

the City of Lawrence, and the Towns of Andover, Methuen, and North Andover. Sources in these areas remain subject to the previously approved requirements of Regulation 5.1, which stipulate that sources are permitted to burn fossil fuel having a sulfur content not in excess of 0.55 pounds per million Btu heat release potential (approximately equivalent to 1.0 percent sulfur content residual fuel oil by weight).

Haverhill Paperboard Corporation, Haverhill, Massachusetts was not approved to implement the provisions of the revision because violations of the NAAQS for SO₂ are predicted if the plant were to burn 2.2 percent sulfur content fuel oil. However, on December 30, 1976 the Massachusetts Department submitted additional conditions and technical information, and an EPA review of these data shows that the plant could burn fossil fuel having a sulfur content not in excess of 0.75 pounds per million Btu heat release potential (approximately equivalent to 1.4 percent sulfur content residual fuel oil by weight) without violating the NAAQS for SO₂. On April 13, 1977 (42 FR 19359) the Regional Administrator published a Notice of Proposed Rulemaking indicating that he was considering approval of Haverhill Paperboard Corporation to burn 1.4 percent sulfur content fuel oil. Haverhill Paperboard Corporation is required to apply for and receive written approval from the Massachusetts Department before burning the specified higher sulfur content fuel, and will be required to conform to all other provisions of the revised Regulation 5.1.

No comments were received during the 30-day comment period.

After evaluation of the State's submittal, the Administrator has determined that the Massachusetts revision meets the requirements of the Clean Air Act and 40 CFR Part 51. Accordingly, this revision is approved as a revision to the Massachusetts Implementation Plan.

(Sec. 110(a) of the Clean Air Act, as amended, 42 U.S.C. § 1857c-5(a).)

Dated: July 5, 1977.

DOUGLAS M. COSTLE,
Administrator.

Part 52 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

SUBPART W—MASSACHUSETTS

1. Section 52.1120(c), paragraph (8) is revised to read as follows:

§ 52.1120 Identification of Plan.

(c) The plan revisions listed below were submitted on the dates specified.

(8) A revision to Regulation 5.1, Sulfur Content of Fuels and Control Thereof, for the Merrimack Valley Air Pollution Control District, submitted on January 28, 1976, and additional technical information pertinent to the Haverhill Paperboard Corporation, Haverhill, Massachusetts, submitted on December 30, 1976,

by the Secretary of Environmental Affairs.

2. In § 52.1126, paragraph (e) is revised to read as follows:

§ 52.1126 Control strategy: Sulfur oxides.

(e) Massachusetts Regulation 5.1 for the Merrimack Valley Air Pollution Control District, excluding the City of Lawrence and the Towns of Andover, Methuen, and North Andover, submitted on January 28, 1976, is approved except as to the following source which is limited to burning fossil fuel having a sulfur content not in excess of 0.75 lb. per million Btu heat release potential (approximately equivalent to 1.4 percent sulfur content residual fuel oil by weight):

Haverhill Paperboard Corporation, Haverhill, Massachusetts.

[FR Doc.77-19980 Filed 7-11-77;8:45 am]

SUBCHAPTER N—EFFLUENT GUIDELINES AND STANDARDS

PART 413—ELECTROPLATING POINT SOURCE CATEGORY

Pretreatment Standards For Existing Sources; Interim Final Regulations

AGENCY: Environmental Protection Agency.

ACTION: Interim final regulation.

SUMMARY: These regulations limit the concentrations of certain pollutants which may be discharged into publicly owned treatment works by electroplating operations. The purpose is to regulate those pollutants which interfere with, pass through, or are otherwise incompatible with the operation of treatment works. The Federal Water Pollution Control Act requires these regulations to be issued. The effect of these regulations will be to require pretreatment of waste water by operations which do electroplating and which discharge waste water into publicly owned treatment works.

EFFECTIVE DATE: July 12, 1977.

ADDRESS: Send comments to: Environmental Protection Agency, 401 M St., SW., Washington, D.C. 20460, Attention: Distribution Officer, WH-552.

FOR FURTHER INFORMATION CONTACT:

Harold B. Coughlin, Effluent Guidelines Division, (WH-552) Environmental Protection Agency, 401 M St. SW., Washington, D.C. 20460. (202) 426-2560.

SUPPLEMENTARY INFORMATION:

BACKGROUND

On March 28, 1974, EPA promulgated a regulation adding Part 413 to Title 40 of the Code of Federal Regulations (39 FR 11510). That regulation (the "Phase I regulation") with subsequent amendments (the "Phase II regulation") (40 FR 18130, April 24, 1975) established effluent limitations guidelines for existing sources in five subcategories and standards of performance and pretreatment stand-

ards for new sources in one subcategory. Proposed revisions and additions setting forth effluent limitations guidelines based on "best available technology economically achievable" (BAT), pretreatment standards for new and existing sources, and standards of performance for new sources were also published for five subcategories (39 FR 11515, March 28, 1974 and 40 FR 18140, April 24, 1975). The history of rulemaking for the category by the Agency prior to December 1976 is described in greater detail in 41 FR 53018 (December 3, 1976).

On December 3, 1976, the Agency suspended the promulgated effluent limitations guidelines based on "best practicable control technology currently available" (BPT). The effluent limitations guidelines based on "best available technology economically achievable" (BAT), new source performance standards, and pretreatment standards for Subpart A of the Electroplating Point Source Category (41 FR 53081) were revoked. The Agency also withdrew its notices of proposed rulemaking for the category (41 FR 53070). The Agency took this action for the purpose of reevaluating the appropriateness of limitations and standards earlier established in light of new data and further analysis.

The pretreatment standards for existing sources which were originally proposed were based on the data and analysis relied upon in promulgating the BPT regulations. The effort to conduct new data gathering and analyses as a basis for reevaluation of the BPT regulations was thus expected to encompass the proposed pretreatment regulations as well. The interim final regulations set forth below take into account the additional study which has been conducted over the past several months.

Pretreatment standards are established for pollutants discharged into publicly owned treatment works (POTW) from existing sources which fall within the following subcategories of the Electroplating Point Source Category: Electroplating of Common Metals Subcategory (Subpart A); Electroplating of Precious Metals Subcategory (Subpart B); Anodizing Subcategory (Subpart D); Coatings Subcategory (Subpart E); Chemical Etching and Milling Subcategory (Subpart F); Electroless Plating (Subpart G) and Printed Circuit Boards (Subpart H). Subparts G and H are new subcategories which are established by this regulation. The content of the standards is discussed in detail below under Summary of Standards.

LEGAL AUTHORITY

These regulations are promulgated pursuant to section 307(b) of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1317(b); 86 Stat. 816 et seq.; Pub. L. 92-500) (the Act), which requires the establishment of pretreatment standards for pollutants introduced into publicly owned treatment works (POTW).

SUMMARY OF STANDARDS

These regulations establish two sets of pretreatment requirements for the

subcategories mentioned. The first set, the "prohibited discharge" standards, are designed to prevent inhibition of, or interference with, publicly owned treatment works, by prohibiting the discharge of pollutants of a nature or in a quantity that would endanger the mechanical or hydraulic integrity of the works. Except for minor changes, these prohibited discharge standards are identical to the prohibitions contained in the general pretreatment regulation now found at 40 CFR 128.131.

The second set of standards, known as "categorical" pretreatment standards, contain specific numerical limitations based on an evaluation of available technologies in a particular industrial subcategory. The specific numerical limitations are arrived at separately for each subcategory, and are imposed on pollutants which may interfere with, pass through, or otherwise be incompatible with publicly owned treatment works. For plants with an average daily flow of 40,000 gallons or more, the present regulations specifically limit the concentrations of total cyanide, amenable cyanide, hexavalent chromium, and the pH range for wastes discharged into a POTW. For plants with an average daily process waste water flow of less than 40,000 gallons, limitations on only amenable cyanide are imposed at this time, due to preliminary indications that these plants might experience relatively severe economic problems if more stringent standards were established. Requiring treatment of cyanide is the logical first step, since destruction of cyanide is a prerequisite for any subsequent removal of metals.

