

# 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](http://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**

The town of Hardrock, Montana is a growing community. The summers are hot, and this one is no different. Their downtown area is beginning to bustle, and small shops are cropping up on the town roads adjacent to the Marble River that meanders through the town. Their town recently built a new water park (open in the summer) that duels as a sledding area in the winter. This perk has driven people to want to come to their small-ish population of 6,000 people. They are noticing very quickly that their town needs a wider road and adjoining highway to connect it to the rest of the state and the town's fantastic amenities.

So, they are building a road! The town commissioner has claimed it's going to be the best road the town has seen and is going to drive the economy up to the skies. The road generally is using current infrastructure and is being widened through town, as well as outside of city limits. In total, approximately two miles of city road, and eight miles of highway are being widened and improved. See attached map of the road widening program. The project started on the east side of town and is heading west. The construction crews are primarily using rock materials from a nearby quartz monzonite outcrop just west of the city. The rock is crushed at the outcropping site, then trucked to where it is needed, including across town, used as fill and road base-coarse. The fill and base-coarse is in the process of being placed on either side of the existing roadway to prepare the surface for widening, allowing the road to be expanded from one lane in each direction to two.

Unfortunately for the town and construction project managers, fugitive dust is blowing in from the quarry and off the truck loads coming through town on windy days. Residents living in the town are concerned about the dust and their health.

“Somedays, especially windy days, I must stay inside otherwise I have trouble breathing. There is always a thin layer of dirt over my car, patio furniture, and anything else outside. I am happy to see a new road being built through town, but the constant dust is a nuisance and I also worry that it might be unhealthy. What are we even breathing in?!” - Peaty Bill, Concerned Citizen

Hardrock has their fair share of windy days, but they also have a lot of rain. Fisher-People of Hardrock, a local NGO, has documented repeated dead fish in the town's river after heavy rain events. It can't be coincidence.

“At first I thought it may not be a real issue, we all see some dying or dead fish in the water occasionally. But after a couple weeks of the same pattern I needed some answers. For two weeks I took daily pH readings and found that after rain events the pH dropped to 5.0 S.U., and it was worse as you were closer to the west of town! It's harmful for the adult fish, as well as the eggs. This is unacceptable!” – Sam Goby, Fisher-People of Hardrock Biologist

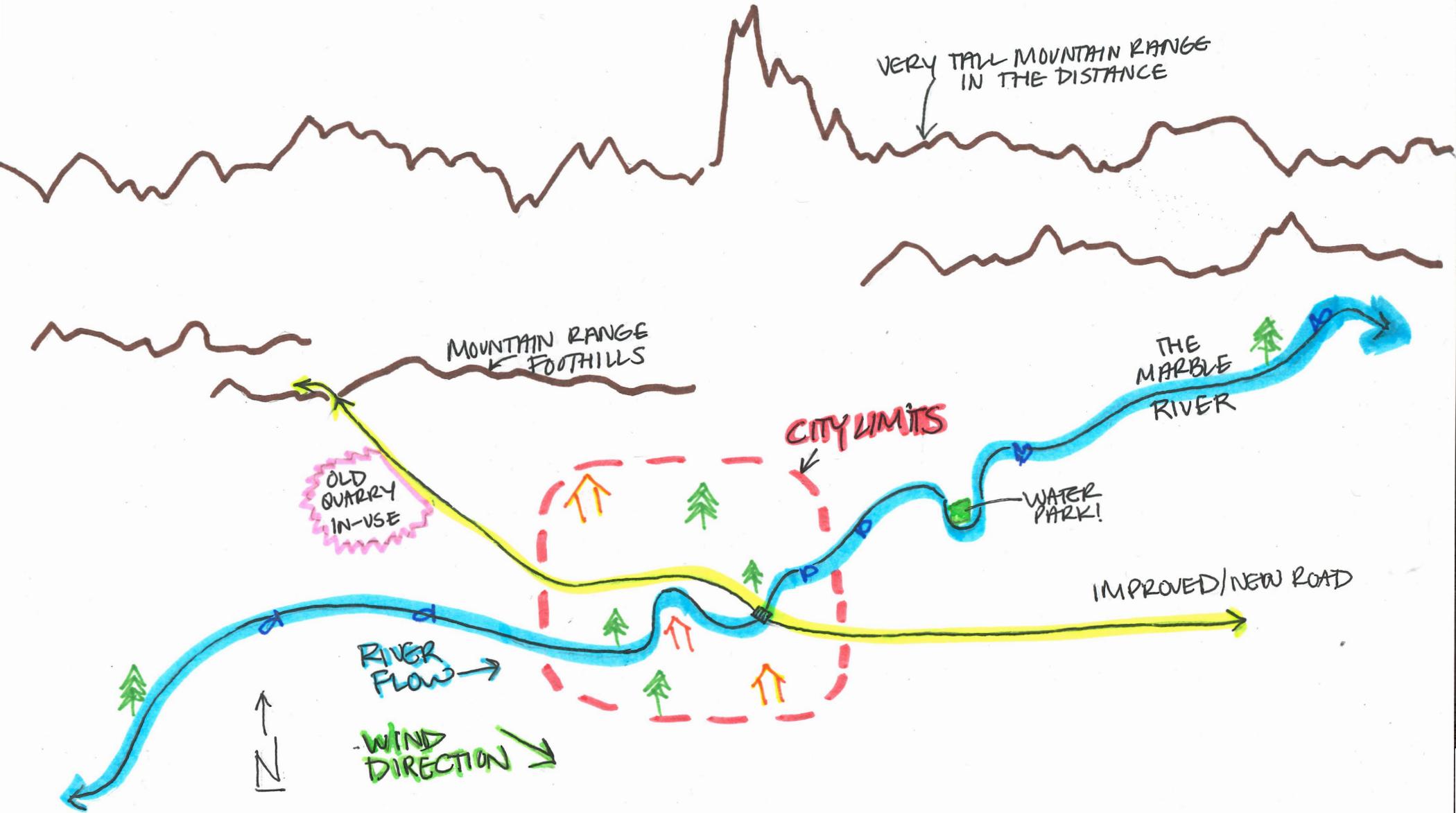
By this time, the road widening has reached 60 percent completion. A geologist from the state mineral resources program commissioned a flyover of this part of the state to assess uranium resources and noticed the presence of uranium in a linear pattern that appeared to follow the alignment of the newly widened road.

