

Attachment F

Proposed Regulations Air Quality, Wastewaters & Waste

The Island of Curacao

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REGULATION 1 -- AIR QUALITY

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Subpart A -- General Provisions

Article 1.0 Introduction

Whereas, the growth in the amount and complexity of air pollution (including noise pollution and stench nuisance) brought about by urbanization, industrial development, and the increasing use of motor vehicles, has resulted in mounting dangers to the public health and welfare; and

Whereas, the natural scenery and the landscape both on and around the Island are harmed due to the many activities of inhabitants and tourists; and

Whereas, Island government leadership is essential for the development of cooperative and effective programs to prevent and control air pollution; and

Whereas, effective and consistent regulations on air pollution prevention (that is, the reduction or elimination, through any measures, of the amount of pollutants produced or created at the source) and air pollution control at the source should be applied to Island sources; and

Whereas, in order to insure the protection of the environment, provisions should be made for a system of permits for undertakings which emit or have the potential to emit pollutants into the atmosphere; and

Whereas, recognizing that a system in which the costs are defrayed in accordance with the "polluter pays" principle provides initiative for an effective environmental policy, the following regulations are promulgated.

Article 2.0 Purpose

The purposes of this regulation are --

(1) to protect and enhance the quality of the Island's air resources so as to promote the public health and welfare;

(2) to initiate and accelerate an Island research and development program to achieve the prevention and control of air pollution;

(3) to provide technical assistance to industry in the connection with the development and execution of their air pollution prevention and control programs;

(4) to foster awareness of the Island's environmental policy and provide a foundation for self-activation for the business community and citizenry.

Article 3.0 Definitions

As used in these regulations:

(a) "Ambient air" means that portion of the atmosphere, external to buildings, to which the general public has access.

(b) "Attainment area" means areas where the ambient air quality is equal to or below the ambient air quality standards.

(c) "CO" means carbon monoxide.

- (d) "ESC" means the Environmental Service of Curacao.
- (e) "Equivalent method" means a method of sampling and analyzing the ambient air for an air pollutant that has been designated as an equivalent method to a reference method in the appendix.
- (f) "Meteorological measurements" means measurements of wind speed, wind direction, barometric pressure, temperature, relative humidity, and solar radiation.
- (g) "NO₂" means nitrogen dioxide. NO means nitrogen oxide. NO_x means oxides of nitrogen and is defined as the sum of the concentrations of NO₂ and NO.
- (h) "O₃" means ozone.
- (i) "Pb" means lead.
- (j) "Reference method" means a method of sampling and analyzing the ambient air for an air pollutant that is specified as a reference method in the appendix.
- (k) "SO₂" means sulfur dioxide.
- (l) "TSP (total suspended particulates)" means particulate matter as measured by the method described in appendix A.
- (m) "VOC" means volatile organic compounds.

Article 4.0 Exclusions

- (a) "Ambient air" excludes that portion of the atmosphere over and within a facility to which the general public does not have common access.
- (b) Excursions in the concentration of pollutants in the ambient air caused by short-term, non-repetitive, temporary man-made occurrences are excluded from use in designating the attainment status of a region of the Island.
- (c) Excursions in the concentration of pollutants in the ambient air caused by natural means (e.g., wind storms) are excluded from use in designating the attainment status of a region of the Island.

Article 5.0 Authority

Authority for the administration and enforcement of these regulations is vested with the Environmental Service of Curacao (ESC).

Subpart B -- Air Programs

Article 6.0 Ambient Air Quality Standards

6.1 Scope.

- (a) Ambient air quality standards are set forth in this part.
- (b) Ambient air quality standards define levels of air quality which are judged necessary, with

an adequate margin of safety, to protect the public health. Such standards are subject to revision, and additional standards may be promulgated as deemed necessary to protect the public health and welfare.

(c) The promulgation of ambient air quality standards shall not be considered in any manner to allow significant deterioration of existing air quality in any portion of the Island.

6.2 Reference conditions.

All measurements of air quality are corrected to a reference temperature of 25°C. and to a reference pressure of 760 millimeters of mercury (1,013.2 millibars).

6.3 Ambient air quality standards.

The ambient air quality standards for criteria pollutants measured by the reference methods described in appendix A, or by equivalent methods, are set forth in the following table:

Pollutant	Measured As	Ambient Air Quality Standard (micrograms per cubic meter)	Averaging Period	Allowable Excursions
Sulfur Oxides	Sulfur Dioxide	80	Annual Arithmetic Mean	None
Sulfur Oxides	Sulfur Dioxide	365	24 - hour	Once per year
Particulate Matter	TSP	150	24 - hour	Five percent of the total calendar days
Particulate Matter	TSP	75	Annual Arithmetic Mean	None
Carbon Monoxide	Carbon Monoxide	10.000	8 - hour	Five percent of the monitored periods
Carbon Monoxide	Carbon Monoxide	40.000	1 - hour	Five percent of the monitored periods
Ozone	Ozone	240	1 - hour	Once per year
Nitrogen Dioxide	Nitrogen Dioxide	100	Annual Arithmetic Mean	None
Lead ¹	Lead	1,5	Maximum Arithmetic Mean Averaged Over a Calendar Quarter	None

1. Lead AAQS to be phased in as leaded gasoline use is phased out of Island usage.

Article 7.0 Ambient Air Monitoring

7.1 Purpose.

(a) This part contains criteria and requirements for ambient air quality monitoring and requirements for reporting ambient air quality data and information. The monitoring criteria pertain to the following areas:

- (1) Quality assurance procedures for monitor operation and data handling.
- (2) Methodology used in monitoring stations.
- (3) Operating schedule.
- (4) Siting parameters for instruments or instrument probes.

(b) This part also acts to establish a government ambient air quality monitoring network for the purpose of providing timely air quality data upon which to base national assessments and policy decisions.

7.2 Applicability.

This part applies to:

- (a) Government agencies.
- (b) Owners or operators of proposed sources.

7.3 Monitoring methods.

Appendix A contains the criteria to be followed in determining acceptable monitoring methods.

7.4 Siting of instruments or instrument probes.

Appendix A contains criteria for siting instruments or instrument probes.

7.5 Operating schedule.

Ambient air quality data collected at any monitor must be collected as follows:

- (a) For continuous analyzers-consecutive hourly averages except during:
 - (1) Periods of routine maintenance,
 - (2) Periods of instrument calibration, or
 - (3) Periods or seasons exempted by the ESC.

7.6 Air monitoring network.

(a) Ambient air will be monitored for the criteria pollutants, SO₂ and TSP, in accordance with Appendix A. ESC will review the locations of monitoring stations operated by private industry to ensure that they meet the following siting criteria:

- (1) Potential for maximum pollutant impact from Island sources,

- (2) Potential of the monitoring location to accurately reflect exposures to the general public and tourists, and
- (3) Location of sensitive subgroups (e.g., hospitals and schools).
- (b) Monitoring stations operated by private industry will be managed and maintained by their owners to insure validity of the data.
- (c) Meteorological data will be monitored at a minimum of one station operated by private industry
- (d) ESC may establish their own network of monitoring stations in accordance with the above criteria.

7.7 System modification.

ESC shall annually develop and implement a schedule to modify the ambient air quality monitoring network to eliminate any unnecessary stations or to correct any inadequacies indicated by the result of an annual review.

7.8 Annual summary report.

(a) ESC shall annually prepare a summary report of all the ambient air quality monitoring data from all monitoring stations. The annual report must be completed by July 1 of each year for data collected from January 1 to December 31 of the previous year.

(b) The annual summary report must contain:

(1) The location, date, pollution source, and duration of each incident of air pollution during which ambient levels of a pollutant reached or exceeded the level specified by article 6.0 of this regulation as a level which could cause significant harm to the health of persons.

7.9 Government monitoring.

The ESC may promulgate criteria similar to that referenced in this part for monitoring a pollutant for which an Ambient Air Quality Standard does not exist. Such an action would be taken whenever the ESC determines that a monitoring program is necessary to monitor such a pollutant.

Article 8.0 Standards of Performance for New Stationary Sources

8.1 Applicability.

(a) This article applies to the owner or operator of any stationary source which proposes the construction or modification of a new source after the date of publication of this regulation.

(b) Any new or revised standard of performance promulgated shall apply to the owner or operator of any stationary source which proposes the construction or modification of a new source after the date of publication in this part of such new or revised standard.

8.2 Definitions.

The terms used in this part are defined in the regulation or in this section as follows:

- (a) "Existing source" means any stationary source other than a new source.
- (b) "Modification" means any physical change in, or change in the method of operation of, a stationary source which results in a significant increase of any air pollutant emitted by such source or which results in a significant increase of any air pollutant not previously emitted.
- (c) "New source" means any stationary source, the construction or modification of which begins after the publication of regulations prescribing a standard of performance under this article.
- (d) "Owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.
- (e) "Significant increase" means a net emission increase potential greater than the quantities listed in Article 15.5 (7) based on a comparison of actual emissions (current versus future).
- (f) "Standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any non air quality health and environmental impact and energy requirements) the ESC determines has been adequately demonstrated.
- (g) "Stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant.

8.3 Determination of construction or modification.

- (a) When requested to do so by an owner or operator, the ESC will make a determination of whether action taken or intended to be taken by such owner or operator constitutes construction (including reconstruction) or modification or the commencement thereof within the meaning of this article.
- (b) The ESC will respond to any request for a determination under this section within 30 days of receipt of such request.
- (c) For the purposes of this article a modification is defined as:
 - (1) A physical or operational change to an existing facility which results in a significant increase in the emission rate to the atmosphere of any pollutant to which a standard applies.
 - (2) An expansion to a existing stationary source that is subject to this article shall not make the remainder of the existing source subject to this article.
 - (3) The following shall not, by themselves, be considered modifications under this part:
 - (i) Maintenance, repair, and replacement which is routine for a source category.
 - (ii) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on that facility.
 - (iii) An increase in the hours of operation.
 - (iv) Use of an alternative fuel or raw material if, prior to the date any standard under this part becomes applicable to that source type, the existing facility was designed to accommodate that alternative use. A facility shall be considered to be designed to accommodate an alternative fuel

or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change.

(v) The addition or use of any system or device whose primary function is the reduction of air pollutants, except when an emission control system is removed or is replaced by a system which the ESC determines to be less environmentally beneficial.

(vi) The relocation or change in ownership of an existing facility.

8.4 Operator responsibilities.

(a) For the purpose of implementing this article, any owner or operator subject to the provisions of this article, shall obtain a license (permit) from the ESC and follow other applicable procedures in accordance with article 15.0 of these regulations.

(b) Compliance with standards shall be determined only by performance tests established by this regulation, unless otherwise specified by the ESC.

(c) At all times, during normal operation, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable environmental controls are being used will be based on information available to the ESC which may include, but is not limited to, monitoring results, opacity observations, review of environmental control systems operating and maintenance procedures, and inspection of the source.

(d) During periods of startup, shutdown, and malfunction, owners and operators, shall operate in accordance with recommended procedures and, to the extent possible, minimize the impact of these periods on ambient air quality.

(e) Special provisions set forth under an applicable article of this regulation shall supersede any conflicting provisions of this section.

8.5 Publication of guideline documents, emission guidelines and compliance times.

Reserved

Article 8.6 Standards of Performance for Petroleum Refineries.

8.6.01 Applicability, designation of affected facility, and reconstruction.

(a) The provisions of this article are applicable to the following affected facilities in petroleum refineries: fluid catalytic cracking unit catalyst regenerators, fuel gas combustion devices, and all Claus sulfur recovery plants except Claus plants of 20 long tons per day (LTD) or less. The Claus sulfur recovery plant need not be physically located within the boundaries of a petroleum refinery to be an affected facility, provided it processes gases produced within a petroleum refinery.

(b) Any fluid catalytic cracking unit catalyst regenerator, fuel gas combustion device or any Claus sulfur recovery plan under paragraph (a) of this article which commences construction or modification after promulgation of these regulations, is subject to the requirements of this article.

(c) Sources which are currently operating or under construction on the date of promulgation of these regulations are exempt from this article.

8.6.02 Definitions.

As used in this article, all terms not defined herein shall have the meaning given them in the regulations.

