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POTATO PROCESSING PLANT LIQUID EFFLUENT
REGULATIONS AND GUIDELINES

Water Pollution Control Directorate
Environmental Protection Service
FISHERIES AND ENVIRONMENT CANADA



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FOREWORD

The intent of the controls, issued under the Fisheries Act, is to protect the fish and other aquatic life from the deleterious effects of effluents from potato processing plants. The controls embodied in the regulations and guidelines apply uniformly across Canada as national baseline requirements. However, a potato processing plant located in an environmentally sensitive area may be subject to stricter controls. Provincial or local governments may also impose more stringent standards than the federal requirements. The more stringent requirements will prevail.

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- (1) Potato Processing Plant Liquid Effluent Regulations
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POTATO PROCESSING PLANT LIQUID EFFLUENT REGULATIONS

Registration
SOR/77-518 27 June, 1977

FISHERIES ACT

**Potato Processing Plant Liquid Effluent
Regulations**

P.C. 1977-1721 23 June, 1977

His Excellency the Governor General in Council, on the recommendation of the Minister of Fisheries and the Environment, pursuant to sections 33 and 34 of the Fisheries Act, is pleased hereby to make the annexed Regulations respecting deleterious substances in liquid effluents from potato processing plants.

REGULATIONS RESPECTING DELETERIOUS
SUBSTANCES IN LIQUID EFFLUENTS FROM
POTATO PROCESSING PLANTS

Short Title

1. These Regulations may be cited as the *Potato Processing Plant Liquid Effluent Regulations*.

Interpretation

2. (1) In these Regulations,
- “Act” means the *Fisheries Act*; (*loi*)
- “biochemical oxygen demanding matter” means the substance contained in the effluent from a plant that results from the operation of a plant and that will exert a biochemical oxygen demand; (*matière ayant une demande biochimique en oxygène*)
- “canned potato products plant” includes any plant where raw potatoes are peeled and shaped for distribution in a canned and preserved condition; (*conserverie de pommes de terre*)
- “composite sample” means a sample obtained in accordance with section 7; (*échantillon composite*)
- “dehydrated potato products plant” includes any plant where raw potatoes are processed to remove moisture by heat, vacuum or air drying, with the finished product distributed as granules, flakes or slices; (*fabrique de pommes de terre déshydratées*)
- “deposit” means to deposit or to permit the deposit into water frequented by fish; (*rejeter*)
- “effluent” means all wastewaters deposited by a plant and includes process water, cooling water, tank drainage, storm water, wastes from water and wastewater treatment facilities and run off from lands used for the storage or treatment of wastewater and sludges associated with the operation of a plant; (*effluent*)

Enregistrement
DORS/77-518 27 juin 1977

LOI SUR LES PÊCHERIES

**Règlement sur les effluents des établissements de
transformation de la pomme de terre**

C.P. 1977-1721 23 juin 1977

Sur avis conforme du ministre des Pêcheries et de l'Environnement et en vertu des articles 33 et 34 de la Loi sur les pêcheries, il plaît à Son Excellence le Gouverneur général en conseil d'établir le Règlement sur les substances nocives présentes dans les effluents des établissements de transformation de la pomme de terre, ci-après.

RÈGLEMENT SUR LES SUBSTANCES NOCIVES
PRÉSENTES DANS LES EFFLUENTS DES
ÉTABLISSEMENTS DE TRANSFORMATION DE LA
POMME DE TERRE

Titre abrégé

1. Ce règlement peut être cité: *Règlement sur les effluents des établissements de transformation de la pomme de terre*.

Interprétation

2. (1) Il faut entendre par
- «conserverie de pommes de terre» un établissement où la pomme de terre est pelée et façonnée pour sa mise en conserve et sa distribution, (*canned potato products plant*)
- «eau de traitement» l'eau qui entre en contact avec la pomme de terre au cours d'une étape quelconque de sa transformation et l'eau de lavage des boîtes et de nettoyage, (*process water*)
- «eaux pluviales» l'écoulement des eaux de précipitation de toute sorte tombées sur un établissement, qui y ruisselle ou le traverse, (*storm water*)
- «échantillon composite» un échantillon prélevé selon l'article 7, (*composite sample*)
- «effluent» toutes les eaux usées rejetées par un établissement, y compris les eaux de traitement, de refroidissement, les vidanges des réservoirs, les eaux pluviales, les résidus des installations de traitement de l'eau et d'épuration des eaux usées et les eaux d'irrigation des aires d'entreposage ou d'épuration des eaux usées et des boues résultant de l'exploitation de l'établissement, (*effluent*)
- «établissement» les installations spécialement prévues pour la transformation de la pomme de terre et de ses dérivés en des sous-produits comme la pomme de terre congelée, déshydratée ou en conserve, les croustilles et la fécule, y compris les entrepôts et les ateliers de traitement, d'expédition et d'emballage sis à proximité de l'établissement et tous les biens-fonds utilisés pour l'exploitation des installations, (*plant*)

- “existing plant” means a plant that commenced commercial production before the date of the coming into force of these Regulations; (*établissement existant*)
- “expanded plant” means any plant in which the total quantity of raw potatoes processed during any year exceeds 2.5 times the total quantity of raw potatoes processed in that plant during the 1976 calendar year; (*établissement à capacité accrue*)
- “frozen potato products plant” includes any plant where raw potatoes are processed and the final potato product is distributed in a frozen condition; (*fabrique de pommes de terre congelées*)
- “Minister” means the Minister of the Environment; (*Ministre*)
- “new plant” means a plant that did not commence commercial production before the date of the coming into force of these Regulations and that commences commercial production on or after that date; (*nouvel établissement*)
- “owner” of a plant means the owner or operator or his authorized representative; (*propriétaire*)
- “plant” includes facilities intended primarily for the conversion of raw potatoes and potato derivatives into products such as frozen potato products, potato chips, dehydrated potato products, canned potato products and potato starch and includes storage, processing, shipping and packaging facilities on the plant site and all properties used for the operation of those facilities; (*établissement*)
- “potato chip plant” includes any plant where raw potatoes are processed and the final potato product is distributed as a snack food in a ready-to-eat condition; (*fabrique de croustilles*)
- “process water” means water that comes into contact with potatoes at any stage in the processing and includes water used for can washing and clean-up; (*eau de traitement*)
- “processing day” means a period of twenty-four consecutive hours or any part thereof during which the plant is in operation; (*journée d'exploitation*)
- “raw potatoes processed” means the net quantity, in tonnes, of raw potatoes that are received at the beginning of the processing line after the raw potato washing operation; (*volume d'activités*)
- “starch plant” includes any plant processing raw potatoes into potato starch; (*féculerie*)
- “storm water” means water run off that results from precipitation of any kind that falls on a plant or that passes over or through the plant; (*eaux pluviales*)
- “total suspended matter” means the non-filterable residue that results from the operation of a plant, that is contained in the effluent from that plant. (*matières totales en suspension*)
- «établissement à capacité accrue» un établissement dont le volume annuel d'activités est 2,5 fois supérieur à celui de l'année civile 1976, (*expanded plant*)
- «établissement existant» un établissement où la production industrielle a commencé avant la date d'entrée en vigueur de ce règlement, (*existing plant*)
- «fabrique de croustilles» un établissement de transformation de la pomme de terre en un produit fini, se présentant sous forme d'aliment léger prêt à être consommé, (*potato chip plant*)
- «fabrique de pommes de terre congelées» un établissement de transformation de la pomme de terre en un produit fini se présentant sous forme congelée, (*frozen potato products plant*)
- «fabrique de pommes de terre déshydratées» un établissement où l'humidité de la pomme de terre est éliminée par chauffage, vacuité ou dessiccation et dont le produit fini se présente sous forme de granules, de flocons et de rondelles, (*dehydrated potato products plant*)
- «féculerie» un établissement produisant de la fécule de pomme de terre, (*starch plant*)
- «journée d'exploitation» une période de vingt-quatre heures consécutives pendant la totalité ou partie de laquelle l'établissement fonctionne, (*processing day*)
- «loi» la *Loi sur les pêcheries*, (*Act*)
- «matière ayant une demande biochimique en oxygène» une substance présente dans l'effluent d'un établissement, due à l'exploitation de ce dernier et exerçant une demande biochimique en oxygène, (*biochemical oxygen demanding matter*)
- «matières totales en suspension» le résidu non filtrable provenant de l'exploitation d'un établissement et présent dans son effluent, (*total suspended matter*)
- «Ministre» le ministre de l'Environnement, (*Minister*)
- «nouvel établissement» un établissement dont la production industrielle n'a pas débuté avant la date d'entrée en vigueur de ce règlement mais a commencé à cette date ou après, (*new plant*)
- «propriétaire» le propriétaire, l'exploitant ou son représentant autorisé, (*owner*)
- «rejeter» déposer ou permettre que soit déposée une substance dans des eaux fréquentées par le poisson, (*deposit*)
- «volume d'activités» le tonnage métrique net de pommes de terre, après lavage, au début de la chaîne de transformation. (*raw potatoes processed*)

(2) When storm water is protected, in such manner as the Minister may approve in writing, from contamination by the deleterious substances prescribed by section 4 that originate from the plant, the storm water shall be deemed not to be part of the effluent for the purposes of these Regulations.

(3) When, prior to being deposited, any effluent from a plant has been treated, in such manner as the Minister may approve in writing, at any site outside a plant for the purpose

(2) Les eaux pluviales protégées, selon que le Ministre peut l'approuver par écrit, de la contamination par les substances nocives provenant de l'établissement et désignées à l'article 4, ne sont pas censées être des effluents aux fins de ce règlement.

(3) Un effluent qui, avant d'être rejeté, a été traité, selon que le Ministre peut l'approuver par écrit, à l'extérieur d'un établissement afin d'en extraire les substances nocives dési-

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of removing therefrom the deleterious substances prescribed by section 4 and for the purpose of controlling pH, the effluent shall be deemed not to be effluent for the purposes of these Regulations.

Application

3. (1) Subject to subsection (2), these Regulations apply to every new plant and every expanded plant.

(2) Where a plant becomes an expanded plant, these Regulations apply to the expanded plant on the first day of the month following the month in which the plant becomes an expanded plant.

Substances Prescribed as Deleterious Substances

4. For the purpose of paragraph (c) of the definition "deleterious substance" in subsection 33(11) of the Act, the following substances from the operation of a plant to which these Regulations apply are hereby prescribed as deleterious substances:

- (a) biochemical oxygen demanding matter; and
- (b) total suspended matter.

Authorized Deposit of Deleterious Substances

5. Subject to these Regulations, the owner of a plant of a class set out in column I of Schedule I may deposit a deleterious substance prescribed by section 4 if

- (a) the actual daily deposit of each deleterious substance, determined in accordance with subsection 11(1), does not exceed the authorized daily deposit of that substance for that class of plant as set out in column III of that Schedule;
- (b) the average daily deposit of each deleterious substance during a month, determined in accordance with subsection 11(2), does not exceed the authorized average daily deposit of that substance for that class of plant as set out in column IV of that Schedule; and
- (c) the pH of each composite sample of effluent, determined in accordance with subsection 9(3), is between 6.0 and 9.0.

ADDITIONAL CONDITIONS OF AUTHORIZATION

General

6. The owner of a plant shall, for each type of effluent deposited by the plant,

- (a) install and maintain facilities, including sampling connections and flow measuring devices, of such type as the Minister may in writing approve for sampling and analysing effluents for the purpose of enabling the Minister to determine whether the owner is complying with the limits of authorized deposits prescribed by section 5;
- (b) take a composite sample on the regular basis prescribed by section 8;
- (c) analyse the sample referred to in paragraph (b) in accordance with section 9;
- (d) measure the flow in accordance with section 10; and

gnées à l'article 4 et d'en régler le pH, n'est pas censé être un effluent aux fins de ce règlement.

Application

3. (1) Sous réserve du paragraphe (2), ce règlement s'applique à tous les nouveaux établissements et à tous les établissements à capacité accrue.

(2) Ce règlement s'applique à un établissement à capacité accrue à compter du premier jour du mois suivant celui au cours duquel il est devenu tel.

Substances désignées comme substances nocives

4. Aux fins de l'alinéa c) de la définition de «substance nocive», au paragraphe 33(11) de la loi, les substances ci-après attribuables à l'exploitation d'un établissement auquel ce règlement s'applique sont désignées comme substances nocives:

- a) les matières ayant une demande biochimique en oxygène et
- b) les matières totales en suspension.

Rejets autorisés de substances nocives

5. Sous réserve de ce règlement, le propriétaire d'un établissement appartenant à l'une des catégories visées à la colonne I de l'annexe I est autorisé à rejeter une substance nocive désignée à l'article 4 à condition que

- a) le rejet journalier réel de chaque substance, calculé selon le paragraphe 11(1), ne dépasse pas le rejet journalier autorisé pour la catégorie d'établissement en question et indiqué à la colonne III de l'annexe,
- b) le rejet journalier moyen de chaque substance durant un mois, calculé selon le paragraphe 11(2), ne dépasse pas le rejet journalier moyen autorisé pour la catégorie d'établissement en question et indiqué à la colonne IV de l'annexe et
- c) le pH de chaque échantillon composite de l'effluent, mesuré selon le paragraphe 9(3), se situe entre 6,0 et 9,0.

CONDITIONS SUPPLÉMENTAIRES RELATIVES À L'AUTORISATION

Dispositions générales

6. Pour chaque type d'effluent rejeté, le propriétaire d'un établissement

- a) installe et entretient des appareils d'échantillonnage et d'analyse des effluents, y compris des raccords d'échantillonnage et des débitmètres, du type que le Ministre peut approuver par écrit et permettant à ce dernier de juger si les limites prescrites à l'article 5 sont respectées par le propriétaire,
- b) prélève un échantillon composite aux fréquences visées à l'article 8,
- c) analyse ces échantillons aux fréquences visées à l'article 9,
- d) mesure le débit selon l'article 10 et

(e) determine the actual and average daily deposits of each deleterious substance in accordance with section 11.

Method of Collecting Composite Samples

7. A composite sample shall be obtained by collecting effluent discharged from a plant during a processing day

- (a) continually during a sampling period of twenty-four hours at a rate in proportion to the flow rate of the effluent discharged; or
- (b) in such a manner that equal volumes of effluent are delivered into a receptacle at equal intervals not longer than one hour during a sampling period of twenty-four hours.

Frequency of Sampling and Analysis

8. The sampling referred to in paragraph 6(b) shall be made (a) in the case of a plant where the weekly quantity of raw potatoes processed is less than 400 tonnes, on one processing day each week; and

(b) in the case of a plant where the weekly quantity of raw potatoes processed is 400 tonnes or more, on two processing days each week.

