ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 419

[FRL 1312-1]

Petroleum Refining Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed regulation.

SUMMARY: EPA proposes regulations to limit effluent discharges to waters of the United States and the introduction of pollutants into publicly owned treatment works from facilities which are engaged in refining petroleum. These facilities are defined more specifically as those classed by the Bureau of the Census in Standard Industrial Classification (SIC) 2911. The purpose of this proposal is to provide effluent limitations guidelines for "best available technology," and "best conventional technology," and to establish new source performance standards and pretreatment standards under the Clean Water Act.

The effect of these regulations on the petroleum refining industry would be to require pretreatment of process wastewaters introduced into publicly owned treatment works (POTWs) and treatment of process wastewaters discharged to waters of the United States. After considering comments received in response to this proposal, EPA will promulgate a final rule.

The Supplementary Information section of this preamble describes the legal authority and background, the technical and economic bases, and other aspects of the proposed regulations. That section also summarizes comments on a draft technical document circulated on April 21, 1978, and solicits comments on specific areas of interest. The abbreviations, acronyms, and other terms used in the Supplementary Information section are defined in Appendix A to this notice.

These proposed regulations are supported by three major documents available from EPA. Analytical methods are discussed in *Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants.* EPA's techincial conclusions are detailed in the *Development Document for Proposed Effluent Limitations Guidelines, New Source Performance Standards and Pretreatment Standards for the Petroleum Refining Point Source Category.* The Agency's economic analysis is found in *Economic Analysis of Proposed Revised Effluent Standards and Limitations for the Petroleum Refining Industry.*

DATE: Comments on this proposal must be submitted on or before February 19, 1980.

ADDRESS: Send comments to: Mr. William A. Telliard, Effluent Guidelines Division (WH-552), Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460. Attention: EGD Docket Clerk, Petroleum (WH-552). The supporting information and all comments on this proposal will be available for inspection and copying at the EPA Public Information Reference Unit, Room 2404 (Rear) PM-213, (EPA Library), 401 M Street, S.W., Washington, D.C. 20460. The EPA information regulation (40 CFR Part 2) provides that a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Technical information and copies of technical documents may be obtained from Mr. William A. Telliard, (202) 755-7733 at the address listed above. The economic analysis may be obtained from Mr. Louis DuPuis, Water Economics Branch (WH-586), Environmental Protection Agency, 401 M St. S.W., Washington, D.C. 20460, (202) 755-7733.

SUPPLEMENTARY INFORMATION:

Organization of This Notice

I. Legal Authority

The regulations described in this notice are proposed under authority of sections 301, 304, 306, 307, 308, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 USC 1251 *et seq.;* as amended by the Clean Water Act of 1977, Pub. L. 95-217) (the "Act"). These regulations are also proposed in response to the Settlement Agreement in *Natural Resources Defense Council, Inc.* v. *Train,* 8 ERC 2120 (D.D.C. 1976), modified March 9, 1979 and in response to the decision of the United States Court of Appeals in *American Petroleum Institute* v. *EPA* 540 F. 2d 1023 (10th Cir. 1976).

II. Background

(a) The Clean Water Act. The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program to "restore and maintain the chemical, physical, and biological intergrity of the Nation's waters." Section 101(a). By July 1, 1977, existing industrial dischargers were required to achieve "effluent limitations requiring the application of the best practicable control technology currently available" (BPT); Section 301(b)(1)(A); and by July 1, 1983, these dischargers were required to achieve "effluent limitations requiring 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" (BAT), section 301(b)(2)(A). New industrial direct dischargers were required to comply with section 306 new source performance standards (NSPS), based on best available demonstrated technology; and new and existing dischargers to publicly owned treatment works (POTWs) were subject to pretreatment standards under sections 307 (b) and (c) of the Act. While the requirements for direct dischargers were to be incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued under section 402 of the Act, pretreatment standards were made enforceable directly against dischargers to POTWs (indirect dischargers).

Although section 402(a)(1) of the 1972 Act authorized the setting of requirements for direct dischargers on a case-by-case basis, Congress intended that, for the most part, control requirements would be based on regulations promulgated by the Administrator of EPA. Section 304(b) of the Act required the Administrator to promulgate regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of BPT and BAT. Moreover, sections 304(c) and 306 of the Act required promulgation of regulations for NSPS, and sections 304(f), 307(b), and 307(c) required promulgation of regulations for pretreatment standards. In addition to these regulations for designated industry categories, Section 307(a) of the Act required the Administrator to promulgate effluent standards applicable to all dischargers of toxic pollutants. Finally, section 501(a) of the Act authorized the Administrator to prescribe any additional regulations "necessary to carry out his functions" under the Act.

EPA was unable to promulgate many of these regulations by the dates contained in the Act. In 1976, EPA was sued by several environmental groups, and in settlement of this lawsuit EPA and the plaintiffs executed a "Settlement Agreement" which was approved by the Court. This Agreement required EPA to develop a program and adhere to a schedule for promulgating for 21 major industries BAT effluent limitations guidelines, pretreatment standards, and new source performance standards for 65 "priority" pollutants and classes of pollutants. See *Natural Resources Defense Council, Inc.* v. *Train,* 8 ERC 2120 (D.D.C. 1976), modified March 9, 1979.

On December 27, 1977, the President signed into law the Clean Water Act of 1977. Although this law makes several important changes in the federal water pollution control program, its most significant feature is its incorporation into the Act of several of the basic elements of the Settlement Agreement program for toxic pollution control. Sections 301(b)(2)(A) and 301(b)(2)(C) of the Act now require the achievement by July 1, 1984, of effluent limitations requiring application of BAT for "toxic" pollutants, including the 65 "priority" pollutants and classes of pollutants which Congress declared "toxic" under Section 307(a) of the Act. Likewise, EPA's programs for new source performance standards and pretreatment standards are now aimed principally at toxic pollutant controls. Moreover, to strengthen the toxics control program, Congress added section 304(e) to the Act, authorizing the Administrator to prescribe "best management practices" (BMPs) to prevent the release of toxic and hazardous pollutants from plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage associated with, or ancillary to, the manufacturing or treatment process.

In keeping with its emphasis on toxic pollutants, the Clean Water Act of 1977 also revised the control program for non-toxic pollutants. Instead of BAT for "conventional" pollutants identified under section 304(a)(4) (including biological oxygen demand, suspended solids, fecal coliform and pH), the new section 301(b)(2)(E) requires achievement by July 1, 1984, of "effluent limitations requiring the application of the best conventional pollutant control technology" (BCT). The factors considered in assessing BCT for an industry include the costs of attaining a reduction in effluents and the effluent reduction benefits derived compared to the costs and effluent reduction benefits from the discharge of publicly owned treatment works (Section 304(b)(4)(B)). For non-toxic, nonconventional pollutants, sections 301(b)(2)(A) and (b)(2)(F) require achievement of BAT effluent limitations within three years after their establishment or July 1, 1984, whichever is later, but not later than July 1, 1987.

The purpose of these proposed regulations is to provide effluent limitations guidelines for BAT and BCT, and to establish NSPS, pretreatment standards for existing sources (PSES), and pretreatment standards for new sources (PSNS), under Sections 301, 304, 306, 307, and 501 of the Clean Water Act.

(b) Prior EPA Regulations. EPA promulgated BPT, BAT, NSPS, and PSNS for the Petroleum Refining point source category on May 9, 1974 (39 FR 16560, Subparts A-E). The BPT, BAT, and NSPS regulations were challanged in the courts by the American Petroleum Institute and others. Both BPT and NSPS were upheld by the court, but BAT was remanded for further consideration. Interim final PSES were promulgated on March 23, 1977 (42 FR 15684) in response to the Settlement Agreement.

The regulations proposed in this notice will supersede existing NSPS, PSNS and PSES. These proposed regulations will also establish BAT and BCT.

(c) Overview of the Industry. The petroleum refining industry is defined by Bureau of the Census Standard Industrial Classification (SIC) 2911. The raw material of this industry is petroleum material (generally, but not always, crude oil). Petroleum refineries process this raw material into a wide variety of petroleum products, including gasoline, fuel oil, jet fuel, heating oils and gases and petrochemicals. Refining includes a wide variety of physical separation and chemical reaction processes. The Development Document lists over one hundred processes used in the petroleum refining industry. Because of the diversity and complexity of the processes used and the products

produced, petroleum refineries are generally characterized by the quantity of raw material processed, rather than by the quantity and types of products produced.

EPA has identified 285 petroleum refineries in the United States and its possessions. The smallest refinery can refine fifty barrels of oil per day (one barrel equal 42 gallons), while the largest can refine 665,000 barrels per day.

The U.S. refining industry processes a total of about 15 million barrels per day. However, industry growth has slowed in recent years due to a number of factors including efforts to conserve petroleum supplies and competition from foreign suppliers. Growth has averaged about five percent per year and has resulted largely from additions to existing refineries rather than by construction of new ones. Largely because of encouragement from the Department of Energy's crude oil allocation program, a limited number of small, new refineries have been constructed. The ratio of growth in U.S. refining capacity by additions to existing refineries to the growth by construction of new refineries has been approximately 3.5 to 1.

