shown interest in donating money to the town to resolve its water supply issues. But Morgan doesn't want to spend their money frivolously, so they are accepting ideas from various consultants on how to solve Coastalville's many problems.

You and your team have been shortlisted by Morgan Sealth, and now you need to develop a plan of action. There are many potential solutions to Coastalville's water supply issues, but any solution that is successful will consider the environmental, economic, and social impacts of this particular circumstance. You have been tasked with developing a plan and various remedies that at least include the following:

1. Who are the stakeholders that need to be involved and consulted with this growing issue?

2. Identify the likely source(s) of the aquifer's contaminants of concern. Are there any that are non-issue?
3. Out of the listed PCOCs and identified sources of contaminants, which are likely to be contaminating the aquifers of the region? How will you identify which are in fact present?
4. Identify potential causes for the higher salinity in the well's water, as noted by residents in the last few years.
5. Develop a plan of action for remediating the aquifer's pollution.
6. Develop an effective long-term solution for the town's drinking water supply system. Be sure to detail what you are going to do in your plan (steps) and explain challenges you may run into from an environmental, economic, and social perspective.



Your Assignment

You are being hired as the town's renowned team of unbiased environmental consultants to address the who, what, where, when, how, and why of what needs to be done to help the community prepare for an uncertain future. Your

proposed plan needs to balance plausible climate change impacts, environmental impacts and waste issues, social license, and economic interests. To be successful in your presentation, you must tactfully and eloquently articulate issues, knowns, unknowns, and recommendations for the completion of this effort.

There is no easy answer that will please everyone completely. You must do your best to build public support, articulate how to address the concerns of community groups, and ensure the project provides the most tangible environmental, economic, and social benefits.

The Expectation

Numbers are not what is most important – logic train, process, conceptualizations, and creativity are the most important considerations for your proposal and presentation. As you may notice, and as we have intended, you have not been given all the information you might require or desire to solve this problem. Such is life.

We encourage you to make assumptions, but you must be ready to defend them and pass the “straight-face” test. Keep in mind this is a competition, and every team may make assumptions with the given information differently. Remember the fundamental principle for success on any project is to KISS (keep it simple st...). You will be expected to present your thoughts in a public forum: eloquently, succinctly, and persuasively.

A note on professionalism: you will notice that a bit of humor is woven into this problem. PNWIS traditionally keeps the EC light so students have fun. We encourage you to do the same. That being said, choose wisely the humor you wish to employ.

The judges are a collective of professionals ranging from those who are young and early in their career, to those who are heads of companies and presidents of national organizations. You are under the microscope by an eclectic group of individuals, so keep it tasteful and be respectful.

The Proposal

Submit your team’s proposal by **5 p.m. PST on Friday OCTOBER 20TH, 2023** via e-mail to MKieneker@FarallonConsulting.com

The proposal should outline the team members by name and assumed project role (e.g “David Bowie” is going to be engineer and will address waste issues, “Carl Sagan” is going to be your air quality expert and thermodynamics enthusiast, “Frederick Law Olmsted” is going to be your landscape architect, and “Kermit” is going to be your urban planner and sustainability champion). The proposal should illustrate the technologies and strategies your team has identified, along with a clear approach of how you will implement them.

The Tweak

No matter how much you do and know, unexpected events and expectations can and do occur in real life. To this end, expect some late-breaking information that might alter your approach and require your plan to evolve, perhaps substantially. The problem and “the Tweak” will require that you find and talk to experts and attend various presentations during the conference for answers and important information. Details on where you need to be to interact with key players will be provided on the first day of the conference. Remember, those who are most successful in the “real world” are those that can identify what resources they have and use them. You are at a professional conference; what resources do you have?

When you submit your proposal, you will receive the Tweak via email prior to the conference. The sooner you submit the proposal the sooner you get the Tweak, but the earliest you will receive the Tweak is the day you submit your proposals.

Good luck and have fun!

PROTOCOL

Pay close attention to the protocol and follow the rules to a tee. This is a game of points. The proposals need to follow the guidelines established in the protocols listed below. **READ THE BELOW PROTOCOLS!**

The Presentation

Your team will need to demonstrate your understanding of the issues that you addressed in your proposal. You must include not only your key elements from your proposal, but also demonstrate adaptive management in dealing with the Tweak. Sustainable approaches for these and other site issues are of great interest to most stakeholders. The winning team presentation will be strong in logic, clarity, application, and creativity.