However, the Agency in the near future will issue in proposed or interim form additional limitations for some or all portions of the industry, based on further analysis. First, the Agency will issue limitations on total cyanide, hexavalent chromium, and pH for some or all of the plants which will be subject only to limitations on amenable cyanide under the regulations which are currently being promulgated. Secondly, the Agency will issue limitations on metals for certain portions of the industry. As discussed below, the reasons for the Agency's decision to issue regulations in stages are closely related to the ongoing effort to develop an accurate economic picture of this industry. Decisions regarding the appropriate stringency and scope of the additional standards will depend upon the outcome of current efforts to characterize the most vulnerable parts of the industry and to determine the possible economic impacts of various levels of regulations.

Because the present interim final regulations provide for up to three years for compliance (see Compliance Date, below), the issuance of regulations in two stages should not materially affect the process of planning for and installing the necessary treatment technology. The time necessary for compliance will again be considered when new regulations are promulgated and when existing regulations are finalized.

The Agency is also in the process of formulating new BPT regulations as well as standards of performance and pretreatment standards for new sources. The Agency expects to issue these regulations in the near future.

For the purpose of clarity, the subcategories affected by the present regulations are exempted from 40 CFR Part 128. The provisions of the present regulation overlap considerably with the language of 40 CFR Part 128. 40 CFR Part 128 was proposed on July 19, 1973 (38 FR 19236), and published in final form in November 1973 (38 FR 30932). It limits the discharge of pollutants which pass through or interfere with the operation of publicly owned treatment works, but it does not set numerical limitations or explicitly list particular pollutants to be regulated. The provisions of 40 CFR Part 128 have sometimes been a source of confusion in the past. New general pretreatment regulations have been proposed (42 FR 6476, February 2, 1977) which will revoke and replace 40 CFR Part 128 upon promulgation. Therefore, the general pretreatment requirements set forth in 40 CFR Part 128 are superseded with respect to the subcategories governed by the present regulations. All pretreatment requirements currently applicable to the subcategories listed are included in the regulations set forth below. When the new general pretreatment regulations are promulgated, these standards will be reviewed for consistency with the new general policies.

TECHNICAL BASIS FOR STANDARDS

The technical analysis upon which these regulations are based included an identification of the principal waste water pollutants generated by this industry, a consideration of the extent to which these pollutants interfere with or pass through POTW, and a study of the various pretreatment technologies which are available for controlling the discharge of such pollutants. Information gathered in an ongoing technical study of direct and indirect dischargers for this industry was used as the primary basis for assessing available pretreatment technologies. Additionally, data gathered earlier in support of the direct discharge limitations under sections 301 and 304 as well as data submitted by the industry were used. Appendix A summarizes these data and the analysis used in developing these limitations. The details of these studies are set forth in the "Pretreatment Report Supplementing the Interim Final Development Documents for the Electroplating Point Source Category", the "Development Document for Interim Final Effluent Limitations Guidelines for the Common and Precious Metals, and Metal Finishing Segments of the Electroplating Point Source Category", and the "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Copper, Nickel, Chromium and Zinc Segment of the Electroplating Point Source Category". The Agency also relied upon a report entitled "A Survey of Three Ex-

emplary Electroplating Waste Treatment Systems".

ECONOMIC IMPACT ANALYSIS

In establishing the present regulations, the Agency has studied and taken into account the potential economic impact on the industry of implementing the standards. The analyses which have been undertaken are described in Appendix A. The details of the economic studies are set forth in a report entitled "Preliminary Economic Analysis of Interim Final Pretreatment Standards for the Electroplating Point Source Category, May, 1977."

Total investment costs for the metal finishing job shops to comply with the standards are estimated to be 38 million dollars. Annualized compliance costs are estimated to be 15 million dollars per year including both capital charges and operating and maintenance costs. It is estimated that 235 metal finishing job shops representing 5,900 jobs may close as a result of the standards. This represents eight percent of the firms and nine percent of the employment in the job shop sector of the industry.

Executive Orders 11821 and 11949, and OMB Circular A-107 require that major proposals for legislation and promulgation of regulations and rules by agencies of the executive branch be accompanied by a statement certifying that the inflationary impact of the proposal has been evaluated. It is hereby certified that the inflationary impact of these standards has been evaluated in the economic impact analysis.

FUTURE REGULATIONS

The present standards represent a minimal level of control which leaves unregulated many harmful pollutants which pass through or interfere with the operation of a POTW or have deleterious effects on the sludge resulting from the operation of such treatment works. The Agency is considering establishing regulations in addition to those which are now being promulgated. In particular, the Agency has considered the need for limitations on metals, as well as limitations on pH, total cyanide, and hexavalent chromium for those plants which are currently subject only to limitations on amenable cyanide. The harmfulness of such pollutants is known, as is the technology for controlling these discharges. However, the preliminary results of an economic analysis indicate that the closure rates for implementation of the full range of limitations by all plants may be high. Consequently, limitations on the full set of parameters are not being promulgated at this time. The Agency, however, will issue further limitations for some or all portions of the industry in the near future, after additional economic analysis has been completed.

Particular attention is being devoted to the representativeness of the data base, the accuracy of the financial information, the feasibility of alternative sources of capital, and the appropriateness of the compliance cost estimates. The Agency hopes to have a more accurate

economic picture of the industry soon, following further evaluation of the data base, review of the costs which were used, and "reality testing" of the economic model by comparing results with the actual experience of municipalities which have enforced regulations similar to those under consideration. In addition, the Agency is currently studying the industry in an effort to more precisely characterize the most vulnerable portions of the industry and to define those groups of plants which are responsible for the most significant environmental harm. Specific factors under consideration include process mix, flow, sales, number of metal finishing employees, total number of employees, and location. Identifiable differences between captive and job shops will also be considered. The Agency will be looking for factors which might provide the basis for formulating a spectrum of standards for different groups of plants, or for establishing variances or exemptions to a central set of standards.

Comments from the public are particularly solicited. The Agency will issue additional limitations in approximately two months from the date of this promulgation.

AVAILABILITY OF DOCUMENTS

The EPA technical and economic reports mentioned above are available for inspection at the EPA Public Information Reference Unit, Room 2922 (EPA Library), Waterside Mall, 401 M St. SW., Washington, D.C. 20460, at all EPA Regional Offices and at State Water Pollution Control Offices.

Copies of the supplemental EPA reports described are being sent to persons or institutions affected by the regulation 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). A limited number of additional copies are available. Persons wishing to obtain a copy may write the Environmental Protection Agency, Effluent Guidelines Division, Washington, D.C. 20460, Attention: Distribution Officer, WH-552.

When this regulation is promulgated in final rather than interim form, revised copies of the technical documentation will be available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Copies of the economic analysis document will be available through the National Technical Information Service, Springfield, Virginia 22151.

PUBLIC PARTICIPATION

Numerous agencies and groups have participated at various stages in the development of pretreatment regulations for existing sources in this industry. Comments were solicited when proposed pretreatment standards were issued on March 28, 1974 (Phase I) and on April 24, 1975 (Phase II). Many agencies and groups were also consulted in the course of developing the proposed regulations. Similar opportunities for public participation were also provided in the

related development of Phase I and Phase II regulations based upon best practicable control technology currently available. Furthermore, a public hearing on pretreatment standards for the electroplating industry was held on June 10, 1974. On December 3, 1976, the Agency announced that the regulations which had been previously proposed or promulgated would be reevaluated. Since that time the Agency has reconsidered the formulation of pretreatment standards and other regulations in light of all comments which have been received. The Agency has also continued to consult with, and receive comments from, interested agencies and groups. Furthermore, at the request of the National Association of Metal Finishers, the Agency has released split samples for duplicate analysis as well as additional data on the electroplating plants that were selected for sampling and study as a basis for reevaluating the regulations. A summary of public participation in this rule-making, public comments, and the Agency's response to major issues which have been raised is contained in Appendix B of this preamble.