(a) "Claus sulfur recovery plant" means a process unit which recovers sulfur from hydrogen sulfide by a vapor-phase catalytic reaction of sulfur dioxide and hydrogen sulfide.

(b) "Coke burn-off" means the coke removed from the surface of the fluid catalytic cracking unit catalyst by combustion in the catalyst regenerator.

(c) "Contact material" means any substance formulated to remove metals, sulfur, nitrogen, or any other contaminant from petroleum derivatives.

(d) "Fluid catalytic cracking unit" means a refinery process unit in which petroleum derivatives are continuously charged; hydrocarbon molecules in the presence of a catalyst suspended in a fluidized bed are fractured into smaller molecules, or react with a contact material suspended in a fluidized bed to improve feedstock quality for additional processing; and the catalyst or contact material is continuously regenerated by burning off coke and other deposits.

(e) "Fluid catalytic cracking unit catalyst regenerator" means one or more regenerators (multiple regenerators) which comprise that portion of the fluid catalytic cracking unit in which coke burn-off and catalyst or contact material regeneration occurs, and includes the regenerator combustion air blower(s).

(f) "Fuel gas" means any gas which is generated at a petroleum refinery and which is combusted. Fuel gas also includes natural gas when the natural gas is combined and combusted in any proportion with a gas generated at a refinery. Fuel gas does not include gases generated by catalytic cracking unit catalyst regenerators and fluid coking burners.

(g) "Fuel gas combustion device" means any equipment, such as process heaters, boilers and flares used to combust fuel gas, except facilities in which gases are combusted to produce sulfur or sulfuric acid.

(h) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

(i) "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives.

(j) "Process gas" means any gas generated by a petroleum refinery process unit, except fuel gas and process upset gas as defined in this section.

(k) "Process upset gas" means any gas generated by a petroleum refinery process unit as a result of start-up, shut-down, upset or malfunction.

(l) "Refinery process unit" means any segment of the petroleum refinery in which a specific processing operation is conducted.

8.6.03 Standard for carbon monoxide.

Each owner or operator of any fluid catalytic cracking unit catalyst regenerator that is subject to the requirements of this article shall comply with the emission limitations set forth in this section on and after the date on which the initial performance test is completed, but not later than 60 days after achieving the maximum production rate at which the fluid catalytic cracking unit catalyst regenerator will be operated, or 180 days after initial startup, whichever comes first.

(a) No owner or operator subject to the provisions of this article shall discharge or cause the discharge into the atmosphere from any fluid catalytic cracking unit catalyst regenerator any gases that contain carbon monoxide (CO) in excess of 1000 ppmv by volume (dry basis).

8.6.04 Standards for sulfur oxides.

Each owner or operator that is subject to the requirements of this article shall comply with the emission limitations set forth in this section on and after the date on which the initial performance test is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after initial startup, whichever comes first.

(a) No owner or operator subject to the provisions of this article shall burn in any fuel gas combustion device any fuel gas that contains hydrogen sulfide in excess of 600 ppmv. The combustion in a flare of process upset gases or fuel gas that is released to the flare as a result of relief valve leakage or other emergency malfunctions is exempt from this article.

(b) Any Claus sulfur recovery plant must meet a recovery percentage greater than or equal to 98 percent; and

(c) Off-gases from any Claus sulfur recovery plant must be incinerated or otherwise treated prior to discharge into the atmosphere.

Article 9.0 Standards of Performance for Existing Stationary Sources**9.1 Applicability.**

(a) This article applies to the owner or operator of any stationary source which is in operation or under construction on the date of promulgation of this regulation.

9.2 Definitions.

The definition terms used in this part are identical to those issued in Section 3.0 and 8.2, unless otherwise noted.

(a) "Fugitive emissions" means those emissions which do not pass through a stack, chimney, flue or process vent. Fugitive emissions include equipment leaks and volatilization from wastewater and land disposal operations.

9.3 Operator responsibilities.

(a) For the purpose of implementing this article, any owner or operator subject to the provisions of this article, shall obtain a license (permit) from the ESC and follow other applicable procedures in accordance with article 15.0 of these regulations.

(b) Compliance with standards shall be determined only by performance of the unit established by this regulation, unless otherwise specified by the ESC.

(c) At all times, during normal operation, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the ESC which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

(d) During periods of startup, shutdown, and malfunction, owners and operators, shall operate in accordance with recommended procedures and, to the extent possible, minimize the impact of these periods on ambient air quality.

(e) Special provisions set forth under an applicable article of this regulation shall supersede any conflicting provisions of this section.

Article 9.4 Standards of Performance for Existing Units at Petroleum Refineries.

(a) Process heaters, boilers and other combustion equipment shall be operated to minimize stack opacity. Procedures and equipment such as the control of excess air and/or steam atomizers for liquid fuels shall be employed to meet these requirements.

(b) During periods of excessive opacity, the refinery shall investigate the causes and change operational parameters to reduce opacity as necessary.

(c) The opacity adjustment provisions of this article shall not apply during sootblowing, startup, shutdown or malfunction of the affected units.

(d) Nothing in this article shall be deemed to require the facility to operate in a manner which could damage equipment or jeopardize the safety of operators.

(e) The refinery shall operate to minimize the quantity of materials sent to flares during normal operation.

(f) Each owner or operator of any fluid catalytic cracking unit shall control particulate emissions from the catalyst regenerator by the use of, as a minimum, a two stage cyclone system, or equal.

Article 9.5 Recordkeeping and reporting.

(a) The Refinery shall consult with ESC with regard to any planned or ongoing flaring of refinery gases which will occur for a period exceeding twelve hours. Flaring that either exceeds or is anticipated to exceed the twelve hour limit will require a discussion between representatives of the refinery and ESC. The purpose of this discussion will be to review the potential impact of continued flaring, and to determine if mitigation is required. Flare notification will include startup and shutdown conditions for which an extended flaring period is anticipated.

The discussions will take into account the following criteria in order to determine an acceptable flaring duration and whether mitigation is necessary:

- (1) Effect of total pollutant load from the refinery.
- (2) Sulfur content of the flare gases.

- (3) Flare system design (for example, whether the flare is a smokless design).
- (4) Predicted impacts to ambient air quality standards.

(b) Reporting of flare events occurring from the venting of pressure safety valves or other safety devices is excluded from the reporting and recordkeeping requirements of this article.

(c) The facility is required to submit a report on an annual basis which describes the overall emissions of the refinery for SO₂, NO_x, CO and TSP from refinery heaters, boilers and other combustion sources. In addition, fuel usage, fuel composition data and the calculation method used to determine the annual emissions must be reported. Acceptable calculation methods include published emission factors, vendor data and emission monitoring data.

(d) Annual reporting must be submitted to the ESC by April 1 of each year to report activities for the previous calendar year.

(e) As of April 1, 1998, the annual report must include VOC emissions from combustion sources, tankage, and loading operations. VOC emissions from fugitive sources are excluded from this regulation.

Article 10.0 Delayed Compliance and Exemptions

10.1 Introduction.

(a) The ESC is authorized to issue to certain sources delayed compliance orders permitting a delay in compliance with applicable regulations. All such delayed compliance orders will be summarized under this section of the regulations.

10.2 Effect of delayed compliance orders

(a) ESC approved delayed compliance orders shall have the following effects:

(1) The order shall preclude enforcement action against the source under this regulation for violations during the period the order is in effect and the source is complying with the terms of the order.

(b) Source responsibilities and liabilities.

(1) The obligations of a source subject to a delayed compliance order include, but are not limited to:

(i) Compliance with the provisions of the delayed compliance order;

(ii) Compliance with applicable regulations not covered by the order;

(iii) Compliance with any requirement imposed by ESC during conditions which might create a period of imminent and substantial endangerment to the health of persons.

(2) Compliance with a delayed compliance order promulgated or approved under this regulation does not preclude enforcement actions for violations not covered by the order.

10.3 Termination of delayed compliance orders.

Delayed compliance orders issued or approved by the ESC under this regulation may be terminated if the ESC determines that the inability of the stationary source to comply with the

regulations no longer exists.

Article 11.0 Noncompliance Issues.

11.1 Applicability.

(a) This part applies to all proceedings for the assessment by the ESC of a noncompliance penalty. This penalty is designed to recover the economic advantage which might otherwise accrue to a source by reason of its failure to comply with air pollution control standards after receipt of a notice of noncompliance.

(b) A owner or operator who is found to be in noncompliance with these regulations is subject to the penalties prescribed in the *Curacao Public Nuisance Ordinance*.

Article 12.0 Designation of Nonattainment Areas.

12.1 Scope.

(a) The ESC is authorized to designate the attainment status of regions of the Island for the purposes of Air Quality planning. Regions so designated are subject to revision, and additional regions may be designated, as the ESC determines necessary to protect the public health and welfare.

(b) Nonattainment status designations are to be determined by the ESC whenever either of the following occur:

(1) a minimum of three consecutive years of air monitoring data indicates that short term ambient air quality standards are exceeded, or

(2) a minimum of one year of air monitoring data indicates that annual ambient air quality standards are exceeded.

Area designations are subject to revision whenever sufficient data becomes available to warrant a redesignation.

(c) The ESC is to determine, within one year of the promulgation of these regulations, areas where visibility is an important value.

12.2 Operator Responsibilities.

(a) Any owner or operator who proposes a new source or modification within an area designated as nonattainment must:

(1) Apply to the ESC for a license (permit) to construct and operate the new source as outlined in article 15.0 of these regulations; and

(2) Demonstrate, through the use of air quality modeling as outlined in Appendix B, to the satisfaction of ESC that the new source or modification will not increase the ambient concentration of any pollutant for which the area is designated nonattainment.

Article 13.0 Protection of Stratospheric Ozone.

(Reserved)

Article 14.0 Control of Air Pollution from Mobile Sources.

(Reserved)

Article 15.0 Permit Program.**Article 15.1 Purpose.**

It is intended by this article to regulate air contamination sources for the protection of public health and welfare. It is also intended that air quality shall be maintained at existing levels in areas where the existing ambient air quality is better than the applicable ambient air quality standards, and that air quality shall be improved to achieve the applicable ambient air quality standards in areas where the existing air quality is worse than the applicable ambient air quality standards. In accordance with this intent it is the purpose of this article to insure that all new sources conform to the applicable standards of this article and that they do not result in producing ambient air contaminant concentrations in excess of those specified in this regulation. New sources shall control the emission of air pollutants consistent with the best practical technology, which takes into account energy, environmental and economic aspects as of the date of issuance of the license (permit) for the new source.

15.2 License (Permit) Approval requirements.

An owner or operator may not cause, suffer, or permit the construction or modification of an air contamination source, or the reactivation of an air contamination source after the source has been out of operation or production for a period of 1 year or more, unless the construction, modification, reactivation or installation has been approved by the ESC.

15.3 Content of applications for license (permit).

(a) Application for license (permit) shall be prepared in accordance with the *Curacao Public Nuisance Ordinance*.

(b) The ESC will not approve an application which fails to meet the requirements of the *Curacao Public Nuisance Ordinance*. A license (permit) may be granted with appropriate conditions.

15.4 Extensions.

Approval granted by the ESC will be valid for a limited period of time, specified by the ESC in the approval. At the end of the time, if the construction, modification, reactivation or installation has not been completed, a new plan approval application or an extension of the previous approval will be required.

15.5 Exemptions.

Approval is not required for the construction, modification, reactivation or installation of the following:

- (1) Air conditioning or ventilation systems not designed to remove pollutants generated by or released from other sources.
- (2) Combustion units rated at 1.000.000 or less Kcals per hour of input.
- (3) Combustion units with a rated capacity of 5 million or fewer Kcals per hour of heat input fueled by LPG or by commercial fuel oils which are No. 2 or lighter. For the purpose of this

article, commercial fuel oil shall be oil which has no externally added reprocessed, recycled or waste material added.

(4) Sources used in residential premises designed to house four or less families.

(5) Mobile sources.

(6) Laboratory equipment used exclusively for chemical or physical analyses.