The major sources of process wastewater are cooling water, water used to wash unwanted materials from a process stream, water used as part of a reaction process, and boiler blowdowns. Current treatment systems used by refineries for this process wastewater include (a) in-plant controls of ammonia and water use, and (b) end-of-pipe treatment consisting of oil/water separators, biological treatment and, in some cases, mixed media filtration. Although significant concentrations of toxic and other pollutants are found in untreated waste, data show that application of BPT results in substantial reduction of pollutants. Toxic pollutants were reduced to near or below the concentrations which can be accurately measured using available measurement techniques.

III. Scope of This Rulemaking and Summary of Methodology

These proposed regulations open a new chapter in water pollution control requirements for the petroleum refining industry. In EPA's 1973–1976 round of rulemakings, emphasis was placed on the achievement of best practicable technology (BPT) by July 1, 1977. In general, this technology level represented the average of the best existing performances of well known technologies for control of pollutants of traditional concern.

In this round of rulemaking, in contrast, EPA's efforts are directed toward insuring the achievement by July 1, 1984, of the best available technology economically achieveable (BAT), which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants. In general, this technology level represents, at a minimum, the very best economically achievable performance in any industrial category or subcategory. Moreover, as a result of the Clean Water Act of 1977, the emphasis of EPA's program has shifted from "classical" pollutants to the control of a lengthy list of toxic substances.

In the 1977 legislation, Congress recognized that it was dealing with areas of scientific uncertainty when it declared the 65 "priority" pollutants and classes of pollutants "toxic" under section 307(a) of the Act. The "priority" pollutants have been relatively unknown outside of the scientific community, and those engaged in wastewater sampling and control have had little experience dealing with these pollutans. Additionally, these pollutants often appear and have toxic effects at concentrations which severly tax current analytical techniques. Even though Congress was aware of the state-of-the-art difficulties and expense of "toxics" control and detection, it directed EPA to act quickly and decisively to detect, measure and regulate these substances. Thus, with the passage of the 1977 legislation, the Nation's water pollution control program was thrust toward the frontiers of science.

EPA's implementation of the Act required a complex development program described in this section and succeding sections of this notice. Initially, because in many cases no public or private agency had done so, EPA and its laboratories and consultants had to develop analytical methods for toxic pollutant detection and measurement, which are discussed under Sampling and Analytical program. EPA then gathered technical and financial data about the industry, which are summarized under Data Gathering Efforts. With these data in hand, the Agency proceeded to develop these proposed regulations.

First, EPA studied the petroleum refining industry to determine whether differences in raw materials, final products, manufacturing processes, equipment, age and size of plants, water usage, wastewater constituents, or other factors required the development of separate effluent limitations and standards for different segments of the industry. This study included the identification of raw waste and treated effluent characteristics including: (1) the sources and volume of water used, the processes employed, and the sources of pollutants and wastewaters in the plant, and (2) the constituents of wastewaters, including toxic pollutants. EPA then identified the constitutents of wastewaters which should be considered for effluent limitations guidelines and standards of performance.

Next, EPA identified several distinct control and treatment technologies, including both in-plant and end-of-process technologies, which are in use or capable of being used in the petroleum refining industry. The Agency compiled and analyzed historical data and newly generated data on the effluent quality resulting from the application of these technologies. The long term performance and operational limitations of each of the treatment and control technologies were also identified. In addition, EPA considered the nonwater quality environmental impacts of these technologies, including impacts on air quality, solid waste generation, and energy requirements.

The Agency then estimated the costs of each control and treatment technology from unit cost curves developed by standard engineering analysis as applied to petroleum refining wastewater characteristics. EPA derived treatment process costs from plant characteristics (production and flow) applied to each treatment process unit cost curve (i.e., powdered activated carbon, metals precipitation, etc.). These unit process costs were added to yield total cost at each treatment level. The Agency evaluated the economic impacts of these costs. (Costs and economic impacts are discussed in detail under the various technology options, and in the section of this notice entitled Costs, Effluent Reduction Benefits and Economic Impacts).

Upon consideration of these factors EPA identified various control and treatment technologies as BCT, BAT, PSES, PSNS, and NSPS. The proposed regulations, however, do not require the installation of any particular technology. Rather, they require achievement of effluent limitations representative of the proper operation of these technologies or equivalent technologies.

The effluent limitations for BAT, BCT and NSPS are expressed as mass limitations (kg/1000 cubic meters raw material) and are calculated by multiplying three figures: (1) achievable long term effluent concentrations based on each control technology (2) achievable wastewater flow and (3) variability factors to account for short term variations in effluent concentrations (daily and monthly variations). This basic calculation was performed for each regulated pollutant or pollutant parameter. Effluent limitations for PSES and PSNS are expressed as allowable concentrations in milligrams per liter (mg/l). For POTWs which may wish to impose mass limitations, the proposed regulations provide alternate equivalent mass limitations.

IV. Sampling and Analytical Program

As Congress recognized in enacting the Clean Water Act of 1977, the state-of-the-art ability to monitor and detect toxic pollutants is limited. Most of the toxic pollutants were relatively unknown until only a few years ago, and only on rare occasions has EPA regulated or has industry monitored or even developed methods to monitor for these pollutants. As a result, analytical methods for many toxic pollutants, under Section 304(h) of the Act, have not yet been promulgated. Moreover, state-of-the-art techniques involve the use of highly expensive, sophisticated equipment, with costs ranging as high as $200,000 per unit of equipment.

When faced with these problems, EPA scientists, including staff of the Environmental Research Laboratory in Athens, Georgia and staff of the Environmental Monitoring and Support Laboratory in Cincinnati, Ohio conducted a literature search and initiated a laboratory program to develop analytical protocols. The analytical techniques used in this rulemaking were developed concurrently with the development of general sampling and analytical protocols and were incorporated into the protocols ultimately adopted for the study of other industrial categories. See *Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants,* revised April 1977.

Because section 304(h) methods were available for most toxic metals, pesticides, cyanide and phenol, the analytical effort focused on developing methods for sampling and analyses of organic toxic pollutants. The three basic analytical approaches considered by EPA were infra-red spectroscopy, gas chromatography (GC) with multiple detectors, and gas chromatography/mass spectrometry (GC/MS). In selecting among these alternatives, EPA considered their sensitivity, laboratory availability, costs, applicability to diverse waste streams from numerous industries, and capability for implementation within the statutory and court-ordered time constraints of EPA's program. The Agency concluded that infra-red spectroscopy was not sufficiently sensitive or specific for application in water. GC with multiple detectors was rejected because it would require multiple runs and be incompatible with program time constraints. Moreover, because this method would use several detectors, each applicable to a narrow range of substances, GC with multiple detectors possibly would fail to detect certain toxic pollutants. EPA chose GC/MS because it was the only available technique that could identify a wide variety of pollutants in many different waste streams, in the presence of interfering compounds, and within the time constraints of the program. In EPA's judgment, GC/MS and the other analytical methods for toxics used in this rulemaking represent the best state-of-the-art methods for toxic pollutant analyses available when this study was begun.

As the state-of-the-art began to mature, EPA began to refine the sampling and analytical protocols, and intends to continue this refinement to keep pace with technology advancements. Resource constraints, however, prevent EPA from reworking completed sampling and analyses to keep up with the evolution of analytical methods. As a result, the analytical techniques used in some rulemakings may differ slightly from those used in other rulemaking efforts. In each case, however, the analytical methods used represent the best state-of-the-art available for a given industry study. One of the goals of EPA's analytical program is the promulgation of additional section 304(h) analytical methods for toxic pollutants, scheduled to be done within calendar year 1979.

Before proceeding to analyze petroleum refining wastes, EPA concluded that it had to define specific toxic pollutants for analyses. The list of 65 pollutants and classes of pollutants potentially includes thousands of specific pollutants; and the expenditure of resources in government and private laboratories would be overwhelming if analyses were attempted for all of these pollutants. Therefore, in order to make the task more manageable, EPA selected 129 specific toxic pollutants for study in this rulemaking and other industry rulemakings. The criteria for selection of these 129 pollutants included frequency of occurrence in water, chemical stability and structure, amount of chemical produced, availability of chemical standards for measurement, and other factors.

EPA ascertained the presence and magnitude of the 129 specific toxic pollutants in petroleum refining wastewaters in a sampling and analysis program involving 23 refineries and two POTWs. The plants were selected primarily to be representative of the manufacturing processes, the prevalent mix of production among plants, and the current treatment technology in the industry. Compliance with BPT requirement is also one of the site selection criteria. Seventeen of these plants were direct dischargers and six were indirect dischargers.

The primary objective of the field sampling program was to obtain composite samples of wastewater to determine presence, absence and relative concentrations of toxic pollutants. Sampling visits were made to correspond to three consecutive days of plant operation. Raw wastewater samples were taken prior to biological treatment. Treated effluent samples were taken subsequent to biological treatment; in some instances samples were taken after effluent polishing (i.e., polishing pond, sand filter). EPA also sampled intake water to determine the presence of toxic pollutants prior to contamination by refining processes.