Analytical and Other Test Methods

9. (1) For the purposes of paragraph 6(c), the concentration in milligrams per litre of a substance described in an item of Schedule II, in each composite sample, shall be determined using

- (a) the test method set out in column I and modified in column II of that item; or
- (b) any other method, approved in writing by the Minister, the results of which can be confirmed by the method referred to in paragraph (a).

(2) For the purposes of paragraph 6(c), procedures pertaining to sampling, preservation and storage of samples and prevention of interference relating to the test methods referred to in paragraph (1)(a), as outlined in the general sections of the publication "Standard Methods for the Examination of Water and Wastewater", 14th edition (1975), published jointly by the American Public Health Association, American Water Works Association and the Water Pollution Control Federation, shall be adhered to.

(3) For the purposes of paragraph 6(c), the pH of a composite sample shall be determined using

- (a) the test method prescribed by section 424 of the publication referred to in subsection (2); or
- (b) any other method, approved in writing by the Minister, the results of which can be confirmed by the method referred to in paragraph (a).

Flow Measurement

10. For the purpose of paragraph 6(d), the flow of each type of effluent deposited by a plant shall be measured continuously and recorded.

e) détermine les rejets journaliers réels et moyens de chaque substance nocive selon l'article 11.

Méthode de prélèvement des échantillons composites

7. Un échantillon composite est prélevé dans l'effluent rejeté par un établissement au cours d'un jour d'exploitation

- a) continuellement pendant vingt-quatre heures et proportionnellement au débit de l'effluent ou
- b) de telle sorte que des volumes égaux d'effluent soient recueillis dans un récipient à des intervalles de temps égaux ne dépassant pas une heure au cours d'une période d'échantillonnage de vingt-quatre heures.

Fréquence des échantillonnages et des analyses

8. L'échantillonnage visé à l'alinéa 6b) se fait, dans le cas d'un établissement,

- a) au cours d'une journée d'exploitation par semaine, si le volume d'activités est inférieur à 400 tonnes métriques par semaine et
- b) au cours de deux journées d'exploitation par semaine, si le volume d'activités est d'au moins 400 tonnes métriques par semaine.

Méthodes d'analyse et de contrôle

9. (1) Aux fins de l'alinéa 6c), la concentration, en milligrammes par litre, d'une substance décrite à l'annexe II, dans chaque échantillon composite, est dosée selon

- a) la méthode du contrôle visée à la colonne I et modifiée dans la colonne II ou
- b) toute autre méthode approuvée par écrit par le Ministre et dont les résultats peuvent être confirmés par la méthode visée à l'alinéa a).

(2) Aux fins de l'alinéa 6c), on doit suivre les méthodes d'échantillonnage, de préservation et de conservation des échantillons et d'élimination des interactions des méthodes de contrôle visées à l'alinéa 1a), telles que décrites dans les sections générales du recueil «Standard Methods for the Examination of Water and Wastewater», 14^e édition (1975), publié conjointement par l'American Public Health Association, l'American Water Works Association et la Water Pollution Control Federation.

(3) Aux fins de l'alinéa 6c), le pH d'un échantillon composite est mesuré selon

- a) la méthode de contrôle visée à la section 424 du recueil visé au paragraphe (2) ou
- b) toute autre méthode que le Ministre a approuvée par écrit et dont les résultats peuvent être confirmés par la méthode visée à l'alinéa a).

Mesure du débit

10. Aux fins de l'alinéa 6d), le débit de chaque type d'effluent rejeté par un établissement est mesuré et enregistré continuellement.

Calculation of Actual Deposit

11. (1) For the purposes of paragraph 6(e), the actual daily deposit per unit of production of each deleterious substance prescribed by section 4 shall be determined using the data obtained under subsection 9(1) and section 10 and shall be expressed in terms of kilograms per tonne of raw potatoes processed per day.

(2) For the purposes of paragraph 6(e), the average daily deposit per unit of production during a month of each deleterious substance prescribed by section 4 shall be determined by calculating the average of the results obtained under subsection (1) and shall be expressed in the terms set out in that subsection.

Reporting and Records

12. (1) The owner of a plant shall, within thirty days after the end of each month, sign, date and forward to the Minister a report, in such form as the Minister may in writing approve, showing for that month

(a) the actual daily deposit of deleterious substances deposited by the plant on each day that samples were taken, determined and expressed in accordance with subsection 11(1);

(b) the average daily deposit of deleterious substances deposited by the plant, determined and expressed in accordance with subsection 11(2);

(c) the pH of composite samples, determined in accordance with subsection 9(3);

(d) the daily production of the plant for each day that samples were taken expressed in terms of tonnes of raw potatoes processed;

(e) the weekly production of the plant for each week during the month, expressed in terms of tonnes of raw potatoes processed;

(f) the number of operating days; and

(g) the total daily flow, in litres, of each type of effluent discharged on each day that samples were taken.

(2) The owner of a new plant shall, before he deposits any deleterious substance prescribed by section 4, and the owner of an expanded plant shall, within thirty days of becoming subject to these Regulations, sign, date and forward to the Minister a declaration, in such form as the Minister may in writing approve,

(a) showing the projected weekly production of the plant expressed in terms of tonnes of raw potatoes processed;

(b) showing the projected annual production of the plant expressed in terms of tonnes of raw potatoes processed; and

(c) listing the major products produced.

(3) The owner of a plant shall, within thirty days after the end of each calendar year, sign, date and forward to the Minister a declaration in such form as the Minister may in writing approve, showing the actual production of the plant for the previous year, in terms of tonnes of raw potatoes processed.

Calcul des rejets réels

11. (1) Aux fins de l'alinéa 6e), le rejet quotidien réel par unité de production de chaque substance nocive visée à l'article 4 est calculé à l'aide des données obtenues selon le paragraphe 9(1) et l'article 10 et s'exprime en kilogrammes par tonne métrique du volume d'activités journalier.

(2) Aux fins de l'alinéa 6e), le rejet quotidien moyen de chaque substance nocive visée à l'article 4 par unité de production au cours d'un mois est déterminé par le calcul de la moyenne des résultats obtenus selon le paragraphe (1) et est exprimé de la façon qui y est visée.

Rapports et dossiers

12. (1) Le propriétaire d'un établissement signe, date et envoie au Ministre, dans les trente jours après la fin de chaque mois, un rapport établi en la forme que ce dernier peut approuver par écrit et indiquant pour ce mois

a) les rejets quotidiens réels de substances nocives par l'établissement à chaque jour où des échantillons ont été prélevés, ces rejets étant calculés et exprimés selon le paragraphe 11(1),

b) les rejets quotidiens moyens de substances nocives, calculés et exprimés selon le paragraphe 11(2),

c) le pH des échantillons composites, mesuré selon le paragraphe 9(3),

d) la production journalière de l'établissement pour chaque jour d'échantillonnage, exprimée en tonnes métriques du volume d'activités,

e) la production hebdomadaire de l'établissement pour chaque semaine du mois, exprimée en tonnes métriques du volume d'activités,

f) le nombre de jours d'exploitation et

g) le volume quotidien total, en litres, de chaque type d'effluent rejeté, à chaque jour où des échantillons ont été prélevés.

(2) Le propriétaire d'un nouvel établissement, avant de rejeter une substance nocive visée à l'article 4, et celui d'un établissement à capacité accrue doivent, dans les trente jours de leur assujettissement à ce règlement, signer, dater et envoyer au Ministre, une déclaration établie en la forme que peut approuver ce dernier par écrit et indiquant

a) la production hebdomadaire prévue de l'établissement, exprimée en tonnes métriques du volume d'activités,

b) la production annuelle prévue de l'établissement, exprimée en tonnes métriques du volume d'activités et

c) les principaux produits fabriqués.

(3) Le propriétaire d'un établissement signe, date et envoie au Ministre, dans les trente jours suivant la fin de chaque année civile, une déclaration établie en la forme que ce dernier peut approuver par écrit, indiquant la production réelle de l'établissement pour l'année précédente, en tonnes métriques du volume d'activités.

Permitted Variation in Additional Conditions

13. Where the owner of a plant establishes to the satisfaction of the Minister that for scientific and technical reasons a scheme of sampling and analysis, measurement or reporting referred to in sections 7, 9, 10 and 12 other than at the regular time interval frequencies required by section 8 is sufficient to enable the Minister to determine whether the owner is complying with the limits of authorized deposits prescribed by section 5, the Minister may, in writing, permit the owner to

- (a) take and analyse samples of each effluent in accordance with the scheme on a regular basis specified in the letter of permission,
- (b) measure the volume of each effluent in accordance with the scheme on a regular basis specified in the letter of permission, or
- (c) report to the Minister in accordance with the scheme on a regular basis specified in the letter of permission

and sections 7, 8, 9, 10 and 12 do not apply to the owner if he complies with the scheme on the regular basis specified in the letter of permission.

Modifications permises des conditions supplémentaires

13. Lorsque le propriétaire d'un établissement convainc le Ministre que, pour des raisons scientifiques et techniques, une fréquence d'échantillonnage et d'analyse, de mesures ou de présentation des rapports, selon les articles 7, 9, 10 et 12, différente de celle prescrite à l'article 8, suffit pour permettre au Ministre de juger si les limites prescrites à l'article 5 sont respectées, ce dernier peut autoriser le propriétaire par écrit

- a) à prélever et à analyser des échantillons d'effluent,
- b) à mesurer le volume d'effluent ou
- c) à remettre ses rapports au Ministre

selon la fréquence que l'autorisation précise et les articles 7 à 10 et 12 ne s'appliquent pas au propriétaire s'il se conforme à l'autorisation.

SCHEDULE I

AUTHORIZED DEPOSITS OF DELETERIOUS SUBSTANCES

Column I	Column II	Column III	Column IV
Class of Plant	Deleterious Substance	Authorized actual daily deposit	Authorized average daily deposit
Potato Chip Plant	Biochemical Oxygen Demanding Matter	1.5 kg/tonne of raw potatoes processed	0.5 kg/tonne of raw potatoes processed
	Total Suspended Matter	2.1 kg/tonne of raw potatoes processed	0.7 kg/tonne of raw potatoes processed
Other Potato Products Plants*	Biochemical Oxygen Demanding Matter	2.7 kg/tonne of raw potatoes processed	0.9 kg/tonne of raw potatoes processed
	Total Suspended Matter	2.4 kg/tonne of raw potatoes processed	0.8 kg/tonne of raw potatoes processed

*NOTE: Other Potato Products Plants include plants that produce canned potato products, dehydrated potato products, frozen potato products and potato starch.

ANNEXE I

REJETS AUTORISÉS DE SUBSTANCES NOCIVES

Colonne I	Colonne II	Colonne III	Colonne IV
Catégorie d'établissement	Substance nocive	Rejet réel journalier autorisé	Rejet journalier moyen autorisé
Fabrique de croustilles	Matières ayant une demande biochimique en oxygène	1,5 kg par tonne métrique du volume d'activités	0,5 kg par tonne métrique du volume d'activités
	Matières totales en suspension	2,1 kg par tonne métrique du volume d'activités	0,7 kg par tonne métrique du volume d'activités
Autres établissements de transformation de la pomme de terre*	Matière ayant une demande biochimique en oxygène	2,7 kg par tonne métrique du volume d'activités	0,9 kg par tonne métrique du volume d'activités
	Matières totales en suspension	2,4 kg par tonne métrique du volume d'activités	0,8 kg par tonne métrique du volume d'activités

*REMARQUE: Les autres établissements de transformation de la pomme de terre comprennent ceux produisant les pommes de terre en conserve, déshydratées, congelées et la fécule.

SCHEDULE II

ANALYTICAL TEST METHODS FOR DETERMINING PRESENCE AND CONCENTRATIONS OF DELETERIOUS SUBSTANCES IN EFFLUENTS

Item	Deleterious Substance	Column I	Column II
		Test Methods	Modifications
1	Biochemical Oxygen Demanding Matter (BOD)	APHA* Section 507	For determining dissolved oxygen the following tests are recommended: Section 422 B APHA* or Section 422 F APHA*, the probe must be standardized against Winkler-Azide method (Section 422 B, APHA*)
2	Total Suspended Matter	APHA* Section 208 D	

* Refers to the publication "Standard Methods for the Examination of Water and Wastewater", 14th Edition (1975), published jointly by the American Public Health Association, American Water Works Association and the Water Pollution Control Federation.

ANNEXE II

MÉTHODES QUALITATIVES ET QUANTITATIVES D'ANALYSE DES SUBSTANCES NOCIVES PRÉSENTES DANS LES EFFLUENTS

Article	Substance nocive	Colonne I	Colonne II
		Méthode d'analyse	Modifications
1	Matière ayant une demande biochimique en oxygène (D.B.O.)	Section 507 de l'APHA*	Pour le dosage de l'oxygène dissous, les méthodes suivantes sont recommandées: Section 422 B de l'APHA* ou Section 422 F de l'APHA* La méthode doit être vérifiée par celle de Winkler à l'azoture (section 422 B de l'APHA*)
2	Matières totales en suspension	Section 208 D de l'APHA*	

* *Standard Methods for the Examination of Water and Wastewater*, 14^e édition (1975), publié conjointement par l'American Public Health Association, l'American Water Works Association et la Water Pollution Control Federation.

POTATO PROCESSING PLANT EFFLUENT GUIDELINES

DEPARTMENT OF FISHERIES AND THE ENVIRONMENT

The following guidelines are issued under the authority of the Minister of Fisheries and the Environment. The intent of the guidelines is to control the discharge of liquid effluents from existing potato processing plants in a manner similar to the "Potato Processing Plant Liquid Effluent Regulations", (SOR/77-518) which apply to the new and expanded potato processing plants, as published in Part II of the July 13, 1977 issue of the *Canada Gazette*.

GUIDELINES RESPECTING SUBSTANCES IN LIQUID EFFLUENTS FROM POTATO PROCESSING PLANTS

Short Title

These Guidelines may be referred to as the *Potato Processing Plant Effluent Guidelines*.

These Guidelines are not to be construed as regulations made under the authority of section 33 of the Fisheries Act.

MINISTÈRE DES PÊCHES ET DE L'ENVIRONNEMENT

Les présentes lignes directrices sont publiées avec l'autorisation du ministre des Pêches et de l'Environnement. Elles ont pour objet de limiter les rejets d'effluents par les établissements existants de transformation de la pomme de terre de la même façon que le «Règlement sur les effluents liquide des établissements de transformation de la pomme de terre» (DORS/77-518), qui s'applique aux établissements nouveaux et à capacité accrue, publié le 13 juillet 1977 dans la Partie II de la *Gazette du Canada*.

LIGNES DIRECTRICES CONCERNANT LES SUBSTANCES PRÉSENTES DANS LES EFFLUENTS DES ÉTABLISSEMENTS DE TRANSFORMATION DE LA POMME DE TERRE

Titre abrégé

1. Les présentes lignes directrices peuvent être citées sous le titre: *Lignes directrices sur les effluents des établissements de transformation de la pomme de terre*.