(7) Sources with a net emissions increase potential less than the following rates for any of the following pollutants:

Carbon monoxide: 100 tons per year (tpy)
Nitrogen oxides: 40 tpy
Sulfur dioxide: 40 tpy
Particulate matter: 25 tpy of particulate matter emissions;
Ozone: 40 tpy of volatile organic compounds
Lead: 0,6 tpy
Asbestos: 0,007 tpy
Beryllium: 0,0004 tpy
Mercury: 0,1 tpy
Vinyl chloride: 1 tpy
Fluorides: 3 tpy
Sulfuric acid mist: 7 tpy
Hydrogen sulfide: 10 tpy
Total reduced sulfur (including hydrogen sulfide): 10 tpy
Reduced sulfur compounds (including hydrogen sulfide): 10 tpy

(8) Other sources and classes of sources determined to be of minor significance by the ESC.

15.6 Compliance requirements.

(a) An owner or operator may not cause, suffer or permit the operation of a source subject to this regulation, unless the source and air cleaning devices identified in the application for the license (permit) and the license (permit) issued to the source, are operated and maintained in accordance with specifications in the application and conditions set forth in the license (permit) issued by the ESC. An owner or operator shall not cause, suffer, or permit the operation of an air contamination source subject to this article in a manner inconsistent with good operating practices.

(b) An owner or operator that propose to construct a new source or modification in an area designated nonattainment for any pollutant shall meet the requirements of article 12 for that pollutant.

(c) An owner or operator of a source subject to this regulation shall demonstrate, through the use of air quality modeling as outlined in Appendix B, to the satisfaction of ESC that the construction of the new source or modification in combination with existing sources or background ambient air pollutant concentrations will not result in ambient concentrations of any pollutant for which the area is in attainment in excess of the AAQS. This can be demonstrated by either:

(1) Demonstrating that the modeled pollutant concentration from the new source or modification is less than the significance thresholds set forth as follows:

Pollutant	Averaging Period	Significant Concentration (ug/m ³)
TSP	Annual	1
TSP	24-hour	5
Sulfur Dioxide	Annual	1
Sulfur Dioxide	24-hour	5
Sulfur Dioxide	3-hour	25
Carbon Monoxide	8-hour	500
Carbon Monoxide	1-hour	2.000
Nitrogen Dioxide	Annual	1
Lead	24-hour	0,1

or

(2) Demonstrating that the predicted concentration impacts for the proposed new source or modification when added with representative air quality background data or when modeled concentration impacts for significant sources located in the impact area of the proposed new source or modification is less than the AAQS.

(d) An owner or operator of the first source to be licensed in an area under this regulation shall not be allowed to consume the entire available AAQS. The ESC in negotiation with the owner or operator shall determine the maximum allowable pollutant concentrations for such a source.

15.8 Transfer of approvals and licenses (permits).

(a) The approval or license (permit) may be transferred from one owner or operator to another only after notification to the ESC.

(b) An approval or license (permit) is valid only for the specific source and that specific location of the source as described in the application.

15.9 Circumvention.

No owner or operator subject to the provisions of this regulation shall build, erect, install, or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard.

15.10 Monitoring requirements.

(a) Continuous monitoring systems shall be installed, calibrated, maintained, and operated by the owner or operator subject to the provisions of the license (permit) received as prescribed in the *Curacao Public Nuisance Ordinance*.

(b) All continuous monitoring systems and monitoring devices shall be installed and operational prior to conducting performance tests. Verification of operational status shall, as a minimum,

include completion of the manufacturer's written requirements or recommendations for installation, operation, and calibration of the device.

15.11 Reporting and record keeping requirements.

(a) Each owner or operator subject to the provisions of this article shall notify the ESC of the specific provisions with which the owner or operator seeks to comply.

(b) Each owner or operator subject to this article shall record and maintain the information as outlined in the owners or operators license (permit).

15.12 Determination of construction or modification.

An owner or operator may submit to the ESC a written application for a determination of whether actions intended to be taken by the owner or operator constitute construction or modification, or commencement thereof, of a source subject to these regulations. The ESC will notify the owner or operator of their determination within 30 days after receiving sufficient information to evaluate the application.

15.13 Compliance demonstrations and waiver of compliance demonstrations.

(a) If required to demonstrate compliance and unless a waiver of compliance demonstration is obtained under this section, the owner or operator shall test emissions from the source--

(1) Within 90 days after the effective date, for an existing source or a new source which has an initial startup date before the effective date; or

(2) Within 90 days after initial startup, for a new source which has an initial startup date after the effective date.

(b) The owner or operator shall notify the ESC of the compliance demonstrations at at least 14 days before the demonstration to allow the ESC the opportunity to have an observer present.

(c) If required to demonstrate compliance, and after the development of local capabilities, the owner or operator of each new source shall, at the request of ESC, provide emission testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to each source.

(2) Safe sampling platform(s).

(3) Safe access to sampling platform(s).

(4) Utilities for sampling and testing equipment.

Note: Items 2, 3 and 4 above can be either a permanent or temporary facility.

Existing sources are only required to perform opacity testing at the request of ESC.

(d) Each emission test shall be conducted under such conditions as the ESC shall specify based on design and operational characteristics of the source.

(e) Unless otherwise specified in an applicable license, samples shall be analyzed and emissions determined within 30 days after each emission test has been completed. The owner or operator

shall report the determinations of the emission test to the ESC.

(f) The owner or operator shall retain at the source and make available, upon request, for inspection by the ESC for a minimum of 2 years, records of emission test results and other data needed to determine emissions.

15.14 Monitoring requirements.

(a) Each owner or operator shall maintain and operate each monitoring system as specified in the applicable license (permit) and in a manner consistent with good air pollution control practice for minimizing emissions. Any unavoidable breakdown or malfunction of the monitoring system should be repaired or adjusted as soon as practicable after its occurrence. The ESC's determination of whether acceptable operating and maintenance procedures are being used will be based on information which may include, but not be limited to, review of operating and maintenance procedures, manufacturer recommendations and specifications, and inspection of the monitoring system.

(b) The owner or operator shall maintain records of monitoring data, monitoring system calibration checks, and the occurrence and duration of any period during which the monitoring system is malfunctioning or inoperative. These records shall be maintained at the source for a minimum of 2 years and made available, upon request, for inspection by the ESC.

15.15 Modification.

(a) Any physical or operational change to a stationary source which results in a significant increase in the rate of emission to the atmosphere of a regulated pollutant to which a standard applies shall be considered a modification and require amendments to the permit.

(b) Upon modification, an existing source shall become a new source for each regulated pollutant for which the rate of emission to the atmosphere increases and to which a standard applies.

(c) The following shall not, by themselves, be considered modifications under this regulation:

(1) Maintenance, repair, and replacement which is routine for a source category.

(2) An increase in production rate of a stationary source, if that increase can be accomplished without a capital expenditure on the stationary source.

(3) An increase in the hours of operation.

(4) The relocation or change in ownership of a stationary source. However, such activities must be reported.

Article 16.0 Standards for Hazardous Air Pollutants.

Reserved

Appendix A Reference Methods for the Determination of Atmospheric Pollutants

The following regulations are incorporated by reference:

United States Code of Federal Regulations, 40 CFR Part 50 Appendices A through G

Appendix B Guidelines on Air Quality Modeling

The following documents are incorporated by reference:

United States Environmental Protection Agency: *Guideline on Air Quality Models*, EPA-450/2-78-027, 1978.

United States Environmental Protection Agency: *Guideline on Air Quality Models*, EPA-450/2-78-027/R, 1986.

United States Environmental Protection Agency: *Supplement A to Guideline on Air Quality Models*, 1987.

United States Environmental Protection Agency: *Supplement B to Guideline on Air Quality Models*, 1993.

United States Environmental Protection Agency: *Onsite Meteorological Program Guidance for Regulatory Modeling Applications*, EPA-450/4-87-013, 1987.

Appendix C Stack Height Guidelines

(a) It is recommended, though not required, that significant sources of air pollution utilize a minimum stack height equal to the Good Engineering Practice (GEP) height.

(b) GEP stack height is defined as the minimum height necessary to avoid the influence of building induced downwash as defined in Appendix B.

(c) Sources subject to air quality modeling, that do not utilize a stack height greater than or equal to GEP height, must account for the influence of building induced downwash as outlined in Appendix B.

(d) Maximum GEP stack height, in the absence of building induced downwash, is not restricted to 65 meters.

Appendix D Technical Support for the Establishment of AAQS.

The use of air quality standards for ambient air assumes that some level of contamination of the ambient air is permissible. This level must be low enough so as not to cause significant effects. The level of control a source will require is a function of what is being protected, how much protection is appropriate, and the existing air quality.

On the Island of Curacao, the primary concern is to safeguard the public health. The AAQS developed by the United States Environmental Protection Agency's (USEPA) as a result of the promulgation of the Clean Air Act Amendments of 1970 and the European Community Environment Legislation (Volume 2 - Air) were reviewed for their appropriateness for the Island of Curacao. The USEPA established AAQS for the pollutants regulated herein assuming that a "threshold value" exists below which health-effects are insignificant. Scientific data are assessed to determine the acceptable "threshold value" and an adequate margin of safety between the "threshold value" and the AAQS is provided. The basis for the European Community regulations included similar methodology. The European Community and USEPA regulations are similar for the pollutants for which an AAQS was developed. Presented below is a summary of the studies used to determine the AAQS and the applicability to the Island of Curacao.

The Island of Curacao has meteorological conditions which assist in the dispersion of pollutants and the minimization of ozone formation. These conditions include a strong prevailing wind and the limited occurrence of inversions or other stagnant conditions. These meteorological conditions should prevent the occurrence of air pollution episodes on the Island.

In general, the studies used to develop ambient air quality standards determine the effects on the more sensitive population groups. These groups would include elderly people, people with existing respiratory diseases and children. Therefore, these standards are used to predict the impacts on the more sensitive individuals in the population. For each of the pollutants which a standard has been developed, discussed below are the results of some studies which indicate the effects of higher pollution concentrations. In all cases, the standard that has been selected should provide adequate protection to the public.

Standard for Sulfur Oxides

Short Term (24 hour) Standard

Numerous epidemiological studies indicate an association between air pollution of sulfur oxides (measured as sulfur dioxide) and health effects of varying severity, especially for short-term pollution episodes. For concentrations of about 1500 $\mu\text{g}/\text{m}^3$ of sulfur dioxide (24-hour average) increased mortality may occur. For concentrations of about 715 $\mu\text{g}/\text{m}^3$ of sulfur dioxide (24-hour average) increased daily death may occur as well as a sharp rise in illness rates for patients over 54 with severe bronchitis. For concentrations of about 600 $\mu\text{g}/\text{m}^3$ of sulfur dioxide (24-hour average) patients with chronic lung disease may experience accentuation of symptoms. For concentrations of about 500 $\mu\text{g}/\text{m}^3$ of sulfur dioxide (24-hour average) increased mortality rates may occur. For concentrations of about 300 $\mu\text{g}/\text{m}^3$ to 500 $\mu\text{g}/\text{m}^3$ of sulfur dioxide (24-hour average) increased hospital admissions of older persons for respiratory disease may occur along with increased absenteeism from work particularly with older people. The EC and USEPA rules are similar for the AAQS of sulfur dioxide. However, the EC rules include various limits based upon suspended particulate concentration and time of year. Since weather conditions are relatively constant, the USEPA approach was utilized. In addition, the EC regulations include a greater percentile of allowable excursions. For these reasons, the USEPA standard of 365 $\mu\text{g}/\text{m}^3$ was selected.

Long Term (Annual) Standard

For concentrations ranging from 105 $\mu\text{g}/\text{m}^3$ to 265 $\mu\text{g}/\text{m}^3$ of sulfur dioxide (annual average) increased symptoms of respiratory and lung disease may occur. For concentrations ranging from 115 $\mu\text{g}/\text{m}^3$ to 120 $\mu\text{g}/\text{m}^3$ of sulfur dioxide (annual average) increased frequency and severity of respiratory diseases in school children may occur as well as an increase in mortality from bronchitis and lung cancer.

Similar to the short-term SO_2 standard, the EC regulations are dependent upon suspended particulate concentrations. An annual SO_2 limit of 80 $\mu\text{g}/\text{m}^3$ was selected.

Standards for Particulate Matter

Short Term (24 hour) Standard

Numerous epidemiological studies indicate an association between air pollution of particulate matter and health effects of varying severity, especially for short-term pollution episodes. For concentrations of 750 $\mu\text{g}/\text{m}^3$ and higher of particulate matter (24-hour average) excess deaths and a considerable increase in illness may occur. Concentrations above 300 $\mu\text{g}/\text{m}^3$ of particulate matter (24-hour average) may worsen acute symptoms for patients with chronic bronchitis. At concentrations above 200 $\mu\text{g}/\text{m}^3$ of particulate matter (24-hour average)

increased absenteeism from work may occur.

The EC regulations will again depend upon seasonal variations and allow higher daily mean values. For this reason, the more stringent USEPA standard was used along with a percentile of allowable excursions similar to that used in the EC standard.

Long Term (Annual) Standard

For concentrations ranging from 100 $\mu\text{g}/\text{m}^3$ to 130 $\mu\text{g}/\text{m}^3$ of particulate matter (annual mean) children will likely develop increased incidences of respiratory diseases. For concentrations above 100 $\mu\text{g}/\text{m}^3$ of particulate matter (annual geometric mean) increased death rates for persons over 50 are likely.

The EC and US annual standards are essentially identical, therefore, the standard applied meets both of these criteria.

Standards for Carbon Monoxide

Exposure of eight or more hours to carbon monoxide concentration of 12.000 to 17.000 $\mu\text{g}/\text{m}^3$ will produce blood carboxyhemoglobin level of 2,0 to 2,5 percent in nonsmokers. This level of carboxyhemoglobin has been associated with adverse health effects. Experimental exposures of nonsmokers to 58.000 $\mu\text{g}/\text{m}^3$ for 90 minutes has been associated with impairment in time-interval discrimination resulting from an increase of about 2,0 percent carboxyhemoglobin in the blood.

Carbon monoxide emissions are primarily associated with mobile sources (cars, trucks, etc.) from urban centers. Due to the meteorological conditions which favor dispersion on the Island of Curacao, and the absence of large dense urban areas, the standard for CO would not be anticipated to be a major concern for the Island of Curacao. The EC does not currently have CO standards, therefore, USEPA values were used.

Standards for Ozone

Ozone is one of the more toxic pollutants regulated. However, few facilities directly emit ozone as a pollutant. Ozone is primarily the result of the reaction of VOCs, NO_x and other pollutants in the atmosphere. It appears to cause significant physiological and pathological changes in both animals and humans at exposure concentrations within the range of those measured in the ambient air. Studies of human volunteers under controlled laboratory conditions indicate that exposures in the range of 196 $\mu\text{g}/\text{m}^3$ to 784 $\mu\text{g}/\text{m}^3$ for 1 to 2 hours result in increased respiratory rates, increased pulmonary resistance, decreased tidal volumes, and changes in respiratory mechanics. These changes appear to be transient. Ozone exposures in the range of 235 $\mu\text{g}/\text{m}^3$ cause coughing, shortness of breath, and pain on deep inspiration to exercising adults.

Since ozone is primarily formed by reactions of other pollutants in the atmosphere, it is not anticipated to be a major concern for the Island of Curacao where pollutants are transported and dispersed quickly by the prevailing meteorological conditions. For this reason, the USEPA standard has been selected.

Standards for Nitrogen Dioxide

An increased incidence of acute respiratory disease was observed when the mean 24-hour nitrogen dioxide concentrations (over a six month period) was between 117 $\mu\text{g}/\text{m}^3$ and 205 $\mu\text{g}/\text{m}^3$. At concentrations of nitrogen dioxide between 118 $\mu\text{g}/\text{m}^3$ and 156 $\mu\text{g}/\text{m}^3$ over a six

month period, the frequency of acute bronchitis increased among infants and school children.

The limit for nitrogen dioxide for the EC is significantly greater than the USEPA standard. However, the EC does have guidelines which approximate the USEPA standard. Since the USEPA value and EC guideline are similar, the USEPA standard was selected.

Standards for Lead

Children appear to be the major subgroup at risk to lead exposure. Clinically significant levels of lead in the blood are considered to be about 30 ug/dL but the first physiological effects of lead exposure begin to appear at blood levels of 10 ug/dL. Based on numerous studies, the USEPA set an AAQS of 1,5 $\mu\text{g}/\text{m}^3$ based on a calendar quarter. At about the same time, background lead in the ambient air of major urban areas in the United States was approximately 1,2 $\mu\text{g}/\text{m}^3$. The major contributor to ambient air concentrations of lead appears to be leaded gasoline (up to 90 percent of the ambient concentration). The USEPA is currently studying the AAQS for lead which may result in the lowering of the AAQS at a future date. For the Island of Curacao, the AAQS of 1,5 is proposed as a target value.

REGULATION 2--WASTEWATERS

<u>Article No.</u>	<u>Description</u>
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2.0	Purpose
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REGULATION 2--WASTEWATERS

Article 1.0 Introduction

Whereas the essential objective of all provisions relating to water pollution is the protection of human health and the environment against harmful effects caused by the spillage of hydrocarbons and other harmful substances at sea or in major inland waters.

Whereas, the natural scenery and landscape both on and around the Island are harmed due to the many activities of inhabitants and tourists; and

Whereas, the Island government leadership is essential for the development of cooperative and effective programs to control water quality management of surface and groundwater and wastewater drainage; and

Whereas, effective and consistent regulations on wastewater reduction, prevention or control through implementation of provisions to connect to sewage mains, installation of sewers and drains, maintaining effluent quality of industrial, commercial, and domestic runoff systems; and

Whereas, in order to ensure protection of the environment, provision should be made for a system of permits and reporting for undertakings which treat, control or dispose of wastewaters or have the potential to cause effluents to surface, ground or discharge to sewage systems; and

Whereas that proportion of the costs not covered by the proceeds of treating waste must be defrayed in accordance with the "polluter pays" principle, the following regulations are promulgated.

Article 2.0 Purpose

The purposes of this regulation are:

- (1) to protect and enhance the quality of the Island's water resources so as to promote the public health and welfare;
- (2) to delineate requirements, practices or procedures to enact additions and improvements for wastewater management to protect soil, groundwater and surface waters (harbor, bay, Caribbean Sea, etc.). Actions covered include programs of Curacao by Ordinance, industrial activities, production of chemicals, groundwater extraction, cesspools, drainage installation and discharge of oil and oily wastewaters;
- (3) to initiate and accelerate an Island implementation program to achieve prevention and control of water pollution;
- (4) to provide technical assistance to industry and the public in connection with development and execution of effluent water projects;
- (5) to establish an awareness of the Island's environmental policy and provide a foundation for the business community and citizenry for self activation;
- (6) to declare goals and policy for programs included for water pollution control;
- (7) to establish effluent limits consistent with established criteria for discharge into waterways,

dredge or fill materials, and disposal of sewage to surface or groundwater of Curacao;

(8) to define an environmental policy of licensing by means of permits which establish conditions to be met for specific activities;

Article 3.0 Definitions

As used in these regulations:

(a) "Average Daily Loading" means the total discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required, the daily average discharge shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

(b) "BOD₅" means five day Biological Oxygen Demand.

(c) "COD" means Chemical Oxygen Demand.

(d) "Effluent Limitation" means any restriction applied to a biological, chemical, physical or radiological parameter contained in any liquid waste at the point of discharge as specified in any permit issued by the ESC.

(e) "ESC" means Environmental Service of Curacao, responsible for protection and conservation of the environment of Curacao.

(f) "Groundwater" means any water naturally found under the surface of the earth.

(g) "License" (Permit) means any official document issued by ESC or other government agency granting the specific activity set forth in the document.

(i) "Liquid Waste" means any sewage, industrial waste or other wastes or any combination thereof which may potentially alter the chemical, physical, biological or radiological integrity of surface and/or groundwater from its natural state.

(j) "Maximum Daily Loading" means the quantity of pollutant in terms of pounds per day which represents a value of one operating day. Maximum daily loadings shall be based on a review of the degree of fluctuation experienced in comparable systems. For purposes of compliance, the average daily flow for the operating day shall be utilized.

(k) "Maximum Instantaneous Concentration" means the concentration of a pollutant in terms of milligrams per liter which represents the value obtained from a grab sample of an effluent. The maximum instantaneous concentration shall be based on a review of the degree of fluctuation experienced in comparable systems. For purposes of compliance, the maximum instantaneous concentration shall be based on the actual analysis of the grab sample.

(l) "Mixing Zone" means the zone extending from the sea's surface to seabed and extending laterally to a distance of 100 meters in all directions from the discharge point(s) or to the boundary of the zone of initial dilution as calculated by a plume model approved by the ESC, whichever is greater.

(m) "Non-Contact Cooling Water System" means a once-through drain, collection and treatment system designed and operated for collecting cooling water which does not come into contact with hydrocarbons or oily wastewater and which is not recirculated through a cooling tower.

(n) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

(o) "Petroleum Refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through the distillation of petroleum, or through the redistillation, cracking, or reforming of unfinished petroleum derivatives.

(p) "Point Source" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation or vessel or other floating craft, from which pollutants are or may be discharged.

(q) "Pollutant" means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical waste, biological material, radioactive material, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into surface or groundwater.

(r) "Sewage" means water-carried human or animal wastes from septic tanks, water closets, residences, buildings, industrial establishments, or other places, together with such groundwater infiltration, subsurface water, admixture of industrial wastes or other wastes as may be present.

(s) "Sewer Line" means a lateral, trunk line, branch line, or other enclosed conduit used to convey waste to a downstream waste management unit.

(t) "Surface Water" means water occurring generally on the surface of the earth.

(u) "TOC" means total organic carbon.

(v) "Wastewater" means the liquid waste or liquid borne wastes discharged from a facility.

(w) "Wastewater Treatment System" means any component, piece of equipment, or installation that receives, manages, or treats process wastewater, product tank drawdown, or landfill leachate prior to direct or indirect discharge. These systems may typically include individual drain systems, oil-water separators, air flotation units, equalization tanks, and biological treatment units.

(x) "Water Pollution" means the man-made or man-induced alteration of the natural chemical, physical, biological and radiological integrity of water.

(y) "Water Quality Standards" means water quality standards duly adopted by the ESC.

(z) "Zone of initial dilution" (ZID) means the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports.

Article 4.0 Exclusions

The following shall be excluded from the scope of these regulations:

- (a) Gaseous effluents emitted into the atmosphere.
- (b) Mining wastes.
- (c) Agricultural wastes.

Article 5.0 Authority

Authority for the administration and enforcement of these regulations are vested with Environmental Service of Curacao (ESC).

Article 6.0 Effluent Limitations

6.1 Industrial Waste Effluent Limitations

(a) General. Effluent limitations and treatment requirements imposed under this section are based upon achieving the criteria contained in the Water Quality Standards located in Appendix 3.0, and upon the application of a practicable level of pollutant removal technology to industrial wastewater discharges. At a minimum, industrial discharges shall be subject to effluent requirements reflecting a commercially proven level of pollutant removal technology. In the event that Water Quality Standards are not achieved through application of a practicable level of pollutant removal technology, effluent limitations and treatment requirements shall be imposed to assure protection of human health and the environment. ESC, in cooperation with the affected facility to be phased in, shall establish compliance criteria to achieve compliance within a reasonable period of time on a case-by-case basis.

(b) Effluent Limitations Based on Water Quality Standards.

1. Effluent limitations on the discharge of any pollutant and/or combination of pollutants may be based upon the results of a chemical test set forth in the latest edition of "Standard Methods for the Examination of Water and Wastewater", prepared and published jointly by: American Public Health Association (APHA), American Water Works Association (AWWA), and Water Pollution Control Federation (WPCF).
2. In areas in which Water Quality Standards are not achieved, ESC will establish a mixing zone containing the point source discharges. ESC, in cooperation with the affected facility, shall establish compliance criteria on a case-by-case basis to assure the protection of human health and the environment.

(c) Effluent Limitations Based on a Practicable Level of Pollutant Removal Technology.

Effluent limitations imposed under this section shall be expressed in terms of average daily loadings.