EFFECTIVE DATE

The Agency is subject to an order of the United States District Court for the District of Columbia entered in "Natural Resources Defense Council (NRDC) v EPA," 8 E.R.C. 2120 (D.D.C. 1976) which requires the promulgation of pretreatment standards for this industry category no later than May 15, 1977. The court order which was entered by the United States Court for the District of Columbia on June 8, 1976, following a consent agreement among the parties to four lawsuits, placed EPA on rigid timetables for the preparation and publication of water pollution regulations for 21 broad industry categories and 65 families of water pollutants.

It has not been practical to develop and republish regulations for this category in a second proposed form and to provide a 30-day comment period within the time constraints imposed by the court order referred to above. Accordingly, the Agency has determined pursuant to 5 U.S.C. 553(b) that notice and comment on the interim final regulations prior to promulgation would be impractical and contrary to the public interest. The effective date shall therefore be the date of publication of these regulations.

COMPLIANCE DATE

Section 301 of the Act anticipates that pretreatment standards for existing sources would be established and compliance would be required before July 1, 1977, while section 307(b) specifies "a time for compliance not to exceed three years from the date of promulgation" of the standard. In view of this conflict of statutory language and the fact that the pretreatment standards are only now being promulgated, the Agency believes that the compliance deadline as set forth in section 307(b) should apply. The time for compliance with the categorical pre-

treatment standards will be not later than three years from the effective date. However, a Regional Administrator or local or state authority should establish a more expeditious compliance date on an individual basis where it is appropriate. Compliance with the prohibited discharge standards is required immediately upon the effective date of these regulations since these standards are essentially the same as 40 CFR 128.131 and since the deadline for compliance with 40 CFR 128.131 has passed.

OPPORTUNITY FOR PUBLIC COMMENT

Interested persons are encouraged to submit written comments. Comments should be submitted in triplicate to the Environmental Protection Agency, 401 M St., SW., Washington, D.C. 20460, Attention: Distribution Officer, WH-552. Comments on all aspects of the regulation are solicited. In the event comments are in the nature of criticisms as to the adequacy of data which are 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 suggest amendment or modification of the regulation. In the event comments address the approach taken by the Agency in establishing pretreatment standards, EPA solicits suggestions as to what alternative approach should be taken and why and how this alternative better satisfies the detailed requirements of section 307(b) of the Act. The Agency particularly solicits comments on other technologies for treating metal finishing effluents. All comments received on or before September 12, 1977, will be considered.

A copy of all public comments will be available for inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library), Waterside Mall, 401 M St. SW., Washington, D.C. 20460. A copy of the technical studies and economic studies referred to above, and certain supplementary materials will 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.

An opportunity for public hearing will be provided shortly after the close of the comment period. The place and time will be announced in a later notice.

SMALL BUSINESS ADMINISTRATION LOANS

Section 8 of the FWPCA authorizes the Small Business Administration, through its economic disaster loan program, to make loans to assist any small business concern in effecting additions to or alteration in equipment, facilities, or methods of operation so as to meet water pollution control requirements under the FWPCA, if the concern is likely to suffer a substantial economic injury without such assistance.

For further details on this Federal loan program write to EPA, Office of Analysis and Evaluation, WH-586, 401 M St. SW., Washington, D.C. 20460.

In consideration of the foregoing, 40 CFR Part 413 is hereby amended as set forth below.

Dated: June 30, 1977.

BARBARA BLUM,
Acting Administrator.

APPENDIX A—TECHNICAL SUMMARY AND BASIS FOR REGULATIONS

This Appendix summarizes the basis for interim final pretreatment standards for existing sources in the electroplating point source category.

(1) *General methodology.* The pretreatment standards set forth herein were developed in the following manner: The point source category was first studied for the purpose of determining whether separate standards are appropriate for different segments within the category. The raw waste characteristics for each such segment were then identified. This included an analysis of the source, flow and volume of water used in the process employed, the sources of waste and waste waters in the operation and the constituents of all waste water. The compatibility of each raw waste characteristic with municipal treatment works was then considered. Waste water constituents posing pass-through or interference problems for POTW were identified.

The control and treatment technologies existing within each segment were identified. This included identification of each distinct control and treatment technology, including both in-plant and end-of-process technologies, which exist or are capable of being designed for each segment. It also included identification of the effluent level resulting from the application of each of the technologies in terms of the amount of constituents and the chemical, physical, and biological characteristics of pollutants. 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 reflected the application of appropriate pretreatment technologies. In identifying such technologies, various factors were considered. These included the total cost of application of technology, the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, non-water 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.

(2) *Summary of technical analyses—(1) Categorization.* Previous regulations for the electroplating point source category were subcategorized on the basis of process considerations. Electroplating was separated from metal finishing processes because electroplating always requires the action of an electrical current to deposit a metallic coating on the basis material acting as an electrode. Metal finishing processes may or may not require a current and may or may not deposit a metallic coat on the basis material. The processes of anodizing, coatings, chemical etching and milling are sufficiently different so as to warrant separate subcate-

gories. Anodizing, usually performed on aluminum, converts the surface of the object to the metal oxide. The object serves as the anode. Coatings refer principally to chromating, phosphating, and immersion plating. Each of these processes applies a thin protective coat on the treated object. An electrical current may or may not be applied. Chemical etching and milling involve the dissolution of the basis material.

In restudying the industry for the purpose of establishing pretreatment regulations, it was decided that printed circuit board manufacturing and electroless plating also warrant separate subcategorization because of the unique mixture of electrolytic and electroless plating operations found in these processes. Additionally, these processes produce pollutants which may render normal waste treatment techniques ineffective if proper safeguards are ignored.

Finally, the foregoing subcategorization is consistent with the existing structure of the industry, each subcategory tending to be oriented toward individual markets which do not overlap significantly.

(ii) *Origins and characteristics of waste water pollutants.* Waste water from this industry comes from the pretreatment and post treatment operations as well as the actual metal finishing and electroplating steps. The known significant pollutants and pollutant properties from these operations include pH, total suspended solids, oil and grease, cyanide, chromium, copper, nickel, zinc, cadmium, lead, tin, iron, aluminum, fluoride, phosphorus, silver, palladium, and various precious metals and organic compounds. The present study indicates that many of these pollutants may occur together and that their individual concentrations may exceed 100 mg/l.

Waste water results from the following operations in this industry: (1) Rinsing to remove films of processing solution from the surface of work pieces at the site of each operation, (2) rinsing away spills, (3) washing the air that passes through ventilation ducts so as to remove spray from the air before it is exhausted, (4) dumps of spent solutions, (5) washing of equipment, and (6) cooling water used in heat exchangers to cool solutions in metal finishing processes. Approximately 90 percent of the water consumed is in rinsing. That used as cooling water is usually recycled for rinsing. Operating solutions to be dumped are slowly trickled into the rinse waters prior to treatment.

Many of the pollutants which are generated pose significant interference or pass through problems at POTW. The problems posed by the parameters affected by the present regulations are as follows:

(a) *Cyanide.* Cyanides are widely used in the electroplating industry and are among the most toxic of pollutants commonly discharged in industrial waste waters. Cyanide may exist as free cyanide as hydrocyanic acid, or in a complex, bound in varying degree to metals which are also present in wastes from this industry.

Of these three forms, hydrogen cyanide (HCN) is probably the most acutely lethal compound. HCN dissociates in water to hydrogen ions and cyanide ions in a pH dependent reaction. The cyanide ion is less acutely lethal than HCN. The relationship of pH to HCN shows that as the pH is lowered to below 7 there is less than 1 percent of the cyanide molecules in the form of the CN ion and the rest is present as HCN. When the pH is increased to 8, 9, and 10, the percentage of cyanide present as CN ions is 0.7, 42, and 87 percent, respectively. The toxicity of cyanides is increased by increases in temperature and reductions in oxygen tensions. A temperature rise of 10°C produces a two to

threefold increase in the rate of the lethal action of cyanide.