This year, all sessions will be held in-person. If your team would like to participate virtually, please reach out ASAP to coordinate with Melody. During the conference each team will meet with each role players to discuss their proposals and incorporate their feedback. During the first meeting we will also discuss any important meeting information, or general Q/A for the challenge. **Final presentations will be held October 26th during the conference.** If you have any direct concerns, please reach out to Melody Kieneker. For presentations, plan for no more than 15 minutes of presentation followed by 5 minutes of questions and answers. You will be timed, and the 15-minute rule is strictly enforced. If your presentation is shorter than 15 minutes, the extra time may be used for further questions.

EC Competition Preparation

Once the problem is posted, students should immediately start to form teams and identify/recruit representatives from appropriate disciplines as needed to address the problem holistically. Just as corporations and other organizations pull together teams from their staff to most effectively address any given project, so too should each student team. Student teams may not contain more than 5 members and are generally comprised of 3 to 5 individuals.

Each team must send an e-mail to Melody Kieneker stating your intent to compete (MKieneker@FarallonConsulting.com). This e-mail will serve as your enrollment in the EC competition. The email addresses that enrolled the teams will also be used to deliver information of any changes prior to the competition. If you have questions, submit them to Melody Kieneker. Answers to the questions will be sent out to all teams.

Each team member must register for the PNWIS Annual Conference in addition to stating their intent to compete. See the conference website for registration links. (<http://www.pnwis.org/annualconference/> <https://pnwis.org/annual-conference-2023/>).

Eligibility

The EC competition is open to all students who are registered for the PNWIS Annual Conference and have not been out of school for more than 1 full year. The competition will be a combined event for graduate and undergraduate students competing equally.

Expectations for proposed problem solutions

Solid technical analysis, logic train, process, conceptualizations, and creativity are all critically important to the proposal and presentation composition. Clear and concise presentation of your thoughts in a public forum is paramount to success.

Written Proposal Guidelines

Each team must submit a written proposal prior to the PNWIS Conference Week, by Friday October 20, 2023, by 5 p.m. PST addressing the problem. The written proposal should provide an outline of the approach that your team is going to take, the issues that you will be discussing, and shall not exceed 3 pages (not including Title Page and up to 3

diagrams, tables, or figures). Please do not forget to include your school, student names, and roles of each team member.

Proposal formatting guidelines include the following:

- 10 Pt Font (Times New Roman or equivalent)
- 1.5 Line Spacing
- 1 Inch Margins
- Divide your proposal into ordered sections
- References in text must be fully cited at the end of the proposal.
 - Example:
 - Reference in text – (Kuhn, 1962)
 - Full reference at end – T. Kuhn. The Structure of Scientific Revolutions (University of Chicago Press, 1962), pp. 27-42

Penalties for breaches in protocol:

- Late Submittal (5 Points Per Day)
- Failure to Register with Melody Kieneker prior to proposal submittal (5 Points)
- Deviating From Formatting Guidelines (3 Points Per Infraction, up to 15 Points)
- Failure to Interview all Roll Players (Up to 10 Points Per Roll Player, at Roll Players Discretion)

Role Players

This year the challenge is in person. If you would like to participate virtually, please reach out to Melody ASAP. During the first day of the conference each team will meet with each role players to discuss their proposals and incorporate their feedback. Role player sessions will be approximately 20-30 minutes per Role Player per team to address questions.

These role players will be project proponent(s), regulators, politicians, activists and other expected or unexpected individuals critical to creating a solution to the problem. Role players will offer insight and clarify any additional questions each team may have in relation to the problem. Please use professionalism during all business meetings, technical sessions, and plenary sessions; have fun while remembering your environment. While these role players are critical, so are the technical sessions and exhibitors that are related to the problem.

Competition Information and Final presentation

For the final presentation, teams must demonstrate their understanding of the issues in the written proposal and address the Tweak. A multi-faceted approach is essential. The solution must address technical, social, and environmental issues.

The winning team presentation will be strong in approach, logic, clarity, application, and creativity.

Winners will be announced at the Awards Luncheon on the last day of the Conference.

Good luck and have fun!

EC Timeline

September 2023: EC Problem Posted

October 20: EC Proposal due by 5 pm PST

October 20: Tweak Sent to Teams after Proposal Submitted

October 25-27: PNWIS Conference

October 25: Challenge introductions and Role Player interaction

October 26: Final Presentations with Role Players and Judges

October 27: Awards Luncheon and Announcement of Winners

If scheduling dates, times, or locations change all participants will be notified as soon as possible. Please reach out with any questions or concerns.

Submit Proposals and questions to:

Melody Kienecker

MKienecker@FarallonConsulting.com