In all instances, grab samples taken every two hours were combined into twenty-four hour composites. Samples for conventional and nonconventional pollutants were obtained from the 24-hour composite samples. Aliquots from the remaining sample volumes were combined in equal portions at the laboratory to obtain the 72-hour composites for toxic pollutant analysis (acid and base-neutral extractable organics, pesticides, metals). Grab samples were taken in specially prepared vials for volatile (purgeable) organics, total phenols and cyanide. Prior to the plant visits, sample containers were carefully washed and prepared by specific methods, depending upon the type of sample to be taken. Samples were kept on ice prior to express shipment in insulated containers.

The analyses for toxic pollutants were performed according to groups of chemicals and associated analytical schemes. Organic toxic pollutants included volatile (purgeable), base-neutral and acid (extractable) pollutants, total phenols and pesticides. Inorganic toxic pollutants included heavy metals, cyanide and asbestos.

The primary method used in screening and verification of the volatiles, base-neutral, and acid organics was gas chromatography with confirmation and quantification of all priority pollutants by mass spectrometry (GC/MS). Total phenols were analyzed by the 4-AAP method. GC was employed for analysis of pesticides with limited MS confirmation. The Agency analyzed the toxic heavy metals by atomic adsorption spectrometry (AAS), with flame or graphite furnace atomization following appropriate digestion of the sample. Duplicate samples were analyzed using plasma emission spectrometry after appropriate digestion. Samples were analyzed for cyanides by a colorimetric method, with sulfide previously removed by distillation. Analysis for asbestos was accomplished by microscopy and fiber presence reported as chrysotile fiber count. Analyses for conventional pollutants (BOD5, TSS, pH, and Oil and Grease) and nonconventional pollutants (TOC and COD) were accomplished using "Methods for Chemical Analysis of Water and Wastes," (EPA 625/6-74-003) and amendments.

The high costs, slow pace and limited laboratory capability for toxic pollutant analyses posed difficulties unique to EPA's experience. The cost of each wastewater analysis for organic toxic pollutants ranges between $650 and $1,700, excluding sampling costs (based upon quotations recently obtained from a number of analytical laboratories). Even with unlimited resources, however, time and laboratory capability would have posed additional constraints. Although efficiency has been improving, when this study was initiated a well-trained technician using the most sophisticated equipment could perform only one complete organic analysis in an eight hour work day. Moreover, when this rulemaking study was begun there were only about 15 commercial laboratories in the United States with sufficient capability to perform these analyses. Today there are about 50 commercial laboratories known to EPA which have the capability to perform these analyses, and the number is increasing as the demand for such capability also increases.

In planning data generation for this rulemaking, EPA considered requiring dischargers to perform monitoring and analyses for toxic pollutants under Section 308 of the Act. The Agency refrained from using this authority in developing these regulations because it desired to keep direct control over sample analyses due to the developmental nature of the methodology and the need for close quality control. Additionally, EPA believed that the slow pace and limited laboratory capability for toxic pollutant analyses would have hampered a mandatory sampling and analytical effort. Although EPA believes that the available data support these regulations, the Agency would have preferred a larger data base for some of the toxic pollutants and will continue to seek additional data. EPA will periodically review these regulations, as required by the Act, and make any revisions supported by new data. In developing these regulations, moreover, EPA has taken a number of steps to deal with the limits of science and available data.

V. Data Gathering Efforts

The data gathering effort is described in detail in Section IV of the Development Document. The effort consisted of two general phases—technical questionnaires sent to each of the refineries and sampling and analysis of wastewater streams at selected refineries.

(a) Technical Questionnaires. The purpose of the technical questionnaires was to characterize the industry and thus identify those factors which, pursuant to section 304 of the Act, must be considered in setting effluent limitations based on BAT, BCT, NSPS, PSES and PSNS. Questionnaires were sent to 299 facilities believed to be included in the petroleum refining point source category. Two hundred sixty completed questionnaires were returned; 25 did not return completed questionnaires and 14 claimed not to be operating refineries.

In addition to the engineering data needed to establish effluent limitations in accordance with the Act, the Agency also asked the refineries for any analytical data they may have collected measuring the presence and quantities of both traditional and toxic pollutants. It also asked the refineries to identify any raw materials used which could be a source of toxic pollutant discharge. The questions about raw materials were intended to form a basis for possible best management practices (BMP) regulations. BMP regulations might specify that alternate methods or raw materials be utilized to reduce or eliminate discharges of toxic pollutants (for example, in the refining industry, the use of organophosphate materials as biocides in cooling towers could be specified to replace the ones commonly used which contain chromium and zinc).

Although data existed on the presence and quantity of traditional pollutant parameters, very little data existed on either the presence or quantity of toxic pollutants. The major exceptions were the metallic toxic pollutants and phenol—many of which had been monitored as a result of previous water pollution abatement requirements.

(b) Sampling and Analysis. EPA selected seventeen direct discharging refineries to sample for the presence and concentration of toxic pollutants in untreated process wastewaters and to sample for the efficiency of current treatment methods in reducing the quantities of these pollutants. The seventeen refineries represent a range of the factors required for consideration by EPA in setting effluent limitations, including size, location and age of equipment and facilities. EPA also selected six of the seventeen refineries to determine the effectiveness of granular activated carbon in further reducing amounts of toxic pollutants after presently used treatment but before discharge to waters of the United States. In addition, the effluent from four of the six plants with activated sludge processes were tested to determine the effectiveness of powdered activated carbon. No refineries currently use either of these treatments; EPA therefore installed the equipment to treat a portion of these refineries' effluent. EPA also took samples of the intake water source from all of the direct discharging refineries. The samples were intended to determine what percentage, if any, of the toxic pollutants in a plant's untreated effluent was attributable to its presence in the intake water. In addition to the 17 refineries sampled by RSKERL, Effluent Guidelines Division and its contractors, 8 refineries were sampled by teams from Surveillance and Analysis Divisions in EPA regional offices. These teams sampled the refineries in the course of their checks of facilities for compliance with current wastewater treatment requiremens; the data collected was used to supplement other sources of information.

EPA also selected for sampling and analysis six indirect discharging refineries and the two POTWs into which they discharge. One POTW was a secondary plant (i.e., with biological treatment) and one was a primary plant (i.e., without biological treatment). The intent of this analysis was to determine the presence and concentration of toxic pollutants being discharged to POTWs by indirect discharging refineries and to measure the effectiveness of POTWs in removing these pollutants prior to their discharge into the waters of the United States. Additionally, the study involved sampling and analysis of the sludges produced by the POTWs.

During the above described sampling program, replicate samples at nine of the direct discharging refineries, three of the indirect discharging refineries, and one of the POTWs were given to representatives of the American Petroleum Institute and/or the company. These samples were analyzed separately by the industry and the results of the analyses at the nine direct discharging refineries have been made available to EPA by the American Petroleum Institute. Analyses of the duplicate samples from the POTW sampling program have not yet been reported to EPA.

(c) Results.—(1) Analytical Results. The analytical data obtained on the concentration of toxic pollutants show significant concentrations of these pollutants in untreated refinery wastewaters. They include, among others, volatile and extractable organics, heavy metals, and cyanide. Results of analyses for traditional pollutant parameters also confirm the findings of the previous study that significant concentrations of traditional pollutant parameters are found in untreated refinery wastes.

During trhe sampling and analysis phase of the data gathering effort, EPA found that BPT treatment substantially reduces toxic pollutant concentrations. Most toxic pollutants are reduced to near or below the concentrations considered accurate for use in the Analytical Protocol developed by the Agency. Discharge of toxic pollutants into U.S. waters continues after BPT treatment, however, even though at much reduced concentrations from that of untreated effluent. Appendix D is a list of toxic pollutants which were found in treated effluents at more than one refinery in concentrations greater than nominal analytical detection limits and in concentrations greater than in the intake water source. Also included in Appendix D are those pollutants found in only one refinery but which could not be attributed to factors unique to that refinery (See discussion of POLLUTANTS NOT REGULATED below).

Analytical results were compared to those reported by the American Petroleum Institute (API) from the duplicate samples taken at nine of the 17 refineries sampled by EPA. While the quantitative concentrations measured by the industry generally differed from those reported by EPA contract laboratories (industry concentrations show a tendancy to be higher than EPA concentrations), the conclusion drawn from the industry data is the same as EPA's. Industry data confirm that substantial concentrations of toxic pollutants are discharged in untreated refinery wastes; that BPT treatment makes substantial reductions in priority pollutant concentrations; and that toxic pollutants are still being discharged to the waters of the United States after BPT treatment.

