## ENVIRONMENTAL PROTECTION AGENCY

[ 40 CFR Part 409 ]

### CRYSTALLINE CANE SUGAR AND LIQUID CANE SUGAR REFINING SUBCATEGORIES

#### Proposed Effluent Limitations Guidelines

Notice is hereby given that effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources set forth in tentative form below are proposed by the Environmental Protection Agency (EPA) for the crystalline cane sugar refining subcategory (Subpart B) and the liquid cane sugar refining subcategory (Subpart C) of the sugar processing category of point sources pursuant to sections 301, 304 (b) and (c), 306(b) and 307(c) of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1311, 1314 (b) and (c), 1316(b), and 1317(c); 86 Stat. 816 et seq.; Pub. L. 92-500) (the "Act").

(a) *Legal authority*—(1) *Existing point sources.* Section 301(b) of the Act requires the achievement by not later than July 1, 1977, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of the best practicable control technology currently available as defined by the Administrator pursuant to section 304(b) of the Act. Section 301(b) also requires the achievement by not later than July 1, 1983, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of best available technology economically achievable which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants, as determined in accordance with regulations issued by the Administrator pursuant to section 304(b) of the Act.

(2) Section 304(b) of the Act requires the Administrator to publish regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of the best practicable control technology currently available and the degree of effluent reduction attainable through the application of the best control measures and practices achievable including, treatment techniques, process and procedure innovations, operating methods and other alternatives. The regulations proposed herein set forth effluent limitations guidelines, pursuant to section 304(b) of the Act, for the crystalline cane sugar refining subcategory (Subpart B) and the liquid cane sugar refining subcategory (Subpart C), of the sugar processing category.

(3) *New sources.* Section 306 of the Act requires the achievement by new sources of a Federal standard of performance providing for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.

Section 306(b)(1)(B) of the Act requires the Administrator to propose regulations establishing Federal standards of performances for categories of new sources included in a list published pursuant to section 306(b)(1)(A) of the Act. The Administrator published in the FEDERAL REGISTER of January 16, 1973, (38 FR 1624) a list of 27 source categories, including the sugar processing category. The regulations proposed herein set forth the standards of performance applicable to new sources for the crystalline cane sugar refining subcategory (Subpart B) and the liquid cane sugar refining subcategory (Subpart C), of the sugar processing category.

Section 307(c) of the Act requires the Administrator to promulgate pretreatment standards for new sources at the same time that standards of performance for new sources are promulgated pursuant to section 306. Sections 409.25 and 409.35 proposed below provide pretreatment standards for new sources within the crystalline cane sugar refining subcategory (Subpart B) and the liquid cane sugar refining subcategory (Subpart C), of the sugar processing category of point sources.

Section 304(c) of the Act requires the Administrator to issue to the States and appropriate water pollution control agencies information on the processes, procedures or operating methods which result in the elimination or reduction of the discharge of pollutants to implement standards of performance under section 306 of the Act. The report or Development Document referred to below provides, pursuant to section 304(c) of the Act, information on such processes, procedures, or operating methods.

(b) *Summary and basis of proposed effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources*—(1) *General methodology.* The effluent limitations guidelines and standards of performance proposed herein were developed in the following manner. General information was obtained on all plants and detailed information was collected for 28 (97 percent) of the 29 domestic cane sugar refineries identified as currently in operation (see Table 1 below). The sources and types of information consisted of:

Applications to the Corps of Engineers for permits to discharge under the Refuse Act Permit Program (RAPP) which were obtained for 24 refineries provided data on the characteristics of intake and effluent waters, water usages, waste water treatment and control practices employed, daily production, and raw materials used.

A questionnaire previously submitted to 17 refineries by the United States Cane Sugar Refineries Association.

On-site inspections of 19 refineries provided information on process diagrams and related water usage, water management practices, and control and treatment practices.

Four refineries were sampled to verify the accumulated data.

Other sources of information included: Personal and telephone interviews and meetings with regional EPA personnel, industry personnel, and consultants; State permit applications; internal data supplied by industry; and a review and evaluation of the available literature.

TABLE 1—SOURCES OF DATA

| Refinery | Type[1] | Location | Size-kkg/day (average melt) | Data source[2] |
|---|---|---|---|---|
| Amstar | C | MD | 2,350 | 1,2,4 |
| Do | C | MA | 900 | 1,2,3,5 |
| Do | C | NY | 1,900 | 1,2,3,4,4 |
| Do | C | LA | 2,800 | 1,2,4 |
| Do | C | PA | 1,900 | 1,2,4 |
| J. Aron & Co | C | LA | 680 | 1,4 |
| California & Hawaiian | C | HA | 170 | 1,4 |
| Do | C | CA | 3,175 | 1,3,4 |
| Colonial (Borden) | C | LA | 1,350 | 1,5 |
| Evercane (Savannah Foods) | C | FL | 360 | 3 |
| Glades County | C | FL | 420 | 3 |
| Godchaux | C | LA | 1,540 | |
| Guanica | C | PR | 200 | 1,3 |
| Igualdad | C | PR | 630 | 1 |
| Imperial | C | TX | 1,350 | 1,2,3,4 |
| Mercedita | C | PR | 545 | 1,3 |
| National | C | PA | 1,900 | 1,3,4 |
| Revere | C | MA | 1,000 | 3 |
| Roig | C | PR | 360 | 1,3 |
| Savannah Foods | C | GA | 1,700 | 1,2,3,4,5 |
| South Coast | C | LA | 635 | 1,4 |
| Southdown | C | LA | 635 | 1,2,3,4 |
| CPC | C-L | NY | 1,650 | 1,2,3,4 |
| SuCrest | C-L | NY | 720 | 1,2,3 |
| Florida Sugar (Borden) | L | FL | 360 | 1,3,4 |
| Industrial (Borden) | L | MO | 275 | 1,3,4 |
| Pepsico | L | NY | 725 | 1,3,5 |
| Ponce Candy | L | PR | 65 | 1,3 |
| SuCrest | L | IL | 775 | 3,5 |