In the body, the CN ion, except for a small portion exhaled, is rapidly changed into a relatively non-toxic complex (thiocyanate) in the liver and eliminated in the urine. The safe ingested limit of cyanide has been estimated at amounts less than 18 mg/day, part of which comes from normal environmental and industrial exposure. The average fatal dose of HCN by ingestion by man is 50 to 60 mg. The U.S. Public Health Service recommended limit for drinking water was 0.1 mg/l, with a mandatory maximum of 0.2 mg/l; however, the National Interim Primary Drinking Water Regulations do not limit cyanide.

Cyanides are more toxic to fish than to lower aquatic organisms such as midge larval, crustaceans, and mussels. Toxicity to fish is a function of chemical form and concentration, and is influenced by the rate of metabolism (temperature), the level of dissolved oxygen, and pH. In the laboratory free cyanide concentrations ranging from 0.05 to 0.15 mg/l have been proven to be fatal to sensitive fish species including trout, blue gills, and fathead minnows. Levels above 0.2 mg/l are rapidly fatal for many species. Long term sublethal concentrations of cyanide as low as 0.01 mg/l have been shown to affect the ability of fish to function normally, e.g., reproduce, grow, move freely.

Cyanide forms complexes with metal ions present in waste water. All these complexes exist in equilibrium with HCN. Therefore, the concentration of free cyanide present is dependent on the pH of the waste and the relative strength of the metal-cyanide complex. The cyanide complexes of zinc, cadmium, and copper may dissociate to release free cyanide. Also, where these complexes occur together, synergistic effects have been demonstrated. Zinc, copper, and cadmium cyanide are more toxic than an equal concentration of sodium cyanide.

Iron cyanides are tightly bound complexes and are not extremely toxic. However, iron cyanide readily dissociates when exposed to sunlight. This poses problems for cyanide discharges into a POTW. Ferric chloride is commonly added in a POTW as part of the treatment system. Cyanide in the waste water will readily complex with the iron, remain dissolved, pass through the POTW, and subsequently photodecompose, releasing cyanide to the ambient waters.

A second pass-through problem related to cyanide is caused by chlorination of waste waters by the POTW for the purpose of disinfection. Chlorination has been found to convert residual cyanide into highly toxic cyanogen chloride, which is subsequently released to the environment.

Finally, cyanide can also interfere with the operation of a POTW. Threshold inhibiting concentrations for POTW range from 0.1–5.0 mg/l. Inhibition of activated sludge units has been reported between 0.5–5.0 mg/l. Slug discharges of cyanide have caused complete failure of some POTW.

At lower concentrations, cyanide is partially biodegradable. However, POTW treatment efficiency is highly variable, with some plants reporting less than 30 percent removal.

(b) *Hexavalent chromium.* Chromium exists in two states, Cr(III) and Cr(VI), and it is the latter form that is more toxic. Hexavalent chromium is an irritant, and corrosive, and may be absorbed by inhalation, ingestion, and through the skin. It causes skin ulcers, is a skin sensitizer, can have corrosive effects on the intestinal tract and cause inflammation of the kidneys.

For fish, the range of 96-hour LC50 values is 10–300 mg/l, including 17.6 mg/l for fathead minnows and 118 mg/l for bluegill. Alevin and juvenile chinook salmon, and

rainbow trout are more sensitive to chromium than adults. Concentrations of 0.01–0.20 mg/l Cr_{VI} increase alevin mortality and retard growth temporarily. Chromium stress during maturation and spawning is suspected of causing susceptibility to infections. Freshwater zooplankton studies have shown the water flea to be the most sensitive invertebrate to Cr_{VI}, with a 48-hour LC₅₀ of 0.022 mg/l. It appears that adult fish are relatively tolerant of Cr_{VI}, but that both freshwater and marine invertebrates are quite sensitive. A Cr_{VI} level of 0.001–0.002 mg/l is a safe level for invertebrates and fish. The National Interim Primary Drinking Water Regulations limit chromium in drinking water to not more than 0.05 mg/l.

Cr_{VI} is toxic to activated sludge. Threshold inhibitory concentrations range from 1–10 mg/l. Inhibition of activated sludge units has been reported between 5–10 mg/l. In many large cities industrial sources are responsible for 72–100 percent of influent chromium concentrations. Current local sewer ordinance limitations range from 0.05–10 mg/l.

Chromium is moderately removed by POTW. There is a great deal of variability among POTW; the average is around 50 percent removal, but for some systems it is as low as 14 percent.

The chromium which does not pass through a POTW is deposited in the POTW sludge. Concentrations of chromium in sludge varied in one study from 20–10,000 mg/kg, with over half of the measurements less than 100 mg/kg. Sludge in Buffalo, New York had concentrations of 2540 mg/kg before implementation of pretreatment standards, and 1040 mg/kg after the regulations were put into effect. The chromium content in municipal sludge can limit the use of the sludge as a soil conditioner. Chromium is mobile in soil, and may readily leach from land fill, or filter into a water supply. This is a significant problem since a large portion of the Nation's water supply comes from underground sources. One Canadian study compared levels of chromium in soil, and vegetation before and after application of sludge, and found that the concentrations in the soil and the plants increased 50 percent after the sludge use. In some agricultural crops chromium can cause reduced growth or death of the crop. Adverse effects of low concentrations of chromium on corn, tobacco and sugar beets have been documented.

(c) *pH*. Extremes of pH or rapid pH changes can exert stress conditions or kill biological life outright. At a pH greater than 10, disruption of a biological treatment system is likely. At a low pH, corrosion of sewer pipes may be caused. Furthermore, at a pH below 7.5, only small amounts of metals are converted to hydroxide form. Since soluble metals tend to pass through POTW untreated, whereas metal hydroxides will tend to be removed in primary clarifiers, pH levels have an important indirect effect on the significance of metal pass-through problems.

(iv) *Treatment and control technology*. Waste water treatment and control technologies have been studied for this industry to determine the best practicable pretreatment technologies. This study showed that although there are differences between subcategories in the types and quantities of wastes generated, the same general treatment technologies are available to this entire industrial segment.

Electroplating wastes are typically treated by a number of sequential control techniques. General practice includes segregation and individual treatment of the wastes containing cyanide and chrome followed by the removal of metals by pH adjustment and clarification or filtration in a common treatment system. As discussed elsewhere in the

preamble, this regulation does not require removal of the metals. Therefore, the present pretreatment limitations for this industry are based on the following control techniques: The reduction of hexavalent chromium to trivalent chromium, (2) oxidation of cyanides, and (3) pH adjustment to the range of 7.5 to 10. The use of the technologies discussed below formed the basis of the pretreatment standards which are being established. However, this does not preclude the use of other waste water treatment techniques which provide equivalent or better levels of treatment. Alternate treatment technologies are discussed in the development document.

(a) *Chrome reduction*. Reduction of hexavalent chrome to trivalent chrome is widely practiced within the industry and is typically done using sulfur dioxide at a pH of approximately 2.

Seventy-three plants sampled by the Agency had operating chrome reduction facilities. The number of data points from each plant varied from one to one hundred and thirty-three. The data from each plant were averaged into a single number so that all plants were considered equally. Approximately 60 percent of these plants already meet the limitations specified by this regulation.

(b) *Cyanide destruction*. Cyanide must be treated before treatment for metals removal may take place. If this is not done soluble metal cyanide complexes rather than insoluble metal hydroxides will be formed.

Cyanide destruction is generally done in a two-stage oxidation treatment system using chlorine or hypochlorite. The first stage of the reaction oxidizes cyanide to cyanate, and the second, cyanate to nitrogen and carbon dioxide. The amenable cyanide limitations set by this regulation may be achieved by a single stage treatment system that completes the first step in this reaction.

The total cyanide limitation set by this regulation is based on two stage treatment and careful separation of iron, nickel, and certain other metal bearing wastes from the cyanide wastes in order to avoid formation of metal cyanide complexes that are untreatable by established waste treatment technologies. This latter segregation practice is standard good housekeeping procedure and is well established within the industry.

Eighty-five plants sampled during this study had cyanide oxidation facilities. The data from each plant were treated in the same manner as the data on chrome reduction. The limitations set by this regulation based on cyanide oxidation are currently achieved by approximately 60 percent of the data base.

