RECEIPT AND LOG-IN OF CHEMICAL AGENT SAMPLES AND STANDARDS

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHEMISTRY PROGRAM

2600 BLAIR STONE ROAD

TALLAHASSEE, FLORIDA

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List of Acronyms

AM	Agent Manager
AR	Army Regulation
CA	Chemical Agent
CAHO	Chemical Agent Hygiene Officer
CAO	Chemical Agent Operator
CASRM	Chemical Agent Standard Reference Material
CHO	Chemical Hygiene Officer
CHP	Chemical Hygiene Plan
COR	Contract Officer's Representative
CWA	Chemical Warfare Agent
DEP	Department of Environmental Protection
DoD	Department of Defense
DR	Difficulty Report
DSHP	Dilute Solution Hygiene Plan
ECBC	Edgewood Chemical and Biological Center
EPA	Environmental Protection Agency
ERLN	Environmental Response Laboratory Network
FDEP	Florida Department of Environmental Protection
IAA	Interagency Agreement
ID	Identification
LIMS	Laboratory Information Management System
LLNL	Lawrence Livermore National Laboratory
LM	Laboratory Manager
MSDS	Material Safety Data Sheet
NEMC	National Exposure Measurement Center
OSHA	Occupational Safety and Health Act
PPE	Personnel Protective Equipment
QAO	Quality Assurance Officer
RCRA	Resource Conservation and Recovery Act
RDTE	Research, Development, Test and Evaluation
SRM	Standard Reference Material
UDA	Ultra-Dilute Agent

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1. Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to establish procedures used at the Florida Department of Environmental Protection (FDEP) Central Laboratory to receive and log-in ultra-dilute Chemical Warfare Agent (CWA) solutions and samples. Because of the need for strict accountability and tracking, an electronic system integrated within our Laboratory Information Management System (LIMS) and/or a logbook within the Intake laboratory will be used to maintain accounting for the dilute agent solutions and samples.

Upon receipt in the laboratory, the condition and custody of samples/standards is evaluated and documented within the Intake facility by staff trained to handle chemical agents. The samples may include water, soils, wipes, or specially prepared solutions. The sample information is then logged into the LIMS and unique identification labels are generated for each sample or standard. Samples and standards are stored at the appropriate temperature within a secured environment.

1.1 Coordination and Accountability

This SOP describes shipment coordination and receipt procedures as well as initial accountability requirements for CWA standard reference material or samples**.**

Log-in is the procedure by which submitted CWA materials are introduced into the laboratory. The documentation recorded during log-in of reference materials includes:

- Agent name and ID number,
- Origin,
- Quantity (concentration and volume per vial and number of vials).

Sample login will include but is not limited to:

- Sample number,
- Sample location,
- Date and Time sampled,
- Sampler's ID,
- Preservation

Upon receipt, the accompanying documentation (chain-of-custody (COC) forms and certificates), preservation and shipping conditions are documented in the LIMS and/or by manual entry into a notebook for CWA reference materials for standard accountability.

1.2 Supporting Standard Operating Procedures (SOPs)

Refer to the following Standard Operating Procedures for additional procedural information with regard to sample custody, safety, analytical methods, and non-conformance reporting. These SOPs contain critical details not fully described within this Receiving SOP. The chemical agent operators and receiving staff must be completely familiar with all of these SOPs.

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1.2.1. Florida Department of Environmental Protection, *Health and Safety Plan*.

1.2.2. Florida Department of Environmental Protection, *Emergency Action Plan*.

1.2.3. Florida Department of Environmental Protection, *Standard Operating Procedure for Handling Perceived Threat Materials* (SOP **LB-029**)

1.2.4. Florida Department of Environmental Protection, Standard Operating Procedure, *Laboratory Accountability, Storage, and hazard Communications Procedures* (SOP **ERLN-001**).

1.2.5. Florida Department of Environmental Protection, *Standard Operating Procedure for Receiving Packages and Freight at the Loading Dock* (SOP **LB-022).**

1.2.6. Florida Department of Environmental Protection, *Sample Receipt and Entry into the DEP Laboratory Information Management System (LIMS)* (SOP **LB-016**).

1.2.7. Florida Department of Environmental Protection, *Standard Operating Procedure for Custody and Storage of Environmental Samples in the DEP Laboratory* (SOP **LB-023**).