[1] C—Crystalline refinery.
C-L—Combination crystalline-liquid refinery.
L—Liquid refinery.

[2] 1 Corps of engineers applications (RAPP).
2 Prior analyses.
3 Interview of plant personnel.
4 Questionnaire.
5 Verification sampling.

The reviews, analyses, and evaluations were coordinated and applied to the following:

An identification of distinguishing features that could potentially provide a basis for subcategorization of the in-

dustry segment. These features included raw material quality, age and size of the refinery, nature of water supply, process employed, and product produced.

A determination of the water usage and waste water characteristics for each subcategory, including the volume of water used, the sources of pollution in the plant, and the type and quantity of constituents in the waste waters.

An identification of those constituents which are characteristic of the industry and determined to be pollutants subject to effluent limitations guidelines and standards of performance.

An identification of the control and treatment technologies presently employed or capable of being employed by the refining industry, including the effluent level attainable and associated treatment efficiency related to each technology.

An evaluation of the cost associated with the application of each control and treatment technology.

The results of this analysis indicated that three refineries are currently achieving no discharge of pollutants to navigable waters by means of land retention, two refineries discharge all process wastes to municipal treatment systems, and ten additional refineries discharge all wastes except barometric condenser cooling water to municipal systems. The majority of the remaining fourteen plants partially treat waste waters.

The pretreatment standards proposed herein are intended to be complementary to the pretreatment standard proposed for existing sources under 40 CFR Part 128. The basis for such standards are set forth in the FEDERAL REGISTER of July 19, 1973, 38 FR 19236. The provisions of Part 128, except for § 128.133, are equally applicable to sources which would constitute "new sources" under section 306 of the Act if they were to discharge pollutants directly to navigable waters. Section 128.133 provides a pretreatment standard for "incompatible pollutants" which requires application of the "best practicable control technology currently available," subject to an adjustment for quantities of pollutants removed by the publicly owned treatment system. Since the pretreatment standards proposed herein apply to new sources, §§ 409.25 and 409.35 below amend § 128.133 to require application of the standard of performance for new sources rather than the "best practicable" standard applicable to existing sources under sections 301 and 304(b) of the Act.

(2) Summary of conclusions with respect to the crystalline cane sugar refining subcategory (Subpart B) and the liquid cane sugar refining subcategory (Subpart C), of the sugar processing category of point sources.

(i) *Categorization.* For the purpose of establishing effluent limitations guidelines and standards of performance, the cane sugar refining segment of the sugar processing category has been divided into two subcategories:

(1) *Subpart B.* Crystalline Cane Sugar Refining Subcategory: This subcategory includes those refineries which process raw sugar into a crystalline refined sugar product.

(2) *Subpart C.* Liquid Cane Sugar Refining Subcategory: This subcategory includes those refineries which process raw sugar into a liquid refined sugar product.

Factors such as age and size of plant, raw material quality, nature of water supply, and process employed as affecting wasfe water constituents and waste control and treatment technologies substantiate this determination.

(ii) *Waste characteristics.* The known significant pollutant properties or constituents of waste waters resulting from cane sugar refining include biochemical oxygen demand, suspended solids, and pH. Other parameters considered to be of less significance are chemical oxygen demand, temperature, total dissolved solids, and nutrients.

(iii) Origin of waste water pollutants in the cane sugar refining segment of the sugar processing category.

Major inplant water uses resulting in waste water streams are barometric condenser cooling water, filter cake slurry, char wash water, floor wash water, carbon slurries, truck and car wash, and ion-exchange regeneration water. The filter cake stream may be handled separately in either a dry or slurry form. These waste water streams are referred to as "process waste water". The filter cake slurry, char wash water, floor wash water, carbon slurries, truck and car wash waters, ion-exchange regeneration water, and other miscellaneous waste water streams are called "process water". The "process water", together with the barometric condenser cooling water, constitute the "process waste water".

(iv) *Control and treatment technology.* The control and treatment technologies which are available include in-plant control techniques and end-of-process treatment technologies. Inplant control measures include the minimization of intake water by maximum reuse of waste waters in the process (by such means as sweet water recovery and condensate utilization) and entrainment prevention in barometric condenser cooling water. The principal end-of-process treatment methods include filtration techniques to remove solid material, disposal of excess waste water in holding ponds and waste stabilization lagoons, discharge of process waste waters to municipal treatment systems, and treatment of process waste waters by activated sludge or other equivalent biological treatment technique.

The three major sources of waste resulting from cane sugar refining are filter cake, process waters, and barometric condenser cooling water. Total waste loadings for: Crystalline cane sugar refineries are—1.54 kg BOD5 per kkg (3.08 lb BOD5 per ton) of melt and 1.86 kg TSS per kkg (3.72 lb TSS per ton) of melt; liquid cane sugar refineries are—3.43 kg BOD5 per kkg (6.86 lb BOD5 per ton) of melt and 1.56 kg TSS per kkg (3.12 lb TSS per ton) of melt. Table 2 is a summary of waste loadings resulting from the application of certain treatment alternatives, using no treatment (Alternative A) as a baseline. Filter cake, resulting from the clarification of melt liquor, can be disposed of without discharge to navigable waters by controlled impoundage of the filter slurry or dry handling of the filter cake (Alternative B). Alternative C involves the addition of demisters and external separators to reduce entrainment of sucrose into barometric condenser cooling water. Alternative D involves, in addition to Alternative C, an activated sludge system to treat process waters. Alternative E involves, in addition to Alternative D, the recycle of barometric condenser cooling water through a cooling device with biological treatment of the assumed two percent blowdown and incorporates sand filtration of the effluent from the activated sludge system to further effect solids removal. Alternative F, in addition to Alternative C, allows for no discharge of process water by total impoundage of this waste stream. Alternative G involves, in addition to Alternative F, a recycling of barometric condenser cooling water through a cooling device and total retention of the assumed two percent blowdown.

TABLE 2—SUMMARY OF WASTE LOADS[1] FROM TREATMENT ALTERNATIVES APPLIED TO A CRYSTALLINE CANE SUGAR REFINERY AND A LIQUID CANE SUGAR REFINERY

CRYSTALLINE REFINING

| Alternative | BOD5 | TSS |
|---|---|---|
| A (base line) | 1.54 | 1.86 |
| B | 1.36 | 1.30 |
| C | 1.15 | 1.30 |
| D | .33 | .05 |
| E | .04 | .03 |
| F | .34 | 0 |
| G | 0 | 0 |

LIQUID REFINING

| Alternative | BOD5 | TSS |
|---|---|---|
| A (base line) | 3.43 | 1.56 |
| B | 3.25 | 1.00 |
| C | 2.90 | 1.00 |
| D | .24 | .10 |
| E | .06 | .03 |
| F | .15 | 0 |
| G | 0 | 0 |

[1] Waste loadings expressed as kg/kkg of melt.

(v) *Control and treatment technology within subcategories.* Waste water control and treatment technologies have been studied for each subcategory of the cane sugar refining segment to determine what is (i) the best practicable control technology currently available (BPCTCA), (ii) the best available technology economically achievable (BATEA), and (iii) the best available demonstrated control technology, processes, operating methods or other alternatives (NSPS). Because of the similarity in waste water streams resulting from cane sugar refining, the technologies of treatment and control are the same for both subcategories.

Specific features of the recommended best practicable control technology currently available (BPCTCA) for the two subcategories are:

Containment of filter mud slurry or dry handling of filter cake with land disposal.

Prevention of spillage during raw sugar handling, unloading, and storage.

Entrainment prevention in evaporators and pans through baffling, centrifugal separators, demisters, and utilization of the proper height of the vapor belt.

Maximum reuse of all general waste streams i.e. floor and equipment wastes, filter screen washes (at present some refineries recycle essentially all floor and equipment washes back to the process).

Biological treatment of process waters by activated sludge or equivalent biological treatment system. These features are the equivalent of Alternative D as presented in Table 2 above.

Specific features of the recommended best available treatment economically achievable (BATEA) for the two subcategories are:

Those features considered to be best practicable control technology currently available.

Recycle of barometric condenser cooling water for condenser or other in-plant uses, with recycle of the blowdown stream to biological treatment. Cooling devices (canals, ponds, or towers) are an integral part of a barometric condenser cooling water recycle system.

The addition of sand filtration of the effluent from the activated sludge or equivalent biological treatment system.

These features are the equivalent of Alternative E as presented in Table 2 above.

Specific features of the recommended best available demonstrated control technology, processes, operating methods or other alternatives (NSPS) are:

Those features considered to be best available technology economically achievable.

These features are the equivalent of Alternative E as presented in Table 2 above.

Effluent limitations guidelines and new source performance standards for the two subcategories, crystalline cane sugar refining and liquid cane sugar refining, which reflect (i) the best practicable control technology currently available (BPCTCA), (ii) the best available technology economically achievable (BATEA), and (iii) the best available demonstrated control technology, processes, operating methods or other alternatives (NSPS) are given in Table 3 below:

TABLE 3.—RECOMMENDED EFFLUENT LIMITATIONS AND STANDARDS OF PERFORMANCE

| Subcategory | LIMITATIONS—kg/kkg of MELT | | | | | |
|---|---|---|---|---|---|---|
| | BPCTCA | | BATEA | | NSPS | |
| | BOD5 | TSS | BOD5 | TSS | BOD5 | TSS |
| **MONTHLY AVERAGES** | | | | | | |
| Liquid cane sugar refining | 0.24 | 0.10 | 0.06 | 0.03 | 0.06 | 0.03 |
| Crystalline cane sugar refining | .33 | .06 | .04 | .03 | .04 | .03 |
| **DAILY AVERAGES** | | | | | | |
| Liquid cane sugar refining | 0.85 | 0.45 | 0.21 | 0.14 | 0.21 | 0.14 |
| Crystalline cane sugar refining | 1.14 | .21 | .12 | .12 | .12 | .12 |

pH for both subcategories shall be within the range of 6.0–9.0.

