

SECTION 2

REQUIREMENTS CHECKLIST FOR CAAP FACILITIES

2.1 Introduction

EPA developed regulatory options for concentrated aquatic animal production (CAAP) facilities with the following components:

- Management of removed solids and excess feed through treatment technologies and best management practices (BMPs).
- A BMP plan to describe practices to minimize the potential for nonnative species escapement and proper facility operation and maintenance.
- Drug and chemical reporting requirements.
- Active feed monitoring for net pen systems.

Table 2-1 illustrates the BMPs described under the proposed rule by subcategory. The combinations of treatment technologies and management practices are based primarily on the type of production system used at a facility. The type of production system determines the relative volume and strength of wastewater produced at a particular facility and the treatability of the wastewater using cost-efficient treatment technologies and management practices. The size of a facility (or production level) determines the overall volume of water discharged and associated pollutant load. EPA used the type of production system and facility size to determine the BMPs and treatment technologies that form the proposed regulatory option.

Table 2-1. Production System Types and Regulatory Options

<i>Required BMPs and Technologies</i>	<i>Flow-Through</i>		<i>Recirculating</i>	<i>Net Pen</i>
	<i>Medium^a</i>	<i>Large^b</i>		
Drug and chemical reporting requirements		X	X	X
Option of alternative compliance: TSS limits and BMP Plan as per requirements below OR only a BMP plan	X	X	X	
<i>a. Management of removed solids and excess feed</i>	√	√	√	

Required BMPs and Technologies	Flow-Through		Recirculating	Net Pen
	Medium ^a	Large ^b		
<i>b. Proper operation and maintenance</i>	X	X	X	
<i>c. Minimize potential for escapes of nonnatives</i>		X	X	X
<i>d. Training for staff</i>	X	X	X	
<i>e. Minimize discharge of net-fouling organisms</i>				X
<i>f. Avoid discharges of blood, viscera, and substances associated with washing nets</i>				X
<i>g. Prohibition of discharges of feed bags, chemicals used to clean nets, and materials containing tributyltin compounds</i>				X
Certification that a BMP plan has been developed	X	X	X	X
Active feed monitoring				X

X=Required components

√=Alternative components that may not be required based on system configuration and compliance alternative.

^aFacilities producing 100,000 up to 475,000 lbs annually are medium facilities.

^bFacilities producing more than 475,000 lb annually are large facilities.

2.2 Checklist

2.2.1 General Reporting Requirements

Under the proposed regulation, regulated facilities must notify the permitting authority of the addition of any investigational new animal drug, any drug that is not used according to label requirements, and any chemical that is not used according to label requirements. (This reporting requirement does not apply to flow-through facilities producing 100,000 to 475,000 lb per year.) The notification procedure is as follows:

- ✓ For drugs and chemicals not used according to label requirements, facilities must provide an oral report to the permitting authority within 7 days after initiating application of the drug or chemical. The oral report should identify the drug or chemical added and the reason for adding the drug or chemical.
- ✓ For drugs and chemicals not used according to label requirements, facilities must provide a written report to the permitting authority within 30 days after the conclusion of the addition of the drug or chemical. The report should identify the drug or chemical added, the reason for treatment, date(s) and

time(s) of the addition (including duration), the total amount of active ingredient added, the total amount of medicated feed added (only for drugs applied through medicated feed), and the estimated number of aquatic animals medicated by the addition.

- ✓ For investigational new animal drugs, facilities must provide a written report to the permitting authority within 30 days after conclusion of the addition of the drug or chemical. The written report should identify the drug or chemical added, the reason for treatment, date(s) and time(s) of the addition (including duration), the total amount of active ingredient added, the total amount of medicated feed added (only for drugs applied through medicated feed), and the estimated number of aquatic animals medicated by the addition.

In addition to the above reporting requirements, facilities must submit a BMP plan certification.