Results of the analyses of samples taken from the two POTWs show that secondary POTWs reduce the concentration of the toxic pollutants discharged by refineries to similar levels as that achieved by the BPT technology employed by direct discharges. This result is based on refineries operating at existing PSES levels. The analysis also shows that primary treatment (both the primary treatment phase of the secondary POTW and the primary POTW) does not significantly remove many of the toxics discharged by indirect discharging refineries. Analyses of POTW sludges shows that substantial concentrations of priority pollutants (heavy metals) accumulate in sludges of POTWs employing either primary or secondary treatment.

(2) Achievable Pollutant Concentrations (Existing Treatment). EPA reevaluated the final concentrations of regulated pollutants now achieved by existing technology. The results of the data gathering effort indicate that, with one exception, BPT technology is achieving concentrations comparable to those on which the original BPT limitations were based. The data also indicates, however, that plants are currently achieving concentrations of 4AAP phenol far lower than that assumed for BPT. Although BPT limitations for 4AAP phenols were based on a concentration of 100 μg/l, the average 4AAP phenol concentration in the final effluent from the seventeen samples refineries was 19 μg/l. The results ranged from "no phenol detected" to 64 μg/l. Without consideration of any variability factors for short term fluctuations, all of the 17 refineries were meeting concentrations of 4AAP phenol less than the achievable concentrations assumed for BPT.

VI. Industry Subcategorization

In developing these regulations, EPA carefully evaluated characteristics of petroleum refineries to determine if subcategorization of the industry was appropriate. In most industries, factors which affect the ability of facilities to achieve technology-based limitations vary among groups of plants. In such cases, EPA will establish different effluent limitations or standards for the various groups (i.e., subcategories). Additionally, the establishment in the 1977 amendments to the Act of a "cost reasonableness" analysis for BCT limitations provides another basis for subcategorization. Where one group of plants has higher costs per pound of pollutant removal, different BCT limitations may be established. Essentially, subcategorization allows the Agency to more precisely fine tune the requirements of technology based limitations to the capacity of a diverse industry.

The study in support of the previous regulations (BPT, BAT, NSPS, and PSNS) concluded that only one factor of—the total effluent flow per unit of production—significantly affected the ability of the various plants in the industry to achieve effluent reductions. However, rather than establishing limitations for various groups of plants based on their flow, EPA developed five mathematical models which allowed the Agency to predict the total effluent flow of a petroleum refinery based on its size and process characteristics. The Agency, therefore, divided the industry into five subcategories—topping, cracking, petrochemical, lube and integrated. Each subcategory included the refineries whose flow was predicted by one of the five models.

In developing these regulations, EPA reviewed those factors, including BCT costs, which might warrant subcategorization of the industry. Again, the Agency concluded that total effluent flow per unit of production is the only factor which significantly affects a refinery's ability to achieve effluent limitations. After review of the previously developed mathematical models, EPA found that while these models adequately predicted effluent flows before application of BPT, they do not adequately predict current industry effluent flow rates. Thus, other models were considered.

In developing its flow model, EPA evaluated which of the petroleum refinery's production processes were most significant in predicting its total effluent flow. Over one hundred distinct processes were considered, as well as a considerable number of process groupings. Ultimately, the Agency's analysis identified four groups of process variables which form the basis of the proposed flow model. These are crude oil capacity, cracking capacity, asphalt capacity and lube capacity. Together, these four groups represent a total of 49 different processes. Although these processes do not necessarily represent the largest contributions to total flow, EPA found that their use in the mathematical model generated the most accurate predictions of that flow (See Summary of Public Participation section below).

This flow model represents the core of EPA regulations for the petroleum refining industry and it is used in two important ways. First, by comparing a plant's actual flow to its predicted flow, EPA is able to determine which plants have higher or lower flows than the average for comparable plants in the industry. EPA has used this information to determine the capacity of plants to reduce their level of flow to below that of the current industry average. (See BAT Effluent Limitations section below).

Second, EPA is using the model to determine specific effluent limitations for each plant in the industry. As with the previous regulations, EPA is using the model to adjust a facility's effluent limitations to account for its total wastewater generated per unit of production. (See Appendix H for sample calculations).

This model does adequately predict the flows of all direct discharging refineries. Since this single model supplants the five models which formed the basis for the previous subcategorization, the Agency concludes that no subcategorization of the industry is necessary with respect to effluent limitations and standards applicable to direct discharges.

Additionally, it is the Agency's general policy on pretreatment standards that such standards be expressed as concentration rather than mass limitations. (See 40 CFR Part 128.43 FR 27736). Since EPA has concluded that achievable concentrations of pollutants do not vary among classes of plants within the petroleum refining industry, subcategorization for pretreatment standards is not necessary.

VII. Available Waste Water Control and Treatment Technology

(a) *Status of In-Place Technology.* BPT regulations have been in effect since 1974 and there is significant uniformity in treatment performance among direct dischargers. Treatment is generally similar to the model BPT treatment. This includes in-plant control of ammonia and water use and end-of-pipe treatment consisting of oil/water separation, biological treatment, and a final polishing step (e.g. filtration). Many refineries have found that the polishing step is not necessary to meet BPT limitations, or that filtration is more effective before, rather than after, biological treatment. Types of biological treatment used in direct discharging refineries include activated sludge, aerated lagoons, oxidation ponds and trickling filters.

Current wastewater treatment practices by indirect dischargers generally are limited to physical oil/water separation and, in some cases, sour water stripping for ammonia and sulfide control. Substantial concentrations of organic toxic pollutants, metals, and cyanide were also found in the refinery wastes being discharged to POTWs.

(b) *Control Technologies Considered for Use in This Industry.* EPA identifed specific control and treatment technologies appropriate to the pollutants discharged by the petroleum refining industry. Some are currently in use in the petroleum refining industry and others have been successfully applied in other industries. The control and treatment technologies considered in the EPA study are the following:

(1) *Reuse and Recycle of Waste Waters.* Total effluent flow can be reduced by both in-plant control and the use of treated and untreated waste waters as alternative water sources for processes which currently use outside water sources. This is a demonstrated technology in the petroleum refining industry (examples include using treated effluent as make-up to cooling towers, pump gland cooling systems, washdown waters, and fire water systems).

Flow reduction is not a single, discrete option, but represents a range of options from no reduction to complete reduction (zero discharge). EPA has evaluated three levels of flow now met by refineries. These levels represent reductions of 27 percent, 52 percent and 100 percent (zero discharge) throughout the industry. In evaluating this option, EPA has assumed that a reduction in total flow will result in a corresponding reduction in total mass discharge of pollutants. A fuller discussion of this issue can be found in the development document and below in the summary of public participation section of this preamble.

(2) *Powdered Activated Carbon Enhancement of Biological Treatment.* Addition of powdered activated carbon to aerated biological systems, significantly improves the removal capabilities of biological treatment, as reported both in the petroleum refining and other industries.

(3) *Granular Activated Carbon Treatment After BPT Treatment.* This treatment technology has not been demonstrated in the petroleum refining industry. It has been used on a limited basis in other industries and in treatment of municipal water supplies.

(4) *Metals Removal.* The removal of metals (such as chromium and zinc) by pH adjustment, precipitation, and clarification is a demonstrated technology in the petroleum refining industry as well as other industries.

(5) *Biological Treatment (Pretreatment).* Wastewaters discharged to POTWs were found to contain high concentrations of toxic pollutants. These concentrations are significantly reduced at direct discharging refineries which use biological treatment.

The costs of applying these technologies were developed through compilation of cost data supplied by equipment manufacturers and by application of standard engineering data and cost estimation techniques. The technical contractor which supported EPA in the development of these proposed regulations has extensive experience in the preparation of engineering cost estimates.

None of the in-plant control or end-of-pipe treatment technologies considered in the development of these regulations is considered to be innovative. All of the in-plant controls and process modifications, as described in this preamble and, more specifically in the Development Document, have either been used or investigated for use in this industry and do not represent major process changes. The end-of-pipe treatment technologies have been applied in this industry or other industries.

VIII. BAT Effluent Limitations

The factors considered in assessing best available technology economically achievable (BAT) include the age of equipment and facilities involved, the process employed, process changes, non-water quality environmental impacts (including energy requirements) and the costs of application of such technology (Section 304(b)(2)(B)). In general, the BAT technology level represents, at a minimum, the best economically achievable performance of plants of various ages, sizes, processes or other shared characteristics. Where existing performance is uniformly inadequate, BAT may be transferred from a different subcategory or category. BAT may include process changes or internal controls, even when not common industry practice.

The statutory assessment of BAT "considers" costs, but does not require a balancing of costs against effluent reduction benefits (see *Weyerhaeuser* v. *Costle, supra*). In developing the proposed BAT, however, EPA has given substantial weight to the reasonableness of costs. The Agency has considered the volume and nature of discharges, the volume and nature of discharges expected after application of BAT, the general environmental effects of the pollutants, and the costs and economic impacts of the required pollution control levels.

Despite this expanded consideration of costs, the primary determinant of BAT remains effluent reduction capability. Effluent limitations for the petroleum refining industry are expressed as mass limitations, i.e., restrictions on the total quantity of pollutants which may be discharged. Since the total mass of most pollutants in an effluent stream depends on both the total effluent flow and the concentration of pollutants in that flow, the six options considered for BAT include various combinations of flow reduction and improved performance of waste treatment technology.

