

Title:	Interim Guidelines for the Disinfection of Fisheries Equipment to Reduce the Spread of Whirling Disease in Southern Alberta
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Disclaimer:	

Purpose

These guidelines have been developed to reduce the risk of spread of *Myxoboluscerebralis*, commonly called Whirling disease, between waterbodies in southern Alberta. These guidelines have been specifically developed to reduce the risks arising from wild fish sampling efforts currently underway by Alberta Environment and Parks fisheries staff and other agencies for whirling disease surveillance.

These guidelines also provide information useful to other agencies as they develop and implement their own protocols specific to their equipment and environmental conditions for whirling disease. They can also be used as a basis for the development of Best Management Practices by those who may be working in various waterbodies, or handling fish daily e.g. aquatic researchers/consultants and professional angling guides.

Additionally, these guidelines can support the development of biosecurity messages and educational information for government staff, external stakeholders and the public related to Whirling disease.

Key Objectives

1. To provide a disinfection protocol that decontaminates equipment, using best management practices, which can be implemented immediately. The protocol is specifically for equipment and staff involved in sampling fish for Whirling disease surveillance (this includes wild and fish culture facilities);
2. To provide a disinfection protocol that staff *can safely, effectively and efficiently administer in the field immediately*, which is effective against Whirling disease;
3. To provide a disinfection protocol that *minimizes harm to the aquatic environment*(i.e., other aquatic species) as a direct, or indirect result of implementation of the protocol;
4. To provide a disinfection protocol which is *safe for staff to use, economically viable, sustainable, and practical*, including both the immediate short-term application of the protocol, and it's use over the long term, while minimizing the deleterious effects of the disinfection protocol on equipment (e.g., corrosion of fisheries

electrofishing equipment, jet boats, vehicles, or other equipment) thereby reducing the necessity of replacing capital assets in the near future and the potential for equipment failures which could jeopardize staff safety.

Situation Analysis

Banff National Park received a preliminary positive result for Whirling disease in Johnson Lake, near Two Jack Lake, in Banff National Park on August 18th 2016, and this result was retested and confirmed by the Canadian Food Inspection Agency (CFIA) and communicated to the public on 25 August, 2016. Although there was no surface water connection to the Bow River from Johnson Lake at the time of the notification, a connection has likely occurred in the past, and may still be present through ground water.

Whirling disease is caused by a parasite (*Myxobolus cerebralis*) that can cause significant declines in some native and non-native trout populations as a result of mortality in infected fish. Several important native and non-native trout populations exist in the Bow River watershed downstream from Banff National Park and many of these support significant sport fisheries. Given the importance of these fish populations and the potential effects of Whirling disease, Alberta Environment and Parks and Parks Canada established a joint response team and initiated the collection of fish from locations adjacent and downstream from Johnson Lake to determine if the parasite was present outside of Johnson Lake and more specifically in the Bow River.

M. cerebralis is transmitted by natural vectors and by humans moving infected fish or using contaminated gear in non-infected waters. As a result equipment used in specific locations was tracked and not used elsewhere (i.e., quarantined) until an effective decontamination procedure was developed to disinfect potentially contaminated gear. The two life-stages of the parasite that can be transmitted on contaminated gear are the triactinomyxon (TAM) spores and myxospores which can be transferred in infected fish, contaminated water mud, sediment or other organic material. These decontamination guidelines are intended to reduce spread of both spores stages.

Note: Gear used at Johnson Lake, or in other potentially contaminated water bodies prior to the implementation of these guidelines, should be identified, isolated and disinfected in accordance with these guidelines, including any other suspect gear this equipment has contacted, before it is used again. Suspect equipment should be "flagged/tagged" out of service, labelled appropriately and secured.

Operating Guidelines

This protocol is based on a risk management approach to disinfection involving two steps; a preliminary, or "hot-spot" disinfection in the field and a subsequent "final" disinfection which is more thorough as it is conducted off-site using specialized power equipment and staff specifically trained in implementation of this protocol. The approach is designed to minimize the risk of spreading Whirling disease by reducing the numbers of live spores which may be resident on gear used during the sampling before it is used in the field again; however, it is recognized that there is still the potential for contamination following the application of these protocols because of the biological limitations (efficacy) of disinfection chemicals currently available, physical limitations of available disinfection equipment in some locations, and manufacturer's considerations with regard to equipment integrity post disinfection and related warranties. Areas of particular concern identified during the initial implementation of this protocol have been identified and additional precautions prescribed as appropriate.