(vi) Cost estimates for control of waste water pollutants.

The following Tables 4a and 4b set forth the total estimated capital and yearly costs associated with the application of the aforementioned control and treatment alternatives. These costs are based on actual design estimates for crystalline cane sugar refineries with capacities of 545 kkg (600 tons) and 1900 kkg (2100 tons) of melt per day, and also for a liquid cane sugar refinery with a capacity of 508 kkg (560 tons) of melt per day.

TABLE 4A—CUMULATIVE ESTIMATED CAPITAL AND TOTAL YEARLY COSTS ASSOCIATED WITH THE APPLICATION OF VARIOUS TREATMENT ALTERNATIVES TO CRYSTALLINE CANE SUGAR REFINING WASTES

| Alt | Reduction | | Costs in K$ | | | |
|---|---|---|---|---|---|---|
| | BOD5 percent | TSS percent | 545 kkg | | 1900 kkg | |
| | | | Capital | Yearly | Capital | Yearly |
| A | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 11.7 | 30.5 | 61 | 45 | 61 | 71 |
| C | 24.7 | 30.5 | 113 | 62 | 134 | 75 |
| D | 75.3 | 96.8 | 368 | 205 | 700 | 296 |
| E | 97.5 | 98.4 | 714 | 283 | 1,510 | 470 |
| F | 78.0 | 100 | 1,530 | 211 | 5,000 | 691 |
| G | 100 | 100 | 2,530 | 352 | 7,620 | 950 |

TABLE 4B—CUMULATIVE ESTIMATED CAPITAL AND TOTAL YEARLY COSTS ASSOCIATED WITH THE APPLICATION OF VARIOUS TREATMENT ALTERNATIVES TO LIQUID CANE SUGAR REFINING WASTES

| Alt | Reduction | | Costs in K$ | |
|---|---|---|---|---|
| | BOD5 percent | TSS percent | 508 kkg | |
| | | | Capital | Yearly |
| A | 0 | 0 | 0 | 0 |
| B | 5.3 | 35.9 | 61 | 45 |
| C | 15.4 | 35.9 | 115 | 62 |
| D | 93.0 | 93.6 | 462 | 230 |
| E | 98.3 | 98.1 | 620 | 265 |
| F | 95.6 | 100 | 1,570 | 217 |
| G | 100 | 100 | 2,040 | 280 |

The cost figures presented above were derived from actual cost data on existing plants and other cost estimates for equipment, facilities, piping, excavation, land, and other related items associated with pollution control measures. The following features were assumed with regard to operation and pollution reduction practices of the average-sized small (545 kkg) and large (1900 kkg) crystalline cane sugar refineries and average-sized liquid (508 kkg) cane sugar refinery, and applied in arriving at the above cost figures: (i) Discharge of diatomaceous earth filter slurries; (ii) sufficient entrainment controls to result in an entrainment level of 16 mg/l of BOD5 in barometric condenser cooling water for crystalline refineries and 33 mg/l of BOD5 in barometric condenser cooling water for liquid refineries; (iii) no recycle of condenser cooling water; and (iv) discharge of process water. Percent reduction of BOD5 and suspended solids (TSS) indicates the cumulative percent of waste load reduction relative to the total potential BOD5 and suspended solids loadings associated with cane sugar refining.

The cost of attaining the recommended treatment levels are:

(1) Crystalline Cane Sugar Refining—The total estimated capital cost to industry to achieve the recommended (i) best practicable control technology currently available (Alternative D) is $4.7 million and (ii) best available technology economically achievable (Alternative E) is $14.2 million.

(2) Liquid Cane Sugar Refining—The total estimated capital cost to industry to achieve the recommended (i) best practicable control technology currently available (Alternative D) is $0.32 million

and (ii) best available technology economically achievable (Alternative E) is $0.8 million.

(vii) Establishing daily average limitations. Based on engineering judgment and an evaluation of what can be achieved by the application of activated sludge for the treatment of cane sugar refining waste waters, daily average limitations have been established. These were determined to be three and three and one-half times the monthly average limitations for BOD5, and four and four and one-half times the monthly average limitations for total suspended solids for the crystalline cane sugar refining subcategory and the liquid cane sugar refining subcategory, respectively.

(viii) *Non-water quality aspects of pollution control.* Principal non-water quality aspects associated with the proposed water-related pollution control technologies recommended herein are (i) the additional energy requirements to effect this control, (ii) solid waste removal, and (iii) air quality relating to the use of cooling towers.

Added energy required for the operation of treatment facilities to achieve the recommended best practicable control technology currently available amounts to:

0.84 percent of the total subcategory energy requirement for crystalline cane sugar refining, and

0.6 percent of the total subcategory energy requirement for liquid cane sugar refining.