1.2.8. Florida Department of Environmental Protection, *Standard Analytical Protocol for Extractable Chemical Warfare Agents Using Gas Chromatography/Mass Spectrometry* (SOP **ERLN-002**).

1.2.9. Florida Department of Environmental Protection, *Chemical Agent Laboratory Training Module.*

1.2.10. Florida Department of Environmental Protection*, Non-Conformance Reporting System* (SOP **LB-002**).

1.2.11. Florida Department of Environmental Protection, *Standard Operating Procedure for Records Maintenance and Storage* (SOP **LB-006**)

2. Ultra-Dilute Agent Accountability

"Accountability" of the primary and non-primary CWA standards means that the lab must be able to secure, track, document, and audit each of the standards from the time of initial receipt until their disposal. Refer to the Accountability **SOP ERLN-001** for additional details.

In case of Laboratory Manager's (LM) and Agent Manager's (AM) absence, delivery of UDA reference material is not to be accepted. Also, unannounced, unplanned or unscheduled shipments of UDA reference material will not be accepted.

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If any UDA shipment container is discovered to be damaged or leaking during inspection it must be immediately placed inside one of the CWA hoods and the CAHO and LM are to be notified immediately.

The Agent Manager signs carrier form(s) for receipt of material or samples and completes the chain-of-custody forms. If the material received is CWA standards, the Agent Manager accompanies the CWA standards until they are logged in and locked in secure storage. The Agent Manager may also be one of the Chemical Agent Operators (CAOs) specifically assigned for CWA standard receipt including accountability. The laboratory supervisor or a designated back-up CAO may receive CWA reference material in the absence of the Agent Manager.

Upon arrival, all shipping containers must be inspected prior to entry into the sample receipt area. Shipments must also be inspected to ensure that containers are sealed and show no evidence of tampering. Shipping seals must be unbroken. During the inspection of each shipping container, if any of the containers has been damaged or is leaking it must remain in the inspection hood. The Safety and Health Manager and Laboratory Supervisor shall be notified immediately. The person inspecting the shipping containers must protect self and coworkers, equipment, and the loading dock receiving area from contamination.

All sample/standard receipt procedures must use the "buddy system" with a second person trained in these procedures observing from a safe (distant) location. Normally during sample check-in, one CAO handles samples while the other handles paperwork. This prevents possible contamination of the paperwork with the CWAs or other analytes.

3. Equipment and Supplies

At a minimum, the following Personal Protective Equipment (PPE) and safety equipment is required to receive CWA materials. The current CWA target analytes at the 10 mg/L concentration level for standards are not lethal but can cause health effects (blisters and adverse nervous system reactions). Because the concentrations of CWA analytes in samples are unknown, sample handling techniques require equal or increased precautions for personal protective equipment as well as stringent engineering and administrative controls.

3.1. Personal Protective Equipment:

- Safety glasses with side shields or safety goggles,
- Disposable poly-coated Tyvek® or Saranex laboratory coats,
- Closed toed shoes,
- Long pants,
- Gloves (doubled nitrile gloves allow 5 minutes of direct work with primary CWA reference material; nitrile silver-shield, *e.g.*, North Silver-Shield, allows 4 hours of direct work with primary CWA reference material),

3.2. Safety Supplies and Documentation Equipment:

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- Lab cart with containment well,
- Spill decontamination material (5-6% commercial bleach, absorbent lab paper or mats),
- Two 2 ½ gallon buckets with screw caps,
- Waste disposal containers,
- Personnel decontamination solution (liquid soap and tap water),
- Digital camera to help document shipment deliveries,
- CWA Accountability Notebook (a bound record of primary CWA reference material receipt),
- CWA completed safety checklist with all items in compliance prior to receiving samples or reference standards.

3.3 Log-in and Storage Equipment:

- Fisher Scientific Isotemp Flammable-Rate Refrigerator, 13-986-426R. For storage of CWA primary solutions of reference materials, or equivalent.
- Fisher Scientific Isotemp Flammable-Rate Freezer, 13-986-425F. For storage of CWA primary solutions of reference materials, or equivalent.
- Fisher Scientific Dual Door Refrigerator. For sample storage, or equivalent.
- PC Computer terminal, networked for LIMs access.
- Laboratory Fume Hoods
- Morse Watchman KeyWatcher III 16 and 32 Key Units – for restricting and monitoring key access.
- Pass-Through Sterilization Unit - Consolidated Still and Sterilizers, or equivalent.