1. Review your equipment before you head into the field and remove any gear from your truck or boat which is not required for field sampling or decontamination as described in this protocol. Be aware that any equipment in your boat, or truck box, which is exposed to potentially contaminated water, must be disinfected in accordance with this protocol.
2. Care should be taken to ensure truck boxes and cabs, particularly cab floor mats and seats do not become contaminated through contact with mud, water and organic debris. Using disposable rubber floor mats in vehicles, and suitable seat covers, will help prevent transfer of Whirling disease. Fabric floor mats should be removed from field vehicles before using for field sampling; potentially contaminated fabric floor mats must be disposed of in accordance with the protocol for disposable materials.

3. Before using any equipment, including watercraft, in potentially Whirling disease contaminated water, ensure that equipment can be disinfected effectively without compromising its functionality (see Appendix 1 – Approved Equipment List).
4. Equipment that cannot or will not (for example disposable material) be disinfected must be handled and disposed of in a biosecure manner (see Appendix 3: Disposable Items Procedure).
5. Equipment approved for use (see Appendix 1 –Approved Equipment List) must only be used at one sampling “site” (see Appendix 2: Definition of Terms) per day, if disinfection is not feasible before use on next “site”.
6. Precautions should be taken upon arrival to the sample site to limit vehicular exposure to potentially contaminated water or soil. Vehicles should be located on high, dry ground whenever practical and possible prior to unloading field equipment.
7. A change in field footwear should be planned prior to heading to the field for sample work. Footwear must be changed on high, dry ground before sampling begins to avoid the need to disinfect personal footwear following sampling. Suitable options include changing into rubber boots immediately on egress from the vehicle (which have been identified and will be used for only this purpose), or the use of boot covers which can be pulled over waterproof footwear (e.g., rubber boots or waders). Boot covers should be considered single use, and should only be used at one sample site. Thought should be given to the selection of boot type for disease surveillance purposes – boots with deep treads or screw in cleats on wader boots require more time to get thoroughly clean prior to hotspot treatment (see Point 9) and should not be used unless necessary for safety purposes.

Note: disposable materials should be contained and disposed of in accordance with appropriate protocols (see Appendix 3: Disposable Items Procedure).

8. Any non-disposable equipment which cannot be disinfected without compromising its functionality, and which must be used, should be protected from contamination with Whirling disease in a fashion that will still facilitate disinfection. For example, electronic sample scales can be put inside heavy duty zip lock baggies to protect them from contamination with Whirling disease during use. The baggies can be removed after sampling at streamside, taking care not to contaminate the “clean” item through contact with potentially contaminated materials. The baggies must be included with other potentially contaminated materials for disposal offsite in accordance with prescribed disposal procedures.
9. Personal clothing must be laundered in hot water if it becomes wetted during sampling, before it is worn at another sampling site, and ideally before it is worn to work again for any purpose. Staff should plan for a full change of clothes and footwear if they expect to sample at more than one site per day; hands should be washed with soap and water between sites as well. A hand sanitizer e.g. Zeppinstant sanitizer (or equivalent) can be used as well for personal hygienic purposes..
10. At the completion of field sampling at a site, all equipment must be subjected to a preliminary or “hot-spot” disinfection in accordance with the following procedures before being used at a different sample site.

Note: Gear used at Johnson Lake, or in other potentially contaminated waterbodies prior to the implementation of these guidelines, should be identified, isolated and disinfected in accordance with these guidelines, including any other equipment suspect gear has contacted, before it is used again. Suspect equipment should be “flagged/tagged” out of service, labelled appropriately and secured.

11. Preliminary (hot-spot) disinfection procedure -- to be conducted streamside before leaving the sample site.
 - At the conclusion of fish sampling, drain all containers, live wells, fish holding tanks, boat bilges, etc., that were filled with “native” water. Water should be drained streamside. Field crews must advise staff at “final” decontamination centres of the origin of any residual liquids in returned gear as unknown liquids will be treated as “native” water unless otherwise indicated e.g. labelled, which can add significant time to decontamination efforts.