Additional energy required to achieve the recommended best available technology economically achievable amounts to:

6.1 percnt of the total subcategory energy requirement for crystalline cane sugar refining, and

1.9 percent of the total subcategory energy requirement for liquid cane sugar refining.

Both the removal of solid material from incoming raw cane sugar (in the form of filter cake) and the biological treatment of refining wastes generate solid wastes which must be disposed of at the plant site or to land-fill areas. It should be noted that these are not hazardous materials and that technology exists for the land disposal of these solid wastes.

Spray drift from cooling towers and spray ponds can present problems, particularly in urban areas. This problem can be reduced by proper control and design, and probably can be eliminated for most wind conditions.

(ix) *Economic impact analysis.* The estimated investment costs for 1977 range between 0.9 and 1.9 percent of current fixed investment depending on the type of plant, size, and location. Annual costs for the 1977 standards vary from 0.08 to 0.5 percent of 1972 sales. For the 1983 standards, the required investment ranges from 1.5 to 1.9 percent of fixed investment, and annual costs are between 0.12 and 0.65 percent of 1972 sales.

These costs do not appear to seriously threaten the economic viability of the industry. Although the proposed limitations will have a negligible effect on prices, the 1977 standards could threaten from three to six plants in the industry. These plants represent between six and twelve percent of current industry production. However, looking at the entire sugar processing industry, it is felt that the long-term supply of sugar would not be greatly affected. These potential plant closures should not result in any significant employment or community effects. For 1983 it has been estimated that no additional closures would occur. Furthermore, neither the 1977 nor the 1983 standards are expected to have any noticeable effects on industry growth or the balance of trade.

A report entitled "Development Document for Proposed Effluent Limitations Guidelines and New Source Performance Standards for the CANE SUGAR REFINING Segment of the Sugar Processing Point Source Category" which further describes the analysis undertaken in support of the regulations being proposed herein is available for inspection in the EPA Information Center, Room 227, West Tower, Waterside Mall, Washington, D.C., at all EPA regional offices, and at State water pollution control offices. A supplementary analysis prepared for EPA of the possible economic effects of the proposed regulations is also available for inspection at these locations. Copies of both of these documents are being sent to persons or institutions affected by the proposed regulations, or who have placed themselves on a mailing list for this purpose (see EPA's Advance Notice of Public Review Procedures, 38 FR 21202, August 6, 1973). An additional limited number of copies of both reports are available. Persons wishing to obtain a copy may write the EPA Information Center, Environmental Protection Agency, Washington, D.C. 20460, Attention: Mr. Philip B. Wisman.

(c) *Summary of public participation.* Prior to this publication, the agencies and groups listed below were consulted and given an opportunity to participate in the development of effluent limitations guidelines and standards proposed for the cane sugar refining segment of the sugar processing category. All participating agencies have been informed of project developments. An initial draft of the Development Document was sent to all participants and comments were solicited on that report. The following are the principal agencies and groups consulted: (1) Effluent Standards and Water Quality Information Advisory Committee (established under Section 515 of the Act); (2) all State and U.S. Territory Pollution Control Agencies; (3) U.S. Department of Health, Education, and Welfare; (4) U.S. Department of Commerce; (5) U.S. Department of Agriculture; (6) U.S. Department of the Interior; (7) U.S. Department of the Treasury; (8) Water Resources Council; (9) United States Cane Sugar Refineries Association; (10) USCSRA Task Force for EPA Effluent Guidelines; (11) Hawaiian Sugar Planters Association; (12) American-Florida Sugar Cane League; (13) Puerto Rico Land Administration; (14) Amstar Corporation; (15) Savannah Foods & Industries, Inc.; (16) California & Hawaiian Sugar Co.; (17) North American Sugar Industries Inc.; (18) Imperial Sugar Co.; (19) SuCrest Corporation; (20) Southdown, Inc.; (21) Ohio River Valley Sanitation Commission; (22) New England Interstate Water Pollution Control Commission; (23) Delaware River Basin Commission; (24) Hudson River Sloop Restoration, Inc.; (25) The Conservation Foundation; (26) Environmental Defense Fund, Inc.; (27) Natural Resources Defense Council; (28) Water Pollution Control Federation; (29) National Wildlife Federation; (30) The American Society of Civil Engineers; (31) The American Society of Mechanical Engineers.

The following organizations responded with comments: California Water Resources Control Board; Texas Water Quality Board; State of Pennsylvania, Division of Industrial Wastes and Erosion Control; State of Florida, Department of Pollution Control; Delaware River Basin Commission; U.S. Department of Agriculture; U.S. Department of Health, Education, and Welfare; U.S. Department of the Interior; and the United States Cane Sugar Refineries Association.

The comments were highly variable; the primary issues raised in the development of the proposed effluent limitations guidelines and standards of performance and the treatment of these issues herein are as follows:

(1) A common criticism was that while the report includes a good summary of existing conditions and reaches logical and practical conclusions, the zero discharge of polluted waters to navigable waters is unrealistic for the refining industry as a whole. In particular, those refineries not having available land to totally retain waste waters would be technologically unable to attain the zero discharge limitation. The practicable and available technologies and treatment alternatives were reconsidered and effluent limitations developed which reflect levels of technology which can be achieved by the entire industry. These are based on biological treatment of the waste water streams, the bases being presented in the Development Document. For the purposes of establishing uniform national standards, effluent limitations guidelines have been established based on this information.

