ISOLATION/QUARANTINE GUIDELINES

Introduction

The following guidance is provided to Fish Health Center Directors (FHCD) and associated staff in the implementation of the Service's Fish Health Policy (713 FW 1-5). Guidance contained herein are subject to change as new information becomes available, hence will be revised as appropriate.

Effluent Disinfection

Chlorine Disinfection

1. It is recommended that a Concentration-Time Index (CT), calculated by multiplying the free chlorine concentration (C) by the contact time (T, in minutes), be used to determine the amount of chlorine, and the period of its application, that is applied to the effluent from a Level A facility.

    a. It is recommend that a free chlorine concentration (C) of 2 ppm be used with a contact time (T) of 10 minutes (CT = 20).

    b. However, a lower free chorine concentration can be used if contact time is increased to maintain a CT of 20 (e.g. 0.5 ppm free chlorine for 40 minutes, or 1 ppm for 20 minutes).

2. During chlorination procedures, it may be necessary to add a weak acid, such as acetic acid, to maintain water pH 7.0.

3. In most situations the treated effluent will need to be de-chlorinated as specified by local regulatory agency, prior to entering a receiving water.

    a. Filtration through activated carbon or neutralization with sodium thiosulphate (8 ppm for every 1 ppm chlorine) are typical methods.

4. It is essential that free chlorine levels in both the treated effluent and de-chlorinated effluent be monitored at the facility.

Ultra-violet Disinfection

1. It is recommended that ultra-violet (UV) be used only when physical plant limitations are such that use of chlorine is not practical.

2. UV radiation must have a wavelength of between 255-266 nanometers and is only effective on water that has turbidity of less than 20 Nephalometric Turbidity Units (NTU).

    a. Filtration will be necessary if treated water exceeds this minimum.

3. Minimum UV exposure is 30,000 W sec/cm^2 and it is highly recommended that two UV treatment modules capable of minimum radiation levels be used in series and a separate parallel system be plumbed and available for times of routine maintenance and cleaning of the primary UV system.

Ozone Disinfection

1. Ozone effectiveness, like that of chlorine, is a function of contact time and concentration.

2. It has many advantages over chlorine, but may be more expensive to build and maintain.

3. The recommended contact time (CT) for ozone is 0.5 mg/L residual for 10 minutes.

4. The turbidity must also be below 20 NTU for effective treatment.

5. As with chlorination, ozone must be removed to a level of 0.002 mg/L or less following treatment to reduce toxicity to receiving waters.

    a. Ozone may be removed by activated charcoal, sodium thiosulphate or by packed column aeration towers.

Additional Disinfection Information

1. Additional details on effluent and surface disinfection/chlorination can be found in *Physiology of Fish in Intensive Culture Systems* by Gary Wedemeyer (Chapter 6, pp. 202-226, ISBN 0-412-07801-5).

Determining Isolation/Quarantine Period Duration

1. Once the level of isolation is determined and implemented, the population must be monitored for pathogens throughout the holding period.

2. The rationale for isolation is to limit the transmission of pathogens within acceptable risk.

    a. Proper testing and monitoring will provide information to better define those risks and allow the movement of aquatic species out of quarantine to the appropriate location.

3. Monitoring may include lethal, non-lethal, standard and non-standard methods for testing.

    a. Standard testing includes lethal sampling at the 5% assumed pathogen prevalence level.

    b. It is essential that complete morbidity and mortality records for quarantined populations be maintained by the operational staff of the quarantine facility.

    c. If chronic unexplained mortality or morbidity occurs within the isolation facility, quarantine can not be lifted and the contained population must be considered high risk.

4. The FHCD must document the monitoring procedures, and note such within the "movement from a facility" Worksheet as per the Aquatic Animal Health Policy (713 FW 5).

5. To remove CPP species from restricted quarantine, the Risk Classification to receiving facility or waters must be determined to be "Low" (as determined via the "movement from a facility" Worksheet), with a Pathogen Risk Score between 35 and 80.

6. When the Risk Classification is determined to be "Moderate" (Pathogen Risk Score between 81 and 125), the CPP species may only be removed following the written approval and justification by the attending FHCD.

7. When the Risk Classification is determined to be "High" (Pathogen Risk Score greater than 125), the CPP species may not be removed from quarantine except to waters of origin where any assumed pathogen exposure would already exist.

8. Central to the decision making process is the quantity and quality of health data available for the quarantine population, their parents, or surrogates from the quarantine population's original habitat (e.g. susceptible animals in the same waters of origin). As stated in 713 FW 5, it is imperative that facility operators have the proper equipment, supplies, training, and permission to sacrifice overtly sick animals in the quarantine facility for microbiological samples.

9. The attending FHCD may recommend and implement a "sentinel" system for monitoring. With such a system an appropriate specific pathogen free (SPF) group of susceptible species are directly exposed to the non-treated effluent of the quarantined species.

    a. This normally allows for the detection of pathogens shed by the isolated CPP species, but may not detect latent or carrier state infections.

b. Such sentinel populations then can be subjected to standard methods of pathogen detection.

c. Such sentinel populations must be monitored and tested at 30 and 60 day intervals at the 5% assumed pathogen detection level.