

NATURAL RESOURCE CONSERVATION AUTHORITY ACT

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**Natural Resources Conservation (Wastewater and Sludge)  
Regulations, 2005**

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In exercise of the power conferred upon the Minister by section 38 of the Natural Resource Conservation Authority Act and of every other power hereunto enabling, the following Regulations are hereby made:-

Citation.

1. These Regulations may be cited as the Natural Resources Conservation (Wastewater and Sludge) Regulations, 2005.

Interpretation.

2. In these Regulations -

["Ambient Temperature" means the temperature of the surrounding air in degrees centigrade;]

"appointed day" means the date of commencement of these Regulations;

"approved course of training" means a course of training approved by the Natural Resources Conservation Authority;

"approved training institution" means a training institution approved by the Natural Resources Conservation Authority;

"Authorised Officer" means -

- (a) a person designated as such by the Authority;
- (b) a member of the Jamaica Constabulary Force;
- (c) a person appointed as such under the Public Health Act; or
- (d) any other person appointed as such by the Minister in writing;

"certification" means certification obtained in accordance with regulation 4;

"Class I" means waters in the Convention area that, due to inherent or unique environmental characteristics or fragile biological or ecological characteristics or human use, are particularly sensitive to the impacts of domestic water;

"classification" means the divisions of wastewater works and operator's licences with Level 1 representing the highest licence classification for wastewater operators and Class 1 the most complex wastewater treatment works;

"compliance plan" means a plan submitted in accordance with regulation 40;

"Convention" means the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena de Indias, March 1983)[adopted at Aruba on 6<sup>th</sup> October 199[ ]];

"domestic waste water" means a discharge from households, commercial facilities, hotels, septage and any other entity the discharge of which includes -

- (a) toilet flushing;
- (b) discharges from showers, wash basins, kitchens and laundries;
- (c) discharges from small industries, provided their composition is compatible with treatment in a domestic wastewater system.

"domestic septage" means liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works, that receives only domestic sewage, but does not include liquid or

solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial industrial wastewater or grease removed from a grease trap at a restaurant or similar establishment;

"existing treatment plant" means any sewage or trade effluent treatment plant in operation for which statutory approval and planning permission were granted on or before 31<sup>st</sup> December, 1996;

"industrial septage" means material pumped from septic tanks or other devices used in the collection, pre-treatment or treatment of any water-carried waste resulting from any process of industry, manufacture, trade or business, where the design disposal of the waste is subsurface and includes domestic septage mixed with any industrial or commercial septage;

"industrial sludge" means a semi-solid or semi-liquid waste (with a water content of less than 15%), generated during the treatment of trade effluent in a treatment works resulting from -

(a) commercial trade; or

(b) industrial or agro industrial operations,

and includes -

(i) industrial septage;

(ii) scum or solids removed in primary, secondary or advanced trade effluent wastewater treatment of trade effluent from livestock animal waste or aquaculture processes; and

(iii) material derived from industrial sludge,  
red mud or oily waste,  
but does not include untreated semi-liquid or semi-  
solid livestock waste;

"livestock waste" means manure from farm animals and  
includes waste from cattle, chickens, ducks, goats,  
horses, pigs, rabbits, sheep and turkeys;

"malfunction" means any sudden infrequent failure (that  
is not reasonably preventable) of equipment to  
operate in a normal manner, but does not include  
any failure that is primarily caused by poor  
maintenance or negligent operation;

"operator" means a person designated as such who is  
responsible for the operation of a treatment plant,  
in whole or in part, whose duties include testing  
and evaluation to control wastewater works  
operations, being a person who possesses the  
technical skills required to operate a wastewater  
treatment plant, which produces effluent according  
to the required standards;

"operator-in-training" means a person who -

- (a) is the holder of a licence in the appropriate  
classification for the treatment plant being  
operated; and
- (b) works under the supervision and direction of  
an operator for the purpose of gaining  
experience and knowledge in the duties and  
responsibilities of an operator of a  
wastewater works;

"outfall" means any appurtenance or structure, approved by the Authority, intended for the ultimate discharge of sewage, trade effluent or domestic wastewater from a treatment plant;

"owner" means -

- (a) the Government of Jamaica;
- (b) any Local Authority or public or private institution;
- (c) any corporation, association, firm or company incorporated or established under the laws of Jamaica; or
- (d) any person or group of persons acting individually or as a group, who own, manage, or maintain wastewater works;

"sewage collection system" means a system that collects sewage or domestic wastewater from more than 10 housing units or any community, district, town or city;

"sewage effluent" includes [any liquid other than that discharged from premises under trade or industry] effluent from a sewage disposal or sewage works;

"sewage effluent standards" means the sewage effluent standards set out in the Third Schedule;

Third  
Schedule.

"sewage sludge" means a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works, but is not limited to -

- (a) domestic septage;
- (b) scum or solids removed in primary, secondary, or advanced wastewater

treatment processes; and

(c) material derived from sewage sludge, but does not include -

- (i) ash generated during the firing of sewage sludge in a sewage sludge incinerator; or
- (ii) grit and screenings generated during preliminary treatment of domestic sewage in a treatment works;

"trade effluent" includes any liquid, other than domestic sewage, (either with or without particles of matter in suspension in it) which is discharged from any premises -

- (a) used for trade or industry; and
- (b) used (whether or not for profit) for agricultural purposes or scientific research or experiment;

"treatment plant" means any facility, works or collection system that is intended to receive sewage, trade effluent or domestic wastewater and to change the quality of such whether by natural or imposed means;

"usgpd" means United States gallons per day;

"m<sup>3</sup>/d" means cubic metres per day;

"L/s" means litres per second;

"m" means metres;

"g" means gram;

"kg" means kilogram;

"septage" means any liquid and solid material removed from septic tanks or other holding tanks for domestic sewage;

"waste-water personnel" means a person employed at a treatment plant who contributes to the proper operation and management of the plant and treatment processes.

Class I and II waters.

3. The Authority may, in consultation with the WRA and in accordance with the Cartagena Convention, declare any waters in Jamaica as Class 1 or Class II waters.

**CERTIFICATION OF TREATMENT PLANT OPERATORS**

Certification of treatment plant operators.

4. - (1) No person shall hold himself out as, offering the services of, or practise as an operator, except in accordance with a certificate granted by the Authority.

(2) A person who wish to practise as an operator shall apply to the Authority for a certificate to do so.

(3) An application for a certificate to operate as a treatment plant operator shall be accompanied by -

- (a) the application fee of one thousand dollars;
- (b) evidence of educational qualifications in the form of certified photocopies of diplomas or certificates required for the type of treatment plant;

(c) a written recommendation from a person falling within the following categories -

- (i) Justice of the Peace or Notary Public;
- (ii) Head or Deputy Head of an educational institution approved by the Ministry of Education;
- (iii) Member of the Jamaica Constabulary Force of the rank of Inspector or

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higher;

(iv) Minister of Religion.

(4) An Application prepared in accordance with paragraph (3) shall be submitted to the Authority in accordance with the Seventh Schedule.

Seventh  
Schedule.

(5) An application that is incomplete shall not be considered.

(6) The application fee paid in accordance with paragraph (3) shall be non-refundable.

~~(7) A fee of five thousand dollars shall be paid~~  
upon the issue of a certificate.

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(8) The Authority shall issue a certificate if the Authority is satisfied that the applicant -

- (a) has not breached any established code of practice for operators;
- (b) is a fit and proper person;
- (c) has the requisite training requirements for the category of plant he intends to operate.

(9) A certificate issued under this regulation shall not be transferable.

(10) A person who contravenes paragraph (1) shall be guilty of an offence and shall be liable on conviction in a Resident Magistrate's Court to a fine not exceeding [ ].

(11) The activities of persons who are holders of certificates issued under this regulation shall be monitored by the Environmental Health Unit and the National Environment and Planning Agency.

(12) Wastewater personnel may be hired to assist the certified operator to maintain the treatment plant.

(13) The Authority shall keep a register of treatment plant operators.

Renewal of certification.

5. - (1) A certificate issued in accordance with regulation 4 may be renewed every five years from the date of issue.

(2) An application for renewal of a certificate shall -

(a) be made six months prior to the date of expiration of the certificate;

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(b) be in the form prescribed as Form [ ] in the [ ] Schedule; and

(c) be accompanied by a fee of two thousand dollars.

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Form [ ]  
[ ]  
Schedule.

Licence to operate a treatment plant.

6. - (1) In order to meet the required standard of Class 1 or Class II waters, the Authority, on an application made in accordance with paragraph (2), may issue a licence to any owner of a treatment plant to operate that plant for the discharge of trade or sewage effluent.

(2) Subject to paragraph (3), an application for a licence referred to in paragraph (1) shall be made in accordance with the Seventh Schedule.

(3) A person who, on the date of commencement of these Regulations, is the holder of a valid licence issued under regulation 8 of the Natural Resources Conservation (Permits and Licences) Regulations, 1996, shall -

(a) subject to paragraph (b) continue to operate the treatment plant to which that licence relates until the date of expiration thereof;

(b) [not less than [ ] months before the expiration of that licence] apply for a licence under these Regulations in accordance with paragraph (2).

(4) An application under paragraph (1) shall be accompanied -

(a) the application fees specified in regulation 8;  
and

Seventh Schedule.