- All small field equipment that was in contact with stream or lake water at the sample site, that can be immersed, must be thoroughly cleaned by hand washing streamside. Cleaning must be thorough enough to remove all organic material, including plants, sediment, mud, fish slime, etc. **THIS IS EXTREMELY IMPORTANT AS PRESENCE OF ORGANICS CAN COMPROMISE THE EFFICACY OF DISINFECTANTS!** Gear must be cleaned and rinsed using stream water at streamside. For small items, a small nylon bristle scrub brush (no wood products), provided for this purpose in AEP field kits, can be used to aid in the removal of organic debris or fish slime. Shoulder length, water proof work gloves and eye protection must be worn to protect from splash and contamination of clothing.
- Large equipment (e.g., boats and trailers) must be cleaned so far as possible with a long handled nylon scrub brush (provided in AEP field kits); extremely muddy equipment may require the use of pressure washers to remove weeds, mud and organics, either streamside, or if impractical at a commercial truck wash equipped with hot water and holding tanks prior to returning to the designated location for final disinfection.
- **AFTER THOROUGH CLEANING**, a two-step bath disinfection procedure must be used to disinfect wettable items at the sample site.
- The first bath will be established using a minimum 100 L rigid plastic container with a tight fitting lid. This bath will contain 1500ppm ppm solution of Quaternary Ammonium Compound (QAC); see Table 1 for available QAC compounds and manufacturer's concentrations. Care should be taken to locate this container where there is low risk of ground being contaminated with Whirling disease.

Note: If using Quat Plus, 2 liters of Quat Plus diluted with 62 liters of water provides 64L of solution which is a practical volume for immersing most field gear.

Immersible items (e.g. sample boards, waders, wader boots, floater coats, slicker suits, PFD's, nets, etc.), must be immersed such that all surfaces which were in contact with potentially contaminated water, mud or fish are submerged for 10 minutes. Care must be taken to ensure that any porous materials which may have absorbed potentially contaminated water are thoroughly soaked and physically agitated while submerged. Save this solution for later use on larger equipment.

- The second bath (typically another 100L hard plastic tub with lid) will contain "clean" water; this is typically obtained off-site for this purpose prior to sampling or from a potable water source on-site if available, but must not be stream water. Water can be transported to site as required in portable water containers (two 20L containers are provided for this purpose in AEP field kits). Small disinfected items, following the 10 minute submersion, should be rinsed in this tank. A quick dip is all that is required as some residual QAC is not harmful to most gear. Large equipment e.g. boats and trailers which are primarily metallic do not need to be rinsed.

Note: If "clean" rinse water is not available, disinfected items should be secured in the totes, with lids firmly attached for transport back to the final disinfection location without a rinse. Large treated gear can also be secured in new garbage bags which should be appropriately labelled. Any potentially contaminated items which cannot be hotspot disinfected by immersion e.g.net heads must be bagged in a fashion which ensures no cross contamination of other equipment, truck box, boat, etc. In these cases, gear must be clearly labelled as "contaminated" to ensure it receives appropriate treatment before being used again.

Table 1: Available QAC's and Manufacturer's Concentrations

Brand Name	Manufacturer	QAC Active Ingredient(s)	QAC Concentration (as supplied)
Quat Plus*	Dustbane	n,n-dialkyl –n, n-dimethyl ammonium chloride	4.8%
Quat Plus M5	Dustbane	n,n-dialkyl –n, n-dimethyl ammonium chloride	7.7%
Vanguard	Dustbane	Didecyl dimethyl ammonium chloride n-alkyl; dimethyl benzyl ammonium chloride	2.88% 1.92%
Pinosan	Dustbane	Didecyl dimethyl ammonium chloride n-alkyl; dimethyl benzyl ammonium chloride	1.44% 0.96%
Quat 128	Sanicare	Didecyl dimethyl ammonium chloride Dimethyl benzyl ammonium chloride	5.07% 3.38%
SparQuat 256	Spartan Chemical	Dialkyl dimethyl ammonium chloride Alkyl dimethyl benzyl ammonium chloride	5-10% 5-10%

*AEP product of choice

Recommended Application Concentration and Dilutions:

The recommended concentration of active ingredient for QAC's compounds (above) is 1500 ppm. The dilution rate for QAC compounds will be specific to the brand name and the concentration of active ingredient in that product. The dilution rate can be calculated by:

- Convert the percent active ingredient identified from the label or MSDS sheet for the product into ppm by multiplying the % times 10,000 e.g. Quat Plus: 4.8% active ingredient X 10,000 = 48,000 ppm
- To determine the dilution rate to obtain the desired concentration of 1500 ppm of active ingredient, divide the ppm obtained above by 1500 ppm. Using Quat Plus as the product of choice this would result in a dilution rate of 32 i.e. 48,000 divided by 1500 = 32. To make up a stock solution this would require diluting one liter of Quat Plus with 31 liters of clean water to yield 32 liters of stock solution at a concentration of 1500 ppm.

Note: These calculations assume no organics present and no interference(s) from other chemicals/minerals in the dilution water. **Solutions should be tested with QUAT test strips initially to confirm concentrations and dilution rates.**

Note: It is important to monitor the QAC solution, as diluted disinfectant can lead to a loss of efficacy. "Quat Check 1000" test papers are available from most suppliers of QAC's to test QAC concentration in the field.

- A 1500 ppm solution of QAC disinfectant must be applied to boats, boat trailers, truck boxes, and vehicle mats with special attention to areas that will not be exposed to direct sunlight. Disinfectant can be applied using garden variety pump-up style sprayers which are labelled specifically for use with chlorine or other

disinfectants. The QUAT Plus solution from the dip tank can be used for this purpose. The solution should be liberally sprayed on both the outside and the inside of watercraft keeping surfaces moist for 10 minutes; care should be taken to avoid non-wettable electronic components should be taken to avoid non-wettable electronic components.

Note: It is important to specifically target the trailer “bunks” to ensure they are cleaned of organics and then thoroughly wetted with a 1500 ppm solution of QAC disinfectant.

- Non-submersible items (e.g., backpack electrofishing units, boat mounted electrofishing control boxes, etc.), where surfaces have been in contact with potentially contaminated water can be surface disinfected by wiping wetted surfaces with a heavy duty type paper shop towel which has been soaked in 1500 ppm QAC. Surfaces must be kept damp for 10 minutes. Any materials used for this purpose must be used at only one site; they must be double bagged and stored in a rigid container with a securely fitting lid e.g. Rubbermaid container labelled and dedicated for this purpose, in the back of a vehicle. They must be transferred to the approved disposal site (see Appendix 3 for a list of approved disposal sites in Alberta) in the original container, or to an approved alternate site for bio-secure storage and later disposal.
 - Gear can then be transported to a designated location for final disinfection via hot water and/or QAC spray and submersion as appropriate. **This step must be completed as well before gear goes back into the field for use at another sample site.**
12. Following stream side or “hot-spot” disinfection, boats, trailers and trucks must be transported to a designated decontamination location where a hot power wash and a secondary chemical disinfection treatment will be applied. **These decontamination “hubs” must meet the following criteria:**
- Be hard surfaced areas large enough to safely turn around a truck and 20 foot boat/trailer unit, with exposure to natural sunlight preferred and are not gravel, or other dirt surfaces prone to collecting water or becoming muddy on application of water. Asphalt or concrete surfaces are preferred such that water will evaporate following disinfection of watercraft because of direct or reflected sunlight.
 - No conveyed drainage to surface waterbodies, wetlands, or adjacent flowing water can be permitted; similarly, no potential for overland drainage to surface waterbodies in the event of large rain events is permissible.
 - Controlled, secure access to the site (i.e., no access to vehicles other than those dedicated to the disinfection protocol) is highly desirable.

Note: Locations which are multi-purpose (e.g., Fish and Wildlife warehouses), which are permanent locations housing watercraft or other aquatic equipment should only be used for this purpose when other suitable locations cannot be found. **In these cases, “containment mats” should be used to minimize risk of long-term contamination of the site. Containment mats designed for this purpose should be used, and should be disinfected at the end of the incident.**

Contained water must be treated as required to ensure safe disposal. This is particularly important if there are concerns that waste water from the decontamination procedure e.g. hot water wash water may still be potentially contaminated e.g. 90 degrees C was not maintained for 10 minutes, or some wetted parts of watercraft (or motors) was potentially not decontaminated completely due to equipment intricacies or manufacturer’s considerations. In this event, municipal authorities at the local wastewater treatment facility should be consulted to determine how best to deal with waste water generated during the decontamination procedures.

13. Final disinfection at designated decontamination location(s)
- a) Primary hot (90 degree C.) water disinfection protocol

- Watercraft to be disinfected should be evaluated for their tolerance to hot water (i.e., 90 degree C), by contacting the distributor or manufacturer prior to treatment. Many inflatable watercraft (e.g., NRS and Zodiac pontoonstyle boats) should not be subjected to more than warm water (e.g., Zodiac recommends temperatures not exceeding 38 degrees C) to ensure that heat and glue welded seams on the pontoons do not rupture.
 - When possible, water should be applied using a low pressure unit which is capable of maintaining a continuous application of 90°C (195°F). Applied water must be in continuous contact with all surfaces, both external and internal for at least 10 minutes; however, manufacturer's recommendations should be followed to prevent catastrophic failure of the watercraft.
 - Care must be taken to ensure that internal components which have been subject to potentially contaminated water (e.g., jet boat motors and pumps, outboard motors, etc.) are subject to the same hot water treatment. Manufacturer's recommendations should be determined and followed in this instance as well to prevent engine or jet failure.
- b) Secondary QAT Chemical Disinfection Protocol
- Following hot water disinfection, all water craft must receive a secondary disinfection with a 1500 ppm QAT compound. This is particularly important where water temperature has not been maintained at 90 degrees. Because of manufacturer's recommendations or where there is no assurance that internal under-hull compartments of a boat were subjected to 90 degrees. QAC can be applied by hand using suitable pump-up sprayers, or via a submersible sump pump and garden hose sprayer from a larger premixed container for larger watercraft.
 - Wetable field gear must undergo an additional bath treatment at 1500ppmsolution of QAC compound for 10 minutes.
 - All items should be allowed to dry completely for 24 hours, ideally in sunlight, prior to being used again in the field.

Note:

- *Small quantities of QAC solution e.g. residual volume from a containment mat can be reused but should be monitored for effective (1500 ppm) concentration. They can be disposed of to sanitary sewer but should be diluted with an equal volume of water.*
 - *Local authorities responsible for operating municipal wastewater treatment facilities should be consulted before disposing of larger volumes of QAC solutions down sanitary sewers.*
14. Care must be taken to ensure that any gear onboard the watercraft (e.g., rope, paddles, etc.) is removed sorted and disinfected according to hot water or wetable protocols prior to commencing hot water disinfection of watercraft.

Note: some disassembly of watercraft may be required to ensure that all compartments are appropriately disinfected (e.g., removal of floorboards from inflatable watercraft).

Training and Quality Assurance

1. All field staff involved in Whirling disease surveillance sampling must be familiar with, and trained in the application of, this protocol before heading into the field..
2. Training may be provided through formal training workshops lead by designated staff (to be identified by the Department or Agency involved); alternately, staff who have been trained i.e. have participated in a training workshop, can familiarize staff new to the protocol via "tailgate" sessions which specifically address the requirements for the planned field trip i.e. specific sample site and equipment to be used that day e.g. a

backpack electrofishing surveillance sampling event which does not involve watercraft. In these cases, a trained staff member should be clearly identified as the decontamination field lead, responsible for ensuring all decontamination protocols are implemented appropriately.

3. All field staff involved in Whirling disease surveillance sampling must be familiar with, and be able to demonstrate proper use of prescribed personal protective equipment.
4. All staff must understand and comply with any Whirling disease specific disease surveillance and decontamination Guidelines, Protocols, Best Management Practices, Standard Operating Procedures, Hazard Assessments and Risk Analyses (HARA's) and relevant Material Safety Data Sheets (MSDS) before heading into the field.
5. Quality assurance checks should be conducted periodically during field disease surveillance sampling by designated staff; results of inspections should be documented and submitted for review and any required follow up action to a responsible Manager/Supervisor.

Notes on fish sampling:

- All fish must be processed i.e. weighed and bagged on site, unless specific procedures are in place to quarantine these fish.
- Fish must be processed on non-porous surface that can be hot water washed and disinfected with QAC's.
- Fish samples should be double bagged to reduce potential leakage of contaminated fluids.
- The outside of sample bags must be cleaned to remove any blood or organic matter with a **3000 ppm QAC solution** (a higher concentration is specified for these materials given the potential for contamination from direct contact with potentially infected fish) before placing samples on ice within a clean and disinfected cooler.
- Transfer samples to -80°C freezer and disinfect coolers. Coolers should be hot water cleaned, sprayed with a 3000 ppm QAC solution and dried completely.
 - All surface water and QAC solution should be collected in the cooler and disposed of in accordance with approved procedures (in accordance with previous procedures..)

List of References:

- Quaternary Ammonia Compound Disinfection Protocols 2012, Colorado DNR.
- Table compiled by Cynthia Tait, USDA Forest Service
- Hedrick et al. 2008
- Table compiled by Beth MacConnel, USFWS
- Cockman, Joneen S., Al Gibbons and Sean Kelly, 2012. Decontamination for Whirling Disease on the Seely Fire in Utah 2012: Sharing an Important Process with our Fellow Teams. Wildland Fire Lessons Learned Centre.
- Personal correspondence with Jim Wagner, Wendy Giamberardino & DavidDePape, Alberta Environment and Parks, August 2016

Appendix 1 –Approved Equipment List

<u>Equipment description</u>	<u>Suitable</u>	<u>Not preferred</u>	<u>Unsuitable</u>	<u>Comments</u>
Any equipment with wooden handles or wooden components which are not sealed			X	High risk of disinfection failure due to porosity
Inflatable Watercraft			X	
- enclosed floor with floorboards			X	Extremely difficult to remove floor to adequately clean
- pontoon style (open floor)			X	Pontoons cannot be treated with 90 C water
Wooden measuring board		X		Should be well sealed with varnish or should be disposed of after use at a single site
Plastic measuring board	X			
Rubber electrofishing gloves	X			
Rubber waders	X			one piece systems will full rubber material and open cleat soles are preferred.
Felt soled waders			X	Do not use due to difficulty in properly disinfecting and drying
Goretex or breathable waders		X		Hot water affects the waterproofing
Fibreglass dipnet poles	X			
Nylon dipnet mesh	X			Check net frame as it may be hollow and difficult to ensure complete disinfection
Steel or aluminum cables or anode rings	X			
Leather wading boots			X	.

Appendix 2 –Definition of Terms

1. Site – A lake or portion of a stream which is selected for fish sampling. In the case of a stream, a site is further defined as sample locations which are contiguous and can vary in length from 1-2 km in the case of rivers and 300 m for streams. There may be several sites located within a reach of a river or stream. Reaches were determined by sub-watershed (e.g., less than order 5) or portions of larger rivers between key features (e.g., dams) that break the river. Proximity to Johnson Lake was also considered when delineating reaches. Gear must not be used outside the reach until it is decontaminated following these protocols.
2. Native water – water which has been collected from a potentially contaminated watercourse to be used at a sample site.
3. Clean water – water not likely to be contaminated with Whirling disease, which has typically been obtained off-site from a potable water supply.
4. Hot water – water being used for disinfection purposes which is 90 degrees C or hotter.
5. Containment Mat – a waterproof, chemically resistant ground cover which is designed to hold the hot water and QAC solutions used to disinfect watercraft. Mats are usually portable, leak proof, one piece systems large enough to accommodate a boat on trailer with self-supporting sides to capture treatment water. Typically, two containment mats are utilized during watercraft disinfection: one mat for hot water disinfection and a second mat for chemical disinfection. A two mat system provides for the separation of hot wash water from chemical disinfection solutions for ease of containment and eventual disposal.

Appendix 3: Disposable Items Procedure

A number of items that are used in these guidelines are considered disposable either due to the difficulty in adequately disinfecting them, and because of their insignificant purchase cost. These items include:

- Boot covers and single-use laboratory coveralls
- Wet wipes, or paper “shop towels”
- Rope
- Bags for contaminated gear

These items must be bagged and tagged on site identifying they are “contaminated equipment for disposal”. This material must be double bagged in heavy duty garbage bags and stored in a rigid container (e.g., Rubbermaid container) with a tight fitting lid. The container must be secured in the back of the transport vehicle and transferred in the container to an approved disposal site for incineration. Where direct transport to an approved disposal site is not possible, containers, clearly marked as “contaminated equipment for disposal” can be dropped off at a secured location designated for this purpose. This is typically a department owned, locked warehouse where a specific room has been identified and labelled for short-term secure storage of disposables. At present, the only location approved for AEP staff use for this purpose is the Glenmore Fish and Wildlife Warehouse, #330, - 65 Ave. S.E. Calgary.

These materials should be shipped as soon as practical to a facility with a suitable incinerator, designed for destruction of contagious diseases like Whirling Disease (e.g., veterinary incinerators at government agriculture facilities, veterinary schools, or others).

A log identifying the material, shipment date, and final destination must be kept for each shipment, which must be signed by the shipper and receiver.

Approved Disposal Facilities in Alberta:

- The use of large animal incinerators currently in use at some veterinary facilities or Universities e.g. University of Calgary veterinary department is being investigated;
- The use of the provincial hazardous waste disposal facility at Swan Hills is being investigated.

Appendix 4: Suggested List of Equipment for Disinfection Procedures

A. Field supplies

1. Two plastic (no wooden components), nylon stiff bristle brushes (two sizes, one small hand scrub brush, a second larger, long handled brush for exterior/interior of watercraft, trailers and trucks);
2. Three 100L rigid plastic totes with tight fitting lids (or equivalent) to be used as follows: disinfectant tub for small gear; rinse tub, and bio-secure container for non disinfectable, disposable items.
3. Pump-up style liquid sprayers (two sizes, one approximately 10L, a second smaller e.g. 1L) , suitable for chemical use (typically labelled as suitable for use with chlorine)
4. Zepp instant hand sanitizer (or equivalent)
5. Quat Plus (preferably a 4 L container)
6. Measuring container marked out in liter increments for use with Quat Plus
7. Pail marked out in liter increments for filling plastic disinfecting totes

B. Personal Protective Equipment (*specifically for use with Quat Plus*)

Note: please refer to product specific MSDS sheets

1. shoulder length "gauntlet style" chemical resistant gloves
2. water proof rain gear that is chemical resistant.
3. water proof, chemical resistant foot wear
4. half-mask respirator with "organic vapor" cartridges for those staff using sprayers to apply QAC's
5. eye protection, preferably goggles, which protect from splash

Appendix 5: Material Safety Data Sheets

1. Quat Plus



MATERIAL SAFETY DATA SHEET (MSDS)

Quat Plus Liquid Disinfectant

Effective against influenza A (H1N1)

Germicides



SECTION I ► PRODUCT IDENTIFICATION			
Product Name	Product Type	WHMIS Classification	
Quat Plus	Liquid Disinfectant	Exempt	
SECTION II ► HAZARDOUS INGREDIENTS			
Chemical Name	Cas Registry No.	%	Toxicity
N,N-DIALKYL-N,N-dimethyl ammonium chloride	68424-95-3	1-5	LD ₅₀ ORAL (RAT) 455 mg/kg
SECTION III ► PHYSICAL DATA			
Appearance	Odour	pH	Boiling Point
Clear colourless liquid	Unscented	10.5	100 °C
			Specific Gravity
			1.0
			Solubility in Water
			100 %
SECTION IV ► FIRE AND EXPLOSION HAZARD DATA			
Flash Point (°C): None		Extinguishing media: Not Applicable	
Special fire fighting procedures: None			
Unusual fire and explosion hazards: None			
SECTION V ► TOXICOLOGICAL PROPERTIES			
HAZARD RATING: Health = 1 Flammability = 0 Reactivity = 0			Rating System 0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme
Swallowing: Slightly Toxic			
Inhalation: Not Applicable			
Skin Absorption: Unknown			
Skin Contact: May cause irritation			
Eye Contact: Irritant			
Special Warning: None			
SECTION VI ► FIRST AID MEASURES			
Ingestion: Promptly drink large quantities of milk, egg whites, gelatin or water. Avoid alcohol. Call a physician immediately.			
Inhalation: Not Applicable			
Skin: Flush thoroughly with water for at least 15 minutes. Remove and wash contaminated clothing.			
Eyes: Flush thoroughly with water for at least 15 minutes. Call a physician.			
SECTION VII ► REACTIVITY DATA			
Stable: Yes			
Conditions to avoid: None			
Incompatibility with other materials: None			
Hazardous decomposition products: None			
Hazardous polymerization: Will not occur.			
SECTION VIII ► PREVENTIVE MEASURES			
Hand protection: Gloves made of neoprene, rubber, polyvinyl chloride, Viton or nitrile.			
Eye protection: Safety glasses with side shields.			
Ventilation: General			
Respiratory protection: None			
Other protective equipment: In case of spills, wear chemical resistant apron and boots.			
Steps to be taken in case material is released or spilled: Mop up spillage. Rinse spill area with water and allow to dry.			
Waste disposal method: Flush with water into waste systems in accordance with municipal, provincial and federal regulations.			
Precautions to be taken in handling and storage: Normal handling processes. Inside storage at 4-40 °C recommended.			
Other precautions: Follow label use instructions.			
UN: Not Applicable		TDG Class: None	Packing Group: Not Applicable
TDG Emergency Telephone Number: 613-996-6666 (COLLECT)			
SECTION IX ► PREPARATION DATA			
Prepared by: D.R. Dunlop		Last updated: June 1, 2014	
Location: Dustbane Products Limited, 25 Pickering Place, Ottawa, Ontario, K1G 5P4 – 613-745-6861			

Quat Plus

Liquid Disinfectant

“This quat-based disinfectant cleaner kills a broad spectrum of bacteria, virus and fungi without the harsh smell of chemicals.”

FEATURES AND BENEFITS

Reduced environmental impact: ECOLOGO Certified UL 2794 - Disinfectants and Disinfectant Cleaners.