(2) The comment was made that further subcategorization of the segment into crystalline versus liquid final product was necessary. This subcategorization was considered and determined to be desirable. The Development Document now reflects the separate subcategorization of these two processing methods. Separate effluent limitations guidelines have been established for each subcategory: Crystalline cane sugar refining and liquid cane sugar refining.

(3) A number of commenters expressed the opinion that because of the variability of processing, waste treatment efficiencies, and sampling results, a necessity exists for the effluent limitations

guidelines to reflect this variability. This has been accomplished by the inclusion in the guidelines of a monthly average and a maximum daily average allowable discharge.

(4) The comment was made that the quality of the raw sugar (raw material) varies with the source, season of the year, cane variety, and agronomic practices. The opinion was expressed that these variations in quality affect the nature of the waste discharged. The available data on raw waste loadings shows no indication that any significant difference exists as a result of any difference in raw material quality.

(5) The statement was made that biological treatment of sugar wastes alone is not a demonstrated treatment technology. The nature of refinery waste is that it is suitable to biological treatment. Sucrose is well known to be highly biodegradable, and substantial BOD5 reductions have been observed in combined factory-refinery impoundage lagoons. The applicability of biological treatment to refinery waste waters has also been well demonstrated by the twelve refineries that discharge process wastes to municipal biological treatment systems, while no refineries currently employ biological treatment in the form of activated sludge or aerated lagoons, these systems are considered to be currently available technology. With proper engineering design and with nutrient addition to the nutrient deficient wastes, these systems can achieve 90 to 95 percent and higher treatment efficiencies for highly organic wastes such as process waste water from cane sugar refineries.

(6) The comment was made that cost information presented in the Development Document was low in terms of dollar values. This information was reviewed and revised. In addition, a model was developed for an average-sized small crystalline refinery to supplement the existing cost information for an average-sized liquid refinery and an average-sized large crystalline refinery. The cost data were derived from actual cost information for existing plants and other cost estimates for equipment, facilities, piping, and other related items associated with pollution control measures.

Interested persons may participate in this rule-making by submitting written comments in triplicate to the EPA Information Center, Environmental Protection Agency, Washington, D.C. 20460, Attention: Mr. Philip B. Wisman. Comments on all aspects of the proposed regulations are solicited. In the event comments are in the nature of criticisms as to the adequacy of data which is available, or which may be relied upon by the Agency, comments should identify and, if possible, provide any additional data which may be available and should indicate why such data is essential to the development of the regulations. In the event comments address the approach taken by the agency in establishing an effluent limitation guideline or standard of performance, EPA solicits suggestions as to what alternative approach should be taken and why and how this alternative better satisfies the detailed requirements of Sections 301, 304(b), 306 and 307 of the Act.

A copy of all public comments will be available for inspection and copying at the EPA Information Center, Room 227, West Tower, Waterside Mall, 401 M Street, SW., Washington D.C. A copy of preliminary draft contractor reports, the Development Document and economic study referred to above and certain supplementary materials supporting the study of the industry concerned will also be maintained at this location for public review and copying. The EPA information regulation, 40 CFR Part 2, provides that a reasonable fee may be charged for copying.

All comments received on or before January 7, 1974, will be considered. Steps previously taken by the Environmental Protection Agency to facilitate public response within this time period are outlined in the advance notice concerning public review procedures published on August 6, 1973 (38 FR 21202).

Dated November 23, 1973.

JOHN QUARLES,
*Acting Administrator.*

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# PART 409—EFFLUENT LIMITATIONS GUIDELINES FOR EXISTING SOURCES AND STANDARDS OF PERFORMANCE AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE SUGAR PROCESSING POINT SOURCE CATEGORY

## Subpart B—Crystalline Cane Sugar Refining Subcategory

Sec.



## Subpart C—Liquid Cane Sugar Refining Subcategory



AUTHORITY: Secs. 301, 304(b) and (c), 306 (b) and 307(c), Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1311, 1314 (b) and (c), 1316(b) and 1317(c); 86 Stat. 816 et seq.; Pub. L. 92-500) (the "Act").

## Subpart B—Crystalline Cane Sugar Refining Subcategory

### § 409.20 Applicability; description of crystalline cane sugar refining subcategory.

The provisions of this subpart are applicable to discharges resulting from the processing of raw sugar into a crystalline refined sugar product.

### § 409.21 Specialized definitions.

For the purpose of this subpart:

(a) The following abbreviations shall have the following meanings: (1) "TSS" shall mean total suspended nonfilterable solids; (2) "kg" shall mean kilogram(s); (3) "kkg" shall mean 1000 kg; (4) "kg/kkg" shall mean kilograms per 1000 kilograms; (5) "BOD5" shall mean five days biochemical oxygen demand; and (6) "lb" shall mean pound(s).