(b) a compliance plan.

(5) A licence shall not be issued for the operation of a treatment plant if the applicant -

(a) is an operator in training who works under the direct supervision of a certified operator; or

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(b) fall within the definition of wastewater personnel as defined in regulation 2.

(6) A licence issued under this regulation shall specify the appropriate wastewater work category to which the licence relates, as set out in the Seventh Schedule.

Seventh Schedule

(7) Where the compliance plan submitted with an application for a licence is approved, such plan shall be affixed to the licence and shall form part of the terms and conditions thereof.

(8) The Authority may issue a licence before approving a compliance plan but such approval shall not affect the date of issue of such a Licence.

Application for operator's licence. [First] Schedule.

7. An application for a licence to operate as a treatment plant operator shall be made in the form prescribed in the [First] Schedule.

Application fees.

8. An application for a licence to operate as a treatment plant operator shall be accompanied by a fee of -

(a) three thousand five hundred dollars for new plants; and

(b) one thousand five hundred dollars for existing plants.

Application for licence to construct and operate sewage industrial waste water treatment facilities.

9. - (1) A licence may be granted for the construction and operation of sewage and industrial wastewater treatment facilities.

(2) An application under paragraph (1) shall be accompanied by a plan in respect of the management and

operation of the facilities.

**RENEWAL OF LICENCES TO OPERATE A TREATMENT PLANT**

Renewal of licences.

- 10. - (1) An application for renewal of a licence shall -
  - (a) be made in the prescribed form every five years from the date of issue or renewal of such a licence and shall be submitted to the Authority not less than six months prior to the date of expiration of the licence; and
  - (b) be accompanied by a fee of two thousand dollars.

Modification of licences.

11. - (1) The Authority may modify a licence where -

- (a) ownership of the enterprise, construction or development in respect of which the licence was granted has changed;
- (b) the licensee proposes to change the process of operation or the technology used which is likely to cause a change in the nature or composition of the discharge;
- (c) the Authority establishes new or revised standards in respect of the undertaking of any enterprise, construction or development; or
- (d) for any other reason which, in the opinion of the Authority, is relevant in determining whether a licence is to be modified.

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(2) An amount equivalent to 33% of the application fees for a licence which is modified under this regulation shall be paid to the Authority.

SUSPENSION AND REVOCATION OF LICENCES

Authority may suspend or revoke a licence.

12. Subject to regulation 12, the Authority may by notice in writing to the licensee, suspend or revoke a licence issued under regulation 4 if -

- (a) the licensee fails to keep records in accordance

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with regulation 16;

(b) the licensee wilfully submitted false, misleading or inaccurate information or omitted relevant information in the application for the grant of a licence;

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(c) the licensee falsifies or gives misleading information in the monitoring report;

(d) the licensee commits a breach of, any term or condition, implied or expressed, of the licence;

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(e) the licensee ceases operations, so, however, that such owner or operator shall be liable in respect of any pollution that might be traceable to the licensed activity;

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(f) the licensee fails to pay fees due and payable to the Authority in respect of the licence;

(g) the level of pollution from any discharge from a treatment plant has or is likely to have an adverse effect on public health or the environment.

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Notice to suspend or revoke a licence.

13. - (1) Subject to paragraph (2), the Authority shall, before revoking or suspending a licence, serve on the owner

or operator of the treatment plant concerned a notice -

(a) specifying the breach and, where it is capable of remedy, require the licensee to remedy it within the time specified in the notice;

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(b) informing the owner or operator that he may apply to the Authority to be heard on the matter within the time specified in the notice;

(2) The Authority shall not serve a notice pursuant to paragraph (1) in relation to a breach if a cessation order pursuant to section 13 of the Act or an enforcement notice pursuant to section 18 thereof, is in effect in

relation to such a breach.

(3) A notice of suspension or revocation under regulation 11(1) thereof shall require the licensee, within one month after receipt of the notice, to show cause why the licence should not be suspended or revoked.

(4) Subject to the provisions of section 35 of the Act, an appeal against a decision of the Authority, shall be made to the Minister.

Training  
institution.

14. - (1) The Authority shall approve persons, institutions or organisation to conduct the training of operators .

(2) The Authority shall by notice in the *Gazette* or a widely circulated newspaper -

- (a) publish the names of persons or institutions approved as operators of a treatment plant;
- (b) subject to paragraph (4), add to or delete from the list, the name of any person or institution.

(4) The Authority shall, before deleting the name of an institution from the list, give notice to that institution.

(5) An institution notified under paragraph (4) may, within three months after receipt of the notice, show cause why its name shall not be deleted from the list.

(6) The name of an institution may be deleted from the list for the following reasons -

- (a) the physical facilities are unsuitable for a training institution of the relevant type;
- (b) the equipment and materials required for the necessary type and level of training are not available or available in sufficient quantity;
- (c) the programme of training being offered is, in the

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opinion of the Authority, not designed to produce persons competent to operate as treatment plant operators;

- (d) the staff of the institution is not qualified to provide the requisite type and quality of training;
- (e) the examinations offered by the institution are not of the standard required to test the level of competence of persons being trained;
- (f) the institution is operated in such a way as to -
  - (i) cast doubt upon the quality or genuineness of the certification granted by it;
  - (ii) bring itself into disrepute in the eyes of the public.

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**SPECIFICATIONS OF A TREATMENT PLANT**

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Specifications.

- 15. - (1) The owner of a treatment plant shall, submit to the Authority a copy of a complete set of "as-built" plans of the plant.
- (2) [The Original] [A] [copy of a] set of "as-built" plans shall be kept at the treatment plant.
- (3) Every treatment plant shall be equipped with an approved flow-measuring device.
- (4) An approved flow measuring device referred to in paragraph (3) shall be installed at the inlet to and the outlet from a treatment plant.
- (5) An approved flow measuring device installed in accordance with paragraph (4) shall be maintained in good working condition.

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**GENERAL PROVISIONS FOR OPERATIONS OF TREATMENT PLANTS**

Treatment plant.

- 16. - (1) In monitoring the operations of a treatment

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Third  
Schedule.

plant the Authority shall be guided by the standards set out in the Third Schedule.

(2) The Authority may apply such of those Standards as it considers consistent with the use of sewage or trade effluent, as the case may require.

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(3) The Authority may request an owner or operator of a plant to take samples of effluent at the following intervals -

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- (a) daily;
- (b) weekly;
- (c) bimonthly; or
- (d) monthly,

and a record of such samples shall be maintained in an operating log and reported in the form prescribed in the Fifth Schedule.

Fifth  
Schedule.

(4) Samples taken in accordance with paragraph (3) shall be made at approximately the same time of day and on the same day of the week.

(5) One or more of the following methods of collecting samples shall include -

- (a) grab samples;
  - (b) flow proportional composite collection techniques;
  - (c) time proportional sampling;
- or one grab sample.

(6) The Authority may, where it considers necessary, request additional monitoring of effluent and recording of data by the licensee.

(7) Where additional records are required, the Authority shall except in cases of emergency notify the licensee at least two weeks before the start of collection of data.

(8) A treatment plant shall be monitored for operational purposes in accordance with -

- (a) best engineering practice; and
- (b) such other guidelines and code of practice as may be issued by the Authority.

**OPERATIONS MANUAL FOR TREATMENT PLANT**

Operations manual.

17. - (1) The operations manual shall be kept at all times at the treatment plant or at a designated place notified to the Authority.

(2) The operations manual shall include -

- (a) a description of the plant;
- (b) a description of the operating procedures, including details of the process operations;
- (c) a list of equipment, including specifications of the equipment;
- (d) maintenance requirements and procedures for the equipment and plant components;
- (e) any other information relevant to the good operation of the plant;
- (f) a schedule of maintenance activities to be carried out by operations staff;
- (g) an effluent monitoring schedule;
- (h) an emergency management plan which shall include but is not limited to risks associated with floods, hurricanes or fires.

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**MAINTENANCE OF SEWAGE TREATMENT PLANTS**

Maintenance of sewage treatment plant.

[18. - (1) Sewage ~~treatment plants with systems that~~ require power to operate shall have a standby power supply for use during power outages, or equipment malfunction.

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(2) Where an owner, operator or person having the charge or management of the facility fails to install

standby power facilities the Authority may require its  
installation by a Control Order.]

**DISCHARGE OF SEWAGE and TRADE EFFLUENT**

Discharge of  
sewage and  
trade  
effluent.

19. - (1) An owner or operator whose business, industry, manufacturing or trade operations, involves the discharge of sewage or trade effluent shall apply for a licence under these Regulations to discharge such effluent.

First  
Schedule.

(2) An application for a licence under paragraph (1) shall be in the form set out in the First Schedule.

(3) An owner whose business, industry, manufacturing or trade operations involve the discharge of sewage or trade effluent into a [sewage] collection system, shall, prior to the connection to such a system, provide a written copy of their pre-treatment standards to the Authority.

Approval of  
licence.

20. The Authority shall consult with the Water Resources Authority before approving an application for a licence to discharge sewage effluent into the ground.

Measurement of  
sewage  
effluent  
quality.

21. The sewage effluent quality shall be measured at the point of discharge, in accordance with a licence granted by the Authority.

Outfall  
pipelines.

