RANGER CLASS: SCIENCE & DISCOVERY ON THE EPR

School/Team: _____Mission attempt #: _____
Team captain: _____
Mission station officials: _____

Set-Up and Safety Check

- ❑ All power cords, power bars, pressurized cylinders, etc. are secured.
- ❑ A fuse is present in the vehicle's electrical system.
- ❑ No hazardous materials are leaking onto the pool deck.
- ❑ Vehicle is hand-launched by team members in a safe manner.
- ❑ No team member has entered the water in order to prepare and/or launch vehicle.
- ❑ Vehicle is in the water near the control shack at the end of the 5-minute set-up period.

Mission official's notes: _____

❑ **Team is ready for the mission: _____ (official's initials)**

Note: An official's decision to disqualify a team due to safety concerns is final. If there is a safety concern, please contact the lead official or competition coordinator.

Fuses

If a team blows the MATE power supply in-line fuse, they are allowed one spare. If the vehicle blows the second MATE fuse, their mission performance period is over. The team will receive points for the mission tasks they have completed up to that point, but will not receive a time bonus score.

Task #1: Collect up to 3 vent crabs.
Task #2: Collect up to 3 samples of the black smoker.
Task #3: Measure the temperature of the hydrothermal vent fluid.

Task #1: Collect up to 3 vent crabs.

This task involves:

- **Collecting up to 3 vent crabs.**
- **Returning the vent crabs to the surface.**

Scoring – 60 points

- 10 points – for each vent crab (up to 3) collected so that it is under the control of the team's ROV and no longer in contact with the topography.
- 10 points – for each vent crab (up to 3) returned to the surface under the control of the team's ROV so that one team member can retrieve the crab from the vehicle.

_____# of samples under the control of the vehicle x 10 points = _____
_____# of samples returned to the surface x 10 points = _____

Task #2: Collect up to 3 samples of the black smoker.

This task involves:

- **Collecting up to 3 samples of the black smoker.**
- **Returning the samples of the black smoker to the surface.**

Teams are permitted, but are not required, to collect and/or return to the surface more than one sample of black smoker at a time.

Scoring – up to 60 points

- 10 points – for each sample of black smoker (up to 3) collected so that it is under the control of the team's ROV and no longer in contact with the smoker.
- 10 points – for each sample of black smoker (up to 3) returned to the surface under the control of the team's ROV so that one team member can retrieve the sample from the vehicle.

_____# of samples under the control of the vehicle x 10 points = _____
_____# of samples returned to the surface x 10 points = _____

Task #3: Measure the temperature of the hydrothermal vent fluid.

This task involves:

- **Locating the vent.**
- **Inserting a temperature sensor into the venting fluid.**
- **Measuring the temperature of the venting fluid and displaying the reading on a video monitor or as a digital readout at the control shack.**

NOTE: The judge(s) should be able to see the temperature reading on the teams' ROV video monitor or as a digital readout at the control shack. The readout can be a separate device or integrated into the teams' ROV control system. Teams are responsible for informing the judge(s) when they are preparing to take a reading and when they are ready to have their measurement scored. The judge(s) will confirm the measurement on the mission score sheet and assign a score based on the accuracy of the temperature measurement compared to the readout on the judges' temperature gauge (called the benchmark).

Scoring – 80 points

ROV's temperature sensor in the vent flow (10 points) _____
ANY temperature reading or temperature gauge movement (10 points) _____

Temperature reading within ± 4.0^{o}C of benchmark (60 points) _____
Temperature reading within ± 5.0^{o}C of benchmark (40 points) _____
Temperature reading within ± 6.0^{o}C of benchmark (20 points) _____

MISSION POINT TOTALS	
Task #1: Collect up to 3 vent crabs.	
# of samples under the control of the vehicle	0 10 20 30
# of samples returned to the surface	0 10 20 30
Task #2: Collect up to 3 samples of the black smoker	
# of samples under the control of the vehicle	0 10 20 30
# of samples returned to the surface	0 10 20 30
Task #3: Measure the temperature of the hydrothermal vent fluid.	
ROV's temperature sensor in the vent flow	0 10
ANY temperature reading or temperature gauge movement	0 10
Temperature reading	0 20 40 60
Mission Score	
PENALTY POINT DEDUCTION	
Illegally pulling tether* _____ infractions X -5	
Illegal communication* _____ infractions X -5	
Exceeded 5-minute demobilization period _____ minutes X -1 =	
Illegal entry of advisors/mentors into control shack[+] _____ infractions X -5	
Team advisors/mentors interfering with judging[+] _____ infractions X -5	
TIME BONUS 1 point for every minute and 0.01 point for every second under 15 minutes	
Duration of Mission: _____ Minutes under 15 remaining: _____ X 1 point = _____ Seconds remaining: _____ X 0.01 point = _____	
Time Bonus	
TOTAL MISSION SCORE	

*Issue a warning for the first infraction. Begin deducting points AFTER the first infraction.

[+] No warning – already stated in rules and control shack area will be cordoned off. Teams may be assessed penalty points or disqualified for inappropriate interference from advisors, mentors or others associated with the team. Team members, advisors, and mentor issues, concerns, or problems must be brought to the attention of the lead coordinator and head judge for immediate resolution.

Failure to follow this procedure will result in penalty points being assessed or team disqualification.

Mission official's initials: _____Team captain's initials: _____