Health and Safety Plan

Title: Atmospheric Water Generator Operation and Sample Collection

Principal Investigator(s): Michael Jahne
Office: ORD
Laboratory: NERL
Division: SED
Branch: EFAB
Building/Room: Test & Evaluation Facility (T&E) High Bay
APTIM Project #: WA 3-06

Approvals

I have read and approve the attached Health and Safety Plan in conformance with the ORD Facility Chemical Hygiene Plan and Health & Safety Plan Policy. I certify that the workplace hazards, routinely and non-routinely encountered by employees, during the described activities, and for which Personal Protective Equipment has been provided, have been assessed for the determination of Personal Protective Equipment required, in compliance with 29 CFR 1910 Subpart I.

	Name	Phone	Signature / Date
Preparer / Principal Investigator	Michael Jahne	513-487-2354	MICHAEL JAHNE Digitally signed by MICHAEL JAHNE Date: 2018.01.11 10:36:54 -05'00'
Immediate Supervisor	Lindsay Stanek	919-541-7792	Lindsay Stanek Digitally signed by Lindsay Stanek DN: cn=Lindsay Stanek, o, ou=CED/NERL/ORD, email=stanek.lindsay@epa.gov, c=US Date: 2018.01.12 11:23:23 -05'00'
APTIM T&E Facility Operations Manager	Timothy Kling	Ex. 4 - CBI	TIMOTHY KLING (affiliate) Digitally signed by TIMOTHY KLING (affiliate) Date: 2018.01.23 12:10:50 -05'00'
APTIM T&E Program Manager	Radha Krishnan		Radha Krishnan 1/23/2018
APTIM Chemical Hygiene Officer	Larry Verdier		Larry L. Verdier 1/23/2018
T&E Facility Manager	Josh Weber	513-569-7845	JOSHUA WEBER Digitally signed by JOSHUA WEBER DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=JOSHUA WEBER, dnQualifier=0000045181 Date: 2018.01.23 14:14:05 -05'00'
SHEM Approval	Jennifer Tant	513-569-7185	

Additional information on the completion of a Health & Safety Plan may be found at the SHEM Intranet Site.

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Laboratory / Field Staff Concurrence

I have read, understood and will comply with all the requirements of the attached Health and Safety Plan, SDSs, and the rules contained in the U. S. EPA Facilities Chemical Hygiene Plan. I have also had the opportunity to ask any questions and had my questions satisfactorily answered prior to my beginning work under this plan.

Name (Print)	Employer (EPA, ORISE, Contractor name, etc.)	Will work in the Lab (L), Field (F), or Both?	Signature	Date

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Training and Medical Surveillance Requirements

Training and medical surveillance requirements will vary depending on the complexity and materials used in the process. Therefore, only personnel trained and monitored will be permitted to work under this plan. To be "authorized", employees must have completed the training and screenings selected below.

Mandatory for all researchers	
Initial Laboratory Safety	X
Current Chemical Hygiene Plan Laboratory Safety Refresher	X
Hazardous Waste Management (RCRA)	X
Project/Task Dependent	
Medical Surveillance	
Respiratory Protection	
Biosafety	
Blood borne Pathogens	
Initial Field Safety and/or 8-hour field safety refresher training in the fiscal year	
24hr / 40hr HAZWOPER and/or 8 hour HAZWOPER refresher in the last 12 months*	X
Hearing Protection	
First Aid / CPR / AED	
DOT Hazardous Materials Awareness/Shipment	
Radiation Safety	
EPA Driver's Training	
EPA Boat Safety Training	
EPA Nanomaterials Health and Safety Awareness Training	
Other (specify)	

*Employees involved in hazardous waste management at T&E

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Project Description

Provide a brief synopsis/abstract of the research project. This can include background information and a general description of the research goals. Borrowing from Quality Assurance reports is acceptable and encouraged in each section of the description.

Atmospheric water generators (AWGs) have the potential to expand the availability of water during shortages, contamination events and other interruptions of service. Given the nature of atmospheric water generation (i.e., condensation of atmospheric water vapor), high quality produced water is anticipated; however, it may not be safe for human consumption. The objective of this study is to assess the feasibility of using AWG condensate as a potable water resource based on analysis of water quality from an AWG unit temporarily installed at the EPA-Cincinnati Test & Evaluation Facility (T&E) High Bay.

This HASP covers AWG operation and sample collection. The unit will be operated by T&E contractor APTIM under WA 3-06. Operation will include periodic draining of the unit as well as monitoring water production rates and routine water quality parameters (pH, temperature, conductivity). Weekly sample collection will involve the filling of three-1L bottles with produced water. Additional samples will be taken of internal condensate prior to treatment. Sample collection will be performed by ORD-NERL staff, who will transport the samples to EPA-Cincinnati AWBERC laboratories for analysis under the following HASPs: "Sample Concentration from Different Matrices and Viral and Indicator Analyses", "Pre-PCR Reagent Preparation and PCR Amplification", PIs B. McMinn and N. Brinkman; "Post-PCR Analysis", PI N. Brinkman; and "General Laboratory Practices Associated with Proteomic Research", PIs M. Donohue and S. Pfaller.