22. - (1) The point of discharge of sewage effluent shall be clearly identified at the site in such manner as to serve as a warning to the public.

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(2) A licensee who intends to install outfall pipelines for the discharge of sewage effluent on the foreshore and floor of the sea shall apply to the Authority for a licence in accordance with section 5 of the Beach Control Authority Act:

Provided that the pipelines shall be installed in such manner as not to interfere with the passage of marine vessels.

Monitoring of  
parameters.

23. - (1) The Authority may require the submission by a licensee of monitoring reports in relation to the following parameters -

- (a) Influent Flowrate ( $Q_{in}$ , all plants);
- (b) Effluent Flowrate ( $Q_{out}$ , all plants);
- (c) Biochemical Oxygen Demand ( $BOD_5$ );
- (d) Total Suspended Solids (TSS);
- (e) Chemical Oxygen Demand (COD);
- (f) Total Nitrogen;
- (g) Nitrates;
- (h) Phosphate;
- (i) Total Phosphorous;

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- (j) Residual Chlorine;
- (k) Faecal Coliform; or
- (l) such other parameters the Authority deems necessary.

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(2) Owners and Operators of sewage treatment plants shall prepare monitoring reports on a monthly and annual basis.

(3) Monthly reports shall include the information specified in the Fifth Schedule.

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Fifth  
Schedule.

(4) Annual reports shall be submitted no later than May 31, each year and shall include the information specified in the Sixth Schedule.

Sixth  
Schedule.

(5) The Authority may require a licensee to submit copies of the monitoring reports to the Authority, EHU and WRA [and such other agency the Authority may specify].

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(6) Copies of all reports shall be kept by the owner or operator of a treatment plant, for a minimum of five years.

Confirmation  
testing.

24. - (1) An owner or operator of a sewage treatment plant who does not have the services of an independent laboratory for testing, shall ensure that confirmation testing of all parameters by an independent laboratory be carried out twice per calendar year.

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Eighth  
Schedule.

(2) The effluent from a sewage treatment plant shall be tested in accordance with the Eighth Schedule.

Irrigation of  
lawns and  
agricultural  
applications.

25. - (1) A treatment plant operator shall not without a licence issued by the Authority, use treated sewage effluent for irrigation of lawns and agricultural applications.

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(2) Any effluent from ~~any sewage treatment plant~~ which is used for irrigation, shall meet the Irrigation Standards listed in Table 4 of the Third Schedule.

Third  
Schedule.

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(3) The Authority shall, in respect of each application for a licence under this regulation, consult with the Ministries of Health and Agriculture and the National Irrigation Commission.

(4) The Authority may, in consultation with the Ministry of Agriculture and the National Irrigation Commission, prescribe additional standards for use of treated sewage for specific agricultural crops.

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Discharge  
of trade  
effluent.

26. The ~~discharge of trade effluent shall be in accordance~~ with the terms and conditions of a Licence granted by the Authority.

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Trade effluent  
quality.

27. - (1) Trade effluent discharged from ~~treatment plants~~ (other than those ~~where effluent is used for irrigation~~) shall meet the Trade Effluent Standards listed in Table 3 of the Third Schedule.

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Third  
Schedule.

(2) The Authority shall, in consultation with the Water Resources Authority, approve an application for a licence to discharge trade effluent into the ground for subterranean discharges.

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(3) The Authority may ~~review the standards every~~ five years and apply new standards to existing facilities.

(4) Before applying such standards the Authority shall give six months notice to a treatment plant operators.

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(5) The ~~parameters to determine~~ effluent quality shall be measured at the point of discharge in accordance with the licence granted by the Authority.

(6) The point of discharge of trade effluent shall be

clearly identified at the site as a warning to the public  
[in accordance with the Second Schedule].

Second  
Schedule.

Testing of  
trade  
effluent.

28. - (1) The effluent from a trade effluent treatment  
plant shall be tested in accordance with the Eighth  
Schedule.

Eighth  
Schedule.

(2) The Authority may require an owner or operator  
to conduct the monitoring of parameters in accordance with  
the licence issued under Form 3 of the Fifth Schedule.

Form 3  
Fifth  
Schedule.

(3) An owner or operator of a trade effluent  
treatment plant shall ensure that confirmation testing of  
all parameters set out in the licence be conducted by an  
independent source

(4) Such testing shall be carried out twice per  
calendar year and a minimum of three months apart.

(5) The results of testing shall be submitted along  
with a monitoring report.

(6) A Monthly report shall be in the form specified  
in Form 1 of the Fifth Schedule.

Form 1  
Fifth  
Schedule.

(7) Annual Reports shall be submitted no later than  
June 30th each year, and shall include such information as  
required by Form 2 of the Fifth Schedule.

Form 2

(8) A copy of all monthly and yearly reports done  
in accordance with paragraphs (7) and (8) shall be kept by  
the owner or operator of a treatment plant operator.

**TREATMENT OF SEPTAGE**

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Septage.

29. Septage removed from a septic tank, absorption pit or  
sewage or trade effluent works, shall be disposed of in a  
treatment plant approved by the Authority and the Ministry  
of Health.

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**MANAGEMENT PRACTICES FOR SEWAGE AND**

INDUSTRIAL SLUDGE

Sewage and industrial sludge.

30. No Person shall -

- (a) dispose of domestic septage on land or any area other than a sewage treatment plant;
- (b) discharge untreated sewage sludge on land or into any water body; or
- (c) sell or distribute without charge, sewage sludge that does not meet the National Treated Sewage Sludge/Biosolids Standards set out in the Tenth Schedule.

Tenth Schedule.

Disposal of sewage sludge. Tenth Schedule.

31. A Person who intends to dispose of sewage sludge shall provide the requisite information specified in the Tenth Schedule.

Treatment of sewage sludge.

32. - (1) [Persons who operate sewage treatment plants shall treat sewage sludge in accordance with the management practices set out in [the guideline document].

(2) Untreated or treated sewage sludge that does not satisfy the National Treated Sewage Sludge/Biosolids Standards for application to agricultural land shall be disposed of in a licensed landfill or other locations approved by the Authority.

(3) Untreated or treated sewage sludge that does not satisfy the National Treated Sewage Sludge/Biosolids Standards for application to agricultural land shall be disposed of in a licensed landfill or other similar locations approved by the Authority.

(4) Application for the disposal of such sludge to areas other than a licensed landfill shall be made in accordance with the provisions of the Tenth Schedule.

Tenth Schedule. Industrial sludge shall not be

33. An operator shall ensure that industrial sludge that

released into the environment. is discharged from a facility or stored in temporary or permanent storage ponds or other such similar device, is not release into the environment.

Industrial sludge shall be harmless and suitable for disposal. 34. A person responsible for the treatment of industrial sludge shall ensure that such sludge is harmless and suitable for disposal in a landfill as prescribed in the

Eleventh Schedule.

Hazardous industrial sludge. 35. Where industrial sludge cannot be rendered harmless and suitable for disposal in a landfill, the facility shall obtain a Licence to dispose of the hazardous sludge in a secure hazardous waste landfill.

Prohibition of unauthorized persons. 36. A person who holds a licence to dispose of sewage and industrial sludge shall prohibit the entry of unauthorized persons, livestock and other animals to storage and treatment ponds, in order to protect the health and well being of persons and animals.

**MONITORING, SAMPLING AND ANALYSIS REQUIREMENTS  
FOR SEWAGE AND INDUSTRIAL SLUDGE**

Monitoring, sampling and analysis. 37. A person who produces sewage or industrial sludge or both, shall, before such sludge leaves the plant, monitor, take samples, analyze the sludge produced and keep records on the operation and performance of the treatment process and the final product quality.

Testing of treatment sewage sludge for use in agriculture. 38. Every producer of treated sewage sludge shall, in accordance with the Eleventh Schedule, ensure that sludge produced and supplied for use in agriculture is tested -

- (a) not less than every six months; or
- (b) whenever any changes in the characteristics of the treated sludge occur as a result of -
  - (i) changes in the treatment process; or
  - (ii) the sewage being treated.

**CONTROL ORDERS**

Control order may be issued. 39. - (1) A control order may be issued in respect of or in anticipation of, a breach of any term or condition of a licence.

(2) A control order issued under paragraph (1) -

(a) shall specify -

(i) the breach in respect of which it is issued or which is likely to occur;

(ii) the steps to be taken to prevent the breach or ameliorate its effects;

(iii) the time within which the steps referred to in subparagraph (b) shall be taken;

(b) may, where appropriate, require the immediate cessation of the breach.

(3) A person who fails to comply with the terms of a control order issued under paragraph (1) shall be guilty of an offence and shall on conviction in a Resident Magistrate's Court be liable -

(a) in the case of a first offence, to a fine not exceeding twenty thousand dollars or to imprisonment for a term not exceeding one year;

(b) in the case of a second or subsequent offence, to a fine not exceeding thirty thousand dollars or to imprisonment for a term not exceeding two years.

Comment [CSD1]: Second offences to be indictable with penalty up to 5 years - and fine set by court

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**COMPLIANCE PLANS**

The Authority may request a compliance plan.

40. - (1) The Authority may request an owner or operator of a treatment plant to submit a compliance plan which shall include performance targets to be achieved [within a specific time].

(2) The Authority may request the following information to be included in a compliance plan -

- (a) a description of the current compliance status of the facility including -
- (i) all effluent sources,
  - (ii) the discharge points; and
  - (iii) the monitoring location;
- (b) a list of the pollutants that exceed the effluent standards;
- (c) a statement of the methods used to determine the facility's compliance status, including a description of all monitoring, record keeping, reporting and test methods, and any other information necessary to verify compliance with or to enforce applicable requirements;
- (d) a statement that the facility shall continue to comply with each applicable requirement in respect of which compliance is currently achieved at the facility; and
- (e) in respect of each applicable requirement for which compliance is not currently achieved at the facility -
- (i) a detailed statement of how the facility will achieve compliance;
  - (ii) a proposed compliance schedule which sets out the remedial measures to be taken, including a sequence of actions with milestones leading to compliance;
  - (iii) if the facility is subject to a control order, the proposed schedule of remedial measures;
  - (iv) a schedule for submission of progress reports or compliance reports to the

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Authority at least once in every six months or more frequently if so required by the licence, indicating what (if any) progress has been made in relation to the schedule and the milestones.

(3) The Authority shall review ~~the~~ compliance plan and shall in writing, notify the ~~owner or operator of the~~ plant ~~as to whether the plan has been approved, refused,~~ or if further information is required.

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Deleted: person who submitted the plan

(4) Where the compliance plan is refused, the notification of such refusal shall-

- (a) set out the reasons for its refusal ; and
- (b) inform such person that he is entitled to revise and re-submit the compliance plan within sixty days of the date of delivery of such notification.

(5) A compliance plan shall be prepared every seven years.

**WARNING NOTICES**

Authority shall issue a warning notice.

41. - (1) The Authority shall issue a warning notice to any person who breaches these Regulations or fails to comply with the terms and conditions of any licence.

(2) The warning notice shall state -

- (a) the nature of the breach;
- (b) the outcome required of remedial action to be taken by the licensee; and
- (c) a reasonable period within which the remedial action shall be carried out; and
- (d) inform the person that he may apply to the Authority to be heard in relation to the breach within such time as may be specified in the notice.

Other actions  
by Authority.

42. The Authority may in addition to the action specified in regulation 41, take one or more of the following actions in response to a breach under these Regulations -

- (a) issue a control order;
- (b) suspend or revoke the licence;
- (c) refuse an application for renewal of the licence;
- (d) apply to the Supreme Court for an injunction to prohibit the operation of the treatment plant;
- (e) without further notice prosecute the owner as it thinks appropriate, in accordance with the provisions of these Regulations;
- [(f) impose administrative penalties.]

Further  
obligations.

43. A person authorized by section 20(1) of the Act may, without prejudice to the generality of that section -

- (a) inspect the operation, including conditions relating to the nature and composition of any discharge of sewage and trade effluent;
- (b) install and maintain equipment for recording the discharge of substances into the environment;
- (c) examine records required to be kept under the Act, these Regulations or any term or condition subject to which a licence is granted.

**FEES AND PENALTIES FOR SEWAGE EFFLUENT  
DISCHARGES**

Annual  
effluent  
discharge  
fee.  
[     ]  
Schedule.

44. The owner or operator of a treatment plant shall pay an annual effluent discharge fee based on the load of effluent discharged, in accordance with the [     ] Schedule.

Administrative  
penalty.

45. Where the effluent quality exceeds the standards established under these Regulations, the owner of the treatment plant shall be liable to an administrative

[Twelfth]  
Schedule.

penalty as set out in the [Twelfth] Schedule.

#### OFFENCES

Offences.

46. Paragraph (2) applies to any person who -
- (a) knowingly provides false or misleading information;
  - (b) fails to provide information as required under these Regulations;
  - (c) fails to keep records as required under these Regulations;
  - (d) fails to allow a duly authorised officer access to a treatment plant;
  - (e) assaults or obstructs a duly authorized officer in the execution of his duty;
  - (f) fails to report a pollution event incident;
  - (g) discharges trade or sewage effluents without a licence or in excess of the standards allowed by a licence;
  - (h) contravenes any term or condition of the Licence;
  - (i) fails to notify the authority of change of ownership of a treatment plant;
  - (j) fails to submit an annual report;
  - (k) fails to comply with a notice to renew a Licence;
  - (l) fails to meet any milestones or other conditions specified in a Compliance Plan.

(2) A person referred to in paragraph (1) shall be liable -

- [(a) to an administrative penalty payable to the Authority [at its discretion;] or
- (b) [on conviction in a Resident Magistrate's Court to

a fine not exceeding fifty thousand dollars or to imprisonment for a term not exceeding one year or to both such fine and imprisonment.]

Transportation of domestic sludge. 47. Any person who transports untreated or partially treated domestic sewage sludge without a licence shall be guilty of an offence and on conviction in a Resident Magistrate's Court be liable to a fine not exceeding [ ] dollars or to imprisonment for a term not exceeding [ ] year or to both such fine and imprisonment.

Discharge of sludge. 48. A person commits an offence if he -  
 (a) discharges sludge on land without a licence; or  
 (b) discharge sludge that does not meet the sludge National Treated Sewage Sludge/Biosolids Standards.

#### **CIVIL REMEDIES**

Recovery of annual discharge fees. 49. If an owner or operator of a treatment plant fails to pay annual discharge fees, the Authority shall be entitled to recover such fees as a civil debt in a Resident Magistrate's Court.

#### **TRANSITIONAL**

Unlicence treatment plant. 50. - (1) Within twelve months of the appointed day every owner or operator of an unlicensed treatment plant shall apply for a licence to operate such a plant.  
 (2) An owner or operator applying under paragraph (1) shall submit an audit and compliance plan.  
 [(3) A person who prior, to the appointed day, of these Regulations, operate a treatment plant may after that day continue operation upon completion of a designated training course and proof of technical competence to operate such a plant in the appropriate waste water works category.]

Sewage effluent [51. - (1) After April 1, 2007, an owner or operator of a

standards. treatment plant that discharges sewage effluent without a licence commits an offence under section 12 of the Natural Resources Conservation Authority Act.

(2) The sewage effluent discharged from existing treatment plants (other than those whose effluent is used for irrigation) shall meet the Sewage Effluent Standards listed in Table 1 of the First Schedule.

(3) The sewage effluent discharge from all new treatment plants (other than those whose effluent is used for irrigation) shall meet the Sewage Effluent Standards listed in Table 2 of the Third Schedule.]

Discounting of penalties. 52. - (1) Where an existing treatment plant brought into compliance within three years of the appointed day and penalties accrue[, the dollar value of the administrative penalty may on application by an owner or operator, be discounted based on the value of the upgrade done to the plant to bring it into compliance.]

(2) An application submitted under paragraph (1) shall be accompanied by a detailed plan of the proposed upgrade to the treatment plant.

(3) The Authority and EHU shall approve a detailed plan submitted under paragraph (1) prior to the commencement of the upgrade.

Detailed plan. 53. The detailed plan referred to in regulation 52(3) shall -

- (a) include an engineering report;
- (b) define the present status of the plant;
- (c) specify the design of the upgrade;
- (d) provide a schedule of implementation and a cost estimate of the works.

Discount on discharge 54. - (1) An owner or operator of a treatment plant may be

Fees. granted a discount on the discharge fee providing that the effluent or sludge is used in a manner beneficial to the environment.

(2) An owner or operator who applies for such discount shall submit information supporting the claim.

Waiver of discharge fee. 55. - (1) Discharge fees [are waived for the year 2004 and] shall be payable on the anniversary date of the Licence.

[(2) Discharge fees are based on the load to the environment for the following parameters.]

Signs. 56. Signs shall be posted at treatment plants in accordance with the Second Schedule -

Second Schedule.

(a) in the case of plants in existence on the appointed day, within six months after that day; and

(b) in the case of plants built after that day at the time of commissioning of each such plant.

Approved flow-measuring device. 57. An approved flow-measuring device shall be installed at the inlet to and at the outlet from, all treatment plants -

(a) in the case of plants in existence on the appointed day, within six months after that day; and

(b) in the case of plants built after that day at the time of commissioning of each such plant.

Maintenance of sewage treatment plants. 58. Treatment plants shall go through maintenance within 24 months of the appointed day.

**FIRST SCHEDULE (Regulation 19)**

**THE NATURAL RESOURCES CONSERVATION AUTHORITY ACT**

**The Natural Resources Conservation (Permits and Licences) Regulations, 1996**

***Application for Licence to Discharge Sewage Effluent or Trade Effluent or to Construct, Reconstruct or Alter Works for the Discharge Thereof (pursuant to sections 4 and 12)***

Application No.:

Application Date:

Note: Please Read The Following Before Completing This Form

1. This Form shall be completed in triplicate and in block letters and submitted with any supplemental or specified information to:  
  
National Environment & Planning Agency  
10 Caledonia Avenue  
Kingston 5
2. The completed form shall be accompanied by any required site location diagram; any engineers drawings, survey plans, facility layout and description of process including flow diagram and any other permit or licence granted by a government department or organization in respect of the application.
3. If this application is for modification of an existing facility, please provide a copy of any existing permit, licence or other approval granted in respect thereof.
4. The attached forms and information requirements shall be answered in full in order to avoid delay in processing the application. Where attached sheets and other technical documents are utilized in lieu of the space provided, indicate appropriate cross-references. Paragraphs that are not applicable to your application should be marked as "N/A".
5. A non-refundable application fee of \$2000 shall be enclosed (certified cheques made payable to the Authority are accepted). Licence fees shall become payable at the time of issue of the licence.
6. If you are in doubt about any provision of this application form please consult with an authorized officer of the Authority before completing it.
7. A separate application shall be made for each source and type of discharge and for each construction, reconstruction or alteration of works.