(a) BAT options considered. (1) *Option One*—Require effluent limitations based on an average flow reduction of 27 percent achieved through greater reuse and recycle of wastewater. This option would not require additional end-of-pipe treatment since limitations would be based upon the performance of BPT end-of-pipe technology; phenol (4AAP) limitations, however, would be based on a long term achievable concentration of 19 μg/l (See discussion under BAT Selection and Decision Criteria below). Effluent limitations on ammonia, sulfide, COD and pH would be set at BPT levels.

The level of flow for this option is now achieved by 50 percent of the facilities in the industry. The Development Document contains a fuller discussion of the manner in which figures were derived. Since treatment of pH, ammonia, and sulfide is based on process changes or in-plant controls, no further reduction from BPT levels would be achieved by a reduction in final effluent flow. EPA does not have sufficient data to conclude that the concentration of COD in treated effluent remains constant as flow is reduced. Consequently, COD, pH, ammonia, and sulfide limitations are being maintained at BPT levels. (See Summary of Public Participation).

For the 165 direct discharging refineries affected by this regulation, $19.3 million additional investment would be required with an annual cost of $7.7 million including interest and depreciation. This amounts to $.00005 per gallon of product. No closures would be expected. Refining capacity and consumption would remain unaffected.

(2) Option Two—Require effluent limitations based on an average 52 percent flow reduction achieved through greater reuse and recycle of wastewater. This option would not require additional end-of-pipe treatment since limitations would be based on the performance of BPT end-of-pipe technology. In-plant side stream treatment may be required in a small number of facilities to remove corrosive or scale forming constituents. Mass limitations on 4AAP phenol would be based on the 19 μg/l currently achieved by industry. Effluent limitations on ammonia, sulfide, COD and pH would be set at BPT levels.

The level of flow for this option is now achieved by 34 percent of the industry; an average reduction of 52 percent would be required throughout the industry.

Although precise costs have not yet been calculated for this option, EPA has concluded, based on its technological evaluation of the industry, that the costs for Option Two approximate those projected for Option three below. For the 165 direct discharging refineries affected by this regulation, $113.0 million additional investment would be required with an annual cost of $48.7 million including interest and depreciation. This amounts to $.0002 per gallon of product. No closures would be expected. Refining capacity and consumption would remain unaffected.

In order to confirm its assessment of costs EPA intends to conduct an engineering field survey of the costs associated with Option Two. This survey will be completed and a report prepared prior to final promulgation of these regulations. EPA will publish a notice in the Federal Register when the report is available to the public. Comments on the cost approximation for Option Two are requested (see solicitation of Comments section below).

(3) Option Three—Require effluent limitations based on a combination of OPTION ONE flow reduction and improved end-of-pipe treatment. Improved end-of-pipe treatment was evaluated with the use of powdered activated carbon (PAC). Several pilot studies have demonstrated this technology; it has been used at full scale by one plant in the industry. This combination of treatment produces mass limitations equivalent to those produced by flow reduction alone under Option Two.

For the 165 direct discharging refineries affected by this regulation, $113.0 million additional investment would be required with an annual cost of $48.7 million including interest and depreciation. This amounts to $.0002 per gallon of product. No closures would be expected. Refining capacity, and consumption would remain unaffected.

(4) *Option Four.*—Require mass limitations based on Option Two plus segregation and separate treatment of cooling tower blowdown. Cooling tower blowdown would be treated for metals (reduction of hexavalent chromium to trivalent chromium, pH adjustment, precipitation and clarification). Limitations for other process streams would be based on treatment in existing BPT treatment systems.

Treatment of segregated streams may result in the removal of more toxics than would use of biological treatment on a combined, more dilute, waste stream. Potential contamination of biological sludges by cooling tower biocides (generally containing chromium and zinc) would be reduced. Removal of organic toxic pollutants in the biological treatment system may be increased since the wastewater would not be diluted with cooling tower water prior to treatment.

EPA has not made a detailed cost analysis for this option. While the cost of metals treatment can be estimated, the cost of segregating cooling tower blowdown from other process streams cannot be estimated with available data. The engineering survey, described above (See Option 2) will also be used to collect data on the technical requirements and cost of cooling water segregation.

(5) *Option Five*—Require effluent limitations based on Option One flow reductions plus the addition of granular activated carbon (GAC) to control residual toxic organic pollutants dissolved in the wastewater discharged from Option 1 technology.

While GAC is not a demonstrated technology in the petroleum refining industry, it has been used in other industries and in treating municipal water supplies. EPA conducted pilot "treatability" tests at six refineries during the data gathering effort. Several technical articles have been published comparing GAC with other technologies in treating refinery wastes. Although results of the Agency study were inconclusive, it can be generally stated that toxic pollutant removal increases with the use of GAC. This removal, however, appears to be only marginally better than with PAC (Option Two) and the cost of GAC is much greater than PAC.

EPA evaluated the economic impact of this option during the previous round of guidelines (See Prior EPA Regulations discussion above). While EPA did not reevaluate the economic impact of this option, the earlier economic impact analysis predicted that some refineries could be expected to close if this option were adopted.

(6) *Option Six*—Require zero discharge from existing refineries. This could be achieved by further reuse and recycle, evaporation, and/or subsurface reinjection of wastewaters. Fifty-five existing refineries are now at zero discharge.

This is a demonstrated technology, but costs were not calculated for this option. While additional costs for building a new refinery to achieve zero discharge can be calculated (See New Source Performance Standards below), the costs of retrofitting an existing refinery are highly site specific. Costs, however, would be significantly higher than costs for applying any of the other options.

(b) BAT selection and decision criteria—EPA has selected Option Two as the basis for proposed effluent limitations. This option was selected because it was best supported by available data and because it affords further reduction in total pollutant discharges through the use of proven technology. It provides reasonable further progress towards the Clean Water Act's goal of the elimination of the discharge of pollutants. Further, these limitations are also technologically and economically achievable through the use of Option Three. Thus, all facilities have several ways to achieve this limitation. They may meet it totally through flow reduction or through a combination of flow reduction and improved treatment.

Available data show that existing treatment is reducing the concentration of 4AAP phenols to 19 $\mu g/l$ (See data gathering effort section above). Consequently mass limitations on phenols will be based on that achievable concentration. In order to validate this decision, EPA is presently requesting, under section 308 of the Act, that 37 refineries believed to have installed BPT model technology send data to EPA for further evaluation of what constitutes a proper achievable concentration of 4AAP phenols based on BPT treatment technology. That data will also allow EPA to make a determination of whether the variability factors used to determine daily and monthly fluctuations should be changed as a result of the lower concentrations. Mass limitations on all other pollutants are based on those final concentrations already part of the BPT limitations.

EPA does not have complete data on the cost of achieving these limitations solely through the use of flow reduction and requests comments on this matter. Further, EPA specifically requests comments and data regarding the proposed change in the achievable concentration of 4AAP phenol (see Solicitation of Comments section below).

Option Four still remains a serious candidate for the basis of final regulations. EPA has data establishing that greater quantities of metals and toxic organics can be removed when introduced into separate treatment systems at higher concentrations. EPA has only limited data on the costs required to segregate flows from cooling towers. This matter is presently under study and comments are requested.

Option Five was not selected because GAC allows only slightly better pollutant removal than PAC (Option Three) and because the cost of GAC is considerably higher than the cost of PAC.

Option Six was not selected because, in the Agency's judgment, the costs of retrofitting for zero discharge on a uniform national basis would be significantly higher than the selected option and may result in a substantial number of plant closures. Nevertheless, this option still remains a serious candidate for any subsequent revisions of BAT limitations, especially for certain sizes and/or types of plants.

IX. BCT Effluent Limitations

The 1977 amendments added section 301(b)(4)(E) to the Act, establishing "best conventional pollutant control technology" (BCT) for discharges of conventional pollutants from existing industrial point sources. Conventional pollutants are those defined in section 304(b)(4)—BOD, TSS, fecal coliform and pH—and any additional pollutants defined by the Administrator as "conventional." On July 30, 1978, EPA designated oil and grease as a conventional pollutant (44 FR 44501).

BCT is not an additional limitation; rather it replaces BAT for the control of conventional pollutants. BCT requires that limitations for conventional pollutants be assessed in light of a new "cost-reasonableness" test which involves a comparison of the cost and level of reduction of conventional pollutants from the discharge of publicly owned treatment works (POTW) to the cost and level of reduction of such pollutants from a class or category of industrial sources. As a part of its review of BAT for certain "secondary" industries, the Agency has promulgated a methodology for this cost test. (See 44 FR 50732, Aug. 29, 1979). The Agency compares industry costs with that of an "average" POTW with a flow of 2 mgd and costs (1977 dollars) of $1.18 per pound of pollutant removal (BOD and TSS).