### § 409.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of best practicable control technology currently available by a point source subject to the provisions of this subpart:

| *Effluent characteristic* | *Effluent limitation* |
|---|---|
| BOD5 | Maximum daily average 1.14 kg/kkg of melt (2.28 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.38 kg/kkg of melt (0.76 lb/ton of melt). |
| TSS | Maximum daily average 0.24 kg/kkg of melt (0.48 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.06 kg/kkg of melt (0.12 lb/ton of melt). |
| pH | Within the range of 6.0 to 9.0. |

### § 409.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best available technology economically achievable by a point source subject to the provisions of this subpart:

| *Effluent characteristic* | *Effluent limitation* |
|---|---|
| BOD5 | Maximum daily average 0.12 kg/kkg of melt (0.24 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.04 kg/kgg of melt (0.08 lb/ton of melt). |

| *Effluent characteristic* | *Effluent limitation* |
|---|---|
| TSS | Maximum daily average 0.12 kg/kkg of melt (0.24 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.03 kg/kkg of melt (0.06 lb/ton of melt). |
| pH | Within the range of 6.0 to 9.0. |

§ 409.24 Standards of performance for new sources.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged reflecting the greatest degree of effluent reduction achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants by a new point source subject to the provisions of this subpart:

| *Effluent characteristic* | *Effluent limitation* |
|---|---|
| BOD5 | Maximum daily average 0.12 kg/kgg of melt (0.24 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.04 kg/kgg of melt (0.08 lb/ton of melt). |
| TSS | Maximum daily average 0.12 kg/kkg of melt (0.24 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.03 kg/kkg of melt (0.06 lb/ton of melt). |
| pH | Within the range of 6.0 to 9.0. |

§ 409.25 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act, for a source within the crystalline cane sugar refining subcategory which is an industrial user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to navigable waters); shall be the standard set forth in Part 128 of this chapter, except that for the purposes of this section, § 128.133 of this chapter shall be amended to read as follows: "In addition to the prohibitions set forth in § 128.131 of this chapter, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works by a major contributing industry shall be the standard of performance for new sources specified in § 409.24: *Provided,* That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced for that pollutant."

## Subpart C—Liquid Cane Sugar Refining Subcategory

§ 409.30 Applicability; description of liquid cane sugar refining subcategory.

The provisions of this subpart are applicable to discharges resulting from the processing of raw sugar into a liquid refined sugar product.

§ 409.31 Specialized definitions.

For the purpose of this subpart:

(a) The following abbreviations shall have the following meanings: (1) "TSS" shall mean total suspended nonfilterable solids; (2) "kg" shall mean kilogram(s); (3) "kkg" shall mean 1000 kg; (4) "kg/kkg" shall mean kilograms per 1000 kilograms; (5) "BOD5" shall mean five day biochemical oxygen demand; and (6) "lb" shall mean pound(s).

§ 409.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of best practicable control technology currently available by a point source subject to the provisions of this subpart:

| *Effluent characteristic* | *Effluent limitation* |
|---|---|
| BOD5 | Maximum daily average 0.85 kg/kkg of melt (1.70 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.24 kg/kkg of melt (0.48 lb/ton of melt). |
| TSS | Maximum daily average 0.45 kg/kkg of melt (0.90 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.10 kg/kkg of melt (0.20 lb/ton of melt). |
| pH | Within the range of 6.0 to 9.0. |

§ 409.33 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best available technology economically achievable by a point source subject to the provisions of this subpart:

| *Effluent characteristic* | *Effluent limitation* |
|---|---|
| BOD5 | Maximum daily average 0.21 kg/kkg of melt (0.42 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.06 kg/kkg of melt (0.12 lb/ton of melt). |
| TSS | Maximum daily average 0.14 kg/kkg of melt (0.28 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.03 kg/kkg of melt (0.06 lb/ton of melt). |
| pH | Within the range of 6.0 to 9.0. |

§ 409.34 Standards of performance for new sources.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged reflecting the greatest degree of effluent reduction achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants by a new point source subject to the provisions of this subpart:

| *Effluent characteristic* | *Effluent limitation* |
|---|---|
| BOD5 | Maximum daily average 0.21 kg/kkg of melt (0.42 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.06 kg/kkg of melt (0.12 lb/ton of melt). |
| TSS | Maximum daily average 0.14 kg/kkg of melt (0.28 lb/ton of melt). Maximum average of daily averages for any period of thirty consecutive days 0.03 kg/kkg of melt (0.06 lb/ton of melt). |
| pH | Within the range of 6.0 to 9.0. |

§ 409.35 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act, for a source within the liquid cane sugar refining subcategory which is an industrial user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to navigable waters); shall be the standard set forth in Part 128 of this chapter, except that for the purposes of this section, § 128.133 of this chapter shall be amended to read as follows: "In addition to the prohibitions set forth in § 128.131 of this chapter, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works by a major contributing industry shall be the standard of performance for new sources specified in § 409.34; *provided,* That if, the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall

be correspondingly reduced for that pollutant.

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## [ 40 CFR Part 418 ]

## FERTILIZER MANUFACTURING POINT SOURCE CATEGORY

### Proposed Effluent Limitations Guidelines

Notice is hereby given that effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources set forth in tentative form below are proposed by the Environmental Protection Agency (EPA) for the phosphate subcategory (Subpart A), the ammonia subcategory (Subpart B), the urea subcategory (Subpart C), the ammonium nitrate subcategory (Subpart D) and the nitric acid subcategory (Subpart E) of the fertilizer manufacturing category of point sources pursuant to sections 301, 304 (b) and (c), 306(b) and 307(c) of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1311, 1314 (b) and (c), 1316(b) and 1317(c); 86 Stat. 816 et seq; Pub. L. 92-500) (the "Act").