Part A. General

1. Name of applicant \_\_\_\_\_
2. Address of applicant \_\_\_\_\_  
\_\_\_\_\_
3. Tel. No. \_\_\_\_\_ Fax No. \_\_\_\_\_
4. If different from applicant  
please specify name and  
  
registration No. of company: \_\_\_\_\_  
\_\_\_\_\_
5. Registered office of company: \_\_\_\_\_  
\_\_\_\_\_
6. Name and location where  
enterprise, etc. for which  
approval is sought shall

be  
undertaken: \_\_\_\_\_

\_\_\_\_\_

7. Name of chief executive officer: \_\_\_\_\_

8. Name of environmental manager: \_\_\_\_\_

9. Name of local authority in whose area enterprise, etc. shall be undertaken: \_\_\_\_\_

10. List of attached documents comprising part of application: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Type of application: Sewage New \_\_\_\_\_

Renewal \_\_\_\_\_

Trade effluent New \_\_\_\_\_

Renewal \_\_\_\_\_

Modification of existing facility \_\_\_\_\_

Construction/reconstruction/alteration of work \_\_\_\_\_

**Part B. Detailed description of Effluent Generating Source**

1. Description of plant facilities, outfall location(s), and production figures (projected or otherwise). Please attach engineering drawings, facility layout(s) and description of process, including flow diagrams.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Indicate any other permits, approvals or licences granted in respect of date by a Government department or organization including date of issue and expiry of each.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Part C. Process Information**

1. List all toxic substances used or manufactured or to be used or manufactured on the location of the enterprise, etc.:

\_\_\_\_\_

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2. All chemicals in use or to be used at the enterprise, etc.:

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3. Intermediate and final products derived from enterprise etc. (*including details and conditions of storage*):

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4. Volume of water consumption (*in litres per day*):

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5. Source of water (*Indicate whether from National Water Commission or Water Resources Authority*):

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6. Source of energy and, if other than natural sunlight, quantitative estimate of consumption:

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**PART D. Waste/ Trade Effluent Information - Treatment and Disposal**

1. Nature and composition of the trade effluent (*specify if liquid, sludge or solid and include any current monitoring or sampling result*):

---

2. What apparatus will be used to measure and record the nature, composition and volume of waste?

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3. Maximum volume of trade effluent proposed to be discharged on any one day:

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4. Rate at which it is proposed to discharge the trade effluent:

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5. Nature of waste water treatment facility (if any):

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6. Treatment level to be provided:

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7. Outfall information: outfall configuration and construction material:

Length from shore \_\_\_\_\_ metres      Elevation of discharge invert  
 \_\_\_\_\_ metres below mean sea level (msl)

Diameter of outfall \_\_\_\_centimetres      Depth of receiving water body at  
 point of discharge\_\_\_\_\_ metres below msl

8. Please provide the following general information:

- (a) Land use requirements, including all wells and surface waters within one kilometre of the site.
- (b) Soil information, including physical characteristic of the soil at the operation.
- (c) Hydrogeologic survey providing data necessary to evaluate the effects of operation on groundwater and groundwater monitoring system proposed.

9. Additional information to be provided with applications for sewage treatment facilities:

- (a) Population - current and design year projection for the population to be served.
- (b) Description and map of area to be served and land use for the current and design years.
- (c) An assessment of the potential environmental impact of the project, including odour, noise, public accessibility, proximity to existing and proposed residential areas, flooding, and aerosol drift.
- (d) Operation and control strategies including preventive maintenance, alternative disposal methods, and system reliability features.

10. The plan of each facility should indicate -

- (a) the layout and construction of the facility and its ancillary equipment including information and fencing and drainage where relevant;
- (b) the storage area for liquid, sludge and solid waste awaiting treatment and residues awaiting removal for disposal elsewhere;
- (c) the provision being made for the parking, loading and unloading of vehicles at the facility.

**Part E. Pollution Control and Waste Management Information**

- 1. Description of pollution monitoring programme (*if any*) including location of monitoring points, parameters to be analyzed, frequency of sampling and personnel involved:

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- 2a. Description of pollution abatement/monitoring equipment (*if any*), year installed and capacity:

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- 2b. Description of pollution prevention, or abatement technologies applied (*specify soil pipes, ventilating shafts, underground drains, cesspools etc.*):

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- 3. Safety, contingency, and emergency response measures:

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- 4. Describe any proposed or implemented conservation measures including wastewater reuse and recycling:

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**Part F. Statement by Applicant**

I hereby declare that the information contained in this application is true and complete to the best of my knowledge and belief. I further agree to maintain and operate the undertaking in accordance with the Act and any regulations thereunder, the standards and guidelines established by the Natural Resources Conservation Authority and any conditions set out in the licence. I understand that the licence, if granted, is not transferable. I shall promptly notify the Authority upon the sale or legal transfer of the undertaking and shall furnish the names and addresses of the purchaser(s) thereof to the Authority.

\_\_\_\_\_  
Signature of applicant or authorized representative

\_\_\_\_\_  
Name and Title (Please print or type)

Date\_\_\_\_\_

**SECOND SCHEDULE (Regulation 24, 25 and 56)**

**Signs and Notices**

The signs and notices depicted shall be of the minimum size stated and shall be posted in a visible position at the location specified at the respective notices.

1. Plant Name

The sign shall be a minimum dimension of 2 m wide, 1.5 m high with title lettering 100mm high and secondary lettering 50 mm high.

**PUREWATER SEWAGE TREATMENT PLANT**  
Owned by : My Hotel  
NRCA Licence No. 000000  
NRCA Licence Expiration Date: \_\_/\_\_/\_\_

2. Sewage Outfall Marker for Marine and Riverine Outfalls

**SEWAGE MARKER**  
  
A sewage plant outlet pipe is located \_\_\_ metres from this marker.  
  
No swimming is recommended within \_\_\_ metres of this marker

3. Sewage Outfall Marker for On- Land (gullies and channels) Locations

**WARNING**  
  
A sewage plant outlet pipe is located \_\_\_ metres from this marker.

4. Sewage Pond Marker

**SEWAGE POND**  
  
Absolutely no swimming or fishing is allowed in this pond.



	product	
PH	6.5 - 8.5	
Phenols	5.0 <u>mg/L</u>	Deleted: mg/l
Phosphate as PO <sub>4</sub>	5 <u>mg/L</u>	Deleted: mg/l
Sodium	100 <u>mg/L</u>	Deleted: mg/l
Sulphate	250 <u>mg/L</u>	Deleted: mg/l
Sulphide	0.2 <u>mg/L</u>	Deleted: mg/l
Temperature	±2° of ambient	Deleted: mg/l
Total Coliform	<500 MPN/100 ml <sub>s</sub>	
Total Dissolved Solids (TDS)	1000 <u>mg/L</u>	Deleted: d
Total Organic Carbon (TOC)	100 <u>mg/L</u>	Deleted: s
Total Suspended Solids (TSS) (maximum monthly average)	50 <u>mg/L</u>	Deleted: mg/l
Total Suspended Solids (TSS) maximum daily average	<150 <u>mg/L</u>	Deleted: o
Trace Metals:		Deleted: c
Zinc	1.5 <u>mg/L</u>	Deleted: mg/l
Lead	0.1 <u>mg/L</u>	Deleted: s
Cadmium	0.1 <u>mg/L</u>	Deleted: s
Arsenic	0.5 <u>mg/L</u>	Deleted: l
Chromium	1.0 <u>mg/L</u>	Deleted: suspended
Copper	0.1 <u>mg/L</u>	Deleted: s
Mercury	0.02 <u>mg/L</u>	Deleted: mg/l
Nickel	1.0 <u>mg/L</u>	Deleted:
Selenium	0.5 <u>mg/L</u>	
Silver	0.1 <u>mg/L</u>	
Tin	-	
Total Heavy Metals	2.0 <u>mg/L</u>	

Table 4 - Natural Resources Conservation Authority (NRCA) Effluent Standard For Sewage Used For Irrigation

Parameter	Standard Limit
Oil & Grease	10 mg/L
Total Suspended Solids (TSS)	15 mg/L
Residual Chlorine	0.5 mg/L
Biochemical Oxygen Demand (BOD <sub>5</sub> )	15 mg/L
Chemical Oxygen Demand (COD)	<100 mg/L
Faecal Coliform	12 MPN / 100mls.

