

**Appendix J**  
**Chamber Recruitment Script**

- You are being asked to participate in a research study performed by NIOSH. The purpose of this research is to study how heat stress affects thinking processes such as attention and memory, and whether we can predict when attention and memory begin to decline by measuring heart rate and temperature. In order to study this, we need to collect information from miners on factors related to heat stress and monitor participants' heart rates and temperatures in an environmental chamber.
- This study is completely voluntary. You do not have to participate. If you choose to participate, you can drop out at any time without any consequences to you from either NIOSH or your manager at work.
- What to expect: if you take part in the study, we will evaluate you for 3 days in an environmental chamber at the NIOSH facility in Spokane.
- You will first need to fill out a health questionnaire so that we can identify persons who might have conditions that could put their health at risk if they were to participate in the study. People who have a history of heart disease, uncontrolled asthma, pregnancy, insulin-dependent diabetes, severe chronic kidney disease, uncontrolled hyperthyroidism, history of heat stroke or seizures, and musculoskeletal injuries in the past 6 months will not be able to participate. Miners who have medical conditions that make them unable to swallow the temperature capsules that measure internal body temperature will not be able to participate, either. These medical conditions include esophageal disorders, obstructive or hypomotility disorders of the gastrointestinal tract, previous gastrointestinal surgery, disorders of the gag reflex, having a pacemaker or implantable cardioverter defibrillators, or miners who are planning to have an MRI within a couple of days of the study. People who have chest pain, shortness of breath, dizziness or fainting, palpitations, unusual fatigue, or calf pain with walking that improves with rest will also not be able to participate. If you are not sure whether you have a health condition or symptom that would exclude you, speak with the physician directly. All information that you provide (either by questionnaire or verbally) will remain confidential.
- We will measure your height, weight, blood pressure, and pulse. The NIOSH physician will listen to your heart and lungs.
- If you are over 40 years old, we will prick your finger with a tiny lancet to get a few drops of blood, which will be used to test your cholesterol. The cholesterol results, blood pressure, and information from the health screening form will be entered into a computer program that estimates cardiovascular risk. If your risk score is less than a specific threshold (meaning that you have a low risk for heart disease), you will be eligible to participate in the study. If you have diabetes or kidney disease, we will also prick your finger to test your blood to see how well your diabetes has been controlled recently and to see what your current kidney function is like.
- You will be oriented to 2 different memory and attention tests. All will be taken by computer.
- You will have a chest strap placed on you to monitor your heart rate. Two hours prior to starting the test, you will swallow a pill that measures your internal temperature and sends the information to a small recorder that is located on the chest strap. The pill is similar to medications that are large capsules.

- On all three study days, we will test one participant at a time at the NIOSH facility. You will travel to the NIOSH facility that morning or afternoon. You will be compensated for travel at \$0.545 per mile. You will spend approximately 3-4 hours on the first day and 5-6.5 hours on the second and third days and will be compensated \$35/hour for your time.
- On the first study day, you will have a chest strap placed on you to monitor your heart rate, and temperature sensors will be placed on forehead, arm, shin, and back. Two hours prior to starting the test, you will swallow a pill that measures your internal temperature and sends the information to a small recorder that is located on the chest strap. The pill is similar to medications that are large capsules. You will perform alternating exercises of one minute of squats with picking up 10-pound weights, and one minute of step-ups onto an 8-inch step while carrying 5-pound weights. You will do these alternating exercises for 20 minutes while the chamber is set to room temperature (70 °F, 40% humidity).
- On the second and third study days, prior to beginning testing, you will complete a brief questionnaire to determine if you have any short-term illnesses or symptoms that could prevent you from safely completing the test. You will be weighed, and you will be asked to provide a urine sample. The urine will be checked only for evidence of dehydration and then will be thrown out.
- You will have a chest strap placed and swallow a temperature pill, just like on day 1.
- You will perform the same alternating exercises of one minute of squats with 10-pound weights, and one minute of step-ups with 5-pound weights as on day 1. You will do these alternating exercises for 20 minutes while the chamber is set to 100 °F, 80% humidity). If your temperature doesn't reach the designated threshold by the end of the exercise round, you will sit and rest inside the chamber for 10 minutes, then repeat the alternating exercises for 10 minutes, followed by another rest for 10 minutes, followed by the alternating exercises for 5 minutes. At any point, when your temperature reaches the designated threshold, you will stop the exercises and begin the cognitive tests.
- You will perform two rounds of testing. During one round, you will complete the exercises followed by cognitive tests when your core temperature reaches 100.4 °F. In the other round, you will complete the exercises and take the cognitive tests when your temperature reaches 101.3 °F.
- Your body temperature will be constantly monitored. When your body temperature reaches the designated threshold, you will take two memory and attention tests to determine whether the heat is affecting your attention, memory, and other thinking processes.
- You will leave the chamber and rest for at least 30 minutes. Then you will re-enter the chamber and repeat the exercises again until your core body temperature reaches the designated threshold, at which time you will repeat the cognitive tests.
- We will stop the test at any time that you feel you want to stop, or if your temperature reaches 102.2 °F for over 2 minutes and you have symptoms.
- After the test, you will be weighed again and will provide another urine sample to measure dehydration.
- You will rest outside the environmental chamber and will be provided with cold water.

- A health provider will monitor your test at all times. If you develop any symptoms of heat illness or another illness, they will be available to assist. If you become overheated, we will treat you with cool towels, cold packs, fans, and fluids.
- Although we use strict screening procedures to reduce risks to participants' safety, if an emergency does occur, the health provider and other NIOSH staff will provide first aid or CPR and will call emergency medical services.
- At the end of the study we will provide you with a report of your results.

**List of conditions or symptoms that will exclude participation in this study**

1. History of coronary heart disease (i.e., angina, heart attack, catheterization with stent placement)
2. Arrhythmias/irregular heart rhythms
3. Heart failure
4. Valvular heart disease
5. Stroke or TIA (i.e., mini-stroke)
6. Peripheral artery disease
7. Uncontrolled asthma (defined as daytime symptoms >2 times per week, limitations of exercise, nocturnal symptoms at least once per week, or need for rescue treatment >2 times per week)
8. Diabetes requiring insulin or diabetes longer than 10 years
9. Chronic kidney disease, stage 4 or 5
10. Uncontrolled hyperthyroidism
11. Musculoskeletal injuries (injuries to muscles, joints, bones, ligaments, or tendons, history of joint replacement) in past six months that required time off from work or regular activities
12. Heat stroke in past (but NOT other forms of heat illness)
13. Seizures
14. Pregnancy
15. Age >54 years
16. Any of the following symptoms:
  - Chest discomfort or discomfort in the neck, jaw, or arms during exertion or while performing daily activities of living
  - Chest discomfort at rest that does not have a benign cause
  - Shortness of breath at rest or with mild exertion
  - Waking up in the middle of the night with shortness of breath that requires sitting up or standing
  - Dizziness or fainting
  - Palpitations or tachycardia
  - Unusual fatigue or shortness of breath with usual activities in past 3 months

- Claudication (crampy leg pain that resolves with rest)
17. Medical conditions that preclude participants from swallowing temperature capsule (i.e., esophageal disorders, obstructive or hypomotility disorders of the gastrointestinal tract, previous gastrointestinal surgery, disorders of the gag reflex, having pacemaker or implantable cardioverter defibrillator, planning to have MRI within 2 days of study test days)
  18. Please mention any other health conditions or symptoms you have to medical officer