3.4 General Supplies

- pH Paper, 0 – 3.0 range, 3.0-5.5 range, 0 – 14 range and 9-12 range
- Glass capillary tubes
- Thermometers, 0 to 40°C (or higher) and Temperature Guns

4. Sample Handling Guidelines

Before beginning any procedures on samples with unknown characteristics or hazards, refer to the Florida Department of Environmental Protection SOP **CM-017** "Standard Operating Procedure for Handling Perceived Threat Materials" for general safety precautions and required guidelines. In addition, the following special safety procedures apply to UDA materials.

4.1 Receiving Shipping Containers:

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All UDA reference materials shipping containers are to be handled with caution. The UDA materials are hazardous. They can cause non-lethal chemical burns and nervous system disorders. Upon arrival, all shipping containers must be inspected at the loading dock prior to entry into The DEP Central Laboratory. Refer to DEP SOP **RC-012** "Standard Operating Procedure for Receiving Packages and Freight at the Loading Dock". During the inspection of each shipping container, if any of the containers have been damaged or are leaking, they are to be placed promptly in one of the CWA hoods. The CAHO and LM are to be notified immediately.

4.2 Moving UDA Material outside of the UDA Laboratory:

The handling and use of UDA material (other than receipt of the samples) is to be restricted to the UDA laboratory. UDA reference material moved outside of the UDA laboratory must be in triple containment at all times.

4.3 Storage of UDA Standards:

Each UDA agent must be stored separately in secondary containment in locked refrigerators (plastic containers with lids within trays on each shelf). Primary UDA glass vials are to be stored in the designated UDA refrigerator in closed secondary containers within trays on each shelf.

4.4 "Buddy System" Procedures:

All sample receipt procedures and UDA operations are to use the "buddy system" with a second person, trained in the CWA handling procedures. The second person must observe the procedures from a safe location, but still within eyesight. Under no circumstance should laboratory staff work with CWA samples or standards alone.

4.5 Before the Work Begins:

Refer to Appendix B for the safety checklists. Prior to beginning any laboratory activities involving an agent, operators must:

- Verify that the passage to all first aid/safety equipment (fire extinguishers, showers, eyewash stations, and emergency exits) is unobstructed,
- Ensure that the first aid kit is properly stocked, including an appropriate number of nerve agent antidote kits,
- Verify that there is an appropriate quantity of personnel decontamination solution (liquid soap and tap water) and sponges for personnel decontamination,
- Verify that an adequate quantity of spill decontamination materials (5-6% commercial bleach or prepared from granular chlorine and waste container absorbent lab paper/absorbent mats) are available,

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- Ensure that sink drain stoppers are in place, and catch pools or drains for emergency showers are available, and
- Ensure that waste disposal containers are available.

In addition, the CAHO shall conduct spot checks to reinforce that the safety equipment listed above is utilized in accordance with this procedure.

5. Records and Notebooks

All of the CWA standards and reagents received into the laboratory must be recorded into the LIMS Standard Preparation module. Samples, likewise, are logged into the LIMS Sample Receiving module. Subsequent standard preparation procedures using the primary or secondary standards must also be recorded in an auditable electronic and/or paper form.

CWA dilute solution users are required to complete the appropriate records for the CWA dilute solutions that they use. This recordkeeping must be completed by the end of each day of use. The FDEP Laboratory Information Management System (LIMS) is used to enter, track, and permanently record all of the data entries. The LIMS maintains separate records for each Primary and Secondary solution.

6. Opening Shipping Container and Log-in of Material

The following instructions are designed for the safe handling and proper documentation of samples or standards received within the FDEP laboratory. Only trained ERLN staff are to open and remove materials from the CWA shipment containers.

- Insure personal protection is in place.
- Place the sealed shipping container in the hood.
- Once in the chemical fume hood in sample receipt, remove and set aside all documentation associated with the CWA reference material or samples (certificates, COCs).

  Note: Uncontaminated packaging material including Styrofoam spacers and ice pack from each shipping container will be left in the shipping container and double bagged in polyethylene bags, labeled as “Non-hazardous Waste” and this will be disposed of as routine non-toxic material.