Elles ne peuvent être interprétées comme étant un règlement établi aux termes de l'article 33 de la *Loi sur les pêcheries*.

Interpretation

2. (1) In these Guidelines "biochemical oxygen demanding matter", "canned potato products plant", "composite sample", "dehydrated potato products plant", "deposit", "effluent", "existing plant", "expanded plant", "frozen potato products plant", "Minister", "owner", "plant", "potato chip plant", "process water", "processing day", "raw potatoes processed", "starch plant", "storm water", and "total suspended matter" have the meaning defined in the "Potato Processing Plant Liquid Effluent Regulations".

(2) When storm water is protected, in such manner as the Minister may approve in writing, from contamination by the substances prescribed in paragraphs 4(a) and (b) that originate from the plant, the storm water shall be deemed not to be part of the effluent for the purposes of these Guidelines.

(3) When, prior to being deposited, any effluent from a plant has been treated, in such manner as the Minister may approve in writing, at any site outside a plant for the purposes of removing therefrom the substances prescribed in paragraphs 4(a) and (b) and for the purpose of controlling pH, the effluent shall be deemed not to be effluent for the purposes of these Guidelines.

Application

3. These Guidelines apply to every existing plant.

Substances and Parameters to be Considered

4. For the purpose of these Guidelines, the following substances and parameters will be considered:

- (a) biochemical oxygen demanding matter;
- (b) total suspended matter; and
- (c) pH.

Objectives

5. For the purpose of these Guidelines, the owner of a plant of a class set out in column I of Schedule I may deposit a substance prescribed by paragraphs 4(a) and (b) if

- (a) the actual daily deposit of each substance, determined in accordance with subsection 11(1), does not exceed the maximum daily deposit of that substance for that class of plant as set out in column III of that Schedule;
- (b) the average daily deposit of each substance during a month, determined in accordance with subsection 11(2), does not exceed the maximum average daily deposit of that substance for that class of plant as set out in column IV of that Schedule; and
- (c) the pH of each composite sample of effluent, determined in accordance with subsection 9(3), is between 6.0 and 9.0.

Interprétation

2. (1) Dans les présentes lignes directrices, les termes «conserverie de pommes de terre», «eau de traitement», «eaux pluviales», «échantillon composite», «effluent», «établissement», «établissement à capacité accrue», «établissement existant», «fabrique de croustilles», «féculerie», «fabrique de pommes de terre congelées», «fabrique de pommes de terre déshydratées», «journée d'exploitation», «matière exerçant une demande biochimique d'oxygène», «matières totales en suspension», «Ministre», «propriétaire», «rejeter» et «volume d'activité» ont la même définition que dans le Règlement sur les effluents des établissements de transformation de la pomme de terre.

(2) Lorsque les eaux pluviales sont protégées, d'une façon que le Ministre peut approuver par écrit, de la contamination par les substances nocives provenant de l'établissement et désignées aux alinéas 4a) et b), elles ne sont pas censées être des effluents aux fins des présentes lignes directrices.

(3) Lorsque, avant d'être rejeté, l'effluent a été traité, d'une façon que le Ministre peut approuver par écrit, à l'extérieur de l'établissement afin d'en extraire les substances nocives désignées aux alinéas 4a) et b) et d'en régler le pH, il n'est plus censé en être un aux fins des présentes lignes directrices.

Application

3. Les présentes lignes directrices s'appliquent à tous les établissements existants.

Substances et paramètres visés

4. Les substances et les paramètres suivants sont visés par les présentes lignes directrices:

- a) les matières exerçant une demande biochimique d'oxygène;
- b) les matières totales en suspension; et
- c) le pH.

Objectifs

5. Aux fins des présentes lignes directrices, le propriétaire d'un établissement appartenant à l'une des catégories énumérées à la colonne I de l'annexe I est autorisé à rejeter une substance désignée aux alinéas 4a) et b) à condition que:

- a) le rejet journalier réel de chaque substance, calculé conformément au paragraphe 11(1), ne dépasse pas le rejet journalier maximal fixé pour la catégorie d'établissement en question, tel qu'il est indiqué à la colonne III de l'annexe;
- b) le rejet journalier moyen de chaque substance durant un mois, calculé conformément au paragraphe 11(2), ne dépasse pas le rejet journalier moyen maximal fixé pour la catégorie d'établissement en question, tel qu'il est indiqué à la colonne IV de l'annexe; et
- c) le pH de chaque échantillon composite de l'effluent, mesuré conformément au paragraphe 9(3), se situe entre 6,0 et 9,0.

ADDITIONAL OBJECTIVES

General

6. The owner of a plant should, for each type of effluent deposited by the plant,

- (a) install and maintain facilities, including sampling connections and flow measuring devices, of such type as the Minister may in writing approve for sampling and analysing effluents for the purpose of enabling the Minister to determine whether the owner is meeting the objectives prescribed by section 5;
- (b) take a composite sample on the regular basis prescribed by section 8;
- (c) analyse the sample referred to in paragraph (b) in accordance with section 9;
- (d) measure the flow in accordance with section 10; and
- (e) determine the actual and average daily deposits of each substance in accordance with section 11.

Method of Collecting Composite Samples

7. A composite sample should be obtained by collecting effluent discharged from a plant during a processing day

- (a) continually during a sampling period of twenty-four hours at a rate in proportion to the flow rate of the effluent discharged; or
- (b) in such a manner that equal volumes of effluent are delivered into a receptacle at equal intervals not longer than one hour during a sampling period of twenty-four hours.

Frequency of Sampling and Analysis

8. The sampling referred to in paragraph 6(b) should be made

- (a) in the case of a plant where the weekly quantity of raw potatoes processed is less than 400 tonnes, on one processing day each week; and
- (b) in the case of a plant where the weekly quantity of raw potatoes processed is 400 tonnes or more, on two processing days each week.

Analytical and Other Test Methods

9. (1) For the purposes of paragraph 6(c), the concentration in milligrams per litre of a substance described in an item of Schedule II, in each composite sample, should be determined using

- (a) the test method set out in column I and modified in column II of that item; or
- (b) any other method, approved in writing by the Minister, the results of which can be confirmed by the method referred to in paragraph (a).

(2) For the purposes of paragraph 6(c), procedures pertaining to sampling, preservation and storage of samples and prevention of interference relating to the test methods referred to in paragraph (1)(a), as outlined in the general sections of the publication "Standard Methods for the Examination of Water and Wastewater", 14th Edition (1975), published joint-

OBJECTIFS SUPPLÉMENTAIRES

Généralités

6. Le propriétaire d'un établissement doit, pour chaque type d'effluent rejeté,

- a) installer et entretenir des appareils d'échantillonnage et d'analyse des effluents, y compris des raccords d'échantillonnage et des débitmètres, du type que le Ministre peut approuver par écrit et permettant à ce dernier de juger si les limites prescrites à l'article 5 sont respectées par le propriétaire;
- b) prélever des échantillons composites aux fréquences indiquées à l'article 8;
- c) analyser les échantillons décrits à l'alinéa b) aux fréquences indiquées à l'article 9;
- d) mesurer le débit conformément à l'article 10; et
- e) déterminer les rejets journaliers réels et moyens de chaque substance conformément à l'article 11.

Méthode de prélèvement des échantillons composites

7. Un échantillon composite doit être prélevé dans l'effluent rejeté par un établissement au cours d'une journée d'exploitation:

- a) en continu pendant vingt-quatre heures et proportionnellement au débit de l'effluent; ou
- b) de telle sorte que des volumes égaux d'effluent soient recueillis dans un récipient à des intervalles de temps égaux ne dépassant pas une heure au cours d'une période d'échantillonnage de vingt-quatre heures.

Fréquence des échantillonnages et des analyses

8. L'échantillonnage dont il est question à l'alinéa 6b) doit se faire:

- a) au cours d'une journée d'exploitation par semaine si le volume d'activité est inférieur à 400 tonnes par semaine;
- b) au cours de deux journées d'exploitation par semaine si le volume d'activité est d'au moins 400 tonnes par semaine.

Méthodes d'analyse et de contrôle

9. (1) Aux fins de l'alinéa 6c), la concentration, en milligrammes par litre, d'une substance figurant à l'annexe II, dans chaque échantillon composite, doit être dosée selon:

- a) la méthode indiquée en regard à la colonne I et ses modifications pertinentes de la colonne II; ou
- b) toute autre méthode approuvée par écrit par le Ministre et dont les résultats peuvent être confirmés par la méthode indiquée à l'alinéa a).

(2) Aux fins de l'alinéa 6c), on doit suivre les méthodes d'échantillonnage, de préservation et de conservation des échantillons et d'élimination des interactions des méthodes dont il est question à l'alinéa 1a), tel qu'il est indiqué dans les sections générales du recueil «Standard Methods for the Examination of Water and Wastewater», 14^e édition (1975),

ly by the American Public Health Association, American Water Works Association and the Water Pollution Control Federation, should be adhered to.

(3) For the purposes of paragraph 6(c), the pH of a composite sample should be determined using

(a) the test method prescribed by section 424 of the publication referred to in subsection (2); or

(b) any other method, approved in writing by the Minister, the results of which can be confirmed by the method referred to in paragraph (a).

Flow Measurement

10. For the purpose of paragraph 6(d), the flow of each type of effluent deposited by a plant should be measured continuously and recorded.

Calculation of Actual Deposit

11. (1) For the purposes of paragraph 6(e), the actual daily deposit per unit of production of each substance prescribed by paragraphs 4(a) and (b) should be determined using the data obtained under subsection 9(1) and section 10 and should be expressed in terms of kilograms per tonne of raw potatoes processed per day.

(2) For the purposes of paragraph 6(e), the average daily deposit per unit of production during a month of each substance prescribed by paragraphs 4(a) and (b) should be determined by calculating the average of the results obtained under subsection (1) and should be expressed in the terms set out in that subsection.

Reporting and Records

12. (1) The owner of a plant should, within thirty days after the end of each month, sign, date and forward to the Minister a report, in such form as the Minister may in writing approve, showing for that month

(a) the actual daily deposit of substances deposited by the plant on each day that samples were taken, determined and expressed in accordance with subsection 11(1);

(b) the average daily deposit of substances deposited by the plant, determined and expressed in accordance with subsection 11(2);

(c) the pH of composite samples, determined in accordance with subsection 9(3);

(d) the daily production of the plant for each day that samples were taken expressed in terms of tonnes of raw potatoes processed;

(e) the weekly production of the plant for each week during the month, expressed in terms of tonnes of raw potatoes processed;

(f) the number of operating days; and

(g) the total daily flow, in litres, of each type of effluent discharged on each day that samples were taken.

(2) The owner of a plant that deposits a substance prescribed by paragraphs 4(a) and (b) should, within 120 days of the coming into force of the "Potato Processing Plant Liquid Effluent Regulations", sign, date and forward to the Minister

publié conjointement par l'*American Public Health Association*, l'*American Water Works Association* et la *Water Pollution Control Federation*.

(3) Aux fins de l'alinéa 6c), le pH d'un échantillon composite doit être mesuré selon:

a) la méthode indiquée à la section 424 du recueil dont il est question au paragraphe (2); ou

b) toute autre méthode que le Ministre a approuvée par écrit et dont les résultats peuvent être confirmés par la méthode indiquée à l'alinéa a).

Mesure du débit

10. Aux fins de l'alinéa 6d), le débit de chaque type d'effluent rejeté par un établissement doit être mesuré en continu et enregistré.

Calcul des rejets réels

11. (1) Aux fins du paragraphe 6e), le rejet journalier réel par unité de production de chaque substance mentionnée aux alinéas 4a) et b) doit être calculé à l'aide des données obtenues conformément au paragraphe 9(1) et à l'article 10 et doit s'exprimer en kilogrammes par tonne métrique de pommes de terre transformées et par jour.

(2) Aux fins de l'alinéa 6e), le rejet journalier moyen de chaque substance nocive mentionnée aux alinéas 4a) et b) par unité de production et par mois doit être déterminé par le calcul de la moyenne des résultats obtenus conformément au paragraphe (1) et doit être exprimé de la façon qui y est indiquée.

Rapports et dossiers

12. (1) Le propriétaire d'un établissement doit signer, dater et envoyer au Ministre, dans les trente jours après la fin de chaque mois, un rapport établi en la forme que ce dernier peut approuver par écrit et indiquant pour ce mois:

a) les rejets journaliers réels de substances, à chaque jour où des échantillons ont été prélevés, ces rejets étant calculés et exprimés conformément au paragraphe 11(1);

b) les rejets journaliers moyens de substances, calculés et exprimés conformément au paragraphe 11(2);

c) le pH des échantillons composites, mesuré conformément au paragraphe 9(3);

d) le volume journalier d'activité de l'établissement, pour chaque journée d'échantillonnage;

e) le volume hebdomadaire d'activité de l'établissement pour chaque semaine du mois;

f) le nombre de journées d'exploitation;

g) le volume journalier total, en litres, de chaque type d'effluent, chaque jour où des échantillons ont été prélevés.

(2) Le propriétaire d'un établissement qui rejette une substance mentionnée aux alinéas 4a) et b) doit, dans les 120 jours de l'entrée en vigueur du Règlement sur les effluents des établissements de transformation de la pomme de terre, signer,

a declaration, in such form as the Minister may in writing approve,

- (a) showing the average weekly production of the plant for the previous year, in terms of tonnes of raw potatoes processed;
- (b) showing the actual production of the plant for the previous year, in terms of tonnes of raw potatoes processed; and
- (c) listing the major products produced.

(3) The owner of a plant should, within thirty days after the end of each calendar year, sign, date and forward to the Minister a declaration of such form as the Minister may in writing approve, showing the actual production of the plant for the previous year, in terms of tonnes of raw potatoes processed.

Permitted Variation in Additional Objectives

13. Where the owner of a plant establishes to the satisfaction of the Minister that for scientific and technical reasons a scheme of sampling and analysis, measurement or reporting referred to in sections 7, 9, 10 and 12 other than at the regular time interval frequencies required by section 8 is sufficient to enable the Minister to determine whether the owner is complying with the limits of maximum deposits prescribed by section 5, the Minister may, in writing, permit the owner to

- (a) take and analyse samples of each effluent in accordance with the scheme on a regular basis specified in the letter of permission;
- (b) measure the volume of each effluent in accordance with the scheme on a regular basis specified in the letter of permission;
- (c) report to the Minister in accordance with the scheme on a regular basis specified in the letter of permission

and sections 7, 8, 9, 10 and 12 do not apply to the owner if he complies with the scheme on the regular basis specified in the letter of permission.