(c) *pH adjustment*. pH control is an established and readily available control technique which was practiced by all of the plants sampled in this study. Typically, the pH is adjusted by adding an acid, such as hydrochloric or sulfuric, or base (lime or caustic) to the waste stream in an agitated tank. pH control is achieved by mixing sufficient amounts of acid or base to the waste to maintain the pH in the desired range.

(iv) *Cost estimates for control of waste water pollutants*. Cost information was obtained from industry, from engineering firms, equipment suppliers, government sources, and available literature whenever possible. Costs based on actual industrial installations or engineering estimates for projected facilities as supplied by contributing companies were also used.

The foregoing cost information was used to develop and verify a costing program which was then used to cost treatment plants for electroplating establishments of various sizes and compositions. Eighty-one model plants were used to characterize the treatment costs associated with this industry.

These models and a summary of the costing methodology are available for public inspection at the EPA Public Information Reference Unit, Room 2922, (EPA Library), Waterside Mall, 401 M Street SW., Washington, D.C. 20460.

(v) *Energy requirements and nonwater quality environment impacts*. The energy costs related to the implementation of these regulations are generally limited to electricity required for liquid transfer pumps and agitator motors.

The major nonwater quality consideration which may be associated with these pretreatment standards is the generation and release to the POTW of metal bearing solid wastes. Use of pH adjustment without metals removal by the industrial user generally result in incidental removal of some fraction of the metals at the POTW. Contamination of the sludge from the POTW with these wastes can limit the sludge disposal alternatives available to the POTW, increase the cost of adequate sludge disposal facilities and prevent the use of the sludge for beneficial purposes such as agriculture. For these reasons, as discussed elsewhere in the preamble, the Agency is currently considering additional limitations which would require removal of these wastes by the industrial user.

Under the present regulations, sludge disposal by the industrial user should not pose a problem.

No significant increase in noise, radiation, air pollution or thermal pollution will result from the implementation of these pretreatment standards.

(3) *Economic summary*. This section summarizes the economic and inflationary impacts of the pretreatment standards for the Electroplating Point Source Category. Executive Orders 11821 and 11949, and OMB Circular A-107 require that major proposals for legislation and promulgation of regulations and rules by agencies of the executive branch be accompanied by a statement certifying that the inflationary impact of the proposal has been evaluated. The inflationary impact of these standards has been evaluated in an economic impact analysis, the results of which are summarized below.

The standards directly affect two kinds of firms: (1) independent establishments performing processes covered by these standards as their primary line of business, and (2) captive establishments performing regulated processes as part of the manufacture of some other product.

The standards are expected to have adverse economic impacts on some independent operations. Although captive establishments were not analyzed in great detail, it is anticipated that the impact on them will be less than on independent operations. The adverse impacts on independent shops are primarily due to capital availability problems that the captives are expected to have to a much lesser degree. In addition, the compliance cost a captive tends to be a much smaller fraction of production cost since it is being spread over more production operations. The specifics of the following discussion refer only to metal finishing job shops.

Total investment costs for the metal finishing job shops to comply with the standards are estimated to be 38 million dollars. This estimate allows for the fact that some jobs have treatment facilities already in place. Annualized compliance costs are estimated to be 15 million dollars per year. This includes both capital charges and operations and maintenance costs.

An estimated 235 job shops representing 5,900 jobs may close as a result of the pretreatment standards. This represents eight percent of the job shops and nine percent of the workers in the job shop sector of the industry.

Prices are expected to rise to account for increased compliance costs. The price of the regulated metal finishing services is expected to rise by an average of between 1.2 and 4.2 percent. Profitability and owners' compensation are expected to drop slightly in the short run for those firms that remain open, but are expected to return to their original levels within a few years of compliance as the industry adjusts to the new abatement requirements.

APPENDIX B.—SUMMARY OF PUBLIC PARTICIPATION

The following are the principal agencies and groups consulted in the development of regulations: (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) Department of Interior; (4) Department of Commerce; (5) Department of Defense; (6) Department of the Treasury; (7) Water Resources Council; (8) Atomic Energy Commission; (9) Office of Management and Budget; (10) National Association of Metal Finishers; (11) Metal Finishers Suppliers Association; (12) American Electroplating Society; (13) Institute of Printed Circuits; (14) Alberts Plating Works, Inc.; (15) American Hot Dip Galvanizers; (16) American Society of Mechanical Engineers; (17) Hudson River Sloop Restoration, Inc.; (18) The Conservation Foundation; (19) Environmental Defense Fund, Inc.; (20) Natural Resources Defense Council; (21) The American Society of Civil Engineers; (22) Water Pollution Control Federation; (23) National Wildlife Federation; (24) American Institute of Chemical Engineers; (25) New England Interstate Water Pollution Control Commission.

The following responded with comments following publication of the Phase I and Phase II regulations: California State Water Resources Control Board; Delaware River Basin Commission; State of New York Department of Environmental Conservation; Commonwealth of Kentucky Department of Natural Resources and Environmental Protection; State of Ohio Environmental Protection Agency; The Commonwealth of Massachusetts Water Resources Commission; State of Michigan Department of Natural Resources; State of Georgia Department of Natural Resources; City of Philadelphia; Colorado Department of Public Health; Municipality of Metropolitan Seattle; Dallas Water Utilities; State of Connecticut Department of Environmental Protection; Department of Commerce; Department of Defense; Department of Health, Education and Welfare; United States Department of the Interior; API Industries; State of Nebraska; State of Wisconsin; State of Virginia; State of North Carolina; State of Illinois; State of Indiana; Izaak Walton League of America; Environmental Resources Defense Council; General Electric; Ford Motor Company; Hewlett Packard; R. O. Hull and Company; MacDermid, Inc.; Institute of Printed Circuits; Kalamus and Associates, Inc.; Berlinger Plating, Inc.; Chromium Inc.; Honeywell; Alcoa Cad-Nickel Plating Corporation; Frank G. Pallard and Associates; Tri-Country Hard Chrome, Inc.; National Association of Metal Finishers; Bell and Howell; Western Electric; Digital Equipment Corporation; The Plate-All Metal Company; American Electroplaters' Society, Inc.; Metal Finishing Suppliers Association, Inc.; Barnard and Maybeck; Hay Company; Harshaw Chemical Company; Alcoa Company; Frederick Gumm Chemical Company; Scientific Control Laboratories; Milwaukee Plating Company; Raytheon Company; GTE Sylva; Eastman Kodak Company; Chrome-

Rite Company; Graham Plating; Welch Allyn; Bendix Corporation; Gould Corporation; H.I.G., Incorporated; Luster-On Products, Inc.; The Ansul Company; Olin Brass; Photo-Chemical Machining Institute; Whirlpool Corporation; Reynolds Metals Company; Monet-Monocraft; American Iron and Steel Institute; Optic-Gage, Inc.; Sperry Univac; Teledyne CAE; Andes, Inc.; Baker Brothers; Rockwell International; Industrial Filter and Pump Manufacturing Company; Rogers Corporation; Control Data Corporation; NRC Corporation; Litton Industry; C. E. Munge Development Laboratory; Platers Supply Company; Sybron Corporation; Van DerHorst Corporation of America; Pratt and Whitney Division of United Aircraft; Columbus Industrial Association; Keeler Brass Company; Lancy Laboratories; Masters-Electroplating Association; Association of Home Appliance Manufacturers; Oxy Metal Finishing Corporation; E. I. DuPont de Nemours, Inc.; Electronic Industries Association; TRW, Inc.; Burndy Corporation; Jamestown Electroplating Works, Inc.; Douglas and Lomason Company; Revere Copper and Brass, Inc.; Sargent and Company; AMP, Inc.; Products Finishing; Wald Manufacturing Company; United States Water Resources Council; S. K. Williams Company; Manufacturing Jewelers and Silversmith of America, Inc.; True Temper Corporation; Texas Instruments, Inc.; Caterpillar Tractor Company; BASF Wyandotte Corporation; Lea-Ronal, Inc.; Automatic Plating Corporation; American Institute of Chemical Engineers; Aircraft Radio and Control.

The major issues raised by commenters during the development of these regulations and the subsequent resolution of these issues are as follows:

1. Numerous commenters questioned the need for pretreatment except in cases where the POTW falls to meet its permit limits.

By requiring pretreatment only when POTW permit conditions are violated, the Agency would be ignoring serious pollutant problems. Incompatible toxic pollutants introduced into a POTW by an industrial user may pass through the POTW substantially untreated into the receiving water without causing the POTW to violate its BOD, TSS, or pH permit limitations. Pass-through of toxic pollutants can result in accumulations in receiving water sediments with subsequent damage to benthic biota, bioaccumulations of toxic pollutants to unacceptable levels in fish, and other water quality problems.

The Agency believes that the requirements for industrial users of POTW established pursuant to section 307 (b) and (c) of the Act and the standards for POTW pursuant to sections 301 and 304 are separate requirements designed to be achieved concurrently. The pollutant parameters governed by the present standards pass through or interfere with the operation of POTW. These standards, accordingly, apply whether or not a particular POTW is already in compliance with secondary treatment standards or other limitations established in its permit. Conversely, a POTW must comply with applicable standards and limitations even though industries discharging to it have not met pretreatment standards.

2. Many commenters stated that the pretreatment limitations should be expressed in terms of concentration rather than as mass limitations.

The limitations specified in this regulation are expressed in terms of concentration although optional mass-based limitations may be developed later which will allow local enforcement authorities to choose between the two. The Agency has decided to use concentration limits in this regulation because of the ease of enforcing such limits and because of the need to implement the pretreatment

program as quickly as possible. However, dilution may be a problem in some instances. Where dilution is encountered and is of concern, local authorities should consider the need for prohibitions on dilution, inspection of pretreatment and industrial facilities and enforcement of mass limitations.

3. Numerical limitations different than those established by this regulation were proposed by some commenters. The comments focused on the technical feasibility of attaining certain limitations by means of given treatment technologies. The comments also focused on the economic impact of establishing various levels of standards.

The standards set forth in these regulations are based on a careful assessment by the Agency of data concerning the levels of control which can be attained by use of available treatment technologies. Data supplied by the commenters as well as data collected by the Agency was used in developing the standards. Furthermore, the Agency has given careful attention to the possible economic impact of establishing various standards. As discussed elsewhere in the preamble, the decision to develop regulations in two stages is closely related to the Agency's efforts to fully consider the economic situation of different segments of the industry in establishing pretreatment standards. The formulation of the present standards is described in more detail in Appendix A.

Part 413, Chapter I, Subchapter N, Title 40 of the Code of Federal Regulations is amended as follows:

Subpart A—Electroplating Point Source Category

Subpart A, § 413.11 is amended by revising paragraph (d) and adding paragraphs (e), (f), and (g) as follows:

§ 413.11 Specialized definitions.

(d) The term "CN,A" shall mean cyanide amenable to chlorination.

(e) The term "CN,T" shall mean cyanide, total.

(f) The term "Cr,VI" shall mean hexavalent chromium.

(g) The term "electroplating process waste water" shall mean process waste water generated in operations which are subject to regulations for the electroplating point source category.

Subpart A is amended by adding § 413.14 as follows:

§ 413.14 Pretreatment standards for existing sources.

For the purpose of establishing pretreatment standards under section 307 (b) of the Act for a source within the electroplating of common metals subcategory, the provisions of Part 123 of this chapter shall not apply. The pretreatment standards for an existing source within the electroplating of common metals subcategory are set forth below.

(a) No pollutant (or pollutant property) introduced into a publicly owned treatment works shall interfere with the operation or performance of the works. Specifically, the following wastes shall not be introduced into the publicly owned treatment works:

(1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works.

(2) Pollutants which will cause corrosive structural damage to treatment works, but in no case pollutants with a pH lower than 5 unless the works is designed to accommodate such pollutants.

(3) Solid or viscous pollutants in amounts which would cause obstruction to the flow in sewers, or other interference with the proper operation of the publicly owned treatment works.

(4) Pollutants at either a hydraulic flow rate or pollutant flow rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency.

(b) In addition to the general prohibitions set forth in paragraph (a) of this section, the following pretreatment standards establish the quality or quantity of pollutants or pollutant properties controlled by this section which may be introduced into a publicly owned treatment works by a source subject to the provisions of this subpart.

(1) For plants discharging less than 40,000 gallons per day of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Milligrams per liter		
CN, A.....	0.20.....	0.08

(2) For plants discharging 40,000 gallons per day or more of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Milligrams per liter		
CN, A.....	0.20.....	0.08
CN, T.....	0.64.....	0.24
Cr, VI.....	0.25.....	0.09
pH.....	Within the range 7.5 to 10.0.	

Subpart B—Electroplating of Precious Metals Subcategory

Subpart B, § 413.21 is amended by revising paragraph (d) and adding paragraphs (e), (f), and (g) as follows:

§ 413.21 Specialized definitions.

(d) The term "CN,A" shall mean cyanide amenable to chlorination.

(e) The term "CN,T" shall mean cyanide, total.

(f) The term "Cr,VI" shall mean hexavalent chromium.

(g) The term "electroplating process waste water" shall mean process waste water generated in operations which are subject to regulations for the electroplating point source category.

Subpart B is amended by adding § 413.24 as follows:

§ 413.24 Pretreatment standards for existing sources.

For the purpose of establishing pretreatment standards under Section 307 (b) of the Act for a source within the electroplating of precious metals subcategory, the provisions of Part 128 of this chapter shall not apply. The pretreatment standards for an existing source within the electroplating of precious metals subcategory are set forth below:

(a) No pollutant (or pollutant property) introduced into a publicly owned treatment works shall interfere with the operation or performance of the works. Specifically, the following wastes shall not be introduced into the publicly owned treatment works:

(1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works.

(2) Pollutants which will cause corrosive structural damage to treatment works, but in no case pollutants with a pH lower than 5, unless the works is designed to accommodate such pollutants.

(3) Solid or viscous pollutants in amounts which would cause obstruction to the flow in sewers, or other interference with the proper operation of the publicly owned treatment works.

(4) Pollutants at either a hydraulic flow rate or pollutant flow rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency.

(b) In addition to the general prohibitions set forth in paragraph (a) of this section, the following pretreatment standards establish the quality or quantity of pollutants or pollutant properties controlled by this section which may be introduced into a publicly owned treatment works by a source subject to the provisions of this subpart.

(1) For plants discharging less than 40,000 gallons per day of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Milligrams per liter		
CN, A.....	0.20.....	0.08

(2) For plants discharging 40,000 gallons per day or more of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Milligrams per liter		
CN, A.....	0.20.....	0.08
CN, T.....	0.64.....	0.24
Cr, VI.....	0.25.....	0.09
pH.....	Within the range 7.5 to 10.0.	

Subpart D—Anodizing Subcategory

Subpart D, § 413.41 is amended by revising paragraph (d) and adding paragraphs (e), (f), and (g) as follows:

§ 413.41 Specialized definitions.

(d) The term "CN,A" shall mean cyanide amenable to chlorination.

(e) The term "CN,T" shall mean cyanide, total.

(f) The term "Cr,VI" shall mean hexavalent chromium.

(g) The term "electroplating process waste water" shall mean process waste water generated in operations which are subject to regulations for the electroplating point source category.

Subpart D is amended by adding section 413.44 as follows:

§ 413.44 Pretreatment standards for existing sources.

For the purpose of establishing pretreatment standards under section 307 (b) of the Act for a source within the anodizing subcategory, the provisions of Part 128 of this chapter shall not apply. The pretreatment standards for an existing source within the anodizing subcategory are set forth below.

(a) No pollutant (or pollutant property) introduced into a publicly owned treatment works shall interfere with the operation or performance of the works. Specifically, the following wastes shall not be introduced into the publicly owned treatment works:

(1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works.