Table 5 - National Treated Sewage Sludge/Biosolids Standards for Fully Treated Sewage Sludge that can be applied to agricultural land

Pollutant	Maximum Concentration #	Annual Pollutant Loading Rates	Jamaican Cumulative loading rates%
	mg/kg (dry weight basis)		kg/ha
<u>Arsenic</u>	65	1.75	15
<u>Cadmium</u>	75	1.7	15
<u>Copper</u>	230	4.0	50
<u>Lead</u>	90	1.6	20
<u>Mercury</u>	0.045		01
<u>Molybdenum</u>	09		02
<u>Nickel</u>	180##	21	40
<u>Selenium</u>	14##	05	05
<u>Zinc</u>	400	6.3	80
<u>Cr</u>	830	42	165
Pathogens	< 1,000 MPN/g of total solids (oven dried mass)	-	-

# Based on the 95<sup>th</sup> percentile (rounded to 5 mg/kg) of the level of occurrence in Jamaican soils except as noted

## Based on US EPA limits

% Based on 4,400 kg dry weight compost per ha for 45 years

**FOURTH SCHEDULE**

**(Regulation )**

**Tolerances to Effluent Standards**

Use of Marine Outfalls

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Where marine outfalls are used, an application may be made to the NRCA to have effluent limits relaxed. However, such application shall be reviewed on a case-by-case basis and the applicant must provide the data, studies and calculations that show that the proposed outfall will allow for an effluent quality which is still acceptable and will not affect the marine environment beyond the levels already established for the ambient water quality. Where clear evidence is not provided to the Authority then the requirements under these Regulations shall apply.

Periods of Maintenance or Malfunction of Treatment Plants

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Where major maintenance or upgrades of treatment plants occur, then effluent quality during this period is expected to worsen and therefore, the requirement for meeting the standards are suspended for this period subject to the following conditions:

- (i) Such period of suspension is for periods not exceeding three (3) months in all cases.
- (ii) The NRCA and the Ministry of Health are to be informed a minimum of two (2) months in advance of major maintenance or upgrade in order to qualify for suspension of meeting standards.

FIFTH SCHEDULE

(Regulations 16, 22 and 27)

Form 1

Monthly Report

The Natural Resources Conservation Authority Act  
The Natural Resources Conservation Authority  
Sewage Effluent Regulations 2000

MONTHLY REPORTING FORM

Date: \_\_\_\_\_ Reporting Period: \_\_\_\_\_ to \_\_\_\_\_

Name of Plant: \_\_\_\_\_

Location of Plant: \_\_\_\_\_

NRCA Permit No.: \_\_\_\_\_ NRCA Licence No.: \_\_\_\_\_

Sampling and Testing

Week of Sample	Date of Sample	Time of Sample	Inflow, Q (m <sup>3</sup> /d)	TEST RESULTS (mg/l) <sup>a</sup>								Residual Chlorine	Comments
				BOD <sub>5</sub>	TSS	COD	N	P	pH	F. Colli-form			
Week 1													
Week 2													
Week 3													
Week 4													
Monthly Average	-	-											-

<sup>a</sup> F. Coli. is reported as MPN/100 ml and pH as a dimensionless number.

Chlorine Residual

No. of tests: \_\_\_\_\_ No. > 1.5 mg/L \_\_\_\_\_ No. = 1.5 mg/L \_\_\_\_\_

Other Tests

Type: \_\_\_\_\_ No. \_\_\_\_\_ Comments: \_\_\_\_\_

Type: \_\_\_\_\_ No. \_\_\_\_\_ Comments: \_\_\_\_\_

Test Methods used for each parameter

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Regulatory Inspections/Visits

NRCA: Yes ? No. \_\_\_\_\_ No ?

EHU: Yes ? No. \_\_\_\_\_ No ?

OPERATION AND MAINTENANCE

Average daily flow per month of reporting period: \_\_\_\_\_ m<sup>3</sup>/d  
\_\_\_\_\_ m<sup>3</sup>/d (Influent) (Effluent, if >375 m<sup>3</sup>/d)

Peak daily influent flow per month of reporting period: \_\_\_\_\_ m<sup>3</sup>/d

Septage received per month: \_\_\_\_\_ m<sup>3</sup>, \_\_\_\_\_ m<sup>3</sup>, \_\_\_\_\_ m<sup>3</sup>

Sludge removed per month: \_\_\_\_\_ m<sup>3</sup>, \_\_\_\_\_ m<sup>3</sup>, \_\_\_\_\_ m<sup>3</sup>

List any equipment failures including periods of power outages:

Date	Nature of problem	Duration
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

List any treatment process problems:

Date	Nature of problem	Duration
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Maintenance Inspection: Yes ?      Date: \_\_\_\_\_      No ?

List any repairs, rehabilitation or upgrades to the plant

Description	Start Date	End Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

List any additional Sewage Inflows received      Source  
Start Date

Start Date	Source
_____	_____
_____	_____
_____	_____

Changes in Staffing

\_\_\_\_\_  
\_\_\_\_\_

Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Plant Operator Signature      Date: \_\_\_\_\_

\_\_\_\_\_  
Owner Signature      Date: \_\_\_\_\_

**Annual Report**

The Natural Resources Conservation Authority Act  
 The Natural Resources Conservation Authority  
 Sewage and Trade Effluent and Septage Regulations 2004

**ANNUAL SEWAGE EFFLUENT REPORTING FORM**

Date: \_\_\_\_\_ Reporting Year: \_\_\_\_\_

Name of Plant: \_\_\_\_\_

JAN	30-	30-day	TEST	RESULTS	(mg/L)	<sup>a</sup>	(Monthly	Average)		
Month	day	Avg								
FEB	Avg	Outflo								
MAR	Inflo	w, Q <sub>out</sub>								
	w, Q <sub>in</sub>	(m <sup>3</sup> /d)								
	(m <sup>3</sup> /d)									
APR										
MAY										
JUN										
JUL										
AUG										
SEP										
OCT										
NOV										
DEC										

Location of Plant: \_\_\_\_\_

NRCA Permit No.: \_\_\_\_\_ NRCA Licence No.: \_\_\_\_\_

Capacity of the Plant: \_\_\_\_\_

**MONITORING**

Sampling and Testing

	BOD <sub>5</sub>	TSS	COD	N	P	F. Coli.	pH	Cl <sub>2</sub>	Comments

<sup>a</sup> F. Coli. is reported as MPN/100 ml and pH as a dimensionless number .

**Chlorine Residual**

No. of tests: \_\_\_\_\_ No. > 1.5 mg/L \_\_\_\_\_ No. = 1.5 mg/L \_\_\_\_\_

**Other Tests**

Type: \_\_\_\_\_ No. \_\_\_\_\_ Comments: \_\_\_\_\_  
 Type: \_\_\_\_\_ No. \_\_\_\_\_ Comments: \_\_\_\_\_  
 Type: \_\_\_\_\_ No. \_\_\_\_\_ Comments: \_\_\_\_\_

Regulatory Inspections/Visits :- NEPA: Yes ? No. \_\_\_\_\_ No ? EHU: Yes ?  
 No. \_\_\_\_\_ No ?

**OPERATION AND MAINTENANCE**

Average daily flow: : \_\_\_\_\_ m<sup>3</sup>/d \_\_\_\_\_ m<sup>3</sup>/d  
 (Influent) (Effluent, if >375 m<sup>3</sup>/d)

Maximum daily influent flow for the year: \_\_\_\_\_ m<sup>3</sup>/d

Total Volume of effluent for the year: \_\_\_\_\_ m<sup>3</sup>

Receiving Water Body \_\_\_\_\_ Watershed Management Unit \_\_\_\_\_

Total Septage received for year: \_\_\_\_\_ m<sup>3</sup>

Total Sludge removed for year: \_\_\_\_\_ m<sup>3</sup>

List any repairs, rehabilitation or upgrades to the plant

Description	Start Date	End Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

List any additional Sewage Inflows received Start Date	Source
_____	
_____	
_____	

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Changes in Staffing

\_\_\_\_\_

\_\_\_\_\_

Comments:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ Date: \_\_\_\_\_

Plant Operator Signature

\_\_\_\_\_ Date: \_\_\_\_\_

Owner Signature

Form 3

The Natural Resources Conservation Authority Act  
 The Natural Resources Conservation Authority  
 Sewage and Trade Effluent and Septage Regulations 2004

ANNUAL TRADE EFFLUENT REPORTING FORM

Date: _____ yyyyymmdd	Reporting Year: _____	Date Received _____ yyyyymmdd
--------------------------	-----------------------	-------------------------------------

Name of Plant: \_\_\_\_\_  
 Location of Plant: \_\_\_\_\_  
 NRCA Permit No.: \_\_\_\_\_ NRCA Licence No.: \_\_\_\_\_

Estimate of average flow rate of trade effluent  
 Average annual flow rate of trade effluent or  
 Monthly flow rate (litres). If the flow rate is not available, use monthly  
 water usage

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec YR

PARAMETER	Annual average concentration	Number of samples	Number of samples above standard	Annual loading
Biological Oxygen Demand (BOD <sub>5</sub> )				
Chemical Oxygen Demand (COD)				
Faecal Coliform				
Nitrate as NO <sub>3</sub>				
Oil & Grease				
pH				
Phosphate as PO <sub>4</sub>				
Temperature				
Total Coliform				
Total dissolved solids (TDS)				
Total Suspended Solids (TSS) (maximum monthly average)				
Total Suspended Solids (TSS) maximum daily average				
Ammonia/ammonium measured as NH <sub>4</sub>				
Barium				
Beryllium				
Boron				
Calcium				
Chloride				
Colour				
Cyanide (free)				
Cyanide (Total as CN)				
Detergent				
Dissolved oxygen (DO)				

PARAMETER	Annual average concentration	Number of samples	Number of samples above standard	Annual loading
Fluoride				
Iron				
Magnesium				
Manganese				
Phenols				
Sodium				
Sulphate				
Sulphide				
Total Oorganic Carbon (TOC)				
Trace Metals:				
Zinc				
Lead				
Cadmium				
Arsenic				
Chromium				
Copper				
Mercury				
Nickel				
Selenium				
Silver				
Tin				
Total Heavy Metals				

Number of reportable incidents \_\_\_\_\_

Community activities \_\_\_\_\_

Date: \_\_\_\_\_

Plant Operator Signature \_\_\_\_\_

Date: \_\_\_\_\_

Owner Signature \_\_\_\_\_

**SIXTH SCHEDULE**

**(Regulation 22)**

Information for Daily Records

Whereas the owner is not required to make daily reports available to the NATURAL RESOURCES CONSERVATION AUTHORITY, they are required to maintain a daily operating log of the treatment plant shall be made available to the NATURAL RESOURCES CONSERVATION AUTHORITY upon request. The format of the log is not defined by these regulations but the information shall be collected is listed below.