SCHEDULE I

MAXIMUM DEPOSITS OF SUBSTANCES CONSIDERED IN PARAGRAPHS 4(a) AND (b) OF THE GUIDELINES

Column I	Column II	Column III	Column IV
Class of Plant	Substance	Maximum actual daily deposit	Maximum average daily deposit
Potato Chip Plant	Biochemical Oxygen Demanding Matter	3.0 kg/tonne of raw potatoes processed	1.0 kg/tonne of raw potatoes processed
	Total Suspended Matter	4.2 kg/tonne of raw potatoes processed	1.4 kg/tonne of raw potatoes processed

dater et envoyer au Ministre une déclaration établie en la forme que peut approuver ce dernier par écrit,

- a) indiquant le volume hebdomadaire d'activité de l'établissement pour l'année précédente;
- b) indiquant le volume annuel d'activité de l'établissement pour l'année précédente; et
- c) énumérant les principaux produits fabriqués.

(3) Le propriétaire d'un établissement doit signer, dater et envoyer au Ministre, dans les trente jours suivant la fin de chaque année civile, une déclaration établie en la forme que ce dernier peut approuver par écrit, indiquant le volume réel d'activité de l'établissement pour l'année précédente.

Modifications permises des conditions supplémentaires

13. Lorsque le propriétaire d'un établissement peut convaincre le Ministre que, pour des raisons scientifiques et techniques, la fréquence des échantillonnages et des analyses, des mesures ou de la présentation des rapports, qui font l'objet des articles 7, 9, 10 et 12, différente de celle qui est prescrite à l'article 8, suffit pour permettre au Ministre de juger si les limites prescrites à l'article 5 sont respectées, ce dernier peut autoriser le propriétaire par écrit:

- a) à prélever et à analyser des échantillons de chaque effluent, selon la fréquence précisée dans la lettre d'autorisation;
- b) à mesurer le volume de chaque effluent, selon la fréquence précisée dans la lettre d'autorisation;
- c) à remettre ses rapports au Ministre, à la fréquence précisée dans la lettre d'autorisation,

et les articles 7, 8, 9, 10 et 12 ne s'appliquent pas au propriétaire s'il se conforme aux fréquences précisées dans la lettre d'autorisation.

ANNEXE I

REJETS MAXIMAUX DES SUBSTANCES INDIQUÉES AUX ALINÉAS 4a) ET b) DES PRÉSENTES LIGNES DIRECTRICES

Colonne I	Colonne II	Colonne III	Colonne IV
Catégorie d'établissement	Substance	Rejet réel journalier maximal	Rejet journalier moyen maximal
Fabrique de croustilles	Matières exerçant une demande biochimique d'oxygène	3,0 kg par tonne de pommes de terre naturelles transformées	1,0 kg par tonne de pommes de terre naturelles transformées
	Matières totales en suspension	4,2 kg par tonne de pommes de terre naturelles transformées	1,4 kg par tonne de pommes de terre naturelles transformées

SCHEDULE I—Conc.

MAXIMUM DEPOSITS OF SUBSTANCES CONSIDERED IN
PARAGRAPHS 4(a) AND (b) OF THE GUIDELINES

Column I	Column II	Column III	Column IV
Class of Plant	Substance	Maximum actual daily deposit	Maximum average daily deposit
Other Potato Products Plants*	Biochemical Oxygen Demanding Matter	5.4 kg/tonne of raw potatoes processed	1.8 kg/tonne of raw potatoes processed
	Total Suspended Matter	4.8 kg/tonne of raw potatoes processed	1.6 kg/tonne of raw potatoes processed

*Note: Other Potato Products Plants include plants which produce canned potato products, dehydrated potato products, frozen potato products and potato starch.

SCHEDULE II

ANALYTICAL TEST METHODS FOR DETERMINING PRESENCE
AND CONCENTRATIONS OF SUBSTANCES IN EFFLUENTS

Item	Substance	Column I Test Methods	Column II Remarks
1	Biochemical Oxygen Demanding Matter (BOD)	APHA* Section 507	For determining dissolved oxygen the following tests are recommended: Section 422 B APHA* or Section 422 F APHA*, the probe must be standardized against Winkler-Azide method (Section 422 B, APHA*)
2	Total Suspended Matter	APHA* Section 208 D	

* Refers to the publication "Standard Methods for the Examination of Water and Wastewater", 14th Edition (1975), published jointly by the American Public Health Association, American Water Works Association and the Water Pollution Control Federation.

[29-1-o]

DEPARTMENT OF FISHERIES AND THE
ENVIRONMENT

The following guidelines are issued under the authority of the Minister of Fisheries and the Environment. The intent of the guidelines is to control the discharge of liquid effluents from existing potato processing plants in a manner similar to the "Potato Processing Plant Liquid Effluent Regulations" (SOR/77-518) which apply to the new and expanded potato processing plants, as published in Part II of the July 13, 1977 issue of the *Canada Gazette*.

ANNEXE I—Fin

REJETS MAXIMAUX DES SUBSTANCES INDIQUÉES AUX
ALINÉAS 4a) ET b) DES PRÉSENTES LIGNES DIRECTRICES

Colonne I	Colonne II	Colonne III	Colonne IV
Catégorie d'établissement	Substance	Rejet réel journalier maximal	Rejet journalier moyen maximal
Autres établissements de transformation de la pomme de terre*	Matières exerçant une demande biochimique d'oxygène	5,4 kg par tonne de pommes de terre naturelles transformées	1,8 kg par tonne de pommes de terre naturelles transformées
	Matières totales en suspension	4,8 kg par tonne de pommes de terre naturelles transformées	1,6 kg par tonne de pommes de terre naturelles transformées

* C'est-à-dire les conserveries de pommes de terre, ainsi que les fabriques de pommes de terre déshydratées ou congelées et les féculeries.

ANNEXE II

MÉTHODES QUALITATIVES ET QUANTITATIVES D'ANALYSE
DES SUBSTANCES PRÉSENTES DANS LES EFFLUENTS

Article	Substance nocive	Colonne I Méthode d'analyse	Colonne II Modifications
1	Matières exerçant une demande biochimique d'oxygène (D.B.O.)	Section 507 de l'APHA*	Pour le dosage de l'oxygène dissous, les méthodes suivantes sont recommandées: Section 422 B de l'APHA* ou Section 422 F de l'APHA*. La méthode doit être vérifiée par celle de Winkler à l'azoture (section 422 B de l'APHA*).
2	Matières totales en suspension	Section 208 D de l'APHA*	

* *Standard Methods for the Examination of Water and Wastewater*, 14^e édition (1975), publié conjointement par l'American Public Health Association, l'American Water Works Association et la Water Pollution Control Federation.

[29-1-o]

MINISTÈRE DES PÊCHES ET DE
L'ENVIRONNEMENT

Les présentes lignes directrices sont publiées avec l'autorisation du ministre des Pêches et de l'Environnement. Elles ont pour objet de limiter les rejets d'effluents par les établissements existants de transformation de la pomme de terre de la même façon que le «Règlement sur les effluents liquide des établissements de transformation de la pomme de terre» (DORS/77-518), qui s'applique aux établissements nouveaux et à capacité accrue, publié le 13 juillet 1977 dans la Partie II de la *Gazette du Canada*.

TOXICITY GUIDELINES FOR POTATO PROCESSING PLANTS

GUIDELINES FOR THE MEASUREMENT OF ACUTE LETHALITY IN LIQUID EFFLUENTS FROM POTATO PROCESSING PLANTS

Short Title

1. These Guidelines may be referred to as the *Toxicity Guidelines for Potato Processing Plants*.

These Guidelines are not to be construed as regulations made under the authority of section 33 of the Fisheries Act.

Interpretation

2. (1) In these Guidelines "composite sample", "deposit", "effluent", "Minister", "owner", "plant", "process water", "processing day", and "storm water" have the meaning defined in the "Potato Processing Plant Liquid Effluent Regulations".

(2) When storm water is deemed not to be part of the effluent for the purposes of the "Potato Processing Plant Liquid Effluent Regulations" and the "Potato Processing Plant Effluent Guidelines", the storm water shall be deemed not to be part of the effluent for the purposes of these Guidelines.

(3) When, prior to being deposited, any effluent from a plant has been treated, in such manner as the Minister may approve in writing, at any site outside a plant for the purposes of removing therefrom toxicity, the effluent shall be deemed not to be effluent for the purposes of these Guidelines.

Application

3. These Guidelines apply to every potato processing plant.

Objectives

4. For the purposes of these Guidelines, the objective for each undiluted effluent deposited is that no more than 50% of the fish die in a composite sample within 96 hours when tested according to the Test Procedure for Ninety-Six Hours Acute Lethality Continuous Flow Test set out in Schedule II.

Monitoring

5. The owner of a plant should carry out an acute lethality test on a composite sample of each undiluted effluent deposited, or have these tests carried out on his behalf, in accordance with the Test Procedure for Twenty-Four Hours Acute Lethality Static Test set out in Schedule I, every two months.

Reporting

6. The owner of a plant should, within thirty days after the end of each test, sign, date and forward to the Minister a report, in such form as the Minister may in writing approve,

LIGNES DIRECTRICES CONCERNANT LE CONTRÔLE DE LA LÉTALITÉ AIGUË DES EFFLUENTS DES ÉTABLISSEMENTS DE TRANSFORMATION DE LA POMME DE TERRE

Titre abrégé

1. Les présentes lignes directrices peuvent être désignées sous le titre: *Lignes directrices concernant la toxicité des effluents des établissements de transformation de la pomme de terre*.

Elles ne peuvent être interprétées comme étant un règlement établi aux termes de l'article 33 de la *Loi sur les pêcheries*.

Interprétation

2. (1) Dans les présentes lignes directrices, les termes «eau de traitement», «eaux pluviales», «échantillon composite», «effluent», «établissement», «journée d'exploitation», «Ministre», «propriétaire» et «rejeter» ont la même définition que dans le Règlement sur les effluents des établissements de transformation de la pomme de terre.

(2) Lorsque les eaux pluviales ne sont pas considérées comme des effluents aux fins du Règlement et des Lignes directrices sur les effluents des établissements de transformation de la pomme de terre, elles ne le sont pas non plus aux fins des présentes lignes directrices.

(3) Lorsque, avant d'être rejeté, l'effluent a été traité, d'une façon que le Ministre peut approuver par écrit, à l'extérieur de l'établissement afin d'en éliminer la toxicité, il n'est plus censé en être un aux fins des présentes lignes directrices.

Application

3. Les présentes lignes directrices s'appliquent à tous les établissements de transformation de la pomme de terre.

Objectif

4. Aux fins des présentes lignes directrices, l'objectif pour chaque effluent rejeté à l'état non dilué est un taux de mortalité des poissons ne dépassant pas 50% après 96 heures, lors d'un contrôle toxicologique réalisé selon la méthode indiquée à l'annexe II, *Mode opératoire du contrôle de la létalité aiguë d'une durée de 96 heures, dans des conditions dynamiques*, à l'aide d'un échantillon composite de l'effluent.

Contrôle

5. L'exploitant d'un établissement devrait effectuer ou faire effectuer tous les deux mois un contrôle de la létalité aiguë de chaque effluent rejeté à l'état non dilué, à l'aide d'un échantillon composite, selon la méthode décrite à l'annexe I, *Mode opératoire du contrôle de la létalité aiguë d'une durée de 24 heures, dans des conditions statiques*.

Rapports

6. Le propriétaire d'un établissement doit, dans les trente jours après chaque contrôle, signer, dater et envoyer au Ministre un rapport établi en une forme que peut approuver ce

showing the following details of any acute lethality test conducted in accordance with section 5, namely:

- (a) the date and time period of the composite sample collection,
- (b) details on refrigeration, transportation and storage of the sample,
- (c) the date and time the test commenced,
- (d) the number of dead fish observed in the test and control vessels for the exposure times outlined in the test procedure used,
- (e) the percent mortality of fish exposed to the toxicity test sample and to the control water at the completion of the test, and
- (f) any other information that the Minister may require.

Permitted Variation in Monitoring and Reporting

7. Where the owner of a plant establishes to the satisfaction of the Minister that for scientific and technical reasons a scheme of sampling and testing, or reporting referred to in sections 5 and 6 other than at the regular time interval frequencies specified in those sections is sufficient to enable the Minister to determine whether the owner is meeting the objectives outlined in section 4, the Minister may, in writing, permit the owner to

- (a) take and test samples of each effluent in accordance with the scheme on a regular basis specified in the letter of permission;
- (b) report to the Minister in accordance with the scheme on a regular basis specified in the letter of permission

and sections 5 and 6 do not apply to the owner if he complies with the scheme on the regular basis specified in the letter of permission.

SCHEDULE I

TEST PROCEDURE FOR TWENTY-FOUR HOUR ACUTE LETHALITY STATIC TEST

The basic applicable portions of APHA*, sections 801 and 810, shall be used as a basis for this test procedure with the following modifications:

- (a) Rainbow Trout (*Salmo gairdneri* Richardson) shall be used as the standard test organism for the test procedure.
- (b) Only healthy, standardized stocks of properly acclimated Rainbow trout shall be used.
- (c) For each acute lethality test, at least ten fish shall be exposed to a representative portion of the composite sample for a period of twenty-four hours and an equal number of fish shall be exposed for the same period under identical conditions to water used for holding fish stocks (control fish).
- (d) This test is invalid if greater than 10% of the control fish die.

dernier par écrit et indiquant les détails suivants concernant tous les contrôles de la létalité aiguë réalisés conformément à l'article 5:

- a) la date et la période de temps où l'échantillon composite a été prélevé;
- b) les détails sur la réfrigération, le transport et la conservation de l'échantillon;
- c) la date et l'heure du début de chaque contrôle;
- d) le nombre de poissons morts dans les milieux contrôlés et dans les milieux témoins après les durées d'exposition indiquées dans le mode opératoire utilisé;
- e) le pourcentage de poissons morts dans les milieux contrôlés et témoins à la fin des contrôles; et
- f) tout autre renseignement que le Ministre peut exiger.

Modification acceptable des modalités de contrôle et de présentation des rapports

7. Lorsque le propriétaire d'un établissement établit à la satisfaction du Ministre que, pour des raisons scientifiques et techniques, une fréquence d'échantillonnage et d'analyse ou de présentation des rapports, différente de celle dont il est question aux articles 5 et 6, suffit pour permettre au Ministre de juger si les objectifs fixés à l'article 4 sont respectés, ce dernier peut indiquer par écrit à l'exploitant qu'il est acceptable:

- a) de prélever et d'analyser les échantillons de chaque effluent non dilué, à la fréquence indiquée dans la lettre d'autorisation; ou
- b) de faire parvenir les rapports au Ministre à la fréquence indiquée dans la lettre d'autorisation,

et les articles 5 et 6 ne s'appliquent pas au propriétaire s'il se conforme aux fréquences précisées dans la lettre d'autorisation.