“I was surprised to see the linear nature of uranium and realized it wasn't a natural deposit when overlaid on a map of the nearby town. The uranium signature appears to follow the newly constructed parts of the roadway. When I noticed that, I immediately reported it to management.” - Charlie Gneiss, State Mineral Resource Program rock enthusiast and geologist

It seems that the town has jumped into this new road project a little hastily, and a few issues have come up. The problems are reoccurring and don't seem to be letting up. The town commissioner has told the media they are not going to make a comment at this point in time, but the commissioner's secretary leaked that they are at a loss of what to do.



PNWIS EC 2019 FIGURE  
FOR GENERAL LOCATION!  
DIAGRAM USE ONLY!



\*MAP DEFINITELY NOT TO SCALE\*

→ ROADWAY CONTINUES UPSLOPE TO THE WEST INTO THE MOUNTAINS, AND EASTWARD ACROSS THE VALLEY TO THE NEXT TOWN. THE TOWN SITS GENERALLY ON THE VALLEY FLOOR ←

## **Your Assignment**

You are being hired as the town's renowned team of unbiased environmental consultants to address the how, who, what and why of what needs to be done to help the widening project and town commissioner. How can the roadway be completed when so many factors have already cropped up as an issue? Your proposed plan will be a proposal to the commissioner and environmental leads that rectifies the issues created by the roadway, as well as making sure the project can be completed so the town can continue to expand. We need to balance environmental impacts, discharges to air and water, 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.

At a minimum, you should keep in mind and address these questions in your submission to the Committee:

1. Develop a plan to finish the roadway.
2. Develop a list of possible issues/challenges and mitigation measures associated with the project.
  - a. What can be done about the dust problems? What do the town's people need to be worried about? How can we mitigate these issues?
  - b. What can cause fish kills? How do we solve this issue?
  - c. Is the uranium signature an issue? What types of radiation could it be, how can we mitigate its effects? Can the road be completed using this material?
3. Develop a plan to communicate the project challenges, solutions, and project progress with the community.

## **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...eve). 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 Monday, October 14th, 2019**, via e-mail to [Melody.Kieneker@erm.com](mailto:Melody.Kieneker@erm.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.

Each team will present their solution on **Thursday** afternoon, October 24th, as part of the conference. When we know how many schools will be presenting, we will develop a schedule, but plan on presentations beginning at 12:00 p.m. and concluding at the end of conference Day 2. PNWIS will have a projector and a laptop (with Microsoft Power Point). Please bring a USB flash drive so we can transfer your presentation to the laptop prior to the presentation. 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.

### **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 ([Melody.Kieneker@erm.com](mailto:Melody.Kieneker@erm.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/annualconference2019/>).

### **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 Annual Conference on Monday October 14, 2019, 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 we will be addressing the role players in a different forum. During the conference, you still will be required to speak with role players involved with the problem. Instead of you seeking out these role players throughout the

conference, there will be a 15-minute session per team to address questions. Of course, you can still seek the role players out during the conference for follow up discussions, but the only required speaking time will be during the session. Each session will be closed to only the role players and individual teams – other teams will not be able to sit in on other's question time. 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.

An orientation meeting for the EC participants will be held on Wednesday, October 23rd (exact time and location will be identified in the conference program). Please anticipate being at the conference location by midday October 23rd. Role players in the problem will be identified during the Wednesday meeting and individual team sessions will be held for you to discuss your proposals with the role players.

### **Competition Finale - The 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.

To further allow for students to attend the Gala event and have more time to interact and join other technical sessions, each of the teams will present their problem solution on **Thursday**, October 24<sup>th</sup>, from approximately noon to 5 p.m. during the conference EC technical session program that day. Final presentation time TBD. A computer and projector will be provided for the presentation (with Microsoft PowerPoint). Please bring your presentation on a USB flash drive to be transferred to the computer. Plan for a 15-minute presentation followed by 5 minutes of questions and answers. The 15-minute presentation limit is strictly enforced. Please practice accordingly. Since this year's presentations are one day earlier, please plan accordingly.

Winners will be announced at the Honors and Awards Luncheon on Friday, October 25th.

Good luck and have fun!

## **EC Timeline**

End-August, 2019: EC Problem Posted

October 14: EC Proposal due by 5 pm PST

October 14-22, 2019: Tweak Sent to Teams after Proposal Submitted

October 23-25, 2019: PNWIS Annual Conference

October 23, 2019: EC Orientation (Location & Time TBD) & Interactions with EC Role Players. Anticipate midday timeframe.

October 24, 2019: EC Presentations (Final time TBD)

October 25, 2019: Honors and Awards Luncheon (12:00 PM)

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

[Melody.Kienecker@erm.com](mailto:Melody.Kienecker@erm.com)