1. In determining compliance, wastewater flows not subject to limitation shall be excluded in the calculation from wastewater flows containing pollutants that are subject to limitation.
2. Wastewater flows containing pollutants added by the discharger shall be at least treated so as not to exceed the following average daily loading limitations for the listed parameters:

	<u>Effluent (mg/l)</u>	Non-Contact Once-Through Cooling Water (mg/l)
(1) BOD ₅ /COD		
(2) Suspended Solids		
(3) Total Dissolved Solids		
(4) Ammonia as N		
(5) Sulfides		
(6) Fluoride		
(7) Oil & Grease		
(8) pH		

The concentration levels imposed shall be utilized to establish average daily loading limitations. Measurements to determine compliance with the above requirements shall be taken at a point after treatment as designated by ESC.

3. If water quality in subsection 2 cannot be met, the ESC shall establish effluent limitations which reflect the application of a practicable level of pollutant removal technology.

(d) Effluent Limitations for Petroleum Refineries.

Existing Refinery

1. The provisions of this section are applicable to the affected facilities in petroleum refineries to improve water quality discharged to the Schottegat Bay or Caribbean Sea, and allow business to operate in an ecologically sound manner.
2. An implementation plan shall be developed by the affected facility which demonstrates progress in limiting pollutants being discharged to the surface waters of Curacao. The implementation plan must address the following minimum goals:
 - a) Short Term Improvements to Existing Operations
 - i. The following actions are required to reduce potential pollutant discharges from existing equipment and establish a baseline from which to measure future improvements:
 - a. Maintain existing Final Oil Catchers and upstream equipment to prevent the release of floating oil, contaminated wastewater or solids from being released to the open waters of the Schottegat Bay or Caribbean Sea.
 - ii. Compliance shall be determined by monitors placed at accessible locations and/or sampling at locations in accordance with negotiated agreements between ESC and the Refinery. The parameters of concern are oil and grease (or TOC), suspended solids, dissolved solids, BOD₅ and pH.
 - b) Medium Term Improvements to Existing Operations
 - i. The following actions are required to reduce wastewater pollutant discharges and to monitor improvements of the quality of the Schottegat and Caribbean Sea:
 - a. Addition of equipment to prevent the discharge of untreated process wastewaters, contact-cooling water, pump pad washes, maintenance or equipment drains, and potentially contaminated stormwaters.
 - b. Addition of equipment to prevent the discharge of untreated spills or leaks.
 - c. Addition of equipment to reduce the level of sulfides and ammonia.
 - d. Addition of equipment to upgrade the Final Oil Catchers.
 - e. Prevent direct release of hydrocarbons from tank farm areas to the channels discharging to the Final Oil Catchers as a result of a spill or storm event.
 - f. Addition of equipment to reduce the level of oil and grease (or TOC), BOD₅, COD, and suspended solids.
 - ii. The wastewater flows containing pollutants added by the discharger shall not exceed the following limitations:

	Primary Treatment Process/Storm ¹	Separated Ballast	Non-Contact Once-Through Cooling Water
(1) BOD ₅ /COD	400/900 ²	150/400 ²	TOC 150 ³
(2) Suspended Solids	75	200	
(3) Total Dissolved Solids	10,000	35,000	
(4) Ammonia as N	30		
(5) Sulfides	30		
(6) Oil & Grease	100	500	
(7) pH	6-9		

Notes:

- (1) Primary treatment consists of oil-water gravity separation following equalization and neutralization.
- (2) TOC may be substituted for COD when the applicant can demonstrate that the chloride content exceeds 1000 mg/l (1000 ppm). If a correlation of BOD₅ to TOC is not available from refinery data, a ratio of 2.2 to 1 shall be applied to the applicable effluent limitations for BOD₅ to determine TOC limit.
- (3) The value given in the table represents an increase for TOC over the background water level.

c) Long Term Improvements to Existing Operations

- i. The following actions are required to further reduce wastewater pollutant discharges and to measure further improvements to the quality of the Schottegat Bay and Caribbean Sea:
 - a. Addition of physical/chemical process equipment to reduce emulsified and soluble hydrocarbons to further clarify wastewater before discharge.
 - b. Addition of secondary aggressive biological treatment prior to discharge to further reduce the COD and soluble biodegradable water pollutants.
- ii. Compliance shall be determined by monitors placed at suitable locations (i.e. stripped sour waters, CPI separator effluent, etc.) and/or sampling at locations in accordance with negotiated agreements between ESC and the Refinery.

Other parameters in Appendix 3, Water Quality Standards, will be measured by taking grab samples in accordance with a monthly schedule.

6.2 Effluent Limitations for Land Disposal of Liquid Waste

[Reserved]

6.3 Effluent Limitations for Heated Liquid Waste

No person shall discharge into surface waters any liquid waste which raises the temperature of this water above 36 °C at the end of a mixing zone.

6.4 Other Limitations

No person shall cause or permit to be discarded, thrown, or dumped into any waters or any drainage ditch in the Island of Curacao any garbage, refuse, dead animal, poultry, trash, carton, bottle, container, box, lumber, timber, paper, or light material or other solid waste.

6.5 Effluent Limitation for Discharge to Publicly Owned Treatment Works

(a) No person or industry shall cause or permit any discharge of waste to the sewage system of Curacao unless it is in accordance with the stipulations of the Wastewater Structural Plan.

6.6 Minimum Treatment Requirements for Sewage Prior to Discharge to a Surface Water

(a) No person or industry shall cause or permit any discharge of liquid waste to the Schottegat Bay, or Caribbean Sea except liquid waste which has received adequate treatment as defined by limits in the Wastewater Structural Plan or designated by ESC.

(b) No person or industry shall cause or permit discharge of liquid waste to a lake or a pond or any tributary thereof, except liquid waste which has received adequate treatment as defined by limits in Wastewater Structural Plan or designated by ESC.

(c) For existing facilities, if the existing facility has demonstrated the ability to continuously meet criteria determined by ESC to be adequate, additional treatment levels may not be required. If violations have occurred, the affected facility will negotiate, if required, levels to be attained, with ESC on a case-by-case basis.

Article 7.0 Prohibitions

7.1 No person shall discharge any pollutant from a point source into surface or groundwater, directly or indirectly, except as authorized pursuant to a permit granted under Article 8, unless such discharge is specifically exempted from such permit requirements.

7.2 No person shall discharge any liquid waste on land or in any subsurface excavation except as authorized pursuant to a permit granted under Article 8, unless such discharge is specifically exempted from such permit requirement.

7.3 A violation of subsection 7.1 or subsection 7.2 of this section (or both) shall be punishable as provided by the Curacao Public Nuisance Ordinance.

7.4 No permit pursuant to Article 8 shall be issued for the following:

(a) Any discharge of liquid wastes which the ESC finds would substantially impair anchorage and navigation of any waters of Curacao; and

(b) Any discharge of liquid wastes which is in conflict with an area-wide waste treatment management plan approved under the Wastewater Structural Plan; and

(c) Any discharge of liquid wastes to a well. No well shall be used for recharge, injection, or disposal purposes. This subsection shall not be construed to prevent recharge of treated liquid wastes for the purpose of water resources management.

7.5 No person shall discharge liquid waste from an existing septic tank or other system where such liquid waste flows to the surface of the ground or into surface water.

7.6 No person shall operate any existing pipeline or bulk transfer facility which causes or contributes to the discharge of pollutants onto the surface of the ground or into surface or groundwater.

7.7 As of an agreed upon date between ESC and the discharger, no direct discharge to streams which may have a negative effect on biosystems commonly used in wastewater and solid waste management units will be allowed. Treatment is required prior to discharge.

Article 8.0 Permit Program

I. Activities Requiring a License (Permit) from the ESC

8.1 No person shall commence construction or operation of any of the following without first having obtained a license (permit) from the ESC.

(a) Any septic tank system or any aerobic home treatment plant system, or

(b) Any liquid waste treatment system, or

(c) Any bulk storage, bulk transfer or pipeline facility, or

(d) Any sewer or pipeline which conveys liquid waste.

8.2 No person shall commence construction or operation of any structure or facility (including, but not limited to, a single or multi-family dwelling, an office building, a store or other commercial building, a factory or other industrial building), the occupancy or use of which will generate liquid waste until a permit is obtained under Article 8.1(a) or 8.1(b), except as exempted by regulation.

II. Permit Application

8.3 Content of Application for License (Permit).

(a) Application for license (permit) shall be prepared in accordance with Curacao Public Nuisance Ordinance.

(b) The ESC will not approve an application which fails to meet the requirements of the Curacao Public Nuisance Ordinance. A license (permit) may be granted with appropriate conditions.

(c) At the time of issuance of Public Notice, the Legislative Council of the Island Territory of Curacao and the Island Executive Council shall be notified.

(d) Extensions. Approval granted by the ESC will be valid for a limited period of time, specified by the ESC in the approval. At the end of the time, if the construction, modification, reactivation or installation has not been completed, a new plan approval application or an extension of the previous approval will be required.

8.4 Public Access to Information

Pursuant to the Island Government Ordinance (Curacao Public Nuisance Ordinance) applications, tentative determinations and fact sheets shall be made available to the public as

provided.

8.5 Public Participation

Pursuant to the Island Government Ordinance (Curacao Public Nuisance Ordinance), procedures for public participation are established.

8.6 Monitoring Requirements. For wastewater discharge licenses (permits), the following monitoring requirements shall be imposed:

(a) The licensee (permittee) shall maintain records of all information resulting from any monitoring activities required in the license (permit).

(b) Any records of monitoring activities and results shall include for all samples:

1. The date, location, and time of sampling.
2. The dates analyses were performed.
3. Name of the party who performed the analyses.
4. The analytical techniques or methods used.
5. The results of the analyses.

(c) The licensee (permittee) shall be required to retain for a minimum of three (3) years any records of monitoring activities and results, including instrumentation, calibration, and maintenance records.

(d) As required by license (permit) conditions, the licensee (permittee) shall provide periodic reports of monitoring results to ESC.

Article 9.0 Activities Not Requiring a License (Permit)

The following activities do not require a license (permit):

(a) Existing ditches used for the express purpose of draining water from the surface of the land.

(b) Uncontaminated stormwater discharge.

(c) Application of organic or inorganic fertilizer to the land for agricultural or horticultural purposes where accomplished using recognized methods.

(d) Transportation of organic or inorganic fertilizers.

(e) Application of herbicides, pesticides, and plant growth regulators for agricultural or horticultural purposes.

(f) Condensate from any cooling system used for air temperature control.

(g) Steam trap blowdown from any steam tracing system.

(h) Plowing or cultivating for agricultural or horticultural purposes.

(i) Irrigation practices utilizing uncontaminated surface or groundwater for agricultural or horticultural purposes.

(j) Washing of motor vehicles, except commercial car washing operations.

- (k) Acid cleansing of masonry.
- (l) Movement of earth for building excavations, foundations or footings.
- (m) Regrading of earth unless otherwise regulated.
- (n) Potable water transmission lines and storage tanks.
- (o) Operation of any quarry, gravel pit, or borrow operation unless there may be a discharge, directly or indirectly, to surface or groundwater.
- (p) Any pipe or system of pipes, except those which convey liquid waste located wholly on the property of the owner where processing, manufacturing, commercial, or business operations occur.

Article 10.0 Severability

If any part of this regulation, or the application of any part thereof, is held invalid or unconstitutional, the application of such part to other persons or circumstances and the remainder of this regulation shall not be affected thereby and shall be deemed valid and effective.