(2) Pollutants which will cause corrosive structural damage to treatment works, but in no case pollutants with a pH lower than 5, unless the works is designed to accommodate such pollutants.

(3) Solid or viscous pollutants in amounts which would cause obstruction to the flow in sewers, or other interference with the proper operation of the publicly owned treatment works.

(4) Pollutants at either a hydraulic flow rate or pollutant flow rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency.

(b) In addition to the general prohibitions set forth in paragraph (a) of this section, the following pretreatment standards establish the quality or quantity of pollutants or pollutant properties controlled by this section which may be introduced into a publicly owned treatment works by a source subject to the provisions of this subpart.

(1) For plants discharging less than 40,000 gallons per day of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Milligrams per liter		
CN, A.....	0.20.....	0.08

(2) For plants discharging 40,000 gallons per day or more of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Milligrams per liter		
CN, A	0.20	0.08
CN, T	0.64	0.24
Cr, VI	0.25	0.09
pH	Within the range 7.5 to 10.0.	

Subpart E—Coatings Subcategory

Subpart E, § 413.51 is amended by revising paragraph (d) and adding paragraphs (e), (f), and (g) as follows:

§ 413.51 Specialized definitions.

(d) The term "CN,A" shall mean cyanide amenable to chlorination.

(e) The term "CN,T" shall mean cyanide, total.

(f) The term "Cr,VI" shall mean hexavalent chromium.

(g) The term "electroplating process waste water" shall mean process waste water generated in operations which are subject to regulations for the electroplating point source category.

Subpart E is amended by adding § 413.54 as follows:

§ 413.54 Pretreatment standards for existing sources.

For the purpose of establishing pretreatment standards under section 307 (b) of the Act for a source within the coatings subcategory, the provisions of Part 128 of this chapter shall not apply. The pretreatment standards for an existing source within the coatings subcategory are set forth below.

(a) No pollutant (or pollutant property) introduced into a publicly owned treatment works shall interfere with the operation or performance of the works. Specifically, the following wastes shall not be introduced into the publicly owned treatment works:

(1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works.

(2) Pollutants which will cause corrosive structural damage to treatment works, but in no case pollutants with a pH lower than 5, unless the works is designed to accommodate such pollutants.

(3) Solid or viscous pollutants in amounts which would cause obstruction to the flow in sewers, or other interference with the proper operation of the publicly owned treatment works.

(4) Pollutants at either a hydraulic flow rate or pollutant flow rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency.

(b) In addition to the general prohibitions set forth in paragraph (a) of this section, the following pretreatment standards establish the quality or quantity of pollutants or pollutant properties controlled by this section which may be introduced into a publicly owned treatment works by a source subject to the provisions of this subpart.

(1) For plants discharging less than 40,000 gallons per day of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Milligrams per liter		
CN, A	0.20	0.08

(2) For plants discharging 40,000 gallons per day or more of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Milligrams per liter		
CN, A	0.20	0.08
CN, T	0.64	0.24
Cr, VI	0.25	0.09
pH	Within the range 7.5 to 10.0.	

Subpart F—Chemical Etching and Milling Subcategory

Subpart F, § 413.61 is amended by revising paragraph (d) and adding paragraphs (e), (f), and (g) as follows:

§ 413.61 Specialized definitions.

(d) The term "CN,A" shall mean cyanide amenable to chlorination.

(e) The term "CN,T" shall mean cyanide, total.

(f) The term "Cr,VI" shall mean hexavalent chromium.

(g) The term "electroplating process waste water" shall mean process waste water generated in operations which are subject to regulations for the electroplating point source category.

Subpart F is amended by adding § 413.64 as follows:

§ 413.64 Pretreatment standards for existing sources.

For the purpose of establishing pretreatment standards under section 307 (b) of the Act for a source within the chemical etching and milling subcategory, the provisions of Part 128 of this chapter shall not apply. The pretreatment standards for an existing source within the chemical etching and milling subcategory are set forth below.

(a) No pollutant (or pollutant property) introduced into a publicly owned treatment works shall interfere with the operation or performance of the works. Specifically, the following wastes shall not be introduced into the publicly owned treatment works:

(1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works.

(2) Pollutants which will cause corrosive structural damage to treatment works, but in no case pollutants with a pH lower than 5.0, unless the works is designed to accommodate such pollutants.

(3) Solid or viscous pollutants in amounts which would cause obstruction to the flow in sewers, or other interference with the proper operation of the publicly owned treatment works.

(4) Pollutants at either a hydraulic flow rate or pollutant flow rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency.

(b) In addition to the general prohibitions set forth in paragraph (a) of this chapter, the following pretreatment standards establish the quality or quantity of pollutants or pollutant properties controlled by this section which may be introduced into a publicly owned treatment works by a source subject to the provisions of this subpart.

(1) For plants discharging less than 40,000 gallons per day of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Milligrams per liter		
CN, A	0.20	0.08

(2) For plants discharging 40,000 gallons per day or more of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Milligrams per liter		
CN, A	0.20	0.08
CN, T	0.64	0.24
Cr, VI	0.25	0.09
pH	Within the range 7.5 to 10.0.	

40 CFR Part 413 is amended by adding a new Subpart G as follows:

Subpart G—Electroless Plating

Sec. 413.70 Applicability; description of the electroless plating subcategory.

413.71 Specialized definitions.

413.72-413.73 [Reserved]

413.74 Pretreatment standards for existing sources.

AUTHORITY: Sec. 307(b), Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1317(b)); 86 Stat. 816 et seq.; Pub. L. 92-500 (the Act).

Subpart G—Electroless Plating**§ 413.70 Applicability; description of the electroless plating subcategory.**

The provisions of this subpart are applicable to discharges resulting from the electroless plating of a metallic layer on a metallic or nonmetallic substrate.

§ 413.71 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "electroless plating" shall mean the deposition of conductive material from an autocatalytic plating solution without application of electrical current.

(c) The term "sq m" ("sq ft") shall mean the area plated expressed in square meters (square feet).

(d) The term "operation" shall mean any step in the electroless plate process which is followed by a rinse and in which a metal is deposited on a basis material.

(e) The term "CN,A" shall mean cyanide amenable to chlorination.

(f) The term "CN,T" shall mean cyanide, total.

(g) The term "Cr, VI" shall mean hexavalent chromium.

(h) The term "electroplating process waste water" shall mean process waste water generated in operations which are subject to regulations for the electroplating point source category.

§ 413.72 [Reserved]**§ 413.73 [Reserved]****§ 413.74 Pretreatment standards for existing sources.**

For the purpose of establishing pretreatment standards under section 307 (b) of the Act for a source within the electroless plating, subcategory, the provisions of part 128 of this chapter shall not apply. The pretreatment standards for an existing source within the electroless plating subcategory are set forth below.

(a) No pollutant (or pollutant property) introduced into a publicly owned treatment works shall interfere with the operation or performance of the works. Specifically, the following wastes shall not be introduced into the publicly owned treatment works:

(1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works.

(2) Pollutants which will cause corrosive structural damage to treatment works, but in no case pollutants with a pH lower than 5.0, unless the works is designed to accommodate such pollutants.

(3) Solid or viscous pollutants in amounts which would cause obstruction to the flow in sewers, or other interference with the proper operation of the publicly owned treatment works.

(4) Pollutants at either a hydraulic flow rate or pollutant rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency.

(b) In addition to the general prohibitions set forth in paragraph (a) of this section, the following pretreatment standards establish the quality or quantity of pollutants or pollutant properties controlled by this section which may be introduced into a publicly owned treatment works by a source subject to the provisions of this subpart.

(1) For plants discharging less than 40,000 gallons per day of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Milligrams per liter		
CN, A.....	0.20.....	0.08

(2) For plants discharging 40,000 gallons per day or more of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Milligrams per liter		
CN, A.....	0.20.....	0.08
CN, T.....	0.64.....	0.24
Cr, VI.....	0.25.....	0.09
pH.....	Within the range 7.5 to 10.0.	