- ✓ The owner or operator of any facility subject to the proposed regulation must certify that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

2.2.2 *Flow-Through System Requirements*

Flow-through facilities subject to the proposed regulation must develop a BMP plan to achieve some or all of the objectives and specific requirements listed below. Checklists at the end of this section provide more details for specific requirements based on annual production levels and facility design.

- ✓ Manage removed solids and excess feed by minimizing the reintroduction of solids removed through the treatment of the water supply, and prevent excess feed from entering the production system.
- ✓ Minimize the discharge of unconsumed food and minimize the discharge of feeds containing high levels of fine particulates or high levels of phosphorus.
- ✓ Clean raceways at frequencies that minimize the disturbance and subsequent discharge of accumulated solids during routine activities such as harvesting and grading of fish.
- ✓ Maintain in-system technologies to prevent overflow of any floating matter and subsequent bypass of treatment technologies.
- ✓ Ensure proper storage of drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Collect animal mortalities on a regular basis. Store and dispose of aquatic animal mortalities to prevent discharge to waters of the United States.

- ✓ Develop and implement practices to minimize the potential escape of nonnative species.
- ✓ Ensure that facility staff are familiar with the BMP plan and have been adequately trained in specific procedures required by the plan.

2.2.3 Recirculating System Requirements

Recirculating facilities subject to the proposed regulation should develop a BMP plan to achieve some or all of the objectives and the specific requirements listed below. Checklists at the end of this section provide more details for specific requirements based on annual production levels and facility design.

- ✓ Manage removed solids and excess feed by minimizing the reintroduction of solids removed through the treatment of the water supply, and prevent excess feed from entering the production system.
- ✓ Properly operate and maintain a concentrated aquatic animal production facility by maintaining in-system technologies to prevent overflow of any floating matter and subsequent bypass of treatment technologies.
- ✓ Ensure proper storage of drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Collect animal mortalities on a regular basis. Store and dispose of aquatic animal mortalities to prevent discharge to waters of the United States.
- ✓ Develop and implement practices to minimize the potential escape of nonnative species.
- ✓ Facilities should ensure that facility staff are familiar with the BMP plan and have been adequately trained in specific procedures required by the plan.

2.2.4 Net Pen Requirements

Net pen facilities subject to the proposed regulation must meet the following requirements:

- ✓ Maintain a real-time monitoring system to monitor the rate of feed consumption (active feed monitoring). The system should be designed to allow detection or observation of uneaten feed passing through the bottom of the net pens and to prevent accumulation.
- ✓ Develop a BMP plan to achieve the following objectives and requirements:

1. Operate the facility to minimize the concentration of net-fouling organisms that are discharged during events such as changing and cleaning nets and screens ashore.
2. Avoid the discharge of blood, viscera, fish carcasses, or transport water containing blood associated with the transport or harvesting of fish into the waters of the United States.
3. Avoid the discharge of substances associated with in-place pressure washing nets into the waters of the United States. The use of air-drying, mechanical, and other nonchemical procedures to control net fouling are strongly encouraged.
4. Develop and implement practices to minimize the potential escape of nonnative species.
5. Discharges of feed bags and other solid wastes are prohibited.
6. Discharges of chemicals used to clean nets, boats, or gear in open waters are prohibited.
7. Discharges of materials containing or treated with tributyltin compounds are prohibited.

2.3 References

Brown, L (ed). 1993. Aquaculture for Veterinarians: Fish Husbandry and Medicine. Pergamon Press, Oxford.

CHECKLIST FOR GENERAL REPORTING REQUIREMENTS

Part A: For drugs and chemicals not used according to label requirements:

Name of drug or chemical: _____

Start date/time of application: _____

End date/time of application: _____

Duration: _____

Reason for use: _____

Total amount of active ingredient added: _____

Total amount of medicated feed added
 (Only for drugs applied through medicated feed): _____

Estimated total number of animals medicated by addition: _____

Oral report to permitting authority

Date and time of oral report: _____

Written report to permitting authority

Date and time of written report: _____

<i>DRUG/CHEMICAL</i>	<i>DATE</i>	<i>TIME</i>	<i>DURATION</i>

CHECKLIST FOR GENERAL REPORTING REQUIREMENTS

Part B: For investigational new animal drugs:

Name of drug or chemical: _____

Start date/time of application: _____

End date/time of application: _____

Duration: _____

Reason for use: _____

Total amount of active ingredient added: _____

Total amount of medicated feed added
(Only for drugs applied through medicated feed): _____

Estimated total number of animals medicated by addition: _____

 Written report to permitting authority

Date and time of written report: _____

<i>DRUG/CHEMICAL</i>	<i>DATE</i>	<i>TIME</i>	<i>DURATION</i>

**REQUIREMENTS FOR FLOW-THROUGH SYSTEMS
WITH TSS LIMITS**

**Facilities with full-flow that produce 100,000 to 475,000 lb per year
(Includes treatment from off-line settling basin that recombines
with bulk flow)**

TSS limits (net concentrations):

Maximum Monthly Average: 6 mg/L

Maximum Daily Average: 11 mg/L

Develop a BMP plan with the following components:

- ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
- ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
- ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
- ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

REQUIREMENTS FOR FLOW-THROUGH SYSTEMS
FOR ALTERNATIVE COMPLIANCE WITHOUT TSS LIMITS

**Facilities with full-flow that produce 100,000 to 475,000 lb per year
(Includes treatment from off-line settling that recombines with bulk flow)**

☐ Develop a BMP plan with the following components:

- ✓ Description of management of removed solids and excess feed including the following practices that meet the following components:
 - Practices that minimize the reintroduction of solids removed through the treatment of the water supply.
 - Practices that minimize excess feed from entering the aquatic animal production system.
 - Practices that minimize the discharge of feed containing high levels of fine particulates or high levels of phosphorus.
 - Description of raceway cleaning practices that minimize the disturbance and subsequent discharge of accumulated solids during routine activities, such as harvesting and grading of fish.
- ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
- ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
- ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
- ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

REQUIREMENTS FOR FLOW-THROUGH SYSTEMS
WITH TSS LIMITS

**Facilities with a separate off-line settling basin (OLSB)
that produce 100,000 to 475,000 lb per year
(Includes facilities that discharge from OLSB separate from bulk discharge)**

TSS limits (net concentrations) for OLSB discharge only:

Maximum Monthly Average: 67 mg/L

Maximum Daily Average: 87 mg/L

Develop a BMP plan with the following components:

- ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
- ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
- ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
- ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

For bulk discharge, develop a BMP plan with the following components:

Description of management of removed solids and excess feed including the following practices that meet the following components:

- ✓ Practices that minimize the reintroduction of solids removed through the treatment of the water supply.
- ✓ Practices that minimize excess feed from entering the aquatic animal production system.
- ✓ Practices that minimize the discharge of feed containing high levels of fine particulates or high levels of phosphorus.

- ✓ Description of raceway cleaning practices that minimize the disturbance and subsequent discharge of accumulated solids during routine activities, such as harvesting and grading of fish.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

REQUIREMENTS FOR FLOW-THROUGH SYSTEMS
FOR ALTERNATIVE COMPLIANCE WITHOUT TSS LIMITS

**Facilities with a separate off-line settling basin (OLSB)
that produce 100,000 to 475,000 lb per year
(Includes facilities that discharge from OLSB separate from bulk discharge)**

- Develop a BMP plan with the following components:**
- ✓ Description of management of removed solids and excess feed including the following practices that meet the following components:
 - Practices that minimize the reintroduction of solids removed through the treatment of the water supply.
 - Practices that minimize excess feed from entering the aquatic animal production system.
 - Practices that minimize the discharge of feed containing high levels of fine particulates or high levels of phosphorus.
 - Description of raceway cleaning practices that minimize the disturbance and subsequent discharge of accumulated solids during routine activities, such as harvesting and grading of fish.
 - ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
 - ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
 - ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
 - ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
 - ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

**REQUIREMENTS FOR FLOW-THROUGH SYSTEMS
WITH TSS LIMITS**

**Facilities with full-flow that produce more than 475,000 lb per year
(Includes treatment from off-line settling basin that recombines
with bulk flow)**