(a) *Legal authority.*—(1) *Existing point sources.* Section 301(b) of the Act requires the achievement by not later than July 1, 1977, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of the best practicable control technology currently available as defined by the Administrator pursuant to section 304(b) of the Act. Section 301(b) also requires the achievement by not later than July 1, 1983, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of the best available technology economically achievable which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants, as determined in accordance with regulations issued by the Administrator pursuant to section 304(b) of the Act.

Section 304(b) of the Act requires the Administrator to publish regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of the best practicable control technology currently available and the degree of effluent reduction attainable through the application of the best control measures and practices achievable including treatment techniques, process and procedure innovations, operating methods and other alternatives.

The regulations proposed herein set forth effluent limitations guidelines, pursuant to section 304(b) of the Act, for the phosphate subcategory (Subpart A), the ammonia subcategory (Subpart B), the urea subcategory (Subpart C), the ammonium nitrate subcategory (Subpart D), and the nitric acid subcategory (Subpart E) of the fertilizer manufacturing category.

(2) *New sources.* Section 306 of the Act requires the achievement by new sources of a Federal standard of performance providing for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.

Section 306(b)(1)(B) of the Act requires the Administrator to propose regulations establishing Federal standards of performance for categories of new sources included in a list published pursuant to section 306(b)(1)(A) of the Act. The Administrator published in the FEDERAL REGISTER of January 16, 1973, (38 FR 1624) a list of 27 source categories including the fertilizer manufacturing category. The regulations proposed herein set forth the standards of performance applicable to new sources for the phosphate subcategory (Subpart A), the ammonia subcategory (Subpart B), the urea subcategory (Subpart C), the ammonium nitrate subcategory (Subpart D), and the nitric acid subcategory (Subpart E) of the fertilizer manufacturing category.

Section 307(c) of the Act requires the Administrator to promulgate pretreatment standards for new sources at the same time that standards of performance for new sources are promulgated pursuant to section 306. Sections 418.15, 418.25, 418.35, 418.45 and 418.55, proposed below, provide pretreatment standards for new sources within the phosphate subcategory (Subpart A), the ammonia subcategory (Subpart B), the urea subcategory (Subpart C), the ammonium nitrate subcategory (Subpart D) and the nitric acid subcategory (Subpart E) of the fertilizer manufacturing category.

Section 304(c) of the Act requires the Administrator to issue to the States and appropriate water pollution control agencies information on the processes, procedures or operating methods which result in the elimination or reduction of the discharge of pollutants to implement standards of performance under section 306 of the Act. The report or Development Document referred to below provides, pursuant to section 304(c) of the Act, information on such processes, procedures or operating methods.

(b) Summary and basis of proposed effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources.

(1) *General methodology.* The effluent limitations guidelines and standards of performance proposed herein were developed in the following manner. The point source category was first studied for the purpose of determining whether separate limitations and standards are appropriate for different segments within the category. This analysis included a determination of whether differences in raw material used, product produced, manufacturing process employed, age, size, waste water constituents and other factors require development of separate limitations and standards for different segments of the point source category. The raw waste characteristics for each such segment were then identified. This included an analysis of (1) the source, flow and volume of water used in the process employed and the sources of waste and waste waters in the operation; and (2) the constituents of all waste water. The constituents of the waste waters which should be subject to effluent limitations guidelines and standards of performance were identified.

The control and treatment technologies existing within each segment were identified. This included an identification of each distinct control and treatment technology, including both in-plant and end-of-process technologies, which are existent or capable of being designed for each segment. It also included an identification of, in terms of the amounts of constituents and the chemical, physical, and biological characteristics of pollutants, the effluent level resulting from the application of each of the technologies. The problems, limitations and reliability of each treatment and control technology were also identified. In addition, the nonwater quality environmental impact, such as the effects of the application of such technologies upon other pollution problems, including air, solid waste, noise and radiation were identified. The energy requirements of each control and treatment technology were determined as well as the cost of the application of such technologies.

The information, as outlined above, was then evaluated in order to determine what levels of technology constitute the "best practicable control technology currently available," "the best available technology economically achievable" and the "best available demonstrated control technology, processes, operating methods, or other alternatives." In identifying such technologies, various factors were considered. These included the total cost of application of technology in relation to the effluent application, the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, nonwater quality environmental impact (including energy requirements) and other factors.

The data upon which the above analysis was performed included EPA permit applications, EPA sampling and inspections, consultant reports, and industry submissions.

The pretreatment standards proposed herein are intended to be complementary to the pretreatment standards proposed for existing sources under 40 CFR Part 128. The basis for such standards is set forth in the FEDERAL REGISTER of July 19, 1973, 38 FR 19236. The provisions of Part 128 are equally applicable to sources which would constitute "new sources," under section 306 if they were to discharge pollutants directly to navigable waters, except for § 128.133. That section provides a pretreatment standard for "incompatible pollutants" which requires application of the "best practicable control technology currently available," subject to an adjustment for