Subpart H—Printed Circuit Board

Sec.

413.80 Applicability; description of the printed circuit board subcategory.**413.81 Specialized definitions.**

413.82-413.83 [Reserved].

413.84 Pretreatment standards for existing sources.

AUTHORITY:—Sec. 307(b), Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1317(b)); 86 Stat. 816 et seq.; Pub. L. 92-500 (the Act).

Subpart H—Printed Circuit Board**§ 413.80 Applicability; description of the printed circuit board subcategory.**

The provisions of this subpart are applicable to the manufacture of printed circuit boards including all manufacturing operations required or used to convert an insulating substrate to a finished printed circuit board. The provisions set forth in other subparts of this category are not applicable to the manufacture of printed circuit boards.

§ 413.81 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "printed circuit board" shall mean any insulating carrier which has circuitry adhered thereto or encapsulated therein primarily for the purpose of interconnecting electric and electronic components.

(c) The term "sq m" ("sq ft") shall mean the area of the printed circuit board immersed in an aqueous process bath.

(d) The term "operation" shall mean any step in the printed circuit board manufacturing process wherein the board is immersed in an aqueous process bath which is followed by a rinse.

(e) The term "CNA" shall mean cyanide amenable to chlorination.

(f) The term "CN,T" shall mean cyanide, total.

(g) The term "Cr, VI" shall mean hexavalent chromium.

(h) The term "electroplating process waste water" shall mean process waste water generated in operations which are subject to regulations for the electroplating point source category.

§ 413.82 [Reserved]**§ 413.83 [Reserved]****§ 413.84 Pretreatment standards for existing sources.**

For the purpose of establishing pretreatment standards under section 307 (b) of the Act for a source within the printed circuit board subcategory, the provisions of Part 128 of this chapter shall not apply. The pretreatment standards for an existing source within the printed circuit board subcategory are set forth below.

(a) No pollutant (or pollutant property) introduced into a publicly owned treatment works shall interfere with the operation or performance of the works. Specifically, the following wastes shall not be introduced into the publicly owned treatment works:

(1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works.

(2) Pollutants which will cause corrosive structural damage to treatment works, but in no case pollutants with a pH lower than 5.0, unless the works is designed to accommodate such pollutants.

(3) Solid or viscous pollutants in amounts which would cause obstruction to the flow in sewers, or other interference with the proper operation of the publicly owned treatment works.

(4) Pollutants at either a hydraulic flow rate or pollutant flow rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency.

(b) In addition to the general prohibitions set forth in paragraph (a) of this section, the following pretreatment standards establish the quality or quantity of pollutants or pollutant properties

controlled by this section which may be introduced into a publicly owned treatment works by a source subject to the provisions of this subpart.

(1) For plants discharging less than 40,000 gallons per day of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
	Milligrams per liter	
CN, A.....	0.20.....	0.03

(2) For plants discharging 40,000 gallons per day or more of electroplating process waste water the following limitations shall apply:

Pollutant or pollutant property	Pretreatment standard	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
	Milligrams per liter	
CN, A.....	0.20.....	0.03
CN, T.....	0.64.....	0.24
Cr, VI.....	0.25.....	0.02
pH.....	Within the range 7.5 to 10.0.	

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[FRL 755-2]

PART 436—MINERAL MINING AND PROCESSING POINT SOURCE CATEGORY

Final Rule Making

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: These regulations limit the discharge of pollutants into navigable waters from existing crushed stone, construction sand and gravel, industrial sand, phosphate rock and mining operations. The Federal Water Pollution Control Act requires these regulations to be issued. These limitations will be incorporated in National Pollutant Discharge Elimination System (NPDES) permits issued by the Federal EPA or by States with approved programs. The effect of these regulations will be to require treatment of waste water discharged from the above types of operations in the mineral mining industry.

EFFECTIVE DATE: August 11, 1977.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

BACKGROUND

On October 16, 1975 (40 FR 48652), and June 10, 1976 (41 FR 23552), EPA promulgated interim final effluent limitations based on the application of "best practicable control technology currently available" (BPT) for 40 CFR Part 436—Mineral Mining and Processing Point Source Category. On June 10, 1976, the Agency also proposed effluent limitations based on the application of "best available technology economically achievable" (BAT) and standards of performance and pretreatment standards for new sources (41 FR 23561). The final regulations set forth below amend the June 10, 1976 interim final regulations, and will be applicable to existing point sources for the crushed stone subcategory (Subpart B), the construction sand and gravel subcategory (Subpart C), the industrial sand subcategory (Subpart D), and the phosphate rock subcategory (Subpart R).

The Agency is not promulgating pretreatment standards for existing sources or finalizing the pretreatment standards for new sources which were proposed in the June 10, 1976 interim final regulations because there are no known situations in which such standards would be applicable. Should information become available which indicates there is a need for such standards, then regulations will be issued. The regulations based upon best available technology economically achievable (BAT) and new source performance standards (NSPS) which were proposed on June 10, 1976 are also not being promulgated at this time because the Agency is currently reviewing the regulatory approach which should be taken in all mining categories with respect to BAT effluent limitations and new source performance standards.

LEGAL AUTHORITY

These regulations are promulgated pursuant to sections 301(b) and 304(b) of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1311 (b), 1314(b); 86 Stat. 816 et seq.; Pub. L. 92-500) (the Act). Section 301(b)(1) requires the attainment of effluent limitations based on the application of "best practicable control technology currently available" (BPT) by July 1, 1977. Section 304(b)(1) provides for the promulgation of such effluent limitations and specifies the factors to be taken into account in assessing BPT in compliance with section 301(b)(1).

SUMMARY AND BASIS OF REGULATIONS

Effluent limitations are established in these regulations for total suspended solids (TSS) and pH. The regulations govern discharges of process generated waste water pollutants and discharges of mine dewatering pollutants by existing sources in all four subcategories listed above.

The best practicable control technology currently available for control-

ling the discharge of process generated waste water pollutants includes recycle of waste water for use in processing. In addition, excess process water and mine water can be treated prior to discharge by settling and, if necessary, occasional use of flocculation. Available technologies are discussed in detail in Appendix A. As in all other mining categories, the limitations for these four subcategories are applied on a concentration basis (mg/l) rather than a mass basis (lbs/ton of product) (except for industrial sand operations using hydrogen flotation), because no correlation between water usage and production can be established. The method of analyses for all parameters shall conform to the methods specified in "Guidelines Establishing Test Procedures for the Analysis of Pollutants," 40 CFR Part 136, published in 41 FR 52780 (December 1, 1976).

Additional waste water pollutants which may be present in some instances are asbestos fibers, radium 226, and phosphates. Control of total suspended solids will have the effect of controlling these pollutants to some extent. Existing treatment systems are not generally designed to specifically remove these pollutants, and additional treatment of these pollutants will not be practicable for most operations. Consequently, specific limitations for these pollutants are not established at this time. The permit issuing authority could, however, impose specific limitations on such pollutants on a case-by-case basis, if practicable technology were nevertheless shown to be available in the particular instance. Furthermore, the permit must, of course, include any additional limitations on such pollutants which are necessary to meet applicable water quality standards.

A report entitled "Development Document for Interim Final Effluent Limitations Guidelines and New Source Performance Standards for the Mineral Mining and Processing Point Source Category" was issued at the time that the interim final BPT regulations for the four subcategories listed above were published on June 10, 1976. A supplementary report on the possible economic effects of the regulations was also issued at that time. Comments on both reports were solicited by the Agency.

After the interim regulations were issued, the Agency collected and analyzed additional data on the four subcategories which are subject to these final regulations. A report entitled "Development Document for Final Effluent Limitations Guidelines and New Source Performance Standards for the Mineral Mining and Processing Point Source Category" details the analyses undertaken in support of the final regulation set forth here. A supplementary analysis on the possible economic effects of the final regulations has also been prepared. Copies of both reports are available for inspection at the EPA Public Information Reference Unit, Room 2922 (EPA Library), Waterside Mall, 401 M St., SW., Washington, D.C., at all EPA regional offices, and at State