**Working during Covid-19 Pandemic**

**STANDARD OPERATING PROCEDURE (SOP)**

**Type of SOP:** **Pandemic**

 **Summary: Undertaking research work in Animal Science during the COVID-19 Pandemic**

**A. Health Considerations:**

**Students, staff and researchers will not be compelled to work on-campus during periods of shelter-at-home directives. Anyone feeling compelled is encouraged to reach out to the Department Chair, CAO, VCR, or the Dean of Graduate Studies.**

**If you feeling unwell for any reason, especially if you are exhibiting any symptoms of COVID-19, notify your lab manager or PI and do not come into work or immediately leave if you are at work on campus. Contact your physician and follow quarantine guidelines as appropriate.**

**Once notified the lab manager or PI should immediately notify Jim Murray (****jdmurray@ucdavis.edu****), Kelly Wade (****kswade@ucdavis.edu****) and Leslie Oberholtzer (****ljoberholtzer@ucdavis.edu****) so that appropriate next steps can be initiated.**

**B. Physical distancing**

* **Personnel are only permitted to enter laboratory or animal facility space to work on approved projects or to maintain critical infrastructure.**
* **Personnel are only permitted to enter Departmental facilities after signing this SOP and sending it to the lab manager/PI by email.**
* **Use the on-line lab scheduler to ensure minimal co-occupation of laboratory space**

**Consider staggered occupancy and working outside of 9.00 am – 5.00 pm, with a maximum of one person per lab bench.**

**Laboratories will have sign in/sign out sheets to ensure traceability of contacts should there be a potential case of COVID-19.**

* **Observe physical distancing:**
	+ - * + **Stay at least 6 feet apart from any other person, including when passing in a hallway, in the bathroom, or in the laboratory.**
* **1 person max. in offices and small spaces**

**C. Movement in, out and around Meyer Hall, Animal Facilities, and laboratories**

**Take the following precautions when starting and when ending work:**

* **Face coverings/masks must be worn everywhere on campus unless you are in a closed room by yourself. This includes outdoor locations, and walking from the parking lot into the buildings.**
* **Use the push buttons to open doors rather than bare hands.**
* **Use paper towels as a barriers when opening hallway doors and operating elevators.**
* **Avoid touching support rails in stairways.**
* **Maximum two, preferably one person, at a time in elevators.**
* **Wipe all door handles and knobs at entrance of laboratory space with disinfectant.**
* **Ensure that doors to the bathrooms are kept open by doorstops.**

**D. General guidelines for working in the laboratory**

* **Wear gloves and a lab coat to prevent potential transfer of COVID-19 onto clothes and skin.**
* **Before using any computer keyboard other than your personal laptop, wipe with disinfectant.**
* **Instruments (e.g. microscopes) should be cleaned before and after they are used.**
* **If you have to use equipment in another lab or in a common equipment room, coordinate your visit with them first to get their permission and maintain social distancing guidelines.**
* **Any package that enters the lab should be handled with gloves and disinfected with minimum 60% alcohol.**
* **Minimize work locations to prevent spreading, if possible restrict activities to your own personal area.**
* **Wash your hands with soap and water for minimum 20 seconds whenever they may have been exposed.**
* **Avoid touching your eyes, nose, or mouth with unwashed or gloved hands.**
* **If prescribed by contemporary health advisories, wear a face mask while in the GBSF.**
* **Practice proper respiratory etiquette, including covering coughs and sneezes.**
	+ [**Cover your mouth and nose**](https://www.cdc.gov/flu/protect/covercough.htm)**with a tissue when you cough or sneeze.**
	+ **Put your used tissue in a waste basket.**
	+ **If you don’t have a tissue, cough or sneeze into your upper sleeve, not your hands.**
	+ **Keeping hands clean through improved hand hygiene is one of the most important steps we can take to avoid getting sick and spreading germs to others. If soap and water are unavailable, use an alcohol-based hand sanitizer that contains at least 60% alcohol to clean your hands.**
* **Maintain regular housekeeping practices, including routine cleaning and disinfecting of surfaces, equipment, and other elements of the work environment.**
* **Cleaning guidelines can be found at** [**https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html**](https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html)

**All personnel who are subject to these SOP requirements must review the completed SOP and sign the associated training record. Completed SOPs must be kept with the UC Davis Laboratory Safety Manual or be otherwise readily accessible to laboratory personnel. Electronic access is acceptable. SOPs must be reviewed, and revised where needed, as described in the** [**UC Davis Laboratory Safety Manual**](http://safetyservices.ucdavis.edu/article/laboratory-safety-manual)**. The unique properties of each chemical must be considered when preparing a SOP.**

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| Date SOP Written:  |  |  | Approval Date: |  |
| SOP Prepared by: |  |
|  |
| SOP Reviewed and Approved by (name/signature): | **Principal Investigator** |
| Department:  | **Animal Science** |
| Principal Investigator/Laboratory Supervisor:  | **REQUIRED - Insert Name** | Contact:  | **REQUIRED - Insert Phone# or email** |
| Lab Manager/ Safety Coordinator:  | **REQUIRED - Insert Name** | Contact:  | **REQUIRED - Insert Phone# or email** |
| Emergency Contact(s):  |  | Contact:  |  |
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| Location(s) covered by SOP: | Building: | **All Animal Science** | Lab/facility Phone: |  |
| Room #(s):  | **All rooms** |

1. **HAZARD OVERVIEW**

COVID-19 is the disease state that results from an infection with a novel coronavirus called SARS-CoV-2. Information from the World Health Organization (WHO) and the Center of Disease Control and Prevention (CDC) states that the virus is transmitted via respiratory droplets from infected individuals. Evidence also suggests that transmission of the virus may occur through contact with contaminated surfaces. Transmission of the virus via asymptomatic carriers has also been documented.

1. **SCOPE/RISK TO DEPT OF ANIMAL SCIENCE PERSONNEL**

Currently there is no laboratory in the Department of Animal Sciences that performs work with SARS-CoV-2 directly and as a result, this SOP will focus on reducing exposure to employees through community transmission.

1. **CONTAINMENT**

Employees may contract the virus through interactions with infected individuals in a public setting or in a private residence. The Centers for Disease Control and Prevention (CDC) (cdc.gov) recommends the following infection prevention measures:

* Actively encouraging sick employees to stay home.
* Sending employees with acute respiratory illness symptoms home immediately.
* Providing information and training to employees on:
	+ Cough and sneeze etiquette.
	+ Hand hygiene.
	+ Avoiding close contact with sick persons.
	+ Avoiding touching eyes, nose, and mouth with unwashed hands.
	+ Avoiding sharing personal items with coworkers (i.e., dishes, cups, utensils, towels).
	+ Providing tissues, no-touch disposal trash cans, and hand sanitizer for use by employees.
* Performing routine environmental cleaning of shared workplace equipment and furniture (disinfection beyond routine cleaning is not recommended).

Principal Investigators, lab managers, supervisors and personnel are encouraged to check the CDC (cdc.gov) guidelines regularly, so that they are up-to-date with the latest infection prevention measures.

Principal Investigators (PIs), supervisors and all personnel should be aware of the dangers of working in a pandemic. We must all share responsibility for our own health and the health of others. Working together and coming up with a plan to minimize exposure to both Covid-19 and hazardous disinfecting chemicals is in everyone’s best interests.

1. **HAZARDOUS CHEMICAL(S)/CLASS OF HAZARDOUS CHEMICAL(S)**

When working during a pandemic, work areas must be disinfected. Disinfectants can also be hazardous chemicals, and usually are. Disinfectants that are effective against Covid-19 are available on the EPA website (epa.gov). The list of disinfectants is long and some of the formulations are proprietary. Consult the manufacturer’s Safety Data Sheet (SDS) of your proprietary disinfectant for its list of hazards. The list of hazardous chemicals below represent the most common active ingredients in disinfectants that might be used during a pandemic. A good resource from UCSD is here: <http://www-ehs.ucsd.edu/bio/disinfectants_chart.html>

1. **Quaternary Ammonium Compounds (QACs)**

 These compounds are found in various forms such as benzalkonium chloride, benzethonium chloride, methylbenzethonium chloride, cetalkonium chloride, cetylpyridinium chloride, cetrimonium, cetrimide, dofanium chloride, tetraethylammonium bromide, didecyldimethylammonium chloride and domiphen bromide (see <https://en.wikipedia.org/wiki/Quaternary_ammonium_cation> for more info). Some forms are not considered antimicrobial.

 The hazards associated with QACs range from skin irritation to death, as well as QACs being a possible reproductive toxin. The amount of hazard associated with a product is a result of both the QAC itself and the dilution of the QAC in the proprietary solution. Please carefully read the SDS of your proprietary solution and the instructions for use to minimize hazards. Generally QACs, even when diluted, have a long shelf life.

 QACs are beneficial in the treatment of porous surfaces (i.e. wood, clothing, etc.) and they are not generally corrosive to metal. However, they can be deactivated in the presence of common soaps. The residuals will also most likely stay on surfaces unless removed by washing with soap/water. Depending on the formulation of your product, it may or may not act as a cleaning agent, areas that are not clean cannot usually be disinfected. The amount of time that a surface has to stay in contact with a QAC in order to disinfect varies according to its formulation, read the instructions of your formulation for how much time you should leave it.

1. **Ethanol (EtOH)**

 In general, ethanol is effective in killing microorganisms. It does so by dissolving the membrane lipid bilayer and denaturing their proteins, and is effective against most bacteria, fungi and viruses. 70% ethanol is the most effective concentration, particularly because of osmotic pressure. Absolute ethanol may inactivate microbes without destroying them because the alcohol is unable to fully permeate the microbe's membrane. Here is the link for EtOH information from Wikipedia: <https://en.wikipedia.org/wiki/Ethanol>.

 Ethanol is a highly flammable volatile liquid. Be careful where you use it as a disinfectant, as you can set the laboratory on fire. It is an irritant to the skin and can be fatal if swallowed. Generally, diluted ethanol has a 3-6 month shelf life.

70% ethanol requires a 10 minute contact time for killing. As the surface dries, you must reapply. There is no residual left by ethanol, other than that left by the diluent (i.e. water). A higher concentration of ethanol is not better. A higher concentration sometimes leads to the drying of the thing you are trying to kill, but not the killing. The pathogen can sometimes still be active when it rehydrates.

1. **Isopropanol (IPA)**

Isopropanol, or Isopropyl alcohol, is effective in killing microorganisms. It works with the same mechanisms as ethanol. It is also highly flammable, but not as volatile as ethanol. It is an irritant and can cause drowsiness/dizziness if the fumes are inhaled. Here is the link for the Sigma IPA SDS: <https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en&productNumber=I9516&brand=SIGMA&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fsearch%3Fterm%3Dipa%26interface%3DAll%26N%3D0%26mode%3Dmatch%2520partialmax%26lang%3Den%26region%3DUS%26focus%3Dproduct>

 It should be used in a 70-75% solution in water to act as a disinfectant, with a contact time of 10 minutes. As the surface dries, you must reapply, although it dries more slowly than ethanol. A higher concentration of IPA is not better. A higher concentration sometimes leads to the drying of the thing you are trying to kill, but not the killing. The pathogen can sometimes still be active when it rehydrates. Generally, diluted IPA has a 3-6 month shelf-life.

1. **Bleach (sodium hypochlorite)**

Bleach is a great disinfectant. You must use a bleach that contains sodium hypochlorite as its active ingredient. This is because it is the chlorine that is released that does the killing. Bleach will also remove color from all fabrics, etc. and is quite corrosive to metal. It is a strong oxidizer, so be careful where you use it for chemical compatibility. Bleach will react with dishwashing soap, which sometimes contains ammonia, to make chloramine gas, which is toxic. Bleach will react with acids (including vinegar) to release chlorine gas, again highly toxic. Bleach itself is toxic and an irritant. Take all appropriate PPE precautions. Here is the link to the SDS for Clorox household bleach: <https://www.thecloroxcompany.com/wp-content/uploads/cloroxregular-bleach12015-06-12.pdf>

 Household bleach is sold as a 3-6% solution of sodium hypochlorite in water. You then take that solution and dilute it further to 1 part bleach to 4 parts water for use as a disinfectant. The contact time is 10 minutes for a good disinfection. It is best if you follow up the disinfection with a wipe of clean water to remove the residue. Diluted bleach has a shelf-life of hours or minutes. The diluted bleach is best used immediately if you wish to use it as a disinfectant. Sunlight (or UV) will deactivate diluted bleach very quickly.

Note: PIs should include the SDS for their disinfectant(s) of choice to this SOP.

1. **ENGINEERING/VENTILATION CONTROLS**

 Disinfectants, if used as directed, should not require engineering or ventilation controls.

1. **ADMINISTRATIVE CONTROLS**

The following elements are required:

1. Complete the [UC Laboratory Safety Fundamentals](http://safetyservices.ucdavis.edu/training/uc-laboratory-safety-fundamentals) (or approved equivalent) training prior to working in the laboratory;
2. Complete laboratory-specific safety orientation and training on laboratory-specific safety equipment, procedures, and techniques to be used, including any applicable laboratory-specific Laboratory Safety Plan(s), prior to receiving unescorted access to the laboratory;
3. Demonstrate competency to perform the procedures to the Principal Investigator (PI), Laboratory Supervisor, laboratory-specific Safety Officer, and/or trainer;
4. Be familiar with the location and content of any applicable Safety Data Sheets (SDSs) for the chemicals to be used (online SDSs can be accessed from [UC SDS](http://ucsds.com));
5. Implement good laboratory practices, including good workspace hygiene;
6. Inspect all equipment and experimental setups prior to use;
7. Follow best practices for the movement, handling, and storage of hazardous chemicals (see Chapters 5 and 6 of [Prudent Practices in the Laboratory](http://ucanr.edu/sites/ucehs/files/133892.pdf) for more detail). An appropriate spill cleanup kit must be located in the laboratory. Chemical and hazardous waste storage must follow an appropriate segregation scheme and include appropriate labeling. Hazardous chemical waste must be properly labelled, stored in closed containers, in secondary containment, and in a designated location;
8. Do not deviate from the instructions described in this SOP without prior discussion and approval from the PI and/or Laboratory Supervisor;
9. Notify the PI or Laboratory Supervisor of any accidents, incidents, near-misses, or upset condition (*e.g.,* unexpected rise or drop in temperature, color or phase change, evolution of gas) involving the process, hazardous chemical(s), or hazardous chemical class described in this SOP; and
10. Abide by the laboratory-specific working alone SOP, if applicable.
11. A discussion with the PI is required before performing disinfection of laboratory surfaces. Some disinfectants will destroy laboratory equipment, or kill the person doing the disinfecting if used in the wrong concentrations.
12. Personnel who get sick with Covid-19 (or suspect they are sick with Covid-19) should **notify their immediate supervisor, who will then notify the chair and the CAO**. The notification should be anonymous to comply with medical confidentiality. The lab should be closed immediately, signage posted for no entry (not that there was a Covid-19 case) and campus cleaning services will be initiated. All personnel that have been in contact with the person or the lab should self-quarantine until testing can be done to confirm Covid-19. Deep disinfection of the lab upon receipt of a positive test for Covid-19 will be done by a vendor that has been contracted by UC Davis.
13. Check the labels on your disinfection solutions to see if there are any special handling or storage requirements.
14. Watch a video on handwashingand demonstrate competency. A video that you might use is here: <https://youtu.be/IisgnbMfKvI>
15. Watch a video on glove removaland demonstrate competency. A video that you might use is here: <https://www.youtube.com/watch?v=BOAb_cy3HxM&feature=youtu.be>
16. **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

At a minimum, long pants (covered legs) and closed toe/closed heel shoes (covered feet) are required to enter a laboratory or technical area where hazardous chemicals are used or stored.

In addition to the minimum attire required upon entering a laboratory, the following PPE is required for all work with hazardous chemicals:

1. Eye Protection:
	1. Eye protection must be ANSI Z87.1-compliant.
	2. At a minimum safety glasses are necessary.
	3. Splash goggles may be substituted for safety glasses, and are required for processes where splashes are foreseeable or when generating aerosols.
	4. Ordinary prescription glasses will NOT provide adequate protection unless they also meet the Z87.1 standard and have compliant side shields.
2. Body Protection: At a minimum a chemically-compatible laboratory coat that fully extends to the wrist is necessary.
	1. If a risk of fire exists, a flame-resistant laboratory coat that is NFPA 2112-compliant should be worn.
	2. For chemicals that are corrosive and/or toxic by skin contact/absorption additional protective clothing (*e.g.,* face shield, chemically-resistant apron, disposable sleeves, etc.) are required where splashes or skin contact is foreseeable.
3. Hand Protection: Hand protection is needed for the activities described in this SOP. Define the type of glove to be used based on the following:
	1. Chemical(s) being used;
	2. Anticipated chemical contact (e.g. incidental, immersion, etc.);
	3. Manufacturers’ permeation/compatibility data; and
	4. Whether a combination of different gloves is needed for any specific procedural step or task.

PPE and hygiene practices should adhere to the directions found on the bottle of disinfectant. Be aware that Cal/OSHA has not relaxed the “fit-testing” requirement for the wearing of N95 masks for work. For more information about fit-testing from employee health please look here: <https://safetyservices.ucdavis.edu/safetynet/the-respiratory-program>.

1. **SPILL AND EMERGENCY PROCEDURES**

Follow the guidance for chemical spill cleanup from [SafetyNet #13](http://safetyservices.ucdavis.edu/safetynet/guidelines-chemical-spill-control) and/or the [UC Davis Laboratory Safety Manual](http://safetyservices.ucdavis.edu/article/laboratory-safety-manual), unless specialized cleanup procedures are described below. Emergency procedure instructions for the UC Davis campus and UCD Medical Center are contained in the [UC Davis Laboratory Safety Manual](http://safetyservices.ucdavis.edu/article/laboratory-safety-manual), [campus Emergency Response Guide (ERG)](http://safetyservices.ucdavis.edu/sites/default/files/documents/Emergency_Response_Guide.pdf), and [UCD Health System ERG](http://www.ucdmc.ucdavis.edu/medresearch/downloads/labsafety/2.6-UCDHS-Emergency-Response-Guide.pdf). The applicable ERG must be posted in the laboratory. All other locations must describe detailed emergency procedure instructions below.

Note that ethanol and IPA are extremely flammable. Use caution in spill cleanup to not ignite.

Note that all of these disinfectants release some sort of fume. These fumes can be as minor as an irritant or as major as a toxic gas. Know what you are doing before cleaning up a spill and consider if you need to call for outside help. Please consult the SDS for your chemical solution to find the best practices for emergency procedures and spill clean-up.

1. **WASTE MANAGEMENT AND DECONTAMINATION**

Hazardous waste must be managed according to [Safety Net #8](http://safetyservices.ucdavis.edu/safetynet/guidelines-disposal-chemical-waste), and must be [properly labeled](http://safetyservices.ucdavis.edu/article/hazardous-waste-storage-and-labeling). In general, hazardous waste must be removed from your laboratory within 9 months of the accumulation start date; refer to the [accumulation time for waste disposal to ensure compliance](http://safetyservices.ucdavis.edu/article/hazardous-waste-storage-and-labeling). Hazardous waste pick up requests must be completed using [WASTe](https://ehs.ucop.edu/waste/#/).

**Note:** See the [WASTe Factsheet](http://safetyservices.ucdavis.edu/sites/default/files/documents/WASTe_Factsheet.pdf) for instructions on how to complete a label.

There probably will be no waste streams generated. Storage of disinfectants should follow the directions on the label. There should not be any special handling/storage requirements except for bleach, which should not be stored next to acids or other incompatibles.

Upon completion of work with hazardous chemicals and/or decontamination of equipment, remove gloves and/or PPE properly and wash hands and arms with soap and water. Additionally, upon leaving a designated hazardous chemical work area, remove all PPE worn and wash hands, forearms, face and neck as needed. Contaminated clothing or PPE should not be worn outside the lab. Soiled lab coats should be sent for professional laundering. Grossly contaminated clothing/PPE and disposable gloves must not be reused.

1. **DESIGNATED AREA**

PIs should fill out this area. Decide which areas should be disinfected and with which disinfectant. Remember that some people will be working in the greenhouse, laboratory, university car, etc. and all areas of work should be documented. Decide which areas/schedule/who disinfects. Consider the size of the lab or work area. Can two people work at once and still maintain proper social distancing? Can the work be done in shifts so that there is only one person in a space at a time? Can laboratory equipment be temporarily moved so that people are not in contact with each other? Consider the air flow within the lab… air comes in through the doors and goes to the hood...how can Covid-19 travel on this current? And how does that Covid-19 travel affect your scheduling?

INSERT - Description(s) of designated area(s) for your laboratory. Designated areas are required for "Particularly Hazardous Substances". The entire laboratory, fume hood, or a portion of the laboratory may be used, and must be labeled with the hazards.

1. **DETAILED PROTOCOL**

PIs should fill out this area. Decide on what work can be done and how approval for that work is obtained. Decide on the procedure for work and communication (i.e. call/email/text upon arrival, call/email/text upon leaving, disinfect first/last, etc.). Consider that the entire lab, including the PI/supervisor, might get sick. What are the contingency plans? Has there been cross-training? Is the SOP for the essential process written somewhere? Is it understandable to anyone?

Note: Any work listed should have their own protocol SOP that has been written and trained on separately from this SOP.

 REQUIRED - Insert or attach detailed laboratory-specific procedures for the process, hazardous chemical(s), or hazard class. You may also include any relevant supporting resources such as SafetyNets, journal citations, etc. that are applicable.

**TEMPLATE REVISION HISTORY**

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| --- | --- | --- | --- |
| **Version** | **Date Approved** | **Author** | **Revision Notes:** |
| **1.0** | **12/1/2014** | **CLSC Task Force** | **New template** |
| **1.1** | **4/16/2015** | **Chris Jakober** | **Changed SDS link, language relating to soiled PPE** |
| **1.2** | **5/11/2016** | **Chris Jakober** | **Updated URLs following website redesign, added URL to UCDHS ERG** |
| **1.3** | **11/30/2016** | **Lindy Gervin** | **Unlocked editable fields** |
| **1.4** | **3/13/2017** | **Lindy Gervin** | **Updated links in section 7 to WASTe system** |
| **1.5** | **12/6/2017** | **Chris Jakober** | **Reformatted hand protection PPE language, added “Equipment” into SOP category type checkbox.** |

**LAB-SPECIFIC REVISION HISTORY**

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| --- | --- | --- | --- |
| **Version** | **Date Approved** | **Author** | **Revision Notes:** |
| **1** |       | **K. Deal** | New |
| **2** | 4/27/2020      | **L. Oberholtzer** |   Reformatted for Animal Science    |
| **3** | 5/8/2020      | **L. Oberholtzer** |      Summary added to SOP |
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**Documentation of Standard Operating Procedure Training**

*(Signature of all users is required)*

* Prior to using **Insert SOP Title**, laboratory personnel must be trained on the hazards involved in working with this SOP, how to protect themselves from the hazards, and emergency procedures.
* Ready access to this SOP and to a Safety Data Sheet for each hazardous material described in the SOP must be made available.
* The Principal Investigator (PI), or the Laboratory Supervisor if the activity does not involve a PI, must ensure that their laboratory personnel have attended appropriate laboratory safety training or refresher training within the last three years.
* Training must be repeated following **any** revision to the content of this SOP. Training must be documented. This training sheet is provided as one option; other forms of training documentation (including electronic) are acceptable but records must be accessible and immediately available upon request.

**Designated Trainer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_**

name  signature     initials

I have read and acknowledge the contents, requirements, and responsibilities outlined in this SOP and **I have demonstrated handwashing and glove removal correctly**:

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| --- | --- | --- | --- |
| **Name** | **Signature** | **Trainer Initials** | **Date** |
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