Field Activities – N/A

Laboratory Activities

Provide a description of the laboratory activities including procedures used and a description of the use of all chemicals. If referencing an SOP, please provide a copy to SHEM for review.

Operation

Twice per week:

1) Record percent capacity and instrument time from interface panel.
2) Fill a 1L container from the unit's ambient temperature water tap and measure the pH, temperature, and conductivity of the collected 1L using a YSI 556 handheld meter. Measurements should be performed on the first 1L drained from the unit.
3) Drain an additional 2L through each of the ambient and cold water taps and discard to floor drain.
4) Record initial volume of flow meter on manual drain.
5) Open manual drain valve and continue to drain until interface panel percent capacity reads <20%; close valve.
6) Record final volume of flow meter on manual drain.
7) Record percent capacity from interface panel.

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Sample Collection

Once per week:

1) Record percent capacity and instrument time from interface panel.
2) Fill two 10-L carboys from the ambient water tap. Sample should comprise the first 20 liters drained from the unit.
3) Fill up to three-1L bottles from the untreated condensate access port.
4) Label samples with the Sample IDs and place in cooler on ice.

Physical Hazards Summary

The physical hazards marked below (X) have been identified as present during the performance of the project. Job hazards for specific steps are described in the JHA table(s). ***Check the column to which the hazards are applicable.***

Physical Hazards	Lab	Field
Electrical Hazards	X	
Radioactive Materials – requires RSO approval of HASP		
Non-Ionizing Radiation		
Ionizing Radiation – requires RSO approval of HASP		
Heavy Lifting – coolers w/ ice & water samples	X	
Vibration		
UV light/radiation		
Noise		
Temperature / Thermal		
Poor Lighting / Low Visibility		
Compressed Gas		
Sharp Objects / Tools		
Slips, Trips, Falls	X	
Other (specify)		

PPE Summary

The PPE items marked below (X) are required during performance of the project. PPE requirements for specific steps are described in the JHA table(s). ***Check the applicable column.***

PPE Type	Lab*	Field
Face / Eye Protection		
Safety Glasses w/ Side Shields	X	
Chemical Splash Goggles		
Face Shield		
Other (specify)		
Ear Protection		
Ear Plugs (Foam Inserts)		
Ear Muffs		
Other (specify)		

PPE Type	Lab*	Field
Hand Protection		
Nitrile disposable exam	X	
Latex disposable exam		
Butyl disposable exam		
Silver Shield® or Ansell Barrier Gloves		
Thermal (Heat Resistant) Gloves		
Cryogen (Cold Resistant) Gloves		
Cotton Gloves		
Leather Gloves		
Cut Resistant (Kevlar ®)		
Other (specify)		
Protective Clothing		
Lab Coat	X	
Lab Apron		
Oversleeves		
Jumpsuit/Coveralls		
Traffic Safety Vests		
Shoe covers		
Safety Shoes: Steel Toe Boots and Shoes		
Safety Shoes: Metatarsal Boots		
Safety Shoes: Slip Resistant Boots and Shoes		
Other (specify)		

Minimum dress for entering a laboratory is closed toe shoes, long pants (waist to ankles), shirt, and safety glasses.

Respiratory Protection

Employees who need to wear a respirator must be enrolled in the Respiratory Protection Program which requires completing medical clearance, fit testing, and respiratory protection training before wearing the respirator. The respirators marked below (X) are required during performance of the project. Respirator requirements for specific project steps are described in the JHA table(s).

No respirators/dust masks are required for this project. Respirator/dust mask use is not authorized. Contact the SHEM Office for requirements if respirator/dust mask use becomes necessary.	**X**
N-95 Filtering Facepiece/Dust Mask	
P-100 Filtering Facepiece/Dust Mask	
Air Purifying Half Face Respirator	
Air Purifying Full Face Respirator	
Powered Air Purifying Respirator (PAPR)	
Airline Supplied Air Respirator	
SCBA	

The following cartridges shall be used: N/A

The cartridges shall be changed/removed from service on the following schedule: N/A

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Equipment and Engineering Controls

The equipment marked below (X) are required during performance of the project. Requirements for specific steps are described in the JHA table(s).

Autoclave	
Balance Enclosure	
Biological Safety Cabinet	
Canopy Hood	
Centrifuge	
Chemical Fume Hood	
Clear Air Bench (laminar flow hood)	
Deep Freezer	
Drying Oven	
Local Exhaust Ventilation	
Muffle Furnace	
Radiological Fume Hood	
Refrigerator / Freezer	
Spot Ventilation Unit (Snorkel)	
Walk-in / Bulking Hood	
Other (specify)	

Biological Research *(Please answer "Yes" or "No")*

Does the project in any way involve manipulation of recombinant DNA?	No
If yes, are all proposed activities specifically exempted from the NIH Guidelines for Research Involving Recombinant DNA Molecules?	n/a
Does the project in any way involve human subjects or biological materials obtained from human subjects?	No
If yes, is the project exempt from the Health and Human Services Policy for Protection of Human Subjects?	n/a
Does the project involve animals requiring Institutional Animal Care & Use Committee (IACUC) approval? (includes vertebrate & invertebrate animals)	No

Biological & Select Agents

The Biosafety Level (BSL) and Animal Biosafety Level (ABSL) refer to specific combinations of work practices, safety equipment, and facility design elements utilized to minimize exposure of workers and the environment to infectious agents and biological toxins. Principal Investigators must perform an agent risk assessment to determine the BSL. Indicate "N/A" if not applicable to project.

Item #	Biological / Select Agent	BSL #	Source of Agent	Vaccination Required?
	N/A			

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Waste Management

Please list all samples, analytical process wastes, and other generated waste streams. Describe the disposal method to be used for each (hazardous waste program, infectious waste program, sink, trash, return to supplier, etc.). See 40 CFR Part 261 for more information on hazardous waste identification and treatability studies.

	Yes	No
Will Hazardous Waste Be Generated?		X
Will the Treatability Exemption be utilized (i.e., will materials considered to be hazardous waste be brought back to an EPA facility from an outside location and subjected to a treatment process, material compatibility study, or toxicological/health effect study)?		X

Produced water will be discharged to the sewer. Produced water is atmospheric condensate that has undergone treatment within the AWG unit (UV, mineralization, and carbon filter) and is therefore anticipated to be of potable quality.

Sample Management

In addition to the statement below, please describe how samples will be identified and labeled for storage (if not immediately discarded), and if any specific storage is required (e.g., flammable storage refrigerator, deep freezer, etc.).

All sample and reagent containers must be labeled to convey the hazards of the container. This should include all constituents including any solvent and solutes or other hazardous constituents such as contaminants within the sample/reagent container. Include storage location and how long samples must be retained.

Samples for water quality analysis will be labeled with a unique ID to include the series of AWG unit ID, Collection Date, and Sample Collection Location (e.g., WG20180101PW). Samples will be immediately transferred on ice by ORD-NERL staff to EPA-Cincinnati AWBERC laboratories for analysis.

Spill Response

In addition to the statement below, please describe procedures for managing spills of chemicals with higher hazards or that require additional measures beyond the CHP requirements. Include how spills will be addressed, if working at a field site.

Small spills may be addressed as described in the EPA Facility Chemical Hygiene Plan.

The SHEM program office provides spill kits for all laboratory use. Staff should review the list and determine the location of the nearest spill kit.

T&E facility	Between entrances to labs 110 and 112, Outside Organic chemistry lab

In addition, the lab maintains spill kits in the following location: N/A
The biological spill kit is located: N/A

References:

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Chemicals/Materials to Be Used

EPA utilizes an online service, Chemwatch, to provide Safety Data Sheets (SDS) to employees.

http://jr.chemwatch.net/chemwatch.web

Account: epa User Name: Everyone Password: *120270*

If the SDS is not available through Chemwatch, a hardcopy of the manufacturer supplied SDS must be submitted to the SHEM office for upload to the Chemwatch system. **ALL fields must be completed in the table below for all chemicals used in the project.**

Item #	Chemicals/Materials Name	CAS#	Project Use (e.g., Reagent, Standard, or Specific task #)	Disposal Method for Unused Chemicals*	Notes (EPA waste codes, special hazards, ingredients, etc.)
1	pH 4 buffer (Fisher)	Mixture	Calibration std.	S	
2	pH 7 buffer (Fisher)	Mixture	Calibration std.	S	
3	pH 10 buffer (Fisher)	Mixture	Calibration std.	S	
4	Conductivity calibrator solution (YSI 3161)	Mixture	Calibration std.	S	

* S = Sink, T = Trash, W = SHEM Waste Program, R = Return to Vendor

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Job Hazard Analysis, Controls, and PPE

Job Step/ Operation	Room/ Area	Potential Hazards/Risks	Recommended Action/Procedure (Engineering Controls, Prudent Practices, Safe Work Practices)	PPE Required
AWG Operation and Water Sample Collection	T&E High Bay	Slips/falls from spilled water from the generator – bruises, sprains Electrical shock	Clean up water immediately. Place "wet floor" signs in area cautioning others to avoid the wet areas. Operate the unit in accordance with the manufacturer's operation manual. Check electrical connections prior to use. Disconnect from the power source for any minor repairs to the unit. Contact the manufacturer for more major repairs.	Safety glasses, nitrile gloves, lab coats
Packing coolers with sample bottles and ice	T&E High Bay	Heavy lifting – back strain	Use storage carts when available. Size up the load to lift. If load is too big or bulky, get assistance and use team lift techniques. Ensure that you have solid footing. Get a good grasp and pull close to your body. Lift with your legs, not your back. Locate storage material no higher than shoulder level and no lower than knee level.	
Calibration of multiparameter instrument	T&E High Bay	skin & respiratory sensitization from calibration solutions	Follow manufacturer's instructions on calibration procedures for the instrument	Safety glasses, nitrile gloves, lab coats

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