



Ministry of Forests,
Lands and Natural
Resource
Operations

Fertilization Standard for Ministry funded Programs Effective March 30, 2015

These standards apply, in addition to the General Standards for Ministry Funded Programs (FS 1001) or FS1000 for internal Ministry contracts, to all fertilization activities carried out under Ministry Funded Programs.

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1.0 DEFINITIONS

1.1 In this document, the following words shall have the following meanings.

“Approved Fertilization Quality Inspection System” means the Fertilization Quality Inspection system contained in this document or another similar system approved in writing by the District Manager prior to the commencement of Work.

“Buffer Zone” means an area established between an area to be fertilized and a area which must not be fertilized or have fertilizer enter into it.

“Contingency Plan” means a plan prepared in accordance with Article 4 of this document, to be implemented in the event of a fertilizer spill, accident or misapplication.

“No Treatment Zone” means an area within which no fertilizing takes place.

“Water Quality Limits” means

- (a) 10 ppm nitrate nitrogen in a stream immediately below the area where fertilizer has been applied;
- (b) 2 micrograms/litre of chlorophyll in a lake;
- (c) 50 milligrams/square metre of chlorophyll in a stream; or

(d) any known water quality standard or objective which is or can be expressed in terms of a maximum

“**Work**” means the work described and funded under a Recipient Agreement;

“**Work Area**” means the areas or locations where Work is to be undertaken or any area of Crown Land occupied for purposes of the Work.

2.0 PERSONNEL & EQUIPMENT

Aircraft Pilots

- 2.1 Pilots for the fertilizer application must, in addition to holding valid Commercial Pilot’s Licences and any required federal/provincial licences and certificates, have demonstrated ability and experience in applying fertilizer in forest situations. No pilot may make an operational flight without direct supervision unless he or she has successfully applied fertilizer to a minimum of one thousand (1 000) hectares of forest land under the supervision of experienced pilots.
- 2.2 In the event that a substitution of a pilot is required, the substitute must meet the Ministry Standards. The substitute pilot must carry out a reconnaissance flight of the Work Areas prior to the commencement of fertilizer application.
- 2.3 The project supervisor must not be the pilot for the operation.

Inspector’s Qualifications

- 2.4 All Work must be inspected by a person (the “Inspector”) who is:
 - (a) the Registered Professional Forester (RPF), or operates under the direction of the RPF, who will sign and professionally seal reports for the Work;
 - (b) experienced and competent in conducting inspections of fertilizer operations;
 - (c) familiar with the Treatment Plans and Work Plans for the Work Areas; and
 - (d) not engaged in the direct conduct of the fertilizer operations.

Aircraft and Equipment

- 2.5 The aircraft and specialty equipment and services used in fertilizer application must have all necessary approvals and certificates in good standing and must be equipped and operated in accordance with the laws and regulations of Canada and the Province of British Columbia.
- 2.6 Aircraft carrying persons employed by or acting as agents of the Province must have the appropriate approvals as determined by the aircraft’s flight manual and certificate of airworthiness.

3.0 FERTILIZER

Provision of Fertilizer

- 3.1 Fertilizer must be of the Specified types and quantities.

Handling and Storage of Fertilizer

- 3.2 Equipment and supplies at the Work Area or loading site must be secured to prevent unauthorized access to the fertilizer.
- 3.3 Fertilizer must be loaded into the dispensing equipment only in locations where spilled fertilizer cannot enter a water body or other non-target area.

- 3.4 Tanks, buckets and other dispensing equipment must not be washed in or near streams, rivers or lakes.

4.0 PRE-OPERATIONS REQUIREMENTS

Work Plans

- 4.1 Where any of the following is not specified in a Treatment Plan for fertilization it must be specified in a Work Plan:
- (a) by Treatment Unit
 - i) the type and total amount of fertilizer to be applied,
 - ii) the fertilizer application rate,
 - iii) the application method,
 - iv) the season or timing of application;
 - (b) a written fertilizer operations plan which must include
 - i) the location of helispots, airstrips, and loading sites,
 - ii) a schedule of fertilizer application to the Work Areas,
 - iii) aircraft ferrying routes between the staging areas and the Work Areas so as to minimize flights over major aquatic systems and to avoid human residences,
 - iv) the location of Buffer Zones around watercourses, waterbodies, no-treatment zones, or other specified areas to be avoided, sufficient to ensure fertilizer does not enter them,
 - v) a water quality monitoring plan, if appropriate to the water resource of the Work Area,
 - vi) the requirement, if any, to mark boundaries of the Work Areas or Buffer Zones,
 - vii) radio frequencies to be used during operations,
 - viii) the visual signal system to be used for emergencies (e.g., smoke bombs, vehicles, lights and flags),
 - ix) the need for and methods of controlling public access,
 - x) disposal procedures for fertilizer containers, bags and other waste material;
 - (c) a Contingency Plan in the event of fertilizer spill, accident or misapplication which must include, but is not limited to:
 - i) a description of the types of spill or events requiring immediate action,
 - ii) the names and telephone numbers of emergency contacts,
 - iii) water quality monitoring to be instituted in the event of a spill or misapplication in or near a water body,
 - iv) accident clean up procedures, and
 - v) disposal of spill materials;
 - (d) other scheduling requirements and conditions as deemed necessary by the District Manager.
- 4.2 A Work Plan must:
- a) Show No-treatment Zones where they are needed to provide protection as required under sections 57 and 59 of the *Forest Planning and Practices Regulation*.
 - (b) provide for water quality sampling in accordance with the *Forest Fertilization Guidebook* where fertilization is to take place in a community watershed.

Layout

- 4.3 The District Manager may at any time require the Recipient to identify and flag on the ground the boundaries of Work Areas, Buffer Zones and No Treatment Zones.

Safety

- 4.4 The Recipient bears all responsibility for safe operations.
- 4.5 Prior to the commencement of fertilizer application, helispots and/or airstrips must be confirmed as safe for use by the fertilizer application aircraft and support equipment. Minor improvements may be made before or after commencement of operations without having to obtain the approval of the District Manager. For the purposes of this section, minor improvements are defined as cutting and removing brush and non-crop trees less than five metres in height occupying landings or old road beds on an area not exceeding one tenth of a hectare.
- 4.6 If there is a need to fall snags or other trees on a Work Area to meet safety or operational requirements, a plan must be submitted to the District Manager at least five Work Days prior to commencing operations.

5.0 FERTILIZER OPERATIONS

General Requirements

- 5.1 All fertilizer application shall be in accordance with the Ministry Standards, including any standards or specifications stated or implied in the Approved Fertilization Quality Inspection System which forms part the Ministry Standards.
- 5.2 Despite any requirement that is Specified on a per hectare basis, all fertilizing requirements must be met throughout the entire Work Area, so that fertilizer is as evenly applied as possible.
- 5.3 The following documents must be on site at all times:
(a) a copy of the Fertilization Standards;
(b) Material Safety Data Sheets (MSDS) of the fertilizers being applied; and
(c) the Work Plan.
- 5.4 The equipment, including vehicles for hauling fertilizer, must not cause unacceptable site disturbance to a Work Area or road.
- 5.5 Ministry of Forests employees or agents must not be permitted in an aircraft applying fertilizer.
- 5.6 Fertilizer must not be applied to a No Treatment Zone, a Buffer Zone or outside a Treatment Unit.

Buffer Zones

- 5.7 A 10-metre buffer zone should be left around the following water bodies, with consideration of no harvest zones associated with riparian areas where no treatment should occur, and in the absence of any direction in a treatment prescription.
a) a fisheries lake
b) any designated fishery stream (S1–S4)*
c) a stream that can be identified, by the application pilot, as open water that flows into any designated fishery stream (S5, S6)*.

*Stream Riparian Classes as outlined in the Forest Planning and Practices Regulation, Division 3 - Riparian Areas

- 5.8 In community watersheds the following buffers are required in conjunction with any buffers outlined in 5.7 and in the absence of any direction in a treatment prescription:
a) 10 m around a flowing stream that is observable from the air
b) 100 m upstream and upslope of a community watershed intake.

- 5.9 Suitable buffers should also be established for research and Sx trials as well to protect private land. Leave at least a 60-metre buffer strip around residences and a 30-metre buffer strip adjacent to lands used for agriculture. This can be modified if the residence or farmland is owned by the forest landowner or the aerial application is acceptable to the resident or landowner.

Notification of Operations Start-up

- 5.10 The Recipient must notify the District Manager of its intended commencement of operations within a community watershed at least one Work Day in advance.

Roads

- 5.11 When fertilizing near a road, all necessary precautions must be taken to ensure the safety of road users. Where necessary, information signs must be posted along roads and flag persons supplied to coordinate traffic.

Requirement to Stop Operations

- 5.12 Fertilizer application operations must be stopped when:
- (a) there is inadequate daylight for safe application;
 - (b) weather conditions arise which could adversely affect normal application patterns, safety of application, or treatment effectiveness;
 - (c) a leak and/or spill of chemicals occurs (such as fertilizers, oils and fuel); or
 - (d) there is a breakdown in ground-based communications;

until such time as the condition causing the stoppage changes or is rectified.

Leakage, Spills and Accidents

- 5.13 In the event of a fertilizer spill or misapplication into non-target areas (e.g. water bodies), operations must be stopped and the Contingency Plan immediately implemented.
- 5.14 Leaks and/or spills of chemicals (such as fertilizers, oils and fuel) must be cleaned up and disposed of in accordance with provincial laws and regulations prior to the resumption of fertilizer application.
- 5.15 Fertilizer spilled at the loading or worksite in the normal course of operations and not considered an emergency under the Contingency Plan must be cleaned up the same day.

Site Clean-up & Repair

- 5.16 Upon completion of fertilizer operations:
- (a) all unused fertilizer must be removed from Crown land;
 - (b) fertilizer containers or bags and any other waste material must be removed from Crown land and disposed of in accordance with the Work Plan;
 - (c) any damage to a Work Area must be repaired; and
 - (d) any remaining spilled fertilizer must be removed.

6.0 INSPECTION SYSTEM AND PAYMENT CALCULATION

Fertilization Quality Inspection

- 6.1 The Inspector must inspect the Work in accordance with an Approved Fertilization Quality Inspection System in a timely manner to ensure all Work is performed to the Ministry Standards.
- 6.2 Unless otherwise approved by the District Manager, the methodology contained in this Article shall form the basis for the Approved Fertilization Quality Inspection System.
- 6.3 The Inspector shall:
- (a) visually check No-treatment Zones and water bodies for the presence of fertilizer, and
 - (b) undertake such checks and observations as are necessary to be able to declare an area satisfactorily treated as described in the following section.

Determination of Satisfactory Treatment

6.4 Quality:

- (a) Application rate; the Application Quality % (AQ%) is determined as follows; AQ% is $100 \times (\text{prescribed rate (PR)} - \text{the absolute value of [PR-actual applied rate]}) / \text{PR}$ and
- (b) operational monitoring confirms
 - i) the fertilizer application system was properly calibrated,
 - ii) the required swath widths and volume delivery per hectare were achieved,
 - iii) compliance with the application procedures,
 - iv) water quality monitoring procedures carried out during application were appropriate to the stream and water resources of the Work Areas; and
- (c) Water Quality Limits were not exceeded for a period of up to three weeks following fertilization.

Payment

- 6.5 (a) Full payment
- 1.) Where inspections indicate fertilizer application quality in a Work Area is at least 92.6%, the Province will pay the full Basic Payment.
 - 2.) In no case shall the Province pay more than 100% of the Basic Payment.
- (b.) Payment reduction for low quality application Where inspection indicates fertilizer Application Quality % (AQ%) in a Work Area is equal to or greater than 70%, but less than 92.6%, the Province shall reduce the Basic Payment by multiplying the Basic Payment by the AQ% using the following formula: $\text{Payment \%} = (\text{AQ\%} \times 1.08) - ([100 - (\text{AQ\%} \times 1.08)]^2) / 8$
- (c.) No Payment If the performance quality on all or a portion of a Work Area is less than 70% and, in the opinion of the Province, cannot be improved to at least this level by reworking, the Province shall make no payment for the unsatisfactorily treated area. No payment for application outside the Work Area.

Wasted fertilizer

- 6.6 The Basic Payment will be reduced in an amount equal to the cost of fertilizer applied outside the prescribed treatment area.

7.0 NOTIFICATION

Requirement to Notify the District Manager

- 7.1 Further to the notification requirements contained in the General Standards for Ministry funded Programs (FS 1001), a Recipient must immediately notify the District Manager whenever:
- (a) an inspection indicates an area greater than one (1) hectare has not been satisfactorily treated (or other minimum area that may be Specified by the District Manager) and the Recipient is unable to rectify the deficiency;
 - (b) fertilizer has been applied, has entered, or is likely to enter a water body, a No-treatment Zone, or an area outside of a Work Area;
 - (c) fertilizer is spilled, other than minor spills in the normal course of operations and which are not considered under the Contingency Plan as requiring immediate action;
 - (d) a Water Quality Limit has been exceeded; or
 - (e) an accident involving aircraft occurs.
- 7.2 Any notification under the previous section must be followed by written notice within one Work Day.
- 7.3 Where an aircraft is involved in an accident, the Recipient must also notify Transport Canada and the Aviation Operations Section of the Ministry of Forests, Lands and Natural Resource Operations, Victoria.