Article 11.0 Sludge Disposal Guidelines and Limitations for Wastewater Treatment Facilities

[Reserved]

Article 12.0 Emissions Guidelines and Limitations for Wastewater Treatment Facilities

[Reserved]

Appendix 1.0 Contents of License (Permit)

1.1 A license (permit) issued hereunder for construction or operation may include, but not be limited to, such information and conditions as the following:

- (a) The legal basis for the issuance of the license (permit); and
- (b) The license (permit) date; and
- (c) The name and address of the licensee (permittee); and
- (d) The activity permitted and its location; and
- (e) The date of the application which resulted in the license (permit), along with the date and a description of each additional submission on which the permit is based; and
- (f) The period of time that the license (permit) is valid; and
- (g) A specific list of requirements which may include:
 - 1. Effluent limitations; and
 - 2. Performance standards; and
 - 3. Load allocations; and
 - 4. Notification of and approval by the ESC prior to introduction of a new pollutant not limited by an existing permit condition; and
 - 5. Notification of intent to initiate operation at least ten (10) days in advance of start up, except for an individual septic tank system or aerobic home treatment plant; and
 - 6. Within ninety (90) days following completion of construction, a certification by the licensee (permittee), submitted to ESC, and signed by the owner/operator or his designee that the facility has been built in accordance with the plans and specifications; and
 - 7. Monitoring requirements as specified by the ESC. Any physical, chemical, biological or bacteriological test shall be made in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater" unless another method is required or approved by the ESC.
- (h) A statement that the permit is transferable in accordance with the Public Nuisance Ordinance. Notifications by the successor or owner or operator and predecessor owner or operator, each informing the ESC of the transfer, is required. Documents described in the Public Nuisance Ordinance (Permit and Permit Application) shall accompany the request with minimum delay of the actual transfer. Notifications accompanied by the permit by the successor owner or operator, and predecessor, informing the ESC of the transfer, is required.
- (i) The signature of the licensee (permittee):
 - 1. In the case of a corporation, by a principal executive officer of at least the level of vice president, or his duly authorized representative, if such representative is

responsible for the activity permitted;

2. In the case of a partnership, by a general partner;
3. In the case of a sole proprietorship, by the proprietor;
4. In the case of a municipal facility, by either a principal executive officer, ranking elected official or other duly authorized employee.

(j) A schedule of compliance if applicable in the judgment of the ESC; and

(k) A statement that any person who causes or contributes to the discharge of a pollutant into Curacao waters shall report such an incident to the ESC.

(l) A statement that the licensee (permittee) shall allow the ESC, upon proper notification and presentation of his credentials:

1. To enter upon licensee's (permittee's) premises in which an effluent source is located or in which any records are required to be kept under terms and condition of the permit;
2. To have access to and copy any records required to be kept under terms and conditions of the permit;
3. To inspect any monitoring equipment or method required in the permit;
4. To sample any discharge of pollutants;

(m) A statement that the licensee (permittee) at all times shall maintain and operate any facilities or systems of control installed by the permittee to achieve compliance with the terms and conditions of the permit.

Appendix 2.0 Procedure for Obtaining a License (Permit)

2.1 The proposed discharge described in any application must meet Curacao Water Quality Standards and any applicable effluent limitation, performance standard (including waste treatment requirements in Article 6 of this regulation) or schedule of compliance established pursuant to any law, regulation or ordinance.

2.2 Any application for a license (permit) shall be submitted on forms made available by the ESC.

2.3 For any application for discharge in excess of 2,000 gpd, the applicant may be required to attend a predesign conference to obtain preliminary comments of the Department and discuss a schedule for submission of reports.

2.4 The ESC may require the applicant to submit the following reports in sequence:

- a. Engineer's report;
- b. Certification of the final design report;
- c. Certification that a manual of operation has been developed for the unit.

The ESC may waive such requirements depending on the nature and magnitude of the discharge. As a minimum, the application must be accompanied by a preliminary engineer's report.

2.5 For any sewer or pipeline which conveys liquid waste which is to be connected to a publicly owned treatment works (POTW), the application shall be submitted by the POTW which has responsibility for the works.

2.6 Any person engaged in an activity at the time of the effective date of this regulation, which requires a permit under this section shall make application to the ESC within ninety (90) days of the effective date of this section on a form as provided by the ESC and until that application is denied, may continue said activity, except that:

- a. A license (permit) for an individual septic tank system or aerobic home treatment system is exempt from this section.

Appendix 3.0 Water Quality Standards

The following standards for Water Quality shall be adopted as the baseline for the refinery. These standards are a goal to be achieved over a reasonable period of time through the cooperation of all industries on the Island.

WATER QUALITY STANDARDS

<u>Regulated Pollutant or Characteristic Discharges</u>	<u>Limits on¹</u>
pH	6-9
Color	500 Pt-Co Units
Foam	None allowed
Oil and Grease (mg/l)	20
Solids -- Total (mg/l)	1500
-- Suspended (mg/l)	60
-- Floating (mg/l)	None allowed
Biocides (mg/l)	0.25
-- Organic Phosphates/Carbonates	0.05
Biol. Oxy. Demand 5.20 C (mg/l)	60
Chemical Oxygen Demand (mg/l)	350
Total Coliform (in organisms per 100 ml)	100 in 90% of consecutive samples;
Substances that react with Methyl Blue (Detergents/dispersants) (mg/l)	2.0
Total Aluminum (mg/l)	5.0
Ammonia (as N) (mg/l)	
Total Nitrogen (mg/l)	10
Total Arsenic (mg/l)	0.5
Total Barium (mg/l)	5.0
Total Cadmium (mg/l)	0.2
Chromium +6 (mg/l)	0.5
Total Chromium (mg/l)	2.0
Total Cobalt (mg/l)	0.5
Total Copper (mg/l)	1.0
Total Cyanide (mg/l)	0.2
Fluorides (mg/l)	0.5
Total Iron (mg/l)	10
Total Lead (mg/l)	0.5
Total Manganese (mg/l)	2.0
Total Mercury (mg/l)	0.01
Total Nickel (mg/l)	2.0
Phenols (mg/l)	0.5
<u>Regulated Pollutant or Characteristic Discharges</u>	<u>Limits on¹</u>
Total Phosphorus (mg/l)	1
Total Selenium (mg/l)	
Silver (mg/l)	
Sulfides (mg/l)	0.5
Vanadium (mg/l)	5.0
Total Zinc (mg/l)	2.0

¹If a mixing zone is applicable for the discharge, than the point of compliance is at the designated mixing zone. If a mixing zone is not applicable, than the point of compliance is at the point of discharge into the body of water.

REGULATION 3 -- WASTE

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REGULATION 3 -- WASTES

Subpart A--General Provisions

Article 1.0 Introduction

Whereas the essential objective of all provisions relating to waste disposal must be the protection of human health and the environment against harmful effects caused by the collection, transport, treatment, storage and disposal of waste; and

Whereas the recovery of waste and the use of recovered materials should be encouraged in order to conserve natural resources; and

Whereas effective and consistent regulations on waste disposal which neither obstruct trade nor effect conditions of competition should be applied to movable property which the owner or operator of a business disposes of, with the exception of radioactive, mining, and agricultural waste, animal carcasses, wastewaters, gaseous effluents and waste covered by specific Island rules; and

Whereas, in order to insure the protection of the environment, provisions should be made for a system of permits for undertakings which treat, store or dispose of waste on behalf of third parties, for a supervisory system for undertakings which dispose of their own waste, and for those which collect the waste of others; and

Whereas that proportion of the costs not covered by the proceeds of treating waste must be defrayed in accordance with the "polluter pays" principle, the following regulations are promulgated.

Article 2.0 Scope

(a) These regulations are generally applicable to the treatment storage and disposal of all waste materials. However, these regulations do not apply to agricultural wastes, mining wastes, and waste covered by other Island regulations.

(b) With respect to the land disposal of wastes, the requirements contained herein delineate minimum levels of performance required of any waste land disposal site operation. These requirements are *risked-based*, not *technology-based*, and will ensure acceptable waste management practices in the future. The recommended procedures sections are presented to suggest preferred methods by which the objectives of the requirements can be realized. The recommended procedures are based on the practice of landfilling waste: normally, consisting of residential, commercial and industrial waste generated within a community. Landfilling is the most widely applied environmentally acceptable land disposal method. If techniques other than the recommended procedures are used, it is the obligation of the facility's owner and operator to demonstrate to the Environmental Services of Curacao by means of engineering calculations and data that the techniques employed will satisfy the requirements.

In addition to addressing current needs, these regulations establish a framework for the development of future risk-based regulations to meet the needs of the Island in the years to come.

Article 3.0 Definitions

As used in these regulations:

(a) "Waste" shall mean: any substance or object in the categories set out in Appendix 1 which the holder discards or intends or is required to discard.

(b) "Generator" shall mean: any industry or business whose activities produce waste (original generator) and/or any industry or business which carries out pre-processing, mixing or other operations resulting in a change in the nature or composition. [Note: Individuals generating household wastes in their homes are not generators, and do not fall under the scope of these regulations.]

(c) "Management" shall mean: the collection, transport, recovery and disposal of waste, including the supervision of such operations and after-care of disposal sites.

(d) "Disposal" shall mean: any of the operations provided for in Appendix 2-A.

(e) "Recovery" shall mean: any of the operations provided for in Appendix 2-B.

(g) "Collection shall mean: the gathering sorting or mixing of waste for transport.

Article 4.0 Exclusions

The following shall be excluded from the scope of these regulations:

(a) Gaseous effluents emitted into the atmosphere.

(c) Mining wastes.

(d) Agricultural wastes

(e) Animal carcasses

(f) Wastewaters with the exception of waste in liquid form.

Article 5.0 Authority

Administration and enforcement of these regulations are vested with the Environmental Services of Curacao (ESC).

Subpart B - Waste Programs

Article 6.0 Pollution Prevention and Waste Minimization

Generators of waste shall take appropriate measures to encourage:

(a) Firstly, the prevention or reduction of waste generation and its harmfulness by:

- the development of clean technologies that are more sparing in their use of natural resources,

- the technical development and marketing of products designed as to make no contribution or to make the smallest possible contribution, by the nature of their manufacture, use or final disposal,

- the development of appropriate techniques for the final disposal of

dangerous substances contained in waste destined for recover.

(b) Secondly, the recovery of waste by means of:

- recycling, re-use or reclamation or any other process with a view to extracting secondary raw materials,
- the use of waste as a source of energy.

(c) Generators will submit an annual report to the Environmental Services of Curacao, by March 1, of each year detailing the efforts made on behalf of Pollution Prevention and Waste Minimization for the previous calendar year.

Article 7.0 Prohibitions

Generators of waste shall take the necessary measures to ensure that waste is recovered or disposed of without endangering human health and the environment,

- without risk to water, air, soil, plants and animals,
- without causing nuisance through noise or odor.

Generators are prohibited from abandonment, dumping or uncontrolled disposal of waste.

Article 8.0 Generator Responsibilities

(a) In order to attain the objectives in Articles 6 and 7, each generator is required to develop within 24 months of the enactment of this regulation a waste management plan to be submitted to ESC. Such a plan shall include:

- an estimate of the type (including composition), quantity, and origin of waste to be recovered or disposed of for the next 12 months,
- a description of the treatment of the waste, if applicable
- general technical requirements relating to the disposal of the waste and the disposal site,
- any special arrangement for particular wastes, for example, asbestos,
- the location and description of each disposal site.

(b) For the purpose of implementing this article, generators of waste, and establishments that carry out the operations specified in Appendices 2-A or 2-B, shall obtain a license (permit) from the Environmental Services of Curacao.

Such a license shall cover the items listed in Article 8(a), above.

(c) Licenses will be granted in accordance with Articles 5 through 21 of the *Curacao Public Nuisance Ordinance*.

(d) Generators will comply with the requirements of Appendix 3 of this regulation.

Article 9.0 Transporter Requirements

Establishments or undertakings which collect or transport waste on a professional basis or which arrange for the disposal or recovery of waste on behalf of others shall also be subject to the applicable sections of Article 8 and the requirements of Appendix 4.

Article 10.0 Treatment, Storage or Disposal Facilities

Establishments or undertakings which treat, store or dispose of wastes on a professional basis on behalf of others shall also be subject to the requirements of Article 8, and the requirements of Appendix 5.

Appendix 1. Categories of Waste

- W-1 Production or consumption residues not otherwise specified below.
- W-2 Off-specification products.
- W-3 Products whose date for appropriate use has expired.
- W-4 Materials spilled, lost or having undergone other mishap, including any materials, equipment, etc., contaminated as a result of the mishap.
- W-5 Materials contaminated or soiled as a result of planned actions, such as residues from cleaning operations, packing materials, or containers, etc.
- W-6 Unusable parts such as rejected batteries, exhausted catalysts, etc.
- W-7 Substances which no longer perform satisfactorily (e.g. contaminated acids, contaminated solvents, etc.)
- W-8 Residues of industrial processes (e.g. slags, still bottoms, etc.)
- W-9 Residues from pollution abatement processes (e.g. scrubber sludges, baghouse dusts, spent fibers, etc.)
- W-10 Machining/finishing residues (e.g. lathe turnings, mill scales, etc.)
- W-11 Residues from raw materials extraction and processing (e.g. mining residues, etc.)
- W-12 Adulterated materials (e.g. oil contaminated with PCBs)
- W-13 Any materials, substances or products whose use has been banned by law
- W-14 Products for which the holder has no further use (e.g. household, office, commercial and shop discards, etc.)
- W-15 Contaminated materials, substances or products resulting from remedial action with respect to land
- W-16 Oily sludges (e.g. soil contaminated with oil, sludge from API separators, sludge from oil catchers, etc.)

Appendix 2-A. Disposal Options

- D-1 Industrial or sanitary landfill
- D-2 Specially engineered landfill (in other words, one that has discreet cells, which are capped and isolated from one another, and the environment)
- D-3 Land treatment (e.g. bioremediation)
- D-4 Deep well injection (e.g. injection of pumpable discards into wells, salt domes or natural repositories)
- D-5 Surface impoundments (e.g. placements of liquid or sludge discards into pits, ponds or lagoons)
- D-6 Physical/chemical treatment (e.g. evaporation, drying, solidification)
- D-7 Incineration
- D-8 Temporary storage, pending any other operation listed in this appendix
- D-9 Permanent storage (e.g. emplacement of containers in a mine or elsewhere)

Appendix 2-B Recovery Options

- R-1 Solvent reclamation/regeneration
- R-2 Recycling/reclamation of organic substances which are not used as solvents
- R-3 Recycling/reclamation of metals and metal compounds
- R-4 Recycling/reclamation of inorganic compounds
- R-5 Regeneration of acids or bases
- R-6 Recovery of components used for pollution abatement
- R-7 Recovery of components from catalysts
- R-8 Oil re-refining or other re-uses of oil
- R-9 Use of waste principally as a fuel or other means to generate energy
- R-10 Spreading on land resulting in a benefit to agriculture or ecological improvement, including composting and other biological transformation processes
- R-11 Use of wastes obtained from any of the operations numbered R1-R10
- R-12 Storage of materials for submission to any operation in this appendix.

Appendix 3 Requirements for Generators of Waste

1.0 Purpose, scope, and applicability.

- (a) These regulations establish standards for generators of waste.
- (b) Within 24 months of the enactment of this regulation, a generator who treats, stores, or disposes of waste must comply with the following:
- (1) A generator must not treat, store, dispose of, transport, or offer for transportation, waste without having received a waste identification number from the Environmental Services of Curacao.
 - (2) Identify each waste by name and waste code number as listed in Appendix 1, by applying knowledge of the waste, in light of the materials or the processes used.
 - (3) Comply with recordkeeping requirements in accordance with 3.0. of this Appendix.
- (c) A person who generates a waste as defined in Article 3 is subject to the compliance requirements and penalties prescribed in *Curacao Public Nuisance Ordinance*.
- (d) A generator who has not received an ESC waste identification number may obtain one by applying to the ESC using form NWA-1 - Notification of Waste Activity (see Section 4.0 of this appendix). Upon receiving the request, ESC will assign a waste identification number to the generator.
- (e) A generator must not offer his waste to transporters or to treatment, storage, or disposal facilities that have not received an ESC waste identification number.

2.0 Manifesting Requirements

- (a) Within 24 months of the enactment of this regulation, a generator who transports, or offers for transportation, waste for offsite treatment, storage, or disposal must prepare a manifest in accordance with Section 5.0 of this appendix.
- (b) The manifest consists of at least the number of copies which will provide the generator, each transporter, and the owner or operator of the designated facility with one copy each for their records and another fully signed copy to be returned to the generator by the TSD facility.
- (c) Use of the manifest.
The generator must:
- (1) Sign the manifest certification by hand; and
 - (2) Obtain the handwritten signature of the initial transporter and date of acceptance on the manifest; and
 - (3) Retain one copy, in accordance with Section 3.0 of this Appendix, and submit a copy of the signed manifest to ESC within ten (10) days of signing.
 - (4) The generator must give the transporter the remaining copies of the manifest.

The transporter must:

- (1) Obtain the handwritten signature of the treatment, storage, or disposal (TSD) facility owner/operator upon delivering the waste, and date of acceptance on the manifest; and
- (2) Retain one copy, in accordance with Article 9.0 of these Waste Regulations, and
- (3) The transporter must give the TSD facility the remaining copies of the manifest.

The TSD facility must:

- (1) Sign and date the manifest.
- (2) Retain one copy, in accordance with Article 10.0 of these Waste Regulations, and
- (3) Submit a copy of the signed manifest to ESC, and one copy to the generator, within ten (10) days of receiving the waste.

(d) Before transporting waste or offering waste for transportation off-site, a generator must package the waste in a safe and acceptable manner.

3.0 - Recordkeeping and Reporting

(a) A generator must keep a copy of each manifest signed for three years from the date the waste was accepted by the initial transporter.

(b) Annual report

Generators must prepare and submit a single copy of an Annual Report to the Environmental Services of Curacao by March 1 of each year. The Annual Report must cover generator activities during the previous calendar year, and must include the following information:

- (1) The ESC waste identification number, name, and address of the generator;
- (2) The calendar year covered by the report;
- (3) The disposition of the waste if it was treated, stored or disposed of on-site;
- (4) The ESC identification number, name, and address for each off-site treatment, storage, or disposal facility to which waste was shipped during the year;
- (5) The name and ESC identification number of each transporter used during the reporting year for shipments to a treatment, storage or disposal facility.
- (6) A description, including the waste number from Appendix 1, and the quantity of each waste shipped off-site to a treatment, storage or a disposal facility.

4.0 Notification of Waste Activity -- Form NWA-1

1. Name of Installation: _____

2. Installation Mailing Address: _____

3. Location of Installation: _____
(if different from above)

4. Installation Contact: Name: _____

Title: _____ Telephone
Number: _____

5. Name of Installation's Legal Owner: _____

6. Description of Wastes Generated: Description and Waste Code from Waste Regulations, Appendix 1.

7. Certification: I certify that I have personally examined and am familiar with the information submitted in this document.

Signature

Name and Official Title

Date Signed: _____

For Official Use Only:
Assigned ESC Waste ID Number: _____

5.0 Manifest Instructions

Item 1. Generator's ESC Waste ID Number--Manifest Document Number

Enter the generator's ESC's waste identification number and the unique five digit number assigned to this Manifest (e.g., 00001) by the generator.

Item 2. Page 1 of ----

Enter the total number of pages used to complete this Manifest

Item 3. Generator's Name and Mailing Address

Enter the name and mailing address of the generator. The address should be the location that will manage the returned Manifest forms.

Item 4. Generator's Phone Number

Enter a telephone number where an authorized agent of the generator may be reached in the event of an emergency.

Item 5. Transporter Company Name

Enter the company name of the transporter who will transport the waste.

Item 6. ESC Waste ID Number

Enter the ESC waste identification number of the transporter identified in item 5.

Item 7. Designated Facility Name and Site Address

Enter the company name and site address of the facility designated to receive the waste listed on this Manifest. The address must be the site address, which may differ from the company mailing address.

Item 8. ESC ID Number

Enter the waste identification number of the designated facility identified in item 7.

Item 9. Waste Description [Including Name, ID Number]

Enter the name, ID Number (Appendix 1) for each waste.

Item 10. Containers (No. and Type)

Enter the number of containers for each waste and the appropriate abbreviation from Table I (below) for the type of container.

Table I--Types of Containers

- DM=Metal drums, barrels, kegs
- DW=Wooden drums, barrels, kegs
- DF=Fiberboard or plastic drums, barrels, kegs
- TP=Tanks portable
- TT=Cargo tanks (tank trucks)
- TC=Tank cars
- DT=Dump truck
- CY=Cylinders
- CM=Metal boxes, cartons, cases (including roll-offs)
- CW=Wooden boxes, cartons, cases
- CF=Fiber or plastic boxes, cartons, cases
- BA=Burlap, cloth, paper or plastic bags

Item 11. Total Quantity

Enter the total quantity of waste described on each line.

Item 12. Unit (Wt./Vol.)

Enter the appropriate abbreviation from Table II (below) for the unit of measure.

Table II--Units of Measure

- N=Cubic meters
- L=Liters (liquids only)
- K=Kilograms
- M=Metric tons (1000 kg)

Item 13. Special Handling Instructions and Additional Information

Generators may use this space to indicate special transportation, treatment, storage, or disposal information.

Item 14. Generator's Certification

The generator must read, sign (by hand), and date the certification statement.

Item 15. Transporter Acknowledgement of Receipt of Materials

Enter the name of the person accepting the waste on behalf of the transporter.

Item 16. TSD Facility Receipt of Materials

Enter the name of the person accepting the waste on behalf of the treatment storage or disposal facility.

Copies: Copies 6 & 5, contain generator's & transporter's signature. Generator retains copy 6 and submits copy 5 to ESC. Copy 4 Transporter's file copy with TSD's signature. Copies 3, 2 &

1, TSD's copy with all signatures. TSD retains copy 3 and submits copy 2 to generator, and copy 1 to ESC.

CURACAO WASTE MANIFEST

1. Generator ESC Waste I.D. Number: _____ Manifest Document # _____ 2. Page 1 of _____
(To be pre-printed by ESC)

3. Generator's Name and Mailing Address

4. Generator's Telephone Number: _____

5. Transporter Company Name: _____ 6. Transporter ESC Waste I.D. Number: _____

7. Designated Facility Name and Site Address 8. Facility ESC Waste I.D. Number: _____

9. Waste Description (Include name and waste ID Number)	10. Containers No. Type	11. Total Quantity Wt/Vol	12. Unit
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

13. Special Handling Instruction and Additional Information

14. Generator's Certification: I hereby declare that the contents of this consignment are fully and accurately described above.
Printed/Typed Name: _____ Signature: _____ Date: _____

15. Transporter Acknowledgement and Receipt of Materials
Printed/Typed Name: _____ Signature: _____ Date: _____

16. Facility Owner or Operator Acknowledgement and Receipt of Materials
Printed/Typed Name: _____ Signature: _____ Date: _____

Copies: Copies 6 & 5, contain generator's & transporter's signature. Generator retains copy 6 and submits copy 5 to ESC. Copy 4 Transporter's file copy with TSD's signature. Copies 3, 2 & 1, TSD's copy with all signatures. TSD retains copy 3 and submits copy 2 to generator, and copy 1 to ESC.

Appendix 4 - Requirements for Transporters of Waste

1.0 Purpose, Scope, and Applicability

(a) These regulations establish standards which apply to persons transporting waste within Curacao as described under Article 9.0, Transporter Requirements.

(b) These regulations do not apply to on-site transportation of waste by generators or by owners or operators of permitted waste management facilities.

(c) A transporter of waste must also comply with applicable sections of Article 8.0, Generator Responsibilities.

(d) Within 24 months of the enactment of this regulation, a transporter must not transport wastes without having received an ESC waste identification number from ESC.

(e) A transporter who has not received an ESC waste identification number may obtain one by applying to the ESC using form NWA-1 - Notification of Waste Activity (see Appendix 3, Section 4.0). Upon receiving the request, ESC will assign a waste identification number to the transporter.

2.0 Manifesting Requirements

(a) Within 24 months of the enactment of this regulation, a transporter may not accept waste from a generator unless it is accompanied by a manifest signed in accordance with the provisions of Article 8, Appendix 3, Section 2.0.

(b) Before transporting the waste, the transporter must sign and date the manifest acknowledging acceptance of the waste from the generator. The transporter must return a signed copy to the generator before leaving the generator's property.

(c) The transporter must ensure that the manifest accompanies the waste.

(d) A transporter who delivers a waste to a designated facility must:

(1) Obtain the date of delivery and the handwritten signature of the owner or operator of the designated facility on the manifest; and

(2) Retain one copy of the manifest, and

(3) Give the remaining copies of the manifest to the accepting designated facility.