ANNEXE I

MODE OPÉRATOIRE DU CONTRÔLE DE LA LÉTALITÉ AIGUË D'UNE DURÉE DE 24 HEURES DANS DES CONDITIONS STATIQUES

Suivre les indications applicables, section 801 et 810 du recueil de l'APHA*, comme fondement opératoire du présent contrôle, en apportant les modifications suivantes:

- a) L'espèce utilisée est la truite arc-en-ciel (*Salmo gairdneri* Richardson).
- b) N'utiliser que des truites normalisées, en bonne santé et bien acclimatées.
- c) Dans chaque contrôle, au moins dix poissons doivent être exposés à une partie représentative de l'échantillon composite pendant une période de 24 heures, et un nombre égal de poissons témoins doivent être gardés dans des conditions identiques pendant la même période de temps dans l'eau utilisée pour conserver les poissons.
- d) Le contrôle n'est pas valable si plus de 10% des poissons témoins meurent.

(e) For each gram of fish there shall be at least 1.5 litres of fresh test sample per twenty-four hour test.

(f) The minimum water depth in any test vessel shall be ten centimetres (10 cm).

(g) The test sample shall be aerated or oxygenated with only that amount of air or oxygen required to maintain a minimum dissolved oxygen level of 8 mg/l and aeration or oxygenation shall be minimized to reduce the stripping of volatile compounds or the oxidation of acutely lethal components in the test sample.

(h) In any test, individual fish shall weigh between 0.5 and 10 grams and the weight of the largest fish shall not be more than twice the smallest.

(i) The test shall be conducted at $15 \pm 1^\circ$ celsius.

(j) The number of dead fish in the treatment and control vessels shall be recorded at $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 4, 8, 12 and 24 hours.

(k) There shall be no direct adjustment of the pH or other chemical characteristics of the test sample.

(l) When transportation or storage of a composite sample is necessary, special precautions shall be used to minimize degradation as follows:

(i) the sample shall be kept in sealed containers which are completely filled to the exclusion of all air,

(ii) if it is necessary for the sample to be stored more than sixty hours between collection and testing, then the sample shall be brought to a temperature range of 1° to 6°C as soon as possible after collection and maintained at this temperature range until just prior to being tested, and

(iii) acute lethality testing commence as soon as possible but in no case shall it commence later than four days after sampling.

e) Pour chaque contrôle d'une durée de 24 heures, il doit y avoir au moins 1,5 litre d'échantillon frais par gramme de poisson.

f) La profondeur minimale de solution dans chaque bassin de contrôle est de dix centimètres (10 cm).

g) L'échantillon contrôlé ne doit être aéré ou oxygéné qu'avec la quantité d'air ou d'oxygène nécessaire pour maintenir une teneur minimale d'oxygène dissous de 8 mg/l. L'aération et l'oxygénation doivent être réduites pour empêcher l'entraînement des composés volatils ou l'oxydation des composants très toxiques de l'échantillon.

h) Dans tous les cas, chaque poisson doit peser entre 0,5 et 10 grammes, et le poids du plus gros ne doit pas dépasser le double de celui du plus petit.

i) Le contrôle doit se faire à $15 \pm 1^\circ\text{C}$.

j) Le nombre de poissons morts dans chaque milieu doit être noté après $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 4, 8, 12 et 24 heures.

k) Le pH ni les autres caractéristiques chimiques de l'échantillon contrôlé ne doivent être modifiés.

l) Lorsqu'il est nécessaire de transporter ou de conserver un échantillon d'effluent, les précautions spéciales suivantes doivent être prises pour en réduire la dégradation:

(i) garder l'échantillon dans des récipients remplis à pleine capacité, pour en éliminer l'air, et bouchés hermétiquement;

(ii) s'il est nécessaire de conserver l'échantillon plus de 60 heures avant le contrôle, l'amener à une température dans l'intervalle de 1 à 6°C , le plus tôt possible après son prélèvement, et le maintenir à cette température jusqu'au moment des contrôles;

(iii) commencer les contrôles aussitôt que possible dans les quatre jours au plus suivant l'échantillonnage.

* Refers to the publication "Standard Methods for the Examination of Water and Wastewater", 14th Edition (1975), published jointly by the American Public Health Association, American Water Works Association and the Water Pollution Control Federation.

* *Standard Methods for the Examination of Water and Wastewater*, 14^e édition (1975), publié conjointement par l'American Public Health Association, l'American Water Works Association et la Water Pollution Control Federation.

SCHEDULE II

ANNEXE II

TEST PROCEDURE FOR NINETY-SIX HOUR ACUTE LETHALITY CONTINUOUS FLOW TEST

MODE OPÉRATOIRE DU CONTRÔLE DE LA LÉTALITÉ AIGUE D'UNE DURÉE DE 96 HEURES DANS DES CONDITIONS DYNAMIQUES

The applicable portions of APHA*, sections 801 and 810, shall be used as a basis for this test procedure with the following modifications:

Suivre les indications applicables, sections 801 et 810 du recueil de l'APHA*, comme fondement opératoire du présent contrôle, en apportant les modifications suivantes:

(a) Rainbow Trout (*Salmo gairdneri* Richardson) shall be used as the standard test organism for the test procedure.

a) L'espèce utilisée est la truite arc-en-ciel (*Salmo gairdneri* Richardson).

(b) Only healthy, standardized stocks of properly acclimated Rainbow trout shall be used.

b) N'utiliser que des truites normalisées, en bonne santé et bien acclimatées.

(c) For each acute lethality test, at least thirty fish shall be exposed to a representative portion of the composite sample for a period of ninety-six hours and an equal number of fish shall be exposed for the same period under identical conditions to water used for holding fish stocks (control fish).

c) Dans chaque contrôle, au moins 30 poissons doivent être exposés à une partie représentative de l'échantillon composite pendant une période de 96 heures, et un nombre égal de poissons témoins doivent être gardés dans des conditions identiques pendant la même période de temps, dans l'eau utilisée pour conserver les poissons.

(d) This test is invalid if mortality occurs among the control fish.

(e) For each gram of fish there shall be at least 2.0 litres of fresh test sample per twenty-four hours. Ninety percent molecular exchange of test solution shall occur within eight hours. The minimum volume of solution in the test vessel shall be 200 cubic centimetres (cc) per gram of fish.

(f) The minimum water depth in any test vessel shall be ten centimetres (10 cm).

(g) The test sample shall be aerated or oxygenated with only that amount of air or oxygen required to maintain a minimum dissolved oxygen level of 8 mg/l and aeration or oxygenation shall be minimized to reduce the stripping of volatile compounds or the oxidation of acutely lethal components in the test sample. A maximum of 2 hours aeration of the test sample is allowed prior to the commencement of the test.

(h) In any test, individual fish shall weigh between 0.5 and 10 grams and the weight of the largest fish shall not be more than twice the smallest.

(i) The test shall be conducted at $15 \pm 1^\circ$ celsius.

(j) The number of dead fish in the treatment and control vessels shall be recorded at $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 4, 8, 24, 48, 72 and 96 hours.

(k) There shall be no direct adjustment of the pH or other chemical characteristics of the test sample.

(l) When transportation or storage of a composite sample is necessary, special precautions shall be used to minimize degradation as follows:

(i) the sample shall be kept in sealed containers which are completely filled to the exclusion of all air,

(ii) if it is necessary for the sample to be stored more than sixty hours between collection and testing, then the sample shall be brought to a temperature range of 1° to 6°C as soon as possible after collection and maintained at this temperature range until just prior to being tested, and

(iii) acute lethality testing shall commence as soon as possible but in no case shall it commence later than four days after sampling.

d) Le contrôle n'est pas valable si un seul des poissons témoins meurt.

e) Il doit y avoir au moins deux litres de solution fraîche pour chaque période de 24 heures et chaque gramme de poisson. Le taux de remplacement moléculaire de la solution doit être de 90% en huit heures. Le volume minimal de la solution dans les bassins doit être de 200 centimètres cubes (cm^3) par gramme de poisson.

f) La profondeur minimale de solution dans chaque bassin de contrôle est de dix centimètres (10 cm).

g) L'échantillon contrôlé ne doit être aéré ou oxygéné qu'avec la quantité d'air ou d'oxygène nécessaire pour maintenir une teneur minimale d'oxygène dissous de 8 mg/l. L'aération et l'oxygénation doivent être réduites pour empêcher l'entraînement des composés volatils ou l'oxydation des composants très toxiques de l'échantillon. Il est permis d'aérer l'échantillon à contrôler pendant un maximum de 2 heures, avant le contrôle.

h) Dans tous les cas, chaque poisson doit peser entre 0,5 et 10 grammes, et le poids du plus gros ne doit pas dépasser le double de celui du plus petit.

i) L'essai doit se faire à $15 \pm 1^\circ\text{C}$.

j) Le nombre de poissons morts dans chaque milieu doit être noté après $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 4, 8, 24, 48, 72 et 96 heures.

k) Le pH ni les autres caractéristiques chimiques de l'échantillon contrôlé ne doivent être modifiés.

l) Lorsqu'il est nécessaire de transporter ou de conserver un échantillon d'effluent, les précautions spéciales suivantes doivent être prises pour en réduire la dégradation:

(i) garder l'échantillon dans des récipients à pleine capacité, pour en éliminer l'air, et bouchés hermétiquement;

(ii) s'il est nécessaire de conserver l'échantillon plus de 60 heures avant le contrôle, l'amener à une température dans l'intervalle de 1 à 6°C , le plus tôt possible après son prélèvement, et le maintenir à cette température jusqu'au moment des contrôles;

(iii) commencer les contrôles aussitôt que possible dans les quatre jours au plus suivant l'échantillonnage.

* Refers to the publication "Standard Methods for the Examination of Water and Wastewater", 14th Edition (1975), published jointly by the American Public Health Association, American Water Works Association and the Water Pollution Control Federation.

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EXPLANATORY NOTES FOR THE
POTATO PROCESSING PLANT LIQUID EFFLUENT REGULATIONS
AND GUIDELINES

The following explanatory notes are intended to clarify the intent, meaning and basis of authority for the Regulations and Guidelines which are not always clear in the control documents because of the difficulty of expressing technical concepts in legal terminology.

INTENT

The intent of the controls, issued under the Fisheries Act, is to protect the fish and other aquatic life from the discharge of deleterious substances in effluents from potato processing plants. The controls embodied in the Regulations and Guidelines will apply uniformly across Canada as national baseline requirements. However, a potato processing plant located in an environmentally sensitive area may be subject to stricter controls. Provincial or local governments may also impose more stringent standards than the federal requirements. The more stringent requirements will prevail.

PURPOSE

The aim of these Regulations and Guidelines is to ensure that all potato processing plants operating in Canada apply best practicable technology to the control of their effluents. Details of best practicable process and treatment technology and internal water use practices that could be utilized to increase by-product recovery and minimize waste discharges are outlined in Appendix I.

METHOD OF DEVELOPMENT

There are two fundamental approaches to pollution control: (a) control at the source; or (b) specification of acceptable levels of degradation in the environment, e.g. receiving water quality standards. The Environmental Protection Service has opted for control at the source as the national approach, in order to reduce gross pollution as quickly as possible. The acceptable level of control is based on the application of "best practicable technology". The phrase "best practicable technology" implies technology both technically and economically viable. BPT (Best Practicable Technology), and the effluent quality standards reflecting BPT, were determined on the basis of recommendations of a task force comprised of federal and provincial regulatory agency officials and representatives of the industry. Within the potato processing industry task force, a number of working groups explored all aspects of the potato processing industry including the production of potato starch. The task force identified BPT and recommended achievable control standards and analytical methods for specified contaminants. These recommendations were then used to formulate the controls.

CONTROL DOCUMENTS

The requirements for the potato processing industry are expressed in regulations, guidelines and explanatory notes. The standards represent what the federal government expects of the industry as a national minimum acceptable control level.

A regulation is a specific law that applies to all relevant situations. The "Potato Processing Plant Liquid Effluent Regulations" are applicable to every new or expanded potato processing plants including starch plants. The regulations limit the amount of specific contaminants in effluents, and define the frequency of monitoring and reporting.

A guideline is not a specific law. It is a statement indicating what practices will be considered by the Environmental Protection Service to be in compliance with the spirit of the law. Failure to comply with a guideline is not itself an offence; however, it may mean that the law itself (e.g. the general prohibition of deleterious discharges expressed in the Fisheries Act) is being violated. The requirements for the potato processing industry includes two sets of guidelines:

(a) "Potato Processing Plant Effluent Guidelines, (Existing Plant Guidelines), and

(b) "Toxicity Guidelines for Potato Processing Plants".

The effluent guidelines ('a' above) limit the amount of specific contaminants in effluents and define the frequency of monitoring and reporting for existing plants. The toxicity guidelines ('b' above) relate to the acute lethality of an effluent to a species of test fish, and these requirements apply to every plant whether new, expanded or existing. Acute lethality tests involve exposing specified test organisms to samples of effluent under controlled conditions.

While the regulated potato processing plants must comply with the regulations from the day they came into force, the guidelines provide the administrative flexibility needed to allow the Minister and the plant owners and operators time to negotiate and implement a compliance schedule.

CONTROLLED PARAMETERS

Numerical limits have been set for biochemical oxygen demanding matter (BOD), total suspended matter, and pH. Limits have been specified for those parameters which are known to occur commonly in potato processing plant effluents in sufficient amounts to be deleterious to fish and for which demonstrated practicable technology exists to reduce these substances to low levels.

With the exception of pH, the numerical limits have been expressed in kilograms per tonne of raw potatoes processed. Expressing the limits in these terms avoids the situation in which the effluent can be diluted in order to meet a desired standard, a potential problem if the standards were expressed in terms of concentration.

Since the control documents are written in metric units, a table of conversion factors is given in Appendix II.

WATER USAGE

Although no attempt has been made to control water usage, water usage in potato processing plants should be minimized. Appendix I contains a section on water use practices. Plant owners are required to report the total daily flow, in litres, of each effluent discharged.

ACUTE LETHALITY LIMIT

The intent of these Toxicity Guidelines is to limit the deposit of deleterious substances to levels where such deposits are not acutely lethal to fish. The acute lethality test serves as a direct indicator of these presence of any contaminants that are acutely lethal to fish.

The acute lethality limit is believed to be compatible with the application of best practicable technology. However, it is suspected that the level of confidence in the effluent meeting the acute lethality test objectives is not as high as for the analytical parameters. For this reason the acute lethality objective is included in the form of a guideline rather than as a regulation.

Two test methods contained in the Toxicity Guidelines are described in the documents. The first is the "Continuous Flow Test" which will be conducted on a periodic basis by the Minister or his designated representative to determine the acute lethality of a plant effluent. The second test is the "Static Test" which is to be conducted by each plant. This test, which is less sensitive than the 96-hour continuous flow test, is intended for use by the plant as a routine check on effluent lethality. It will provide the plant owner with additional insight into how effective his wastewater treatment system is over extended periods of time and under varying operational and seasonal conditions.

MINISTER AND ADMINISTRATION

While the responsibility for administering the functions of the Minister under these regulations and guidelines normally rests with the Environmental Protection Service of the Department of Fisheries and the Environment, some of these functions may be performed in some provinces or territories by a provincial or other federal regulatory agency. However, unless a plant owner is notified that another agency is administering any part of these regulations or guidelines, he should direct any reports which are required to be sent to the Minister under the regulations or guidelines, or any inquiries, to the appropriate office of the Environmental Protection Service, Department of Fisheries and the Environment:

Pacific Region: British Columbia, Yukon

Regional Director
EPS - Pacific Region
Kapilano 100
Park Royal
West Vancouver, B.C.
V7T 1A2
Area Code 604 666-6711

Northwest Region: Alberta, Saskatchewan, Manitoba,
Northwest Territories

Regional Director
EPS - Northwest Region
10th floor, Room 901
Imperial Oil Building
10025 Jasper Avenue
Edmonton, Alberta
T5J 2X9
Area Code 403 425-4580

Ontario Region: Ontario

Regional Director
EPS - Ontario Region
2nd floor, 135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5
Area Code 416 966-5840

Quebec Region: Quebec

Regional Director
EPS - Quebec Region
2020 University Street
5th floor
Montreal, Quebec
H3B 3K9
Area Code 514 283-4670

Atlantic Region: New Brunswick, Prince Edward Island, Nova Scotia
and Newfoundland

Regional Director
EPS - Atlantic Region
16th floor
Bank of Montreal Tower
5151 George Street
P.O. Box 2406
Halifax, N.S.
B3J 3E4
Area Code 902 426-3593

INTERPRETATION

The definitions in the interpretation section of both the Regulations and Guidelines are quite specific, but a few points should be noted.

(a) "effluent" includes all wastewater generated in the operations of a plant such as process water, wash water, tank drainage, contaminated cooling water and contaminated storm water. Storm water will be considered to be contaminated if it comes into contact with any part of the plant and as a result the concentration of BOD or total suspended matter is increased above the background concentration of these substances normally found in storm water run-off in the area. Similarly cooling water, that comes into direct contact with the material being processed and as a result the concentration of BOD or grease is increased above the background levels normally found in the raw water supply shall be considered to be contaminated and will be regarded as process water. Cooling water, periodically discharged from a closed, recycling system to which slimicides, bacteriacides and similar agents have been added, shall be considered as contaminated for the purposes of the acute lethality guidelines. Cooling water which has been chemically treated prior to use and is subsequently discharged will be examined on a case by case basis.

Uncontaminated storm and cooling water will not be considered as effluent and will be exempt from the Regulations and Guidelines.

(b) "expanded plant" means any plant which increases its total annual production by 1.5 times, with this increase calculated against the annual production for 1976 calendar year. In addition it should be noted that an expanded plant must be in compliance with the Regulations on the first day of the month following the month in which plant became an expanded plant. Example calculations of the method of determining if a plant is an expanded plant are given in Appendix III.

(c) "plant" includes any facilities intended for the conversion of raw potatoes and potato derivatives into products such as:

- (a) frozen potato products
- (b) potato chips (snackfoods)
- (d) canned potato products
- (e) potato starch.

The area of concern to the Minister is the entire developed area of the property i.e. the actual facilities where storage, processing, packaging and shipping takes place and in addition all properties used in the operation of these facilities i.e. sludge disposal areas, spray irrigation systems, water and wastewater treatment facilities. However plants which only wash and bag potatoes for the fresh market are not included.

(d) "storm water" includes all surface run-off resulting from precipitation (rain, snow, etc.) falling on a plant and includes all run-off originating outside the plant if it passes over or through the plant. The control documents exclude clean run-off from the control requirements, providing this run-off is adequately segregated from contamination by any of the parameters listed in section 4 of the Regulations and Existing Guidelines. The segregation system so employed must be approved in writing by the Minister before that run-off is exempted from the Regulations and Guidelines. The intent of this is to encourage plants to prevent storm water from becoming contaminated and to segregate the clean storm water from other effluents.

OFFSITE TREATMENT FACILITIES

The control documents make an exemption from the control requirements for effluents leaving a potato processing plant, if those effluents are treated in facilities outside the plant, such as a municipal sewage system or a land disposal facility, and providing the Minister approves of such manner of disposal. This approval will only be given where the offsite facility provides an equivalent degree of treatment to that required by the Regulations and/or Guidelines. If the outside facilities are not approved by the Minister, the effluents leaving the potato processing plants are subject to the requirements of the Regulations and/or Guidelines.

Generally plants which discharge their effluent to an approved offsite facility, and which do not discharge contaminated storm or cooling water directly into a water course, will be exempted from the Regulations and Guidelines.

As land disposal such as spray irrigation has been recognized as a viable treatment alternative for potato processing wastes, a brief set of notes relating to this alternative is presented in Appendix IV.

LIMITS OF AUTHORIZED/MAXIMUM DEPOSITS

Section 5, together with Schedule 1, of both the Regulations and Existing Plant Guidelines sets out the maximum amount of BOD and total suspended matter that can be contained in the effluents being deposited. Distinction is made between classes of plants as well as between existing plants and new or expanded plants. In addition, different limits are set for the amount of each substance that can be discharged in any one operating day and the average amount that can be discharged during a month.

For example an existing potato chip plant cannot discharge, during any one day, more than 3.0 kilograms of BOD₅ per tonne of raw potatoes processed on that day, nor can the average daily discharge during a month exceed 1.0 kilogram of BOD₅ per tonne of raw potatoes processed. The reason that the discharge limit for any one day is higher than the monthly average discharge limit is to allow for minor short term variations in final effluent quality caused by temporary upsets in plant operations and variations in sampling and analytical procedures. The BOD₅ discharge limits for a new or expanded potato chip plant would be 1.5 kilograms per tonne of raw potatoes processed for any day and 0.5 kilograms per tonne of raw potatoes processed for an equivalent month.

Section 5 also contains a requirement that the pH of effluents be between 6.0 and 9.0.

Discharge limits in the Guidelines for existing plants are less stringent than in the Regulations for new and expanded plants. It is expected that, when new plants or plant expansions are being contemplated, water conservation programs and best practicable process and treatment technology will be incorporated into the design, thus allowing these plants to be in compliance with the Regulations as soon as they commence operation. It is intended that, over a period of time, all existing plants will eventually meet the limits presently required for new plants, either directly as they increase production and thus become expanded plants, or through the installation of best practicable technology for the purpose of replacement and/or upgrading of plant facilities.

ADDITIONAL CONDITIONS OF AUTHORIZATION/ADDITIONAL OBJECTIVES

Section 6 in both the Regulations and Existing Plant Guidelines outlines the additional requirements that must (should be adhered to by plant owners. This section outlines in general terms the need for:

- a) installation and maintenance of certain facilities,
- b) composite sampling,
- c) analysis,
- d) flow measurement, and
- e) calculation of actual deposits.

The above items are covered in detail in sections of the Regulations and Existing Plant Guidelines subsequent to section 6.

COMPOSITE SAMPLING AND ANALYSIS

Section 7 defines the term "composite sample". Composite samples may be obtained by utilizing either a sampler which samples proportional to flow or a sampler which samples at regular time intervals (i.e. withdraws equal volumes of sample at regular time intervals not exceeding one hour). To determine the concentration of a contaminant in the composite samples, the APHA tests specified in section 9 and Schedule II are to be used. Alternate test methods may be utilized provided they can be correlated to the specified test methods. The methods of sample preservation and interference elimination specified in APHA Standard Methods must be followed.

FREQUENCY OF TESTING

Section 8 of the Regulations and Existing Plant Guidelines specifies the frequency with which composite samples should be collected and analyzed. This section specifies different frequencies of sampling depending on the size of the plant. Wherever possible samples should be collected on Tuesday, Wednesday and/or Thursday to avoid operational problems associated with start-up and shut-down surrounding weekends.

FLOW MEASUREMENT

The Regulations and Existing Plant Guidelines stipulate, in section 10, that the flow of each effluent should be measured continuously and recorded. From these records, the total volume discharged each day can be obtained either by a summation of flow rates over the day or a meter reading each day. Where uncontaminated storm water or uncontaminated cooling water is discharged through a common system with the effluent, the effluent volume must be measured and the effluent sample must be collected before dilution.

A summary of flow measurement, frequency and type of sampling, and reporting requirements for the various classes and sizes of plants is provided in Appendix V.

CALCULATION OF ACTUAL DEPOSITS

The actual deposit of a contaminant discharged for a given period, normally 24 hours, can be calculated by multiplying the concentration of the contaminant measured in the effluent (section 9) by the volume of effluent deposited during the given period (section 10). The equation below gives the relationship:

$$\text{Total daily load of contaminant in kilograms} = \text{Daily flow of effluent in litres} \times \text{Concentration of contaminant in mg/litre} \times \frac{1}{10^6}$$

The total daily load of contaminant discharged is then divided by the total quantity of raw potatoes processed during the same 24 hour period to determine the quantity of contaminant discharged per unit of production e.g. kilograms of BOD₅ per tonne of raw potatoes processed. The quantities so obtained (actual deposits) are compared to the daily amount of authorized (maximum) deposits given in column III of Schedule I of the Regulations and Existing Plant Guidelines to determine if the plants concerned are in compliance with the requirements of the Regulations or Guidelines.

Each month the arithmetic average of the actual daily deposits measured during that month, expressed in terms of kilograms of contaminant per tonne of raw potatoes processed is calculated for each contaminant. These arithmetic averages are the average daily deposits for a month and are compared to the authorized (maximum) average daily deposit given in column IV of Schedule I to determine if the plants concerned are in compliance with the Regulations or Existing Plant Guidelines.

Appendix VI gives example calculations for determination of actual deposits and their comparison to authorized (maximum) deposits.

INTERMITTENT DISCHARGE OF EFFLUENTS

Plants which store their effluent for more than one month, and discharge during subsequent months, may not be able to meet the discharge limits. Under these circumstances the plant would be discharging the equivalent of more than one day's effluent per day but would be processing the normal amount of raw potatoes during that day. When these plants calculate their actual daily deposit they must use the actual daily flow figures and the actual or calculated daily production information. The use of intermittent discharge systems without suitable effluent treatment should be avoided since they can produce acutely lethal effluents.

REPORTING

Reporting requirements are specified in section 12 of the Regulations for all new and expanded plants and in section 12 of the Existing Plant Guidelines for all existing plants. In the case of new and expanded plants, the information reported is used to determine if the plant is in compliance with the regulated allowable limits. For existing plants, the reported information is required to determine if a plant meets the objectives of the Guidelines. It should be noted that the Regulations and Existing Plant Guidelines require all plants to report once each month, regardless of plant size.

It is hoped that the reporting requirements of these documents may be integrated with existing provincial reporting procedures currently in effect for potato processing plants. However the forms which should be used for reporting the information specified are attached in Appendix VII.

PRODUCTION INFORMATION

Section 12 of both the Regulations and Existing Plant Guidelines require that production information be reported periodically. This information is needed to determine:

1. frequency of sampling and analysis for individual plants, and,
2. if a plant has become an expanded plant and thus subject to the Regulations.

The forms attached in Appendix VII should be used for reporting production information.

ACUTE TOXICITY TESTING

Appendix VIII to these explanatory notes describes in some detail the 96-hour continuous flow test and the 24-hour static test. It is not practical, however, to include in Appendix VIII all technical data and equipment specifications that may be required by a laboratory intending to conduct these tests. For further information and advice, please contact the Environmental Protection Service of the Department of Fisheries and the Environment or the Minister's designated representative.

The 24-hour acute lethality static test, intended for use by plants or their consultants, should be conducted at a frequency specified in section 5 of the Toxicity Guidelines. Appendix VII provided a form which should be used when acute lethality test information is reported as specified in section 6 of the Toxicity Guidelines.

APPENDIX I

BEST PRACTICABLE PROCESS AND TREATMENT TECHNOLOGY AND WATER USE PRACTICES

Installation of Best Practicable Process and Treatment Technology (BPT) should ensure that each plant maximizes its by-product recovery and minimizes the discharge of BOD, total suspended matter and grease.

Best practicable treatment technology means a system equivalent to the following:

- (a) screening (such as tangential or sidehills) followed by
- (b) flow equalization followed by
- (c) primary clarification followed by
- (d) secondary treatment (such as extended aeration activated sludge) followed by
- (e) final effluent clarification
- (f) good housekeeping
- (g) good maintenance
- (h) safe disposal of spent chemicals (such as caustic soda and cleaning agents)
- (i) segregation and treatment of storm water, if required.
- (j) segregation of uncontaminated cooling water.

Best practicable process technology will vary depending on the sector of the industry being considered. However it is suggested that the competitive nature of the potato processing industry will ensure that the latest equipment technology available will be installed. New plants should consider such measures as separation of potato culls and peel wastes from the process water, recycle of process streams wherever possible, and the use of hydroclones to partially reclaim process water for recycle. Where possible, existing plants should upgrade their operations by employing the above schemes.

WATER USE PRACTICES

Although no attempt has been made to regulate water usage, potato processing plants are encouraged to control and minimize their water usage, thus minimizing the volume of effluent requiring treatment. It should be recognized that excess water usage in certain processes such as blanching generates excessively higher organic loadings due to leaching from the potato. The installation of best practicable process technology in both new and existing plants will result in significant reductions in water use. Indeed prior to the installation of effluent treatment systems, plant management should critically review its processing technology and water usage and institute a program of water conservation.

APPENDIX II

METRIC UNITS

The Regulations and Guidelines are expressed in terms of metric units. In order to avoid confusion the following conversion table is provided, however all plants are required to report information in metric units.

Conversion Table

	Symbols
ton (2240 pounds) X 1.0161 = tonnes	t
pounds X 0.4536 = kilograms	kg
imperial gallons X 4.5459 = litres	l
feet X 0.3048 = meters	m
cubic feet X 28.316 = litres	l

(Imperial gallons/1000 pounds) X 10.02 = litres/1000 kilograms (l/tonne)

Note that 1 metric tonne is equal to 1000 kilograms.

EXAMPLE 1

10 pounds X 0.4536 = 4.536 kilograms

EXAMPLE 2

20,000 pounds X 0.4536 = 9022 kilograms = 9.022 tonnes

EXAMPLE 3

20 gallons X 4.5459 = 90.918 litres

EXAMPLE 4

(650 gallons/1000 pounds) X 10.02 = 6513 litres/1000 kilograms
= 6513 litres/tonne

EXAMPLES 5

(Pounds/1000 pounds) X 1.0 = kilograms/1000 kilograms

APPENDIX III

EXPANDED PLANT - SAMPLE CALCULATION

The following example is provided to illustrate the steps involved in determining if a plant has become an expanded plant and these must meet the requirements of the Regulations.

EXAMPLE A potato chip plant commences operation in 1973 and steadily increases production to 1980; annual raw potatoes processed figures are given below:

	Annual Production (tonnes of raw potatoes processed)
1973	10,000
1974	12,000
1975	15,000
1976	15,000
1977	20,000
1978	25,000
1979	32,000
1980	40,000

For a plant to become an expanded plant it must increase its annual production by 2.5 times the 1976 annual production.

1976 production level = 15,000 t

New production level = 15,000 X 2.5 = 37,500 t.

or alternatively 15,000 + 15,000 X 1.5 = 37,500 t.

Thus in 1980 when the plants annual production exceeded the 37,500 tonnes mark the plant must be in compliance with the Regulations. In addition, annually that the plant achieved the 37,500 tonnes production level on September 15th, the requirements of the Regulations must be achieved by October 1st.

NOTE

Plant management, who are planning increases in production, are urged to discuss the matter with the Regulatory Agency. This will ensure that necessary planning to meet the objectives of the Guidelines or the requirements of the Regulations can proceed smoothly with the minimum of upset to plant production. Existing plants which meet the Guidelines will have to embark on an upgrading program to ensure they meet the requirements of the Regulations before their production exceeds the 2.5 times level. This upgrading program should be undertaken at the time expansions are made. The Regulatory Agency will assist plant management in determining if the contemplated production increases will necessitate a plant upgrading its treatment to meet the more stringent Regulatory requirements.

APPENDIX IV

GENERAL CONSIDERATIONS FOR LAND APPLICATION OF LIQUID EFFLUENTS

Introduction

The utilization and disposal of various wastewaters on land is considered a viable alternative to other wastewater treatment systems providing a number of conditions are met (5). The most active media for decomposition, immobilization or utilization of wastes is in the root zone of the soil which supports great numbers of diverse micro-organisms, a large and effective surface area for adsorption and plant roots for the extraction of plant nutrients. A number of non-biological chemical reactions are also possible in this zone. One must be cognizant of the value of this resource and take care not to restrict its potential with respect to food production. The degree of treatment by this method in respect to removal of BOD is generally greater than by other physical and biological methods (6). Operating costs can often be offset as a result of increased crop production due to utilization of nutrients in the effluent and to this beneficial effects of additional water in areas with general moisture deficits in the soil. Capital costs are extremely variable due to costs of land and equipment. Irrigation can be accomplished manually or by automated systems with their associated capital and operating costs. Another factor to be considered is the fact that land costs are likely to appreciate with time while mechanical biological plants depreciate.

Potato Wastewater Characteristics

Chemical characteristics of potato processing wastewater vary according to such factors as method of peeling, degree of in-plant recycling, pretreatment and the types of product produced. However, some general statements can be made in that total nitrogen concentration is usually between 20 to 50 mg/l, total phosphorus between 3 and 6 mg/l, and potassium is generally high compared to most wastewater, being in the range at 60 to 120 mg/l. The sodium concentration will either be relatively low or high depending on the method of peeling. The sodium concentration in the wastewater from plants utilizing the lye peeling process will be high and in most cases make irrigation inadvisable (1). The suitability of wastewater for irrigation is based on two major parameters; total dissolved solids as measured by the electrical conductivity (E.C.) and the sodium adsorption ratio (SAR). Considerable work in Alberta has placed the following limits on wastewater for sustained irrigation.

E.C. not greater than 2.5 mmhos/cm

SAR not greater than 8

The SAR is calculated as follows:
$$SAR = \frac{Na^+}{\sqrt{[(Ca^{++} + Mg^{++})/2]}}$$
with concentration expressed in meq/l

Wastewater Application

Two concepts in respect to annual application of wastewater have received the most consideration. At one end of the scale is the concept of maximum utilization of water and nutrients for crop production while at the other end, the concept of disposal with limited use of water and some use of nutrients.

According to unpublished data from the Agrometeorology Section of Agriculture Canada, all of the agricultural areas in Canada experience moisture deficits for perennial crops almost 50% of the time. Where these deficits are large and substantial land areas are available, the concept of full utilization is encouraged to take full advantage of the water and nutrients in the wastewater. This concept results in limited addition to the groundwater system and therefore subsurface drainage requirements are not critical.

In areas where moisture deficits are small or where large areas of land are difficult to obtain, the concept of land disposal will be necessary. In these cases the bulk of the wastewater will be lost to deep percolation as well as a portion of the nitrogen compounds contained therein. Except where the soil is coarse textured, a high percentage of the suspended solids, organic material and phosphorus will be removed. Conditions of subsurface drainage must be adequate to remove a large portion of the water applied as a drastic build-up of the water table could lead to anaerobic soil conditions. The consequence of increased groundwater flow and the possible addition of small amounts of nitrate to the groundwater should be assessed during a preliminary feasibility study. In situations where natural subsurface drainage conditions are inadequate, the installation of buried tile drains will be necessary.

Another method being advocated is spray-run-off where wastewater is sprayed on a grassed slope at a rate exceeding the infiltration of the soil. The excess wastewater which is collected at the bottom of the slope is of much improved quality (7). It should be recognized that effluent from this type of system would be subject to the Regulations and Guidelines, if it discharged to a watercourse.

One disadvantage of the irrigation method of waste treatment is the requirement of winter storage in most situations. The maximum use concept will require the longest storage as application is wholly dependant on consumptive use of water and nutrients by the crop.

The degree of solids removal before storage should be as great as practically possible to reduce odours from the storage pond and reduce the organic loading to the soil. It may in fact be necessary to supply aeration to the holding areas to reduce odors.

Examples of Land Applications

Maximum Use Concept

The application of 40 cm of potato dehydrating wastewater per annum in a region over a period of four years has resulted in a seasonal water table rise but with no change in the quality of the groundwater (1). A slight but predicted increase in salinity resulted.

Minimal Use Concept

Field trials utilizing artificially drained soils for treatment of corn cannery wastes resulted in an 87% COD reduction when the wastes were applied at a rate of two cm/day with a rest period of one to two hours between applications (3). Evidence was obtained to indicate that the backfill material had not settled adequately and therefore the waste was not retained long enough by the soil to facilitate oxidation. Laboratory miscible displacement trials removed 97% of the COD. Apparently the rest period was also of insufficient duration.

Spray Run-off

Cannery wastewaters were applied to a sloping grassed field at the application rate of 56 kilograms of BOD per hectare (50 lbs of BOD per acre) every third day. It was found, from the mean results over one year of operation that the BOD of the run-off had been reduced by 97 percent (5).

Costs

Although data is available on comparative treatment cost in an Environmental Protection Agency Publication (6) the variability in land requirements for storage and irrigation as well as return on investment from cash crops, in warrants a separate estimate for each situation.

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6. National Canners Association, 1971, Liquid Wastes from Canning and Freezing Fruits and Vegetables, U.S. Environmental Protection Agency.
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APPENDIX V

SUMMARY OF FLOW MEASUREMENT, FREQUENCY AND TYPE OF SAMPLING, AND REPORTING REQUIREMENTS

CLASS OF PLANT	PLANT SIZE tonnes of raw potatoes processed per week	FLOW MEASUREMENT measured continuously and recorded	FREQUENCY OF SAMPLING **		TYPE OF SAMPLE		REPORTING FREQUENCY for BOD,TSM, pH		ACUTE LETHALITY TESTING FREQUENCY once every two months	ACUTE LETHALITY REPORTING FREQUENCY within thirty days of testing	REMARKS
			one day per week	two days per week	composite at equal time intervals for 24 hours period	flow proportional composite	new plant monthly	existing monthly			
POTATO CHIP PLANT	< 400	X	X		X	X	X	X	X	X	
	> 400	X		X	X	X	X	X	X	X	
OTHER POTATO PRODUCTS PLANTS*	< 400	X	X		X	X	X	X	X	X	
	> 400	X		X	X	X	X	X	X	X	

* other potato products plants include plants which produce canned potato products, dehydrated potato products, frozen potato products and potato starch.

** these samples are for analysis of BOD₅, total suspended matter and pH.

APPENDIX VI

CALCULATION OF ACTUAL DEPOSITS

The following examples are provided to illustrate the steps involved in determining the actual deposits for a variety of plant conditions. The examples also illustrate the relative magnitudes of effluent concentrations, based on typical production and water use data, required to be in compliance with the Regulations or to meet the objectives of the Existing Plant Guidelines.

Plants are required to sample and measure flows at frequencies given in section 8 in both the Regulations and Existing Plant Guidelines. The frequency of sampling and measuring of flows varies depending on the size of the plant. Once plants have measured effluent flows and analysed for BOD₅ and total suspended matter, final effluent loadings must be calculated, as shown in Example 1. Once the required information on a plant's effluent has been determined, the information should be reported on the forms provided. (Appendix VII)

Examples Calculations

Four examples are presented below, as follows:

- Example 1 - New frozen potato products plant
- Example 2 - Existing frozen potato products plant
- Example 3 - New potato chip plant
- Example 4 - Existing potato chip plant

Example 1 - A new potato processing plant producing frozen french fries and hash browns and dehydrated potato products obtained the following results from an effluent sampling program for a one month period. Since the plant processed in excess of 400 tonnes of raw potatoes per week, composite samples were taken on two processing days during each week. The results of the effluent sampling are as follows.

1	2	3	4	5
Day	Flow (litres)	Quantity Processed (1000 kilograms)	BOD (mg/l)	TSM (mg/l)
1	328,000	50	100	75
2	377,000	52	65	66
3	427,000	50	320	285
4	315,000	42	50	65
5	292,000	45	75	80
6	382,000	53	90	70
7	315,000	48	110	85
8	292,000	50	135	125

Calculation of Actual Deposit

Day	BOD Loading	TSM Loading
	$\frac{\text{Col. 2}}{1,000,000} \times \text{col. 4}$ Col. 3	$\frac{\text{Col. 2}}{1,000,000} \times \text{col. 5}$ Col. 3
	(Kilograms/1000 Kilograms Potatoes)	(Kilograms/1000 Kilograms potatoes)
1	0.66	0.49
2	0.47	0.48
3	2.73	2.43
4	0.38	0.49
5	0.49	0.52
6	0.65	0.50
7	0.72	0.56
8	0.79	0.73

The monthly deposit is the average of the loading values for the sampling days. Hence:

Average of Daily Deposits of BOD = 0.86 kilograms/1000 kilograms potatoes and
 Average of Daily Deposits of TSM = 0.78 kilograms/1000 kilograms potatoes

Referring to the Regulations Schedule I, Table I for new frozen product plants, the plant would be in compliance with the monthly limits but was over the allowable daily deposit on one occasion. This indicates a possible short term upset in the system and/or sampling or analytical error that should be investigated.

Example 2 - An existing frozen products plant submitted the following effluent concentrations and loadings, and production and water use data for their monthly report.

Note: The calculation procedures involved in this and all following samples are identical to those shown in Example 1.

1	2	3	4	5	6	
Day	Water Use (Litres)	Potato Use (x 1000 kilograms)	BOD (mg/l)	BOD Loading (kilograms/1000 kilograms potatoes)	TSM (mg/l)	TSM Loading (kilograms/1000 kilograms potatoes)
1	117,000	14	190	1.59	175	1.46
2	126,000	11	250	2.86	225	2.58
3	113,000	14	180	1.45	156	1.26
4	135,000	15	205	1.85	200	1.80

Average of Daily Deposits of BOD = 1.94 kilograms/1000 kilograms raw potatoes
 Average of Daily Deposits of TSM = 1.78 kilograms/1000 kilograms raw potatoes

After comparison with Schedule I, Table I of the Guidelines, these results indicate that the plant meets the objectives of the guidelines for the daily deposit on all days but not the daily average for the month. Tighter control on the in-plant waste water discharges is possibly necessary or perhaps the effluent treatment plant is overloaded.

Example 3 - An effluent study of the treated effluent from a new potato chip processing facility exhibits characteristics and loadings as follows:

Day	Water Use (litres)	Potato Use (x 1000 kilograms)	BOD (mg/l)	BOD Loading (kilograms/1000 kilograms potatoes)	TSM (mg/l)	TSM Loading (kilograms/1000 kilograms potatoes)
1	140,000	19	105	0.77	205	1.51
2	158,000	24	45	0.30	50	0.33
3	122,000	22	65	0.36	85	0.47
4	117,000	16	55	0.40	60	0.44

Average of Daily Deposits of BOD = 0.46 kilograms/1000 kilograms raw potatoes
 Average of Daily Deposits of TSM = 0.69 kilograms/1000 kilograms raw potatoes

This plant is in compliance with all limits as required in the regulations (Schedule I, Table II).

Example 4 - A large existing potato chip operation supplies the following data for one month as per the regular reporting procedure.

Day	Water Use (litres)	Potato Use (x 1000 kilograms)	BOD (mg/l)	BOD Loading (kilograms/1000 kilograms potatoes)	TSM (mg/l)	TSM Loading (kilograms/1000 kilograms potatoes)
1	1,550,000	180	110	0.95	112	0.96
2	1,390,000	170	95	0.78	120	0.98
3	1,500,000	160	105	0.98	200	1.88
4	1,590,000	170	130	1.22	135	1.26
5	1,820,000	195	97	0.91	96	0.90
6	1,990,000	205	135	1.31	180	1.75
7	1,620,000	175	100	0.93	129	1.19
8	1,930,000	210	108	1.00	235	2.16

Average of Daily Deposits of BOD = 1.00 kilograms/1000 kilograms raw potatoes
 Average of Daily Deposits of TSM = 1.39 kilograms/1000 kilograms raw potatoes

This plant meets the objectives of the Guidelines according to Schedule I, Table II.

APPENDIX VII

Attached are forms which plants should use when reporting information to the Minister. The forms should be used as follows:

Form A - Potato Processing Plant Effluent Report

These forms should be used to provide the information specified in subsection 12(1) of the Regulations and Existing Plant Guidelines and section 6 of the Toxicity Guidelines.

Form B - New and Expanded Potato Processing Plant Projected Production Capacity Report

This form should be used to provide the information specified in subsection 12(2) of the Regulations.

Form C - Potato Processing Plant Production Capacity Report

This form should be used to provide the information specified in subsection 12(3) of the Regulations and Existing Plant Guidelines.

Form D - Existing Potato Processing Plant Production Capacity Report

This form should be used to provide the information specified in subsection 12(2) of the Existing Plant Guidelines.

FORM A: POTATO PROCESSING PLANT EFFLUENT REPORT

Company Name :	Location of Plant :
Owner or Manager :	Phone :
Number of operating days during month = _____	
Specify major product a) Potato Chip <input type="checkbox"/> b) Other products <input type="checkbox"/>	

Date of Sample Collection	Total Quantity of Raw Potatoes Processed (in Tonnes/day) A	Total Flow of each Effluent (Specify) (in Litres/day) B	Biochemical Oxygen Demand		Total Suspended Matter		pH
			mg/l C	Kilograms per tonne of raw potatoes D	mg/l E	Kilograms per tonne of raw potatoes processed F	
Average of daily deposits (monthly amount)*							

$$\text{Column D} = \frac{\text{Column B} \times \text{Column C}}{10^6} \qquad \text{Column F} = \frac{\text{Column B} \times \text{Column E}}{10^6} \times \text{Column A}$$

Notes:

- * Average of Deposits is the sum of column D or F divided by the number of days samples were collected.
- ** See back of page for space for weekly production information and acute lethality test records.

Declaration:

I hereby certify that the statement and quantities listed above are correct to the best of my knowledge.

Signature of title of Responsible
Officer of the Company

Date

WEEKLY PRODUCTION INFORMATION AND ACUTE LETHALITY TEST REPORT

DATE OF FIRST DAY OF EACH WEEK.	WEEKLY PRODUCTION (tonnes of raw potatoes processed)

ADDITIONAL ACUTE LETHALITY TEST INFORMATION

Details on Refrigeration Transportation and Storage of the Samples:

If 24 hour static test not used, please specify test procedure:

Any Other information:

24 HOUR STATIC	TEST #1	TEST #2
Date of Sample Collection Time of Sample Collection (use 24 hour clock)		
Date Test Commenced Time Test Commenced (use 24 hour clock)		
Number of Dead Fish in Test Vessel at following time intervals	¼ hour	
	½ hour	
	1 hour	
	2 hours	
	4 hours	
	8 hours	
	12 hours	
	24 hours	
Number of Dead Fish in Control Vessel at following time intervals	¼ hour	
	½ hour	
	1 hour	
	2 hours	
	4 hours	
	8 hours	
	12 hours	
24 hours		
Percent Mortality of Fish at completion of Test in: Test Vessel		
	Control Vessel	



FORM B: NEW AND EXPANDED POTATO PROCESSING PLANT PROJECTED PRODUCTION CAPACITY REPORT

Company Name:	
Location of Plant:	
Owner or Manager:	
Phone:	

(1) Please indicate your plant's major products: _____

(2) Please indicate whether your plant is:

a) New

b) Expanded

(3) Please indicate the projected annual production of your plant:

a) Potato chip plant _____ tonnes of raw potatoes processed

b) Other potato products plant* _____ tonnes of raw potatoes processed

*Other potato products plant includes plants which produce canned potato products, dehydrated potato products, frozen potato products and potato starch.

(4) For an expanded plant, please indicate the 1976 annual production

_____ tonnes of raw potatoes processed

Declaration:

I hereby certify that the statement and quantities listed above
are correct to the best of my knowledge.

Signature and Title of Responsible
Officer of the Company

Date



Environment
Canada

Environnement
Canada

Environmental
Protection
Service

Service de la
protection de
l'environnement

FORM C: POTATO PROCESSING PLANT PRODUCTION CAPACITY REPORT

Company Name	
Location of Plant	
Owner or Manager	
Phone	

(1) Please indicate category most applicable to your plant:

- a) Potato chip plant
- b) Other potato products plant

(2) Please indicate the annual production of your plant for the last calendar year:

_____ tonnes of raw potatoes processed.

(3) Please specify year for which information is given: _____

(4) Please indicate the projected annual production for the next calendar year:

_____ tonnes of raw potatoes processed

Declaration:

I hereby certify that the statement and quantities listed above
are correct to the best of my knowledge.

Signature and Title of Responsible
Officer of the Company

Date



FORM D: EXISTING POTATO PROCESSING PLANT PRODUCTION CAPACITY REPORT

Company Name:	
Location of Plant:	
Owner or Manager:	
Phone:	

(1) Please indicate your plant's major products: _____

(2) Please indicate the following production information for 1976:

	average weekly production*	total annual production*
a) Potato chip plant		
b) Other potato products plant		

* Production information to be specified in tonnes of raw potatoes processed.

Declaration:

I hereby certify that the statement and quantities listed above are correct to the best of my knowledge.

**Signature and Title of Responsible
Officer of the Company**

Date

APPENDIX VIII

EXPLANATORY NOTES FOR ACUTE LETHALITY TEST PROCEDURES

The following notes amplify the test methods for the 96-hour acute lethality continuous flow test and the 24-hour acute lethality static test contained in the Toxicity Guidelines. Procedures and conditions of the two tests are the same except where difference are specifically mentioned. It is not intended that these notes provide step-by-step procedures for conducting the tests. Rather, they are intended to clarify the test methods contained in the control documents, and should not be construed as eliminating the need for applying sound judgement in the conduct of acute lethality tests. Further information and advice can be obtained from the Environmental Protection Service of the Department of Fisheries and the Environment, or the Minister's designated representative.

Test Species

Rainbow trout (Salmo gairdneri Richardson) are to be used as the standard test fish.

Procurement of Fish Stocks

Rainbow trout stocks for use in the tests must be procured from a certified fish hatchery able to supply sufficient numbers of the required size and weight and in a healthy condition. It is the responsibility of the tester to secure sufficient fish to conduct the required tests. More than one test can be conducted over a period of time using fish from the same hatchery batch provided the procedures outlined herein are followed each time. Imported stocks of rainbow trout must have passed the disease control requirements of the Inspection Branch of the Fisheries Service of the Department of Fisheries and the Environment.

Fish Specifications

Individual fish should weigh between 0.5 and 10 grams. The weight of the largest fish cannot be more than twice the smallest in any batch received from a hatchery.

Handling of Fish

Fish are to be handled gently at all times, particularly when being transferred, and should not be unduly stressed or subjected to extreme conditions. Since the temperature of the holding water used during transfer of fish stocks from hatchery to lab may be outside of $15^{\circ} \pm 1^{\circ}\text{C}$ it may be necessary to slowly acclimate the fish batch to a new temperature. This transition should be performed in steps not exceeding 5°C , and at rates less than 2°C per hour, with a couple of

days at constant temperature between steps. If these suggested rates are exceeded, excessive fish mortality may result. Once the temperature requirement has been met, the fish stocks may be put into the acclimation tank either by submerging the transfer container into the tank or by slowly emptying the holding container into the tank.

Holding Facilities

The holding facilities for the fish will be considered to be the acclimation tanks. The acclimation tank and accessories should be made of non-toxic material either opaque glass, porcelain, fiberglass, polyethylene, polypropylene or glass-reinforced polyester. A good design is a cylindrical tank, the bottom tapering slightly to a central drain so that the lowest layer of water containing waste food and faeces is removed. The acclimation tank must be located away from any excessive visual, audio or mechanical disturbance. There should be a fixed dark-light period close to the natural dark-light sequence. The same sequence must be maintained when the acute lethality test is conducted.

During the acclimation period a constant flow of control water through the tanks is necessary. The volume of water in the acclimation tank at any one time should be at least 0.1 litre per gram of fish. Volume of water in the tank should not exceed the total flow during 3.5 hours, ensuring 90% molecular replacement in 8 hours. The acclimation tanks should total at least 230 litres capacity to hold sufficient fish for one or more tests. If large numbers of fish stocks are to be secured in batch quantities from the hatchery, a larger acclimation volume may be required.

Feeding of Fish

Twice daily feeding of fish during the five day work week is satisfactory. (Stocks of very small fish, e.g. up to 5 cm, may require several feedings of small quantities of food every day). The fish should be fed dried foods with a 30-40% protein content and including vegetable substances, to avoid incidence of disease. The fish should be fed only with an amount of food that can be consumed in about 10 minutes, or that amount each day equivalent to 3-5% of the fish body weight. Excessive feeding must be avoided because this will simply dirty the control water. Once the required quantity has been determined, feedings should be repeated at the same times each day using this quantity. Feedings should be suspended two full days before testing. The fish should not be fed during the test period.

Care of Fish

The temperature of the acclimation water should be maintained at $15^{\circ} \pm 1^{\circ}\text{C}$. This can be achieved by placing the acclimation tank in a constant temperature room or equipping it with thermostatic devices. Any abrupt changes in the quality of holding water must be avoided, especially temperature changes, so as to keep the fishes' external environment constant. A slight current is desirable to provide exercise for the fish. This can usually be accomplished by the flow-through system. Tanks should be disinfected and rinsed well between batches of fish.

Aeration

Continuous aeration with oil-free compressed air (or oxygen) should be provided to keep the dissolved oxygen level near saturation during acclimation. The minimum dissolved oxygen content should be 8 mg/l. The air (or oxygen) should be dispersed near the bottom of the tank unless the aeration is conducted upstream from the tanks on the incoming control water. Acclimation water should not come in contact with toxic metals such as copper, zinc or cadmium, nor come in contact with other toxic substances.

Cleaning

In well designed holding tanks, cleaning of the acclimation water should be accomplished by the action of the flowing water. However, additional periodic siphoning of settled material may be necessary to ensure a clean healthy environment.

Acclimation Period

Fish stock secured from a hatchery must be acclimated for a minimum of two weeks in the control water under conditions outlined in this document before use in a test.

Health of Fish Stock

Symptoms of disease, abnormalities of appearance or behavior should be absent in the fish during the acclimation period. Dead or diseased fish should be removed from an acclimation tank as soon as they are noticed.

Fish stocks should be standardized to confirm the state of their health. A reference chemical test should be carried out on each batch of fish procured from a hatchery to indicate any deviation in the resistance of the batch to stress. The daily percentage mortality of fish held as stock for the purpose of testing should not exceed one percent. Fish should not be treated with antibiotics or any other "hygienic chemicals" for two weeks prior to their use in tests. No test fish should have been previously exposed to effluent.

Source of Control Water

Control water is the liquid that is used to acclimate the test fish and is used in the control test. The control water may be dechlorinated tap water or well water. The use of process intake water for control water should be discouraged as the quality of such water may vary considerably. Chlorinated tap water is toxic to fish.

Composite Effluent Sampling

An effluent sample refers to a representative sample of liquid effluent being discharged from a single outfall to the receiving water. In the case of a plant having a multiple number of outfalls, an effluent sample is required from each outfall.

A suitable facility should be installed and maintained at each outfall to enable a composite sample of effluent to be withdrawn from each effluent pipe. Uncontaminated storm water and cooling water must not be included in the sample. The locating of the sampling facility must be made accordingly. The samples should be withdrawn from an area of homogeneous mixture away from the sides of the outfall pipe. Each sample should be large enough to cover the entire test requirements.

Transporting and Storing Samples

When transporting or storing effluent samples, the samples should be contained in a sealed container from which air has been excluded by complete filling. The samples should not come in direct contact with copper or galvanized plumbing, brass fittings or rubber or plastics from which toxicants may leach.

If the sample is not to be tested until more than 60 hours after collection, it should, as soon as possible, be brought to and maintained at a temperature range of 10° to 6°C until just prior to being used in the test vessels. The effluent sample should not be aerated during transportation or storage until just prior to use in the acute lethality test.

The tests should commence as soon as possible after the effluent samples are collected and no later than four days after sampling. If the test cannot be conducted within the four day period, a new sample should be collected.

Basic Equipment Requirements

For detailed information, testers should contact the Environmental Protection Service of the Department of Fisheries and the Environment or the Minister's designated representative.

Test Vessels

The test vessels should be made of a non-toxic material such as glass, polyethylene or fiberglass. It is permissible to use vessel liners made of polyethylene sheeting or polypropylene to simplify the job of cleaning the test vessels after each use. If pumps or tubes are used, it is important to ensure that neither the effluent nor the control water come in contact with copper, brass or galvanized metal. The test vessels should be covered with a mesh screen made of non-toxic material during the test.

Temperature of Test

The liquid temperature should be maintained at $15^{\circ} \pm 1^{\circ}\text{C}$ during the test, either by conducting the tests in a temperature controlled room or by the use of a temperature controlled water bath.

Aeration During Test

Aeration should be accomplished using oil-free air or oxygen connected to unplasticized tubing. The flow rate of the air or oxygen should be minimized to reduce stripping of volatile compounds, but sufficient to maintain a minimum dissolved oxygen level of 8 mg/l. A maximum of 2 hours aeration of the test sample is allowed prior to the commencement of the test.

For the 96-hour continuous flow test, aeration should be carried out in the head tanks, or at a point intermediate between the head tanks and the test vessels. If 8 mg/l cannot be maintained then aeration should be in the test containers as for the static test.

For the 24-hour static test, aeration should be into the bottom of the test tank. The bottom dispenser should be of the type that disperses the air into a large number of fine bubbles.

Flow During Test

When conducting the continuous flow test, there should be at least 2.0 litres of fresh test sample per gram of fish in the test vessel every 24 hours. In addition, for the 96-hour continuous flow test, there should be a 90% molecular exchange of test sample in the vessel every 8 hours. To accomplish this, the ratio of tank volume to hourly flow rate must not exceed 3.5. At any one time the volume of test sample in the test vessel should be 0.2 litres per gram of fish.

For the static test, no sample replacement is necessary during the test.

Control Test

A control test, using control water, should be conducted at the same time as the sample test and under identical conditions. If any of the fish are dead in the control vessels at termination of the continuous flow test, the test is invalid. Similarly if more than 10% of the control fish are dead at termination of the static test, the test becomes invalid.

Number of Fish Per Test Vessel

Each test vessel in the 96-hour continuous flow test should contain ten fish. At least ten fish should be used in each test vessel for the 24-hour static test.

Randomization

When transferring fish from the acclimation tank to the test vessels, a system (a deck of cards, dice, or random tables) should be used to ensure randomization.

Commencing Test

Before the test is started, the test vessels and accompanying tubing should be thoroughly cleaned. To start the 96-hour continuous flow test, the test sample and control water are introduced from the head tank, and the appropriate flow rate is established depending on the size of the fish being used. A constant amount of liquid, depending on fish size, is maintained in the vessels. For the static test, each test vessel is filled with the required volume, as determined by the size of fish.

The temperature and dissolved oxygen levels are checked in the test vessels, and the fish are then introduced with dip nets. Once all fish have been introduced, a timer is set and the test commences.

Mortality Observations

For the 96-hour continuous flow test, the number of dead fish in each test vessel should be observed and recorded at approximately 1/4, 1/2, 1, 2, 4, 8, 24, 48, 72 and 96 hours after commencement of the test. For the 24-hour static test observations and recordings should be made at approximately 1/4, 1/2, 1, 2, 4, 8, 12 and 24 hours after commencement of the test. Fish are considered dead when, upon mild mechanical prodding with a glass rod, there is no visible respiratory movement or any other overt movement. As soon as the fish is considered dead it should be removed from the test vessel with a dip net.

Checks

Periodic checks should be made of the flow rate, temperature, and dissolved oxygen content of the bioassay sample and control water.

Terminating Test

The continuous flow test should end after 96 hours unless any of the control fish die before that time, at which point the test becomes invalid. The static test should also terminate at 24-hours, unless more than 10% of the control fish die prior to 24 hours, at which time the test becomes invalid. All test fish in all test vessels, living or dead, should be disposed of. The test sample and control water should be removed from the head tank and test vessels, and all equipment cleaned with biodegradable soft detergent and rinsed with water.