1. General Information
  - (i) Name of Plant
  - (ii) Location of Plant
  - (iii) Name of Operator(s)
  - (iv) Date
2. Weather Conditions at the Plant
  - (i) Precipitation
  - (ii) Temperature
  - (iii) Wind
3. Operating Parameters
  - (i) Average daily inflow
  - (ii) Effluent chlorine residual
  - (iii) pH

Any unusual events which may be significant to environmental effect or public health shall be recorded (e.g. flooding of the plant, fishing in ponds, etc.).

## SEVENTH SCHEDULE

(Regulation 6)

APPLICATION FOR CERTIFICATETREATMENT PLANT OPERATOR

TYPE OR PRINT CLEARLY.

Applications that are incomplete or lack supporting evidence will delay processing. If the applicant is successful, the licence is valid for a three year period.

NOTE: A \$1500.00 application fee is required and if approved, a fee of \$5000 is required. Make payments to: **National Environment & Planning Agency**.

1. \_\_\_\_\_  
(Last name) (First name) (Middle name)
2. \_\_\_\_\_  
(Home street address) (City/town) (Parish)
3. \_\_\_\_\_  
(Home phone) (Business phone)
4. \_\_\_\_\_  
(Date of birth)
5. Current Wastewater Operator Certification: Yes No  
If **yes** provide the following information  
  
Country  
Date received  
By examination?  
If engineer submit appropriate documentation and proof of qualifications.

6. Is this application for reciprocity with another Country? Yes No

(A copy of your license & Country/State certification rules must accompany this application)

7. Place a check mark next to the class level of plant for which you are applying. The minimum education (post secondary level) and experience requirements for each level are listed below.

**A. Class IV shall mean any wastewater works as follows:**

1. Raw sewage stabilization ponds with a design hydraulic capacity greater than 200 m<sup>3</sup>/d (0.053 mgd) but equal to or less than 4000 m<sup>3</sup>/d (1.05 mgd); or
2. Wastewater works classified by the WWOLB as Class IV wastewater works.

**B. Class III shall mean any wastewater works as follows:**

1. Wastewater works using biological treatment methods having a design hydraulic capacity greater than 200 m<sup>3</sup>/d (0.053 mgd), but equal to or less than 2000 m<sup>3</sup>/d (0.53 mgd); or

- 2. Wastewater works using physical/chemical treatment methods having a design hydraulic capacity greater than 200 m<sup>3</sup>/d (0.053 mgd), but equal to or less than 2000 m<sup>3</sup>/d (0.53 mgd); or
- 3. Wastewater works using combinations of biological and physical/chemical treatment methods having a design hydraulic capacity greater than 200 m<sup>3</sup>/d (0.053 mgd), but equal to or less than 400 m<sup>3</sup>/d (0.105 mgd); or
- 4. Raw sewage stabilization ponds, with a design hydraulic capacity greater than 4000 m<sup>3</sup>/d (1.05 mgd); or
- 5. Wastewater works that do not use biological or physical/chemical treatment methods but are classified by the WWOLB as Class III wastewater works.

**C. Class II shall mean any wastewater works as follows:**

- 1. Wastewater works using biological treatment methods having a design hydraulic capacity greater than 2000 m<sup>3</sup>/d (0.53 mgd), but equal to or less than 20,000 m<sup>3</sup>/d (5.3 mgd); or
- 2. Wastewater works using physical/chemical treatment methods having a design hydraulic capacity greater than 2000 m<sup>3</sup>/d (0.53 mgd), but equal to or less than 20,000 m<sup>3</sup>/d (5.3 mgd); or
- 3. Wastewater works using combinations of biological and physical/chemical treatment methods, having a design hydraulic capacity greater than 400 m<sup>3</sup>/d (0.105 mgd), but equal to or less than 10,000 m<sup>3</sup>/d (2.65 mgd).

**D. Class I shall mean any wastewater works as follows:**

- 1. Wastewater works using biological treatment methods having a design hydraulic capacity greater than 20,000 m<sup>3</sup>/d (5.3 mgd); or
- 2. Wastewater works using physical/chemical treatment methods having a design hydraulic capacity greater than 20,000 m<sup>3</sup>/d (5.3 mgd); or
- 3. Wastewater works using combinations of biological and physical/chemical treatment methods, having a design hydraulic capacity greater than 10,000 m<sup>3</sup>/d (2.65 mgd).

8. Is applicant requesting any education and/or experience substitutions?  
 Education Substitution:           Yes           No  
 Experience Substitution:        Yes           No

9. Education:

a. Circle the highest level of education successfully completed.

Primary  
 Secondary  
 Tertiary

Name of school  
 Location  
 Number of years

Date of graduation/school leaving  
Certificate/ diplomas/degrees received

- b. List additional courses and training which you would like considered toward the education requirement. Attach evidence of course completion (certificate, grade report). List Course Title, Name & Location, Date Completed, Credits on back page.
- c. Attach evidence of course completion (certificate, grade report, etc.). Submit official college transcript.

10. Experience: List your employment record in wastewater operations, starting with your present or most recent employment (indicate whether employment was full or part-time). If employment was part-time, indicate average number of hours worked per week. Partial credit toward operating experience may be given for related experience. **You must provide a complete and thorough description of duties for each relevant job description. Use additional sheets, if necessary.**

- A. Name of facility and location  
Type of facility and design flow  
Treatment Units:  
Solids Handling Units:  
Your title  
Name and title of supervisor

Description of Duties:

Date Started: \_\_\_\_\_  
(Mo/Yr)

Date Separated: \_\_\_\_\_  
(Mo/Yr)

Total Length of Employment: \_\_\_\_\_  
Years Months Full-Time Part-time

- B. Name of facility and location  
Type of facility and design flow  
Treatment Units:  
Solids Handling Units:  
Your title  
Name and title of supervisor

Description of Duties:

Date Started: \_\_\_\_\_  
(Mo/Yr)

Date Separated: \_\_\_\_\_  
(Mo/Yr)

Total Length of Employment: \_\_\_\_\_  
Years Months Full-Time Part-time

- C. Name of facility and location  
Type of facility and design flow  
Treatment Units:  
Solids Handling Units:  
Your title  
Name and title of supervisor

Description of Duties:

Date Started: \_\_\_\_\_  
(Mo/Yr)

Date Separated: \_\_\_\_\_  
(Mo/Yr)

Total Length of Employment: \_\_\_\_\_  
Years Months Full-Time Part-time

11. **SIGNATURES**

Verification of experience is required by the signature of either the operator in responsible charge at the facility or the permittee of record for the facility.

\_\_\_\_\_  
(Operator in Responsible Charge) (Permittee of Record)

12. **REFERENCES**

Give name, address and daytime phone number of two persons, not relatives, who have knowledge of your character, experience, and ability.

- a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- b. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I hereby certify the information given by me is true and complete to the best of my knowledge, not only for the issuance of the certificate, but also for the retention of the certificate. I further agree to abide by the provisions of the Sewage and Trade Effluent and Septage Regulation."

Signed:

Date:

**RETURN TO:**  
**[NEPA]**

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Table 1

## Approved Test Methods

Whereas the Test Methods listed in Appendix 2 of the National Sewage Effluent Standards, 1997 are internationally accepted methods of analysis; the proposed specific tests for NRCA compliance purposes are listed below. However, other test methods can be used if evidence is provided to prove compatibility with the test methods proposed by NRCA.

Parameter	Standard Methods for the Examination of Water and Wastewater Test Method(s)	ISO Test Method(s)
Biochemical Oxygen Demand (BOD <sub>5</sub> )	5210 B, 5-day BOD test	ISO 5815:1989, Dilution and seeding
Total Suspended Solids	2450 D, Total Suspended Solids dried at 103 - 105 °C	
Nitrate as nitrogen)	4500-NO <sub>3</sub> E, Cadmium Reduction	
Total Nitrogen	4500-N, Persulphate Method	ISO 10048:1991
Phosphates	4500-P E, Colorimetric	ISO 6878-1:1986, Colorimetric
Total Phosphorous	4500-P I, Persulphate	
Chemical Oxygen Demand	5220 D, Closed reflux, Colorimetric	
PH	4500-H <sup>+</sup> B, Electrometric	
Faecal Coliform	9221 C, Multiple tube fermentation	ISO 9308-2:1990
Residual Chlorine	4500-Cl, DPD Colormetric	ISO 7393-2:1985, DPD Colormetric

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Recommended test methods for analytical analyses of effluent samples used to assess for compliance with NRCA's National Trade and Sewage Effluent Standards.

The test methods are as illustrated in the following references;

1. Clesceri, L; Greenberg, Arnold and Trussel, R. (Editors). 1989. Standard Methods for the Examination of Water and Wastewater, 17th Edition. APHA-AWWA-WPCF. Publication Office: APHA, 1015 Fifteenth Street NW, Washington, DC 20005. (APHA = American Public Health Association. AWWA = American Wastewater Association. WPCF = Water Pollution Control Federation)
2. ISO. 1994. ISO Standards Compendium, Environment, Water Quality, Vol. 2 - Chemical methods, 1st Edition. ISO, Case Postale 56, CH-1211 Geneve, Switzerland. (ISO = International Organization for Standardization)

Deleted: Waste Water

Deleted: Waste Water

3. ISO.1994. ISO Standards Compendium, Environment, Water Quality, Vol. 3 - Physical, biological and microbiological methods, 1st Edition. ISO, Case Postale 56, CH-1211 Geneve, Switzerland.

For the Trade Effluent, The proposed Analytical methods for NRCA compliance purposes are listed below. However, other test methods can be used if evidence is provided to prove compatibility with the test methods proposed by NRCA.

**Table 2**

PARAMETER	Standard Methods for Examination of Water & Wastewater by <a href="#">Lenore S. Clesceri</a> , <a href="#">Am Public Health ASN</a> , <a href="#">Andrew D. Eaton</a>	ISO or U.S EPA Method (to be completed)
Ammonia/ammonium measured as NH <sub>4</sub>	4500-NH <sub>3</sub>	
Barium	3500-Ba	
Beryllium	3500-Be	
Biological oxygen demand (BOD)	5210	ISO 5815:1989, Dilution and seeding
Boron	4500-B	
Calcium	3500-Ca	
Chemical Oxygen Demand (COD)	5220	
Chloride	4500-Cl-	
Colour	2120	
Cyanide (free)	4500-CN-	
Cyanide (Total as CN)		
Detergent	5540	
Dissolved oxygen (DO)	4500-O	
Faecal Coliform	9221	ISO 9308-2:1990
Fluoride	4500-F <sup>-</sup>	
Iron	3500-Fe	
Magnesium	3500-Mg	
Manganese	3500-Mn	
Nitrate as NO <sub>3</sub>	4500-NO <sub>3</sub> <sup>-</sup>	
Oil & Grease	5520	U.S. EPA Method 1664: Guidelines Establishing Test Procedures for the Analysis of Oil and Grease and Non-Polar Material
pH	4500-H <sup>+</sup>	
Phenols	5530	
Phosphate as PO <sub>4</sub>	4500-P	ISO 6878-1:1986, Colourmetric
Sodium	3500-Na	
Sulphate	4500-SO <sub>4</sub> <sup>2-</sup>	
Sulphide	4500-S <sup>2-</sup>	
Temperature	2550	
Total Coliform	9221	
Total dissolved solids (TDS)	2540C	

Total organic carbon (TOC)	5310	
Total suspended solids (TSS) (maximum monthly average)	2540D	
Total suspended solids (TSS) maximum daily average	2540D	
Trace Metals: Zinc Lead Cadmium Arsenic Chromium Copper Mercury Nickel Selenium Silver Tin Total Heavy Metals	3500-metal	

**NINTH SCHEDULE****(Regulation )****Parameters to be Monitored**

The parameters for which the standard establishes limits and for which monitoring is to be done are

BOD <sub>5</sub>	Biochemical Oxygen Demand
TSS	Total Suspended Solids
Total Nitrogen	Nitrogen in Nitrate, Nitrite and Ammonia
Phosphates	Phosphorus in Phosphates
COD	Chemical Oxygen Demand
pH	Acidity or alkalinity
Faecal Coliform	
Residual Chlorine*	

\*Where natural treatment systems are designed to reduce coliform levels without the use of chlorine then the residual criteria would not apply.

**TENTH SCHEDULE****(Regulation )**

**Application of treated sewage sludge for land disposal that does not meet the National Treated Sewage Sludge/Biosolids Standards.**

1. All applications for biosolids to land sites are to be approved by the Authority prior to use. This shall enable the Authority to maintain a record of such sites and ensure that sludge is being spread on sites that are approved by the Authority's for such purpose.
2. The criteria for granting such approvals are as follows:
  - (a) land application sites shall have minimum separation distances of :
    - (i) 300 m from a drinking water supply well
    - (ii) 100 m from any surface water except that this may be reduced to 50 m when a vegetative buffer strip at least 10 m wide is maintained between the site and the surface water.

- (iii) 1 m between the ground surface and bedrock or groundwater. The Authority may allow a reduced separation distance to a minimum of 0.5 m on a case-by-case basis provided the rate of application is reduced.
- (iv) 200m from an inhabited dwelling except that this distance may be reduced to 100 m if the sludge is incorporated with the soil and the resident owner and occupant gives their written consent

- a) Land application sites may not be located in wetlands or in channels of any waterbody, and those portions of the floodplain adjoining such channels; ← Formatted: Bulletsand Numbering
- b) Land application sites may be located in the floodplain (land which has been or may be covered by flood waters) but the site may not be used when the floodplain is flooded;
- c) Land application sites shall be limited to cultivated cropland, tree plantations, or pasture; ← Formatted: Bulletsand Numbering
- d) Other sites may be reviewed and approved by the Authority in writing on a case-by-case basis;
- e) Land application sites shall be limited to a slope of 12% or less. ← Formatted: Bulletsand Numbering

#### ELEVENTH SCHEDULE

(Regulation )

#### A. Testing of sludge

##### 1. Sampling frequency and method

The sludge produced shall be sampled every month

A sample set shall consist of a set of five samples taken at random from a batch of sludge; each sample consisting of not less than 100 ml in the case of liquid sludge or 100 g in the case of dried sludge;

Where analysis of samples over a period of six consecutive months shows that none of them contain Salmonella species, or more than 102 units of E. coli, the interval before the next sampling may be increased to three months.

##### B. Tests to be done

Each sample shall be analysed so as to determine:

C. (a) the presence of E. coli; and ← Formatted: Bulletsand Numbering

D. (b) the presence of Salmonella species, where the batch of sludge in question has undergone a treatment process designed so as to reduce the amount of E. coli present in the sludge by not less than 99.9999 per cent,

E. pH

F. the percentage content of dry matter

G. the percentage organic matter on a dry weight basis

H. the percentage of nitrogen on a dry weight basis

I. the percentage of phosphorus on a dry weight basis

The concentrations in milligrams per kilogram of dry matter of-

J. chromium; ← Formatted: Bulletsand Numbering

K. Zinc

L. Copper

M. Nickel

N. Cadmium

O. Lead

P. Mercury

Q. Methods of analysis

Enteric viruses. ASTM Designation: D 4994-89, "Standard Practice for Recovery of Viruses From Wastewater Sludges", 1992 Annual Book of ASTM Standards: Section 11 -- Water and Environmental Technology, ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

Fecal coliform. Part 9221 E. or Part 9222 D., "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, American Public Health Association, 1015 15th Street, NW., Washington, DC 20005.

Helminth ova. Yanko, W.A., "Occurrence of Pathogens in Distribution and Marketing Municipal Sludges", EPA 600/1-87-014, 1987. National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161 (PB 88-154273/AS).

Inorganic pollutants. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, Second Edition (1982) with Updates I (April 1984) and II (April 1985) and Third Edition (November 1986) with Revision I (December 1987). Second Edition and Updates I and II are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161 (PB-87-120-291). Third Edition and Revision I are available from Superintendent of Documents, Government Printing Office, 941 North Capitol Street, NE., Washington, DC 20002 (Document Number 955-001-00000-1).

(oxygen uptake rate. Part 2710 B., "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, 5)

Salmonella sp. bacteria. Part 9260 D., "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, American Public Health Association, 1015 15th Street, NW., Washington, DC 20005; or

Kenner, B.A. and H.P. Clark, "Detection and enumeration of Salmonella and Pseudomonas aeruginosa", Journal of the Water Pollution Control Federation, Vol. 46, no. 9, September 1974, pp. 2163-2171. Water Environment Federation, 601 Wythe Street, Alexandria, Virginia 22314.

(6) Specific American Public Health Association, 1015 15th Street, NW., Washington, DC 20005.

The analyses for metals referred to above shall be carried out following strong acid digestion; the reference method of analysis shall be that of atomic absorption spectrometry, and the limit of detection for each metal shall not exceed the appropriate limit value specified in column (3) of the sludge table or, in the case of chromium, 25 milligrams per kilogram of dry matter.

## PART II

### Standards for Solid Waste/Industrial Sludge Suitable for Landfill

Leachate test results not to exceed 100mg/l

#### Parameter

Ammonia sulphide	Maleic anhydride
Benzidine	Methylamine
Benzyl chloride	Potassium permanganate
Diethylamine	Quinoline
Ethylamine	Strychnine
Ethylenediamine	Tetrachloroethanes