EPA applied this methodology to the costs for removing conventional pollutants in the petroleum refining industry and concluded that BCT limitations based on a 52 percent reduction in total effluent flow by greater recycle and reuse of wastewaters (Option Two) or a 52 percent reduction in pollutants discharged by a combination of flow reduction and powdered activated carbon enhancement of activated sludges (Option Three) are reasonable. At this level, the total annualized cost for BCT technology is $48.7 million and EPA projects that 48.7 million pounds of BOD and TSS will be removed throughout the industry by Option Two technology. Based on these figures, the cost to pollutant reduction ratio for Option Two is $1.00 per pound of BOD and TSS removed (compared to a POTW cost of $1.18 per pound of BOD and TSS). Therefore, EPA proposes, BCT effluent limitations at the proposed BAT (Option Two) level. BCT investment, annualized costs, and economic impact are included in the BAT analyses.

X. New Source Performance Standards (NSPS)

The basis for new source performance standards (NSPS) under section 306 of the Act is the best available demonstrated technology. New plants have the opportunity to design the best and most efficient petroleum refining processes and wastewater treatment technologies; Congress, therefore, directed EPA to consider the best demonstrated process changes, in-plant controls, and end-of-pipe treatment technologies capable of reducing pollution to the maximum extent feasible.

(a) NSPS Options Considered. (1) *Option One*—Require performance standards based on the same technology proposed for BAT, including wastewater flow control by recycle and reuse of wastewaters after BPT treatment. As discussed under BAT Option Two, application of this technology will ensure a high degree of removal of toxic pollutants. Similar reductions in pollutant mass discharge can be achieved by BAT Option Three. This level of treatment is similar to current NSPS, and no additional expenditures are required due to these revised standards.

(2) *Option Two*—Require performance standards based on grandular activated carbon (BAT Option Five). As discussed under BAT Option Five, GAC allows somewhat better pollutant removals than NSPS Option One, but is considerably more expensive.

(3) *Option Three*—Require a performance standard of zero discharge. Unlike BAT Option Six, there is no cost of retrofitting to come into compliance with a zero discharge requirement. Zero discharge of refinery wastes is a demonstrated technology; fifty-five refineries have been identified by EPA which are currently achieving no discharge of wastewaters to U.S. waters. The American Petroleum Institute (API) has published a technical report which makes a detailed evaluation of the technologies capable of achieving no discharge of refinery wastes. The report also calculates the costs to be expected if those technologies were designed into a new refinery (i.e., without the need to retrofit existing equipment). This option

would require new source of the size and configuration likely to be built in the 1980's to incur additional investment of $9.5 million with an annual cost of $3.5 million including interest and depreciation. If a level of price protection is instituted that maintains industry capacity at current levels, these regulations will essentially have no effect, since new refineries will not be entering the industry in the foreseeable future. If a level of price protection is instituted that allows for growth in refinery capacity proportional to growth in consumption, the cost of compliance of $.001 a gallon will be reflected in higher product prices of the same amount.

(b) NSPS Selection and Decision Criteria—EPA has selected Option Three as the basis for proposed new source performance standards. Zero discharge is a demonstrated technology in the petroleum refining industry and, based on available data, can be economically achieved. Consequently, EPA believes that the Act requires that Option Three be the basis for NSPS. EPA, however, solicits other data which would support or refute the assumption that zero discharge is an achievable technology for new sources on a nationwide basis. Additionally, EPA solicits comments on the other options suggested. (See solicitation of comments section below.)

XI. Pretreatment Standards

Section 307(b) of the Act requires EPA to promulgate pretreatment standards for both existing sources (PSES) and new sources (PSNS) of pollution which discharge their wastes into publicly owned treatment works (POTWs). These pretreatment standards are designed to prevent the discharge of pollutants which pass through, interfere with, or are otherwise incompatible with the operation of POTWs. In addition, the Clean Water Act of 1977 adds a new dimension to these standards by requiring pretreatment of pollutants, such as heavy metals, that limit POTW sludge management alternatives. The legislative history of the Act indicates that pretreatment standards are to be technology based and, with respect to toxic pollutants, analogous to BAT. The Agency has promulgated general pretreatment regulations which establish a framework for the implementation of these statutory requirements. (See 43 FR 27736, June 26, 1978).

A determination of which pollutants may pass through or be incompatible with POTW operations, and thus be subject to pretreatment standards, depends on the level of treatment employed by the POTW. In general, more pollutants will pass through or interfere with a POTW employing primary treatment (usually physical separation by settling) than one which has installed secondary treatment (settling plus biological stabilization).

Section 301(b)(1)(B) of the Act requires most POTWs to have installed secondary treatment by July 1, 1977. There are, however, two groups of POTWs which have not yet met this requirement. One group remains subject to the obligation and contains POTWs which are scheduled to install secondary treatment within the next few years. A second group of POTWs will be exempt from the requirement to install secondary treatment. Under Section 301(h) of the Act, POTWs which discharge into marine waters may, under certain circumstances, receive a waiver from this requirement. EPA has promulgated regulations dealing with the issuance of section 301(h) waivers. (44 FR 34784, June 15, 1979).

(a) Pretreatment Options Considered. (1) *Option One*—Establish pretreatment for all refineries which requires metals (chromium) removal (pH adjustment, precipitation and clarification) and existing PSES controls of ammonia and oil and grease. Metals removal would be required only for cooling tower blowdown, since that is the major source of the heavy metals of concern—chromium and zinc. Under this option, organic priority pollutants would pass through primary POTWs which have not yet complied with Section 301(b)(1)(B) of the Act and those POTWs which are granted waivers under Section 301(h).

For the 53 indirect discharging refineries affected by this regulation $9.6 million additional investment would be required with annual costs of $5.2 million including interest and depreciation. No closures would be expected. A new indirect discharging refinery of the size and configuration likely to be built in the 1980's would incur additional investment of $0.3 million with annual costs of $0.2 million including interest and depreciation. Refining capacity and domestic consumption would be unaffected by this regulation.

(2) *Option Two*—Establish two pretreatment standards. Pretreatment for those refineries discharging into POTWs which have been granted waivers under Section 301(h) would be based on concentrations achievable after application of BPT technology. Pretreatment for other indirect discharging refineries would contain the limitations identified in Option One.

At this time the economic effects for this option are the same as for Option One, since there are no POTWs which have been granted waivers under Section 301(h). Costs were developed, however, for seven indirect discharging refineries to install biological treatment. These costs are presented in the Development Document.

(b) Selection of pretreatment technology and decision criteria—EPA has selected Option Two as the basis for pretreatment standards. Based on its sampling and analysis program, EPA has determined that pollutants found in petroleum refining wastes after present PSES treatment do not pass through secondary POTWs and that only metals limit the POTW sludge management alternatives. Consequently, for metals only, EPA is proposing additional pretreatment standards for indirect dischargers whose wastes go to POTWs employing secondary treatment.

The Agency additionally proposes that this limitation apply to those indirect dischargers whose wastes go to a primary POTW which is scheduled to install secondary treatment. Although EPA has determined that petroleum refining wastes pass through primary POTWs, the Agency believes that it woud be improper to require industrial sources discharging into such POTWs to install treatment systems which will be unnecessary when the POTWs come into compliance with the requirement of secondary treatment.

EPA is, however, proposing specific pretreatment standards based on application of BAT technology for those indirect dischargers whose wastes go to POTWs with 301(h) waivers. Since POTWs with 301(h) waivers will remain at primary treatment, only specific limitations on indirect dischargers will ensure that their wastes do not pass through into waters of the United States. Such standards, however, will apply only where a valid 301(h) waiver has been granted. Those sources discharging into a POTW which has a pending application for a 301(h) waiver will be subject to the generally less stringent pretreatment standards based on secondary treatment in the POTW until such time as the waiver is finally approved. The Agency requests comments on the approach it has adopted for determining which pollutants must be regulated through pretreatment standards. (See Solicitation of comments section below.

XII. Regulated Pollutants

The basis upon which the controlled pollutants were selected is set out in Section VI of the Development Document.

(a) *BAT.* EPA has selected two toxic pollutants for control of toxic discharges in the petroleum refining industry. Specific effluent limitations are being established for total phenol (4AAP) and chromium (both total chromium and hexavalent chromium). These pollutants are subject to limitations expressed in kilograms per 1000 cubic meters of raw material.

Pollutants which have the same requirement under BPT and BAT include COD, ammonia and sulfide.

(b) *BCT.* The pollutants selected for control by BCT technology are those pollutants limited by BPT which have been classified as conventional pollutants—BOD*5*, TSS, and oil and grease. These pollutants are subject to limitations expressed in kilograms per 1000 cubic meters of raw material. Additionally, a BCT limitation for pH is set at BPT levels.

(c) *Pretreatment Standards.* In establishing existing PSES, EPA found that ammonia and oil and grease interfere with the operation of POTWs at levels which may be discharged by indirect dischargers in the petroleum refining industry. Although the existing PSES also contain a technology based limitation for chromium, this limitation was included only as guidance to those POTWs which found it necessary or desirable to limit chromium. The Agency proposes that the chromium limitation now be adopted as a mandatory pretreatment standard since EPA has found that chromium accumulates in POTW sludges and will limit the sludge management alternatives of the POTW. The same pollutants (chromium, oil and grease, and ammonia) are also selected for control in PSNS. The pretreatment standards are expressed as maximum daily concentrations (milligrams per liter). Informational mass limitations are also provided for those POTWs which find it necessary or desirable to limit total mass discharge of pollutants.