Multiple Claims: effectively destroys a broad range of bacteria, fungi and viruses including: *Pseudomonas aeruginosa*, *Salmonella choleraesuis*, *Staphylococcus aureus*, HIV-1 and *Trichophyton mentagrophytes*.

Dual Purpose: Cleans and disinfects.

WHERE TO USE

Formulated for use in health care, food processing facilities, schools, offices and public areas. It may be used to disinfect all hard, non-porous surfaces including walls, floors, tubs, sinks, counter tops, garbage pails, furniture etc.

HOW TO USE

Preclean heavily soiled surfaces before using Quat Plus. Dilute with unheated tap water according to the dilution rates listed below. Apply the solution with a sponge, mop or cloth. Allow 10 minutes contact time for complete disinfection.

Dilution Rates:

Disinfection/ECOLOGO (Certified UL 2794)	1:80
All purpose	1:120
Regular cleaning	1:256
Heavy cleaning	1:40
Auto-scrubber	1:256

Note: Adjust dilution rates to suit your cleaning needs.

MOLD AND MILDEW: When mixed at a rate of 1:80, QUAT PLUS effectively inhibits the growth of odour-causing mold and mildew. Apply the solution and allow it to dry on the treated surface. Repeat treatment when mold or mildew returns.

DISINFECTING: Allow a minimum contact time of 10 minutes in a single application. Surfaces subject to direct food contact should be adequately rinsed with potable water. Heavily soiled surfaces must be precleaned.

HIV-1: When mixed at a rate of 1:80, QUAT PLUS may be used to disinfect and decontaminate hard surfaces exposed to blood or other body fluids that contain the HIV-1 virus. Thoroughly clean all hard surfaces removing blood and body fluids prior to disinfection. Allow surfaces to remain wet for a minimum of 4 minutes. Wear protective clothing including latex gloves, gown, mask and eye goggles. Blood, body fluids, cleaning materials and clothing should be autoclaved and disposed of according to local regulations. [Note: efficacy testing was done in the presence of hard water (400 ppm as CaCO₃) and a soil load (5% blood serum)].

SPECIFICATIONS

N,N-DIALKYL-N,N-dimethyl ammonium chloride: 4.8%

Inert Ingredients: 95.2%

pH, concentrate @ 25°C: 10.5

pH, at 1:80 @ 25°C: 9.0-9.5

Colour: Colourless

Odour: Unscented

DIN#: 02298694

CFIA: Yes

Quat Plus is an effective bactericide, fungicide and virucide as demonstrated by the following support data:

- a) CLAIM - DISINFECTANT - AOAC USE - DILUTION TEST AT 600 ppm (dilution ratio of 1:80 in 250 ppm hard water).

<i>Pseudomonas aeruginosa</i>	ATTC# 15542	10	0/10
<i>Staphylococcus aureus</i>	ATTC# 6538	10	0/10
- b) CLAIM - DISINFECTANT - AOAC USE - DILUTION TEST AT 600 ppm (dilution ratio of 1:80 in 250 ppm hard water and 5% organic soil).

<i>Salmonella enterica</i>	ATTC# 10708	10	0/10
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- c) CLAIM - FUNGICIDE - AOAC FUNGICIDAL USE - DILUTION TEST AT 600 ppm (dilution ratio of 1:80 in 250 ppm hard water and 5% organic soil).

<i>Trichophyton mentagrophytes</i>	ATTC# 9533	10	0/10
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- d) CLAIM - VIRUCIDE - EPA VIRUCIDAL EFFICACY OF A DISINFECTANT FOR USE ON INANIMATE ENVIRONMENTAL SURFACES AT 600 ppm (dilution ratio of 1:80 in 250 ppm hard water and 5% organic soil).

HIV type 1	Strain HTLV III	Titer reduction $\geq 3.5 \log_{10}$
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- e) CLAIM - INFLUENZA A H1N1 - EPA VIRUCIDAL EFFICACY OF A DISINFECTANT FOR USE ON INANIMATE ENVIRONMENTAL SURFACES AT 600 ppm (dilution ratio of 1:80 in 250 ppm hard water and 5% organic soil).

HIV type 1	Strain HTLV III	Titer reduction $\geq 3.5 \log_{10}$
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Original signed by: _____
Travis Ripley Exec. Director
Policy Divison
Fish & Wildlife
Environment and Parks

Date: _____

Original signed by: _____
John Conrad Director
ASERT
Environment and Parks

Date: _____