TSS limits (net concentrations):

Maximum Monthly Average: 6 mg/L

Maximum Daily Average: 10 mg/L

Develop a BMP plan with the following components:

- ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
- ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
- ✓ Description of practices to minimize the potential escape of nonnative species
- ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
- ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

Drug and chemical reporting requirements.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

REQUIREMENTS FOR FLOW-THROUGH SYSTEMS
FOR ALTERNATIVE COMPLIANCE WITHOUT TSS LIMITS

**Facilities with full-flow that produce more than 475,000 lb per year
(Includes treatment from off-line settling that recombines with bulk flow)**

- Develop a BMP plan with the following components:**
 - ✓ Description of management of removed solids and excess feed including the following practices that meet the following components:
 - Practices that minimize the reintroduction of solids removed through the treatment of the water supply.
 - Practices that minimize excess feed from entering the aquatic animal production system.
 - Practices that minimize the discharge of feed containing high levels of fine particulates or high levels of phosphorus.
 - Description of raceway cleaning practices that minimize the disturbance and subsequent discharge of accumulated solids during routine activities, such as harvesting and grading of fish.
 - ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
 - ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
 - ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
 - ✓ Description of practices to minimize the potential escape of nonnative species
 - ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
 - ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.
- Drug and chemical reporting requirements.**

REQUIREMENTS FOR FLOW-THROUGH SYSTEMS
WITH TSS LIMITS

**Facilities with a separate off-line settling basin (OLSB)
that produce more than 475,000 lb per year
(Includes facilities that discharge from OLSB separate from bulk discharge)**

- TSS limits (net concentrations) for OLSB discharge only:**
 - Maximum Monthly Average: 55 mg/L
 - Maximum Daily Average: 69 mg/L

- Develop a BMP plan with the following components:**
 - ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
 - ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
 - ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
 - ✓ Description of practices to minimize the potential escape of nonnative species.
 - ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
 - ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

- For bulk discharge, develop a BMP plan with the following components:**
 - ✓ Description of management of removed solids and excess feed including the following practices that meet the following components:
 - Practices that minimize the reintroduction of solids removed through the treatment of the water supply.
 - Practices that minimize excess feed from entering the aquatic animal production system.
 - Practices that minimize the discharge of feed containing high levels of fine particulates or high levels of phosphorus.

- Description of raceway cleaning practices that minimize the disturbance and subsequent discharge of accumulated solids during routine activities, such as harvesting and grading of fish.

Drug and chemical reporting requirements.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

REQUIREMENTS FOR FLOW-THROUGH SYSTEMS
FOR ALTERNATIVE COMPLIANCE WITHOUT TSS LIMITS

Facilities with a separate off-line settling basin (OLSB) that produce more than 475,000 lb per year (Includes facilities that discharge from OLSB separate from bulk discharge)

Develop a BMP plan with the following components:

- ✓ Description of management of removed solids and excess feed including the following practices that meet the following components:
 - Practices that minimize the reintroduction of solids removed through the treatment of the water supply.
 - Practices that minimize excess feed from entering the aquatic animal production system.
 - Practices that minimize the discharge of feed containing high levels of fine particulates or high levels of phosphorus.
 - Description of raceway cleaning practices that minimize the disturbance and subsequent discharge of accumulated solids during routine activities, such as harvesting and grading of fish.
- ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
- ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
- ✓ Description of practices to minimize the potential escape of nonnative species.
- ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
- ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

Drug and chemical reporting requirements.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

REQUIREMENTS FOR RECIRCULATING SYSTEMS
WITH TSS LIMITS

Facilities that produce 100,000 lb or more per year

TSS limits (net concentrations) for all discharges:

Maximum Monthly Average: 30 mg/L

Maximum Daily Average: 50 mg/L

Develop a BMP plan with the following components:

- ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
- ✓ Description of storage practices for drugs and chemicals that avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Description of practices to collect animal mortalities on a regular basis and to store and dispose of mortalities to prevent discharge to waters of the United States.
- ✓ Description of practices that minimize the potential escape of nonnative species.
- ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
- ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

Drug and chemical reporting requirements.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

REQUIREMENTS FOR RECIRCULATING SYSTEMS
FOR ALTERNATIVE COMPLIANCE WITHOUT TSS LIMITS

Facilities that produce 100,000 lb or more per year

Develop a BMP plan with the following components:

- ✓ Description of management of removed solids and excess feed including the following practices that meet the following components:
 - Practices that minimize the reintroduction of solids removed through the treatment of the water supply.
 - Practices that minimize excess feed from entering the aquatic animal production system.
 - Practices that minimize the discharge of feed containing high levels of fine particulates or high levels of phosphorus.
 - Description of raceway cleaning practices that minimize the disturbance and subsequent discharge of accumulated solids during routine activities, such as harvesting and grading of fish.
- ✓ Description of practices that maintain in-system technologies to prevent overflow of floating matter and subsequent bypass of treatment technologies.
- ✓ Description of storage practices for drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility.
- ✓ Description of practices to collect animal mortalities on a regular basis, and practices to store and dispose of mortalities to prevent discharge to waters of the United States.
- ✓ Description of practices to minimize the potential escape of nonnative species.
- ✓ Discussion of training and briefing for staff regarding specific procedures required by the BMP plan.
- ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.

Drug and chemical reporting requirements.

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

REQUIREMENTS FOR NET PEN SYSTEMS

Facilities that produce 100,000 lb per year or more, except net pen facilities located in the State of Alaska producing native species of salmon

- Maintain real-time monitoring system to monitor the rate of feed consumption.**
- Develop a BMP plan to meet the following requirements and objectives:**
 - ✓ Operate the facility to minimize the concentration of net-fouling organisms that are discharged during events such as changing and cleaning nets and screens ashore.
 - ✓ Avoid the discharge of blood, viscera, fish carcasses, or transport water containing blood associated with the transport or harvesting of fish into the waters of the United States
 - ✓ Avoid the discharge of substances associated with pressure-washing nets into the waters of the United States. The use of air-drying, mechanical and other nonchemical procedures to control net fouling are strongly encouraged.
 - ✓ Develop and implement practices to minimize the potential escape of nonnative species.
 - ✓ Discharges of feed bags and other solid wastes into the waters of the United States are prohibited.
 - ✓ Discharges of chemicals used to clean nets, boats, or gear into the waters of the United States are prohibited.
 - ✓ Discharges of materials containing or treated with tributyltin compounds into the waters of the United States are prohibited.
 - ✓ Certification by owner or operator of the facility that a BMP plan has been developed and that it meets the objectives as defined in the proposed regulation.
- Drug and chemical reporting requirements.**

Refer to Section 3 for more detail on how to write a BMP plan and Appendix B for an example of a BMP plan.

CALCULATING MEDICATED FEED CONTENT

Drug treatments for aquaculture operations are commonly added to the diet to reduce the labor involved with administering the treatment. Fish requiring drug treatment are considered to have reduced appetites and therefore are commonly fed at only 1% of their estimated body weight per day. The amount drug added to feed varies depending on the severity of the infection and type of drug used. A common treatment level for oxytetracycline is 75 mg/kg (Brown, 1993).

Pounds of feed per day * dosage * conversion factor

Where

Pounds of feed per day = daily feeding levels (lbs)

Dosage = amount of drug in a given mass of feed (mg drug/kg feed)

Conversion factor = 0.4536 kg/lb

An example calculation for a drug treatment of oxytetracycline at 75 mg/kg for 5000 lb of fish at a feed rate of 1% per day is presented below.

5000 lb fish * 1% feed rate = 50 lb feed per day

50 lb feed * 0.4536 kg/lb (conversion factor) * 75mg/kg dosage = 0.0037 lb of oxytetracycline per day.

Where

Feed rate = the amount of feed offered per day based on a percentage of body weight