(d) *NSPS.* Since the new source performance standard is zero discharges all pollutants are regulated.

XIII. Pollutants Not Regulated

The Settlement Agreement contained provisions authorizing the exclusion from regulation, in certain instances, of toxic pollutants and industry subcategories. These provisions have been re-written in a Revised Settlement Agreement which was approved by the District Court for the District of Columbia on March 9, 1979.

It should be noted that the limitations in this regulation has been developed to cover the general case for this industry subcategory. In specific cases, it may be necessary for the NPDES permitting authority to establish permit limits on toxic pollutants which are not subject to limitations in this regulation. (See relationship to NPDES permits section).

(a) *BAT Limitations.* Paragraph 8(a)(iii) of the Revised Settlement Agreement allows the Administrator to exclude from regulation toxic pollutants not detectable by Section 304(h) analytical methods or other state-of-the-art methods. Data collected by EPA, the American Petroleum Institute, and individual companies were used in making decisions not to regulate specific toxic pollutants. Eighty-five toxic pollutants were not found at any of the seventeen refineries sampled. These pollutants are excluded, therefore, from regulation and are listed in Appendix B to this notice.

Paragraph 8(a)(iii) of the Revised Settlement Agreement also allows the Administrator to exclude from regulation toxic pollutants detected in the effluent from a small number of sources and uniquely related to those sources. Appendix C lists the 7 toxic pollutants which satisfy this criterion. Although certain other pollutants were found in the treated effluent at only one refinery, their presence in the untreated effluent of a number of facilities indicate that they are not uniquely related to that source.

Paragraph 8(a)(iii) of the Revised Settlement Agreement also allows the Administrator to exclude from regulation toxic materials which were detected but for which no treatment technology is known to the Administrator that will reduce discharges of the pollutant. Cyanide is discharged in significant amounts by the petroleum refining industry (see Section VI of the Development Document) but EPA is not aware of any end-of-pipe technology which will reduce cyanide discharges beyond those presently discharged by the petroleum refining industry. Based on the available data, EPA is not able to determine which processes generate cyanide found in the untreated waste. EPA, however, plans to continue study of this problem to determine whether cyanide discharges can be reduced by in-plant control.

Paragraph 8(a)(iii) of the Revised Settlement Agreement also allows the Administrator to exclude from regulation toxic pollutants which will be effectively controlled by the technology upon which are based other effluent limitations. The Agency believes that the technology upon which BAT effluent limitations for phenol (4AAP) and chromium are based will effectively control the organic and metallic toxic pollutants listed in Appendix D. The toxic pollutants listed in Appendix D are, therefore, excluded from regulation.

(b) *Pretreatment Standards.* On the basis of sampling at six refineries which practice indirect discharge and two POTWs, the Agency concludes that the organic priority pollutants listed in Appendix F discharged by refineries in compliance with existing PSES do not pass through or interfere with a secondary POTW. The Agency proposes in this notice to require pretreatment standards which limit the same pollutants at the same concentrations as interim final PSES. The pollutants limited under PSES include oil and grease and ammonia. Additionally, EPA establishes a standard for total chromium based on interim final PSES guidance. As with BAT, EPA will continue to study methods for reducing the discharge of cyanides.

This standard, however, only applies to those refineries which discharge into a POTW which is required by the Act to achieve effluent limitations based on secondary treatment. Appendix G is a list of those priority pollutants which were found to pass through POTWs which only apply primary treatment. Therefore, the Agency concludes that existing regulations cannot be used to exclude these pollutants from regulation when a POTW has been granted an exemption under section 301(h) of the Act from the requirement to achieve effluent limitations based on secondary treatment. As discussed above (Regulated pollutants section) the Agency proposes to limit the toxic pollutant total phenol (4AAP). As in the case of BAT, the Agency believes that the technology upon which pretreatment standards for phenol (4AAP) and chromium are based will effectively control the other organics and metals listed in Appendix F.

XIV. Non-Water Quality Aspects of Pollution Control

The elimination or reduction of one form of pollution may aggravate other environmental problems. Therefore, sections 304(b) and 306 of the Act require EPA to consider the non-water quality environmental impacts (including energy requirements) of certain regulations. In compliance with these provisions, EPA has considered the effect of these regulations on air pollution, solid waste generation, and energy consumption. This proposal was circulated to and reviewed by EPA personnel responsible for non-water quality environmental programs. While it is difficult to balance pollution problems against each other and against energy utilization, EPA is proposing regulations which it believes best serve often competing national goals.

The following are the non-water quality environmental impacts (including energy requirements) associated with the proposed regulations:

Air Pollution—Imposition of BAT, BCT, NSPS, and pretreatment standards will not create any additional air pollution problems.

Solid Waste—A study by EPA's Office of Air Quality and Standards shows that considerable amounts of solid wastes are already being generated by the petroleum refining industry. Some of this solid waste is generated by current wastewater treatment equipment, but the majority is generated by other sources such as process sources, storage tank bottoms, etc. Proposed BAT and PSES will increase these wastes by as much as 15,000 metric tons per year beyond BPT levels. Most of this amount will be additional sludge from the use of powdered activated carbon, if used (BAT OPTION THREE) as an alternative to some of the flow reduction in BAT OPTION TWO. These sludges will contain additional organic toxic pollutants and some additional metals.

On the other hand, EPA estimates that implementation of proposed pretreatment standards will result in POTW sludges having lesser quantities and concentrations of toxic pollutants. POTW sludges will become more amenable to a wider range of disposal alternatives, possibly including beneficial use on agricultural lands.

Energy Requirements—EPA estimates that the achievement of proposed BAT and BCT effluent limitations will result in a net increase in electrical energy consumption of approximately 28.4 million kilowatt-hours per year. Proposed pretreatment standards are projected to add another 1.9 million kilowatt-hours to electrical energy consumption for existing indirect dischargers.

XV. Costs, Effluent Reduction Benefits, and Economic Impact

Executive Order 12044 requires EPA and other agencies to perform Regulatory Analysis of certain regulations. 43 FR 12661 (March 23, 1978). EPA's proposed regulations for implementing Executive Order 12044 require a Regulatory Analysis for major significant regulations involving annual compliance costs of $100 million or meeting other specified criteria. 43 FR 29891 (July 11, 1978). Where these criteria are met, the proposed regulations require EPA to prepare a formal Regulatory Analysis, including an economic impact analysis and an evaluation of regulatory alternatives. The proposed regulations for the petroleum refining industry do not meet the proposed criteria for a formal Regulatory Analysis. Nonetheless, this proposed rulemaking satisfies the formal Regulatory Analysis requirements.

EPA's economic impact assessment is set forth in *Economic Analysis of Proposed Revised Effluent Standards and Limitations for the Petroleum Refining Industry* November 1979, EPA 440/2-79-027. This report details the investment and annual costs for the industry as a whole and for individual plants covered by the proposed petroleum refining regulations. The data underlying the analysis were obtained from the "Estimation of Costs Associated with the Application of BAT Limitations for the Petroleum Refining Point Source Category on a Plant-by-Plant Basis", March, 1979 and supplements, publicly available economic information, and data from the Agency survey of the industry. The report assesses the impact of compliance costs in terms of plant closures, production changes, price changes, employment changes, local community impacts, and balance of trade effects.

Refined petroleum products hold such economic importance in our society that price fluctuations tend to have serious consequence; as a result, the U.S. government stringently controls the industry. Some of the major economic controls on the industry are crude oil price controls, product price controls, and price protection from imported refined products. The economic analysis assumes that crude oil and product price controls will be essentially eliminated by the time these regulations require compliance, but considers two scenarios of price protection. The first scenario assumes a level of price protection for domestic refineries that maintains the current capacity. The second scenario assumes a level of price protection such that capacity increases parallel to the increase in total domestic consumption. The economic impacts of the regulations, including refinery closings, are discussed separately for each of these scenarios. A more complete discussion of possible future scenarios and the selection of these two is presented in the Economic Analysis.

Refinery closures are evaluated on an individual refinery basis. Refineries with costs of more than $.001 per gallon are analyzed in detail including a comparison of the estimated cash flow per unit of production with unit costs of complying with the regulations. If the refinery generates a cash flow greater than the unit costs of compliance, it is not considered a potential closure.

For new sources, EPA considers the impact of the regulations on the costs of production of new capacity. The Department of Energy has predicted that during the period form 1985 to 2000 most of the growth of petroleum product consumption will be in gasoline, distillate fuels, and petrochemical feedstocks. In keeping with this prediction, the economic analysis for new sources was based on a 190,000 barrel a day refinery with a configuration appropriate for emphasizing production of these products.