(e) The transporter must deliver the entire quantity of waste which he has accepted from a generator to:

(1) The designated facility listed on the manifest; or

(2) An alternate designated facility, if the waste cannot be delivered to the designated facility because an emergency prevents delivery; or

(3) If the waste cannot be delivered in accordance with (1) - (3) of this section, the transporter must contact the generator for further directions and must revise the manifest according to the generator's instructions.

3.0 Recordkeeping and Reporting

(a) A transporter of waste must keep a copy of the manifest signed by the generator, him or herself, and the owner or operator of the designated facility for a period of three years from the date the waste was accepted by the transporter.

(b) Annual report

Transporters must prepare and submit a single copy of an Annual Report to the Environmental Services of Curacao by March 1 of each year. The Annual Report must cover transporter activities during the previous calendar year, and must include the following information:

(1) The ESC waste identification number, name, and address of the transporter;

(2) The calendar year covered by the report;

(3) The ESC identification number, name, and address for each off-site treatment, storage, or disposal facility to which waste was shipped during the year;

(4) A description, including the waste number from Appendix 1, and the quantity of each waste transported to a treatment, storage or a disposal facility.

4.0 Waste Discharges

(a) In the event of a discharge of a waste during transportation, the transporter must take appropriate immediate action to protect human health and the environment (e.g., notify local authorities, dike the discharge area).

(b) If a discharge of a waste occurs during transportation and an ESC officer acting within the scope of his official responsibilities determines that immediate removal of the waste is necessary to protect human health or the environment, that official may authorize the removal of the waste by transporters who do not have an ESC waste identification number and without the preparation of a manifest.

(c) A transporter must clean up any waste discharge that occurs during transportation or take such action as may be required or approved by ESC officials so that the discharge no longer presents a hazard to human health or the environment.

Appendix 5 - Requirements for Treatment, Storage and Disposal (TSD) Facilities

1.0 Purpose, Scope, and Applicability

(a) These regulations establish standards which apply to persons treating, storing or disposing of waste within Curacao as described under Article 10.0, Treatment, Storage, or Disposal Facilities.

(b) A TSD facility must also comply with applicable sections of Article 8, Generator Responsibilities.

(d) Within 24 months of the enactment of this regulation, a TSD facility must not receive wastes without having received an ESC waste identification number from ESC.

(e) A TSD facility that has not received an ESC waste identification number may obtain one by applying to the ESC using form NWA-1 - Notification of Waste Activity (see Appendix 3, Section 4.0). Upon receiving the request, ESC will assign a waste identification number to the TSD facility.

(f) Landfills shall also comply with the requirements of Appendix 6.

2.0 Manifesting Requirements

(a) Within 24 months of the enactment of this regulation, a TSD facility may not accept waste from a transporter unless it is accompanied by a manifest, signed in accordance with the provisions of Article 8, Appendix 3, Section 2.0.

(b) Before receiving the waste, the TSD facility owner or operator must sign and date the manifest acknowledging acceptance of the waste from the transporter. He or she must immediately give the transporter at least one copy of the signed manifest. The TSD facility owner or operator must return a signed copy to the generator and another signed copy to ESC within 30 days after the delivery.

3.0 Recordkeeping and Reporting

(a) A TSD facility must keep a copy of the manifest signed by the generator, the transporter, and him or herself for a period of three years from the date the waste was accepted by the TSD facility.

(b) A TSD facility must prepare and submit a single copy of an Annual Report to the Environmental Services of Curacao by March 1 of each year. The Annual Report must cover TSD facility activities during the previous calendar year, and must include the following information:

- (1) The ESC waste identification number, name, and address of the TSD facility;
- (2) The calendar year covered by the report;
- (3) The ESC identification number, name, and address for each generator that shipped waste to the TSD facility;
- (4) A description, including the waste number from Appendix 1, and the quantity of each waste transported to the TSD facility.

4.0 General Facility Standards

(a) The owner or operator must prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active portion of his facility, unless he can demonstrate to ESC that:

- (1) Physical contact with the waste, structures, or equipment within the active

portion of the facility will not injure unknowing or unauthorized persons or livestock which may enter the active portion of a facility; and

- (2) Disturbance of the waste or equipment, by the unknowing or unauthorized entry of persons or livestock onto the active portion of a facility, will not cause a violation of the requirements of this part.

(b) The owner or operator must inspect his facility for malfunctions and deterioration, operator errors, and discharges which may be causing--or may lead to--(1) release of waste constituents to the environment or (2) a threat to human health. The owner or operator must conduct these inspections often enough to identify problems in time to correct them before they harm human health or the environment. The frequency of inspections for various facility operations will be stipulated in the license (permit) between the facility and ESC.

(c) The owner or operator must remedy any deterioration or malfunction of equipment or structures which the inspection reveals on a schedule which ensures that the problem does not lead to an environmental or human health hazard. Where a hazard is imminent or has already occurred, remedial action must be taken immediately.

(d) The owner or operator must record inspections in an inspection log or summary. He must keep these records for at least three years from the date of inspection. At a minimum, these records must include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions.

(e) Facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with the requirements of this part.

5.0 Operating record.

(a) The owner or operator must keep a written operating record at his facility.

(b) The following information must be recorded, as it becomes available, and maintained in the operating record until closure of the facility:

(1) A description and the quantity of each waste received, and the method(s) and date(s) of its treatment, storage, or disposal at the facility;

(2) The location of each waste within the facility and the quantity at each location. For disposal facilities, the location and quantity of each waste must be recorded on a map or diagram of each cell or disposal area. For all facilities, this information must include cross-references to specific manifest document numbers, if the waste was accompanied by a manifest;

(c) All records, including plans, required under this part must be furnished upon request, and made available at all reasonable times for inspection, by any officer, employee, or representative of ESC.

Appendix 6 Guidelines for Landfills

6.0 Definitions

(a) Cell means compacted wastes that are enclosed by natural soil or cover material in a land disposal site.

(b) Cover material means soil or other suitable material that is used to cover compacted wastes in a land disposal site.

(c) Daily cover means cover material that is spread and compacted on the top and side slopes of compacted waste at least at the end of each operating day in order to control vectors, fire, moisture, and erosion and to assure an aesthetic appearance.

(d) Final cover means cover material that serves the same functions as daily cover but, in addition, may be permanently exposed on the surface.

(e) Free moisture means liquid that will drain freely by gravity from solid materials.

(f) Groundwater means water present in the saturated zone of an aquifer.

(g) Hazardous wastes means any waste or combination of wastes which pose a substantial present or potential hazard to human health or living organisms because such wastes are nondegradable or persistent in nature or because they can be biologically magnified, or because they can be lethal, or because they may otherwise cause or tend to cause detrimental cumulative effects.

(h) Infectious waste means: (1) Equipment, instruments, utensils, and fomites of a disposable nature from the rooms of patients who are suspected to have or have been diagnosed as having a communicable disease and must, therefore, be isolated as required by public health agencies; (2) laboratory wastes, such as pathological specimens (e.g. all tissues, specimens of blood elements, excreta, and secretions obtained from patients or laboratory animals) and disposable fomites (any substance that may harbor or transmit pathogenic organisms) attendant thereto; (3) surgical operating room pathologic specimens and disposable fomites attendant thereto and similar disposable materials from outpatient areas and emergency rooms.

(i) Leachate means liquid that has percolated through solid waste and has extracted dissolved or suspended materials from it.

(j) Municipal wastes means normally, residential, and commercial waste generated within a community.

(k) Open burning means burning of wastes in the open, such as in an open dump.

(l) Open dump means a land disposal site at which wastes are disposed of in a manner that does not protect the environment, is susceptible to open burning, and is exposed to the elements, vectors, and scavengers.

(m) Plans means reports and drawings, including a narrative operating description, prepared to describe the land disposal site and its proposed operation.

(n) Residue means all the solids that remain after completion of thermal processing, including bottom ash, fly ash, and grate siftings.

(o) Responsible agency means the organizational element that has the legal duty to ensure that owners, operators or users of land disposal sites comply with these guidelines.

(p) Runoff means the portion of precipitation that drains from an area as surface flow.

(q) Sanitary landfill means a land disposal site employing an engineered method of disposing of wastes on land in a manner that minimizes environmental hazards by spreading the wastes in thin layers, compacting the wastes to the smallest practical volume, and applying and compacting cover material at the end of each operating day.

(r) Scavenging means uncontrolled removal of waste materials.

(s) Sludge means the accumulated semiliquid suspension of settled solids deposited from wastewaters or other fluids in tanks or basins. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluents, dissolved materials in irrigation return flows or other common water pollutants.

(t) Vector means a carrier, usually an arthropod, that is capable of transmitting a pathogen from one organism to another.

(u) "Waste" shall mean: any substance or object in the categories set out in Appendix 1 which the holder discards or intends or is required to discard.

(v) Working face means that portion of the land disposal site where wastes are discharged and are spread and compacted prior to the placement of cover material.

6.1 Requirements and Recommended Procedures

A. Purpose:

(a) It is the goal of these guidelines to reduce and eventually eliminate open dumping in Curacao over the next ten (10) years.

(b) In consultation with Environmental Services Curacao the owner/operator shall determine what wastes shall be accepted and shall identify any special handling required. In general, only wastes for which the facility has been specifically designed shall be accepted; however, other wastes may be accepted if it has been demonstrated to the responsible agency that they can be satisfactorily disposed of within the design capability of the facility or after appropriate facility modifications.

The plans should specify the procedures to be employed for wastes requiring special handling.

B. Operations

(a) Routine sanitary landfill techniques of spreading and compacting wastes and placing cover material (daily cover) at the end of each operating day should be used to dispose of wastes.

(b) Certain bulky wastes, such as automobile bodies, furniture, and appliances may be salvaged in a controlled manner at a point other than the working face. Otherwise, they should be crushed on solid ground and then pushed onto the working face near the bottom of the cell. Other bulky items, such as demolition and construction debris, tree stumps, and large timbers, should be pushed onto the working face near the bottom of the cell.

(c) Water treatment plant sludges containing no free moisture and digested or heat treated waste water treatment plant sludges containing no free moisture should be placed on the working face along with wastes and covered with soil or wastes. The quantities accepted should be determined by operational limitations encountered at the working face.

(d) Incinerator and air pollution control residues containing no free moisture should be incorporated into the working face and covered at such intervals as necessary to prevent them from becoming airborne.

(e) Open burning is prohibited.

(f) Under certain circumstances it may be necessary to accept special wastes at land disposal sites. The following special wastes require specific approval of the responsible agency for acceptance at the site: Hazardous wastes, infectious institutional wastes, bulk liquids and semi-liquids, sludges containing free moisture, highly flammable or volatile substances, raw animal manure, septic tank pumpings, raw sewage sludge, and certain industrial process wastes. Where the use of the disposal site for such wastes is planned, a special assessment is required of the following items: The site characteristics, nature and quantities of the waste, and special design and operations precautions to be implemented to insure environmentally safe disposal.

(g) Regular users of the land disposal site should be provided with a list of the materials to be excluded. The list should also be displayed prominently at the site entrance. If a regular user persists in making unacceptable deliveries, he should be barred from the site and reported to the responsible agency.

6.2 Site selection.

A. Site selection and utilization shall be consistent with public health and welfare, and air and water quality standards and adaptable to an appropriate land-use plan.

B. Plans for the design, construction, and operation of new sites or modifications to existing sites shall be prepared or approved by a professional engineer. The plans shall be submitted to the ESC for review and, if warranted, approval.

C. Records should be maintained covering at least the following:

(1) Major operational problems, complaints, or difficulties.

(2) Qualitative and quantitative evaluation of the environmental impact of the land disposal site, with regard to the effectiveness of gas and leachate control, including results of: (i) Leachate sampling and analyses; (ii) gas sampling and analyses; (iii) ground and surface water quality sampling and analyses upstream and downstream of the site.

(3) Vector control efforts.

(4) Dust and litter control efforts.

(5) Run-on/Runoff control efforts.

(6) Quantitative measurements of the wastes handled. This should be accomplished through routine or periodic utilization of scales and topographic surveys of the site.

(7) Description of waste materials received, identified by source of materials.

D. Upon completion of the site, a final cover shall be utilized, and a detailed description, including a plat, should be recorded with ESC. The description should include general types and locations of wastes, depth of fill, and other information of interest to potential landowners.