  Note: If the CWA reference packaging material has been contaminated the Safety and Health Manager shall be notified and shall issue directions regarding disposal.

- Document the shipping method (e.g. Fed Ex, UPS etc.) on the LIC form. Make a copy of each shipping receipt. Place the copies with the field paperwork. If you are unable to remove an intact shipping receipt, then document the tracking number(s) on the LIC form.

- Document whether the sample containers are sealed with evidence tape and if the seals are intact.

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- Measure the temperature. Open the cooler and locate the Temperature Control Bottle. If there is no temperature control bottle then a plastic sample bottle can also be used when using the temperature gun. The temperature guns do not work well on glass so do not measure the temperature of glass containers. Use the calibrated temperature gun to determine the cooler temperature. Hold the gun several inches from the container and record the temperature. If the temperature is between 5 and 7 °C then use a regular calibrated thermometer (not a temperature gun) to measure the temperature of the Temperature Control Bottle; the temperature guns do not have enough accuracy to determine the temperature when it is borderline. Do NOT place the regular thermometer in a sample container since it can contaminate the sample.

- The vials are placed in plastic containers with press seal lids. Secondary containment plastic trays are used for transport and storage inside the reference material refrigerator. Use paper towels to cushion the glass vials. A separate plastic container is used for each agent (labeled with agent name). **Nerve agent is always stored separately from blister agent material** unless they arrive together in a mixed standard.

- The Agent Manager notifies the supplier of any discrepancies in number or amount of reference material.

- Compare the number of containers received with the number of containers listed on the field paperwork. For container number information, check the backs of the DEP field sheets and the chain of custody forms. Document any discrepancies on the associated field paperwork and initial and date the comments.

- Document any non-conformance samples (e.g. loose caps, cracked containers etc.). When documenting non-conformance, identify containers using both the field IDs and the tests.

- The COC and condition form are critical documents that must be complete and accurate. These forms and other documents that arrive with each CWA shipment are retained as delivery & accountability documentation.

- Provide the CWA shipment documents and COC forms to the Receiving Room staff for LIMs log-in.

7. Storage of Dilute Agents Solutions and Samples

7.1 UDA Standard and Sample Refrigerators

Refrigerators used to store UDA standards or unknown samples are equipped with alarms designed to sound when the refrigerator temperature set points are exceeded. Loss of refrigerator temperature control may create a vapor hazard. In a situation where the standards need to be moved to another refrigerator, only trained staff must move the standards. All UDA standards and unknown samples must be stored in double containment. Standards and samples must never be stored in the same refrigerator or freezer. Packaging will be selected to provide containment of dilute solution liquid and vapor. CASARM-certified dilute solutions are stored under refrigeration, or in accordance with instructions supplied by the

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CASARM Quality Assurance, Quality Directorate or provider. Dilute agent solutions with similar physiological effects should, when possible, be stored as a group, separate from other agents (e.g., nerve agents separated from blister agents). Each UDA agent must be stored separately in secondary containment in locked refrigerators (plastic containers with lids within trays on each shelf).

A record of each entry into the Chemical Agent refrigerator and the daily refrigerator temperature data must be recorded in the Refrigerator Entry & Temperature Log by the Chemical Agent Operator. If the temperature of the UDA materials is outside of the 4±2°C range, the refrigerator is not to be opened and the LM and the CAHO are to be notified. The temperature charts will be changed by the CAOs each week. The charts will be retained in the Refrigerator Entry & Temperature log.

7.2 Storage of Non-CWA Hazardous Materials

Incompatible hazardous materials must be stored in separate areas, or at least segregated within secondary containment. Labels for all incoming hazardous materials are maintained on the container, and are not removed or defaced until the container is empty or submitted for disposal. It is preferable that labels on secondary (transport and storage) containers be removed when the hazardous material has been removed. Emptied containers are decontaminated and marked as empty.

All hazardous material containers, including waste containers, must be labeled as to content. Containers that are too small to label in this fashion are placed in a secondary container, and the outer container labeled to show the contents of the inner container.

7.3 Movement of Reference Standards from Receipt to Storage

- Reference material moved outside of the agent laboratory must be in triple containment at all times.
- Each agent is stored separately in secondary containment in locked refrigerators (plastic containers with lids within trays on each shelf) unless the standard is a mixed standard. The refrigerators used for storage of CWA have lock and key in addition to secure electronic entry for the room in which the refrigerators are located.
- Labels on agent vials must not be removed or defaced until the container is empty, decontaminated and ready for disposal. If labels are accidently removed, this is to be noted in the CWA Accountability Notebook and the Agent Manager notified.
- All items on the CWA safety checklist (Attachment 2) shall have been confirmed as compliant prior to beginning any work with agent or samples.
- After CWA reference materials are received, they are stored at 4±2°C, secured by electronic and lock & key access control and dedicated to CWA materials only. Access to the CWA area is limited to laboratory personnel and access to the CWA Reference Material laboratories is limited to authorized staff only (signs posted and access limited with electronic keypad).
- The Flammable-Rated ERLN Refrigerator is utilized to store the CWA primary solutions of reference material at the concentrations as received (10 mg/L). The AM

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controls the physical lock and key access to the refrigerator. This material is tracked by 1 uL amounts in the CWA Accountability Notebook.

- The large double-door sample refrigerators are used to store CWA samples.
- When CWA standards are moved to chemical fume hoods, at no time during hood usage is the face or head of the CAO to break the plane of the hood sash. CWA glass ampoules shall only be uncapped in CWA laboratory fume hoods. Fume hoods shall be equipped with spill trays. Fume hoods have audible and visual alarms to warn of low flow. Fume hoods shall be equipped with containers of prepared decontamination solution. When uncapped, CWA vials shall be supported by a vial rack or other physical support to prevent tipping.
- Once CWA reference standards are safely stored, the Agent Manager notifies the Laboratory Supervisor that the reference standards are safely stored and the operation has been completed.

7.4 Movement of Samples from Receipt to Storage

- Samples must always be treated as if they might contain CWAs. Each sample will be carefully screened in Sample Receiving for detectable levels of:

  - CWA agent(s),
  - Other harmful chemicals (flammables, volatile organics, explosives),
  - Radioactivity

    Note: The presence of elevated radioactivity or potential biologicals will require that samples be rerouted to a laboratory equipped to handle these samples.

- Labels on samples must not be removed or defaced. Containers are retained as part of evidence development.
- All items on the CWA safety checklist (Attachment 2) must be confirmed as compliant prior to beginning any screening work on samples.
- Once samples are moved into chemical fume hoods, at no time during hood usage is the face or head of the CAO to break the plane of the hood sash. Sample containers shall only be opened in laboratory chemical fume hoods. Fume hoods shall be equipped with spill trays, prepared decontamination solution, paper absorbent towels to neutralize and contain spills. Fume hoods shall have audible and visual alarms to warn of low flow.
- Once samples have been logged into the Laboratory's LIMS and undergone preliminary screening, if all samples pass preliminary screening, they may be moved in a laboratory cart with spill well to sample storage by a CAO. Immediately notify the Laboratory Supervisor and Health and Safety Manager if preliminary screening indicates high levels of **CWA analytes or total volatile organics (flammables) or other screened parameters.**

8. Labeling of Containers for CWA Hazardous Materials

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All UDA standards, reagents, samples, and waste containers will be clearly labeled identifying their contents. Equipment released for washing will be labeled as 'Decontaminated' prior to removal from the UDA laboratory.

Each inner container and the outer container label for CWA dilute solutions must be distinctive (e.g., borders) from other non-CWA agent labels used in the laboratory and must be large enough to be easily identifiable. Each inner container and the outer container of dilute solutions and agent candidates must be labeled with its agent and/or code name to properly identify the contents. The label will have a red border (or other distinguishable marking). Containers too small for complete information must have the name or code name (e.g., xGA, xVX, xHD, XL, etc.), and the custody number of the chemical agent clearly marked. The "x" prefix used in conjunction with the agent code name indicates it is an UDA agent solution (for example, xVX or xGB).

Containers with non-primary solutions of the ultra-dilute CWAs are also identified with a different border label and prefix code "UD" to distinguish these from primary UDA dilute solutions.

The mandatory outer container label information for dilute agent solutions includes:

- TOXIC CHEMICAL (in bold red letters),
- The original issue quantity of agent in the container stated in metric terms and the concentration,
- Type of chemical agent involved (name or code name),
- Accountability document number (lab book, unique identification (ID), number for the individual solution),
- The refrigerator ID where the material is stored,
- The name and telephone number of the Agent Manager (AM) of the material,
- The date when the material was first placed in storage,
- Special instructions or notes regarding use or removal of the contents, and
- Expiration date of the solution.

The current volume of Primary dilute solution is tracked electronically using the CA Dilute Solution Primary Standard Record in the LIMS.

9. Spill Cleanup Procedures

In the event of an in-hood spill of 1 mL or less, decontamination solution is applied to the spill immediately. Operators shall use Silver Shield® gloves and carefully blot the decontamination solution/spill material with absorbent lab paper towels/pads. Contaminated paper is placed in the hood decontamination waste container (solid waste). The spill area is then to be rinsed with water and wiped dry with laboratory tissue/absorbent pads. This material is to be placed in the decontamination containers in the hood.

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Following spill clean-up, operators shall dispose of used PPE in hazardous waste decontamination containers for solids in the hood.

- CAOs shall report the spill and circumstances leading to the event to the Health and Safety Officer. Any losses of CWA material shall be recorded in the CWA Accountability Notebook and the Agent Manager and Laboratory Supervisor notified.
- In case of larger spills or any spills outside of the fume hoods, the Health and Safety Officer must be notified and will determine requirements for cleanup.
- With loss of engineering controls (ventilation, hood alarms or intercom), all personnel are to immediately evacuate the CWA laboratories and call the Health and Safety Officer.
- The handling and use of CWA material and samples is restricted to CWA sample receipt and laboratories.
- If suspected or actual direct contact or exposure to CWA occurs, wash skin with liquid soap and rinse with tap water. This wash and rinse cycle is to be repeated three time using the sink or safety shower. Notify the Health and Safety Officer IMMEDIATELY following the wash and rinse decontamination.
- Before leaving the CWA laboratories PPE is to be removed, including safety glasses, gloves and laboratory coats and hands are washed with soap and water.

Decontamination Solutions:

Decontamination solution for spills (5-6%) - commercially available 5% sodium hypochlorite (bleach). Unopened containers have a shelf-life of one year. Opened, in-use decon solution should be replaced after 90 days.
Decontamination solution for CWA contaminated liquids and solids material (0.5-0.6%) - commercially available sodium hypochlorite (bleach) diluted 1:10 with water. One liter of this solution is prepared at the beginning of each working day and disposed of as part of the end of day procedures.

10. References

10.1 "Accountability Procedures for Ultra-dilute Chemical Agent Solutions and RDTE Dilute solutions." NEMC standard operating procedure, NEMC-09, July 2007 Draft.

10.2 Florida Department of Environmental Protection, *Health and Safety Plan*, June 2021.

10.3 Florida Department of Environmental Protection, *Emergency Action Plan,* October 2020.

10.4 Army Regulation 50-6 Chemical Surety.

10.5 Army, Marine Corps, Navy, Air Force "Potential Military Chemical/Biological Agents and Compounds" January 2005.

10.6 "Storage Requirements and Hazard Communication for Chemical Agent Dilute Solution Laboratories" NEMC standard operating procedure, NEMC-06, July 2007 Draft.

10.7 Florida Department of Environmental Protection Comprehensive Quality Assurance Plan, Chemistry Section, Bureau of Labs.

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10.8 Florida Department of Environmental Protection, Standard Operating Procedure **LB-029** *Standard Operating Procedure for Handling Perceived Threat Materials.*

10.9 Florida Department of Environmental Protection, Standard Operating Procedure **LB-022** *Standard Operating Procedure for Receiving Packages and Freight at the Loading Dock*

10.10 Florida Department of Environmental Protection, Standard Operating Procedure **LC-016** *Standard Operating Procedure for the Sample Receipt and Entry into the DEP Laboratory Information Management System (LIMS).*

10.11 Florida Department of Environmental Protection, Standard Operating Procedure **LB-023** *Standard Operating Procedure for Maintaining the Custody and Storage of Environmental Samples in the DEP Laboratory.*

10.12 Florida Department of Environmental Protection, Standard Operating Procedure **LB-002** *Non-Conformance Reporting System*.

10.13 Florida Department of Environmental Protection, Standard Operating Procedure **LB-006** *Standard Operating Procedure for Records Maintenance and Storage.*

10.14 Florida Department of Environmental Protection, *Chemical Agent Laboratory Training Module, May 2010.*

10.15 Florida Department of Environmental Protection, Standard Operating Procedure **ERLN-001,** *Laboratory Accountability, Storage, and Hazard Communications Procedures.*

10.16 Florida Department of Environmental Protection, Standard Operating Procedure **ERLN-002***, Standard Analytical Protocol for Extractable Chemical Warfare Agents Using Gas Chromatography/Mass Spectrometry.*

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Preoperational Checklist and Transfers In and Out of Hood

Operation description	Location(s) identified within operation	Effects of hazards on the operation	Risk[a] Assessment Code (RAC)	Recommended actions to reduce the hazards	Resulting **RAC code**
Checking hood function	Lab	Due to malfunctioning, magnahelic indicates acceptable flow when it is out of range. Lab staff exposed.	Low	Check face velocity with hanging vane velometer prior to use.	Low
Checking hood function	Lab	Due to malfunctioning magnahelic or hood alarms, hood failure occurs without warning. Lab staff exposed.	Medium	Perform routine maintenance on hoods. Check face velocity with hanging vane velometer. Test hood alarms periodically and perform needed maintenance.	Low
Glove check	Lab	Improper check, operator misses hole in gloves. Exposed staff initiates the emergency response alarm.	Low	100% glove check. Use two pair of gloves.	Low

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Operation description	Location(s) identified within operation	Effects of hazards on the operation	Risk[a] Assessment Code (RAC)	Recommended actions to reduce the hazards	Resulting **RAC code**
Transfer in or out of a hood	Hood/Lab	Spill outside or inside of ventilation control. Staff exposed to agent. Initiate alarm.	Medium	Use of secondary containers and spill trays. Caution and focus on task at hand (no distractions). Dry run SOP steps prior to working with chemical agent. PPE worn as specified. Emergency PPE and decontamination equipment/reagents available. “Buddy” verifies safety procedures and is available to assist with emergency response.	Low
Preparing & using decontamination solutions	Hood/Lab	Splatter or spill of caustic such as solid or liquid sodium hydroxide, HTH, sodium carbonate. Inhalation hazard. Dermal hazard. Respiratory distress. Skin irritation. Caustic burns (delayed) on operator’s hands, arms, face, and eyes.	High	PPE—goggles or face shield worn over safety glasses with side shields, gloves, lab coat, or coveralls with rubber apron. Weigh caustics in hood. Attentiveness to task (no distractions). Purchase Clorox or HTH in small containers. Use hood while pouring Clorox or scooping solid HTH.	Medium
Transferring waste to processing room	Lab	Operator drops waste container in lab. Exposure to residual agent solution. Splatter of caustic. Burns to lab personnel (delayed).	Medium	Double-bagging (standard practice). Caution (e.g., check to make sure there are no obstructions in path, etc.). Use lab cart to transport items.	Low

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Operation description	Location(s) identified within operation	Effects of hazards on the operation	Risk[a] Assessment Code (RAC)	Recommended actions to reduce the hazards	Resulting **RAC code**
Human Factors: Stress associated with working with CA (especially when performing operations for the first time) may result in accidents. Ergonomics issues may result in accidents. Working in a hood creates unnatural posture and movements. Laboratory work may require repetitive movements resulting in tiring of specific muscles, cramping, and skeletal fatigue. Accidents have resulted from an indifferent attitude, failure to use common sense, or failure to follow instructions.	Hoods and laboratory	Chemical agent exposure, injury, and property damage. Trips, slips, falls, spills, etc.	High	Ensure that the operator and buddy are prepared for each operation, and review the SOP prior to beginning work. Any questions about the procedure should be adequately addressed and answered prior to beginning the operation. If the operator or buddy is not feeling well, do not start the operation. Think about what is required of the procedure and ensure that the operator and buddy can complete the tasks required. Give some thought to ergonomics. Adjust body posture for comfort. Strive to maintain movements within the hood that match natural movements. If fatigue or cramping occurs, schedule breaks as part of the activities (at an appropriate time). Always be aware of what your coworkers are doing in your immediate area because you can be a victim of their mistakes. Do not hesitate to point out to fellow workers if they are engaging in unsafe practices or operations. Variations in established procedures, including changes in quantities or reagents, may be dangerous. If necessary, consult the Chemical Agent Hygiene Officer.	Low
Recovery from engineering and/or power failures.	Hoods and operations in CWA lab	Chemical agent exposure and injury	High	Practice drills conducted to include shut down of operations associated with engineering failures such as hood failure and power outages.	

[a] All risk assessment codes were determined only after considering human factors such as indifferent attitude, failure to use common sense, and failure to follow instructions.

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Chemical Agent Dilute Solution Safety Checklist

Check	Checklist Item
	Verify that the passage to all first aid/safety equipment (fire extinguishers, showers, eyewash stations, and emergency exits) is unobstructed.
	Ensure that the first aid kit is properly stocked, including an appropriate number of nerve agent antidote kits.
	Verify that there is an appropriate quantity of personnel decontamination solution (liquid soap and tap water) and sponges for personnel decontamination.
	Verify that an adequate quantity of spill decontamination materials (5-6% commercial bleach or prepared from granular chlorine and waste container absorbent lab paper/absorbent mats) are available.
	Ensure that sink drain stoppers are in place, and catch pools or drains for emergency showers are available.
	Ensure that waste disposal containers are available.
	In addition, the CAHO shall conduct spot checks to reinforce that the safety equipment listed above is utilized in accordance with this procedure.
	Document non-conformance by issuing a Non-Conformance Report (NCR) in the LIMS and notify the client.
	Document corrective actions that may be required. Otherwise, notify the client if an NCR is issued.

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Appendix B

Safety Checklists

I. **Beginning of each working day** prior to beginning any work.

The following items are to be checked and found satisfactory prior to any laboratory operations.

CAO's Name: Signature: Date/Time:

Yes/No (All must be Yes before work in CWA labs)

1. Labs at negative pressure relative to the hall way?
2. Decontamination solution and containers available?
3. PPE including gloves and agent impervious labcoats available?
4. Hood operational?
5. Refrigerator temperatures 4 $\pm$ 2° C?

II. **End of each working day** prior to ending all work

The following items are to be checked and found satisfactory prior to any laboratory operations.

CAO's Name: Signature: Date/Time:

Yes/No (All must be Yes before exiting CWA labs)

1. Labs at negative pressure relative to the hall way?
2. Decontamination solution containers closed?
3. Hood operational?
4. Refrigerator temperatures 4 $\pm$ 2° C?
5. Log books complete?
6. All working solutions capped? All primary solutions locked in refrigerator? Extra 0.5-0.6% decon solution added to decon buckets?
7. Work area clean?
8. All solutions properly labeled and in secondary containment?
9. Hood sashes closed?
10. Refrigerator locked (key, electronic and wall cable)?
11. This completed checklist correctly filed?
12. All PPE removed and hands washed before leaving CWA Labs?

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Perceived Threat Materials Checklist (Page 1 of 3)

	Information or Result	Documented by	Date/Time
Event ID			
Submitting Agency			
Contact Name/Phone Number			
Names of Additional Authorities Contacted			
Physical Description of Material and Available Volume/Weight for Analysis			
Description of Adverse Effects			
Exposure Mode, (contact, inhalation, etc.)			
Suspected Agent Name			
Field Screening Tests and Results			

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Perceived Threat Materials Checklist (Page 2 of 3)

	Information or Result	Documented by	Date/Time
Biological Screening Tests and Results			
Observations			
pH Screening where appropriate			
Solubility Tests Conducted and Results			
IR Screening Results			

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Perceived Threat Materials Checklist (Page 3 of3)

	Information or Result	Documented by	Date/Time
HazMat Smart-Strip Screening Results			
Hazmat Smart M8 Screening Results			

PTM Sample Condition

Container Description	Description	Type of Seal (e.g. evidence tape)	Condition of Seal
Outer Container			
Inner Container			
Inner Container			
Inner Container			
Sample			

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PTM Sample Condition

Request ID: _____Shipping Method: _____Date/Time of Receipt: _____

Sample Unpacked by: _____ Date/Time: _____ Photos Taken (Y/N): _____

Radiation Testing Performed:

Outer Container Result: _____ By: _____ Date/Time: _____

Sample Result: _____ By: _____ Date/Time: _____

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SOP Version Edits:

1. Incremented versions.
2. Typo corrections.
3. Updated the Equipment and Reference sections.

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