Of the 285 domestic refineries, 218 are expected to incur additional costs to comply with these regulations. The investment required would be $132.2 million with an annual cost of $53.9 million including interest and depreciation. No refinery closures would be expected due to these regulations and the equivalent of 610 jobs to operate pollution control equipment would be added to current industry employment of 160,000. Other economic effects would depend on the course of public policy regarding refineries and are discussed below.

Scenario One—The first economic scenario assumes tariffs on imported goods are set in a manner that gives the industry a relatively low level of protection from imported products. As a result, current refining capacity is maintained and no new sources enter the industry. Price leves are unaffected by these proposed regulations, and the average pollution control cost of $.0002 a gallon is absorbed by the refineries. The proposed regulations would not affect refining capacity, domestic consumption, or the balance of trade.

1. BAT/BCT—EPA estimates that 165 directly discharging refineries would incur additional costs to meet these requirements. Additional investment would be $113.0 million with annual costs of $48.7 million including interest and depreciation. These costs would be absorbed by the refineries rather than passed on as price increases. None of the refineries would be expected to close due to these regulations and refinery capacity would remain unchanged.

2. PSES—Approximately 53 indirect discharging refineries would incur additional costs to meet these requirements. Additional investment would be $9.6 million with annual costs of $5.2 million including interest and depreciation. These costs would be absorbed by the refineries rather than passed on as price increases. None of these refineries would have compliance

costs of $.001 or more per gallon of product. None of the refineries would be expected to close due to the regulation and refinery capacity would remain unchanged. Since prices would be unaffected, domestic consumption and the balance of trade would also remain unchanged by these regulations.

3. NSPS/PSNS—Since refinery capacity is held at current levels for this scenario, no major new capacity is constructed. These new source requirements then have no economic effects.

Scenario Two—The second economic scenario allows for a level of industry price protection such that refining capacity grows at the same rate as domestic consumption. In other words, domestic refineries retain the same share of the domestic market as they do now. In this scenario the price level is set high enough to attract new refineries, with new source pollution control equipment, into the industry. These proposed regulations increase the cost of production at new refineries by $.0001 to $.001 a gallon of product, and raise the industry-wide price level by the same amount.

1. BAT/BCT—EPA estimates 165 direct discharging refineries would incur additional costs to meet these requirements. Additional investment would be $113.0 million with an annual cost of $48.7 million including interest and depreciation. None of this cost is absorbed by the refineries, however, since the price level is set high enough to attract new refineries. Existing refineries would be in a much more favorable financial situation compared to Scenario One because of the elevated price levels necessary to attract new refineries to the industry. No closures would be expected, and capacity, domestic consumption, and the balance of trade would be unchanged by these BAT/BCT regulations.

2. PSES—Approximately 53 indirect discharging refineries would incur additional costs to meet these requirements. Additional investment would be $9.6 million with annual costs of $5.2 million including interest and depreciation. As with direct dischargers, none of this cost is absorbed by the refineries. No closures would be expected, and capacity, domestic consumption, and the balance of trade would remain unchanged by these PSES.

3. New Sources—In economic Scenario Two, refinery capacity grows at the same rate as domestic consumption, encouraged by price increases due to higher tariffs. New capacity brought on stream is either a zero discharge facility (since NSPS allows no discharge) or a facility subject to PSNS. The additional costs and resulting price increases are based on a 190,000 barrel a day refinery configured to emphasize products for which additional capacity is most needed. If this new refinery would discharge to a municipal treatment system, an additional $0.3 million investment would be required with annual costs of $0.2 million including interest and depreciation. This would amount to $.0001 per gallon. Price increases would be no more than $.0001 a gallon due to PSNS. If this refinery is at an acceptable site from which it could not discharge to a municipal treatment system, the refinery would have to achieve zero discharge to be in compliance with NSPS. Additional investment of $9.5 million with annual costs of $3.5 million including interest and depreciation would be required as compared to the costs of meeting current NSPS. This would amount to $.001 per gallon, causing price increases of up to $0.001 a gallon. Depending on sites available for new refineries, prices would increase from $.0001 to $.001 per gallon.

Effluent Reduction Benefits

EPA estimates that achievement of BAT effluent limitations will remove approximately 123,300 pounds per year of chromium, 86,180 pounds per year of phenols (total-4AAP), and substantial quantities of other toxic pollutants. EPA estimates that achievement of BCT effluent limitations will remove approximately 48.7 million pounds per year of conventional pollutants.

XVI. Best Management Practices

Section 304(e) of the Clean Water Act authorizes the Administrator to prescribe "best management practices" ("BMPs"), described under Authority and Background. EPA intends to develop BMPs which are: (1) applicable to all industrial sites; (2) applicable to an designated industrial category; and (3) capable of guiding permit authorities in establishing BMPs required by unique circumstances at a given plant.

EPA is considering promulgating BMPs specific to the petroleum refining industry at some time in the future. One area of concern is the potential for leaks and spills of toxic pollutants stored in on-site facilities and not subject to controls under section 311(j)(1)(c) of the Act. Another process which might be controlled by BMPs is cooling tower blowdown. It is possible that refineries could be required to monitor for chromium and zinc in both cooling tower blowdown and in effluent discharge. In the event of persistently high discharges of these compounds, the permitting authority may require that certain refineries cease using corrosion inhibitors which contain zinc and chromium and use alternate organophosphate corrosion inhibitors or other alternates. Additionally, EPA may promulgate BMPs requiring dikes, curbs, or other measures to contain leaks and spills of toxic pollutants not controlled under section 311(j)(1)(c) of the Act.

XVII. Upset and Bypass Provisions

An issue of recurrent concern has been whether industry guidelines should include provisions authorizing noncompliance with effluent limitations during periods of "upset" or "bypass." An upset, sometimes called an "excursion," is unintentional noncompliance occurring for reasons beyond the reasonable control of the permittee. It has been argued that an upset provision in EPA's effluent limitations guidelines is necessary because such upsets will inevitably occur due to limitations in even properly operated control equipment. Because technology-based limitations are to require only what technology can achieve, it is claimed that liability for such situations is improper. When confronted with this issue, courts have divided on the question of whether an explicit upset or excursion exemption is necessary or whether upset or excursion exemption is necessary or whether upset or excursion incidents may be handled through EPA's exercise of enforcement discretion. Compare *Marathon Oil Co.* v. *EPA*, 564 F. 2d 1253 (9th Cir. 1977) with *Weyerhaeuser* v. *Costle, supra.* and *Corn Refiners Association, et al.* v. *Costle*, No. 78-1069 (8th Cir., April 2, 1979). See also *American Petroleum Institute* v. *EPA*, 540 F. 2d 1023 (10th Cir. 1976); *CPC International, Inc.* v. *Train*, 540 F. 2d 1320 (8th Cir. 1976); *FMC Corp.* v. *Train*, 539 F. 2d 973 (4th Cir. 1976).

While an upset is an unintentional episode during which effluent limits are exceeded, a bypass is an act of intentional noncompliance during which waste treatment facilities are circumvented in emergency situations. Bypass provisions have, in the past, been included in NPDES permits.

EPA has determined that both upset and bypass provisions should be included in NPDES permits and has recently promulgated NPDES regulations which include upset and bypass permit provisions 44 FR 3285, (June 7, 1979). The upset provision establishes an upset as an affirmative defense to prosecution for violation of technology-based effluent limitation. The bypass provision authorizes bypassing to prevent loss of life, personal injury or severe property damage. Consequently, although permittees in the petroleum refining industry will be entitled to upset and bypass provisions in NPDES permits, these proposed regulations do not address these issues.

XVIII. Variances and Modifications

Both BAT and BCT effluent limitations are subject to EPA's "fundamentally different factors" variance. See *E. I. du Pont de Nemours and Co.* v. *Train*, 430 U.S. 112 (1977); *Weyerhaeuser Co.* v. *Costle, supra*. This variance recognizes factors concerning a particular discharger which are fundamentally different from the factors considered in this rulemaking. Although this variance clause was set forth in EPA's 1973–1976 industry regulations and will not be included in the petroleum refining or other industry regulations. See the final NPDES regulations at 44 FR 32854, 32950 (June 7, 1979), for the text and explanation of the "Fundamentally different factors" variance. Final NPDES regulations will be promulgated shortly.

Pretreatment standards for existing sources are subject to the "fundamentally different factors" variance and credits for pollutants removed by POTW's. See 40 CFR 403.7, 403.13; 43 FR 27736 (June 26, 1978). Pretreatment standards for new sources are subject only to the credits provision in 40 CFR 403.7. New source performance standards are not subject to modification through EPA's "fundamentally different factors" variance or any statutory or regulatory modifications. See *duPont* v. *Train, supra*.

XIX. Relationship to NPDES Permits

The BAT, BCT, and NSPS limitations in these regulations will be applied to individual petroleum refining plants through NPDES permits issued by EPA or approved state agencies, under section 402 of the Act. Upon the promulgation of final regulations, the numerical effluent limitations must be applied in all federal NPDES permits thereafter issued to petroleum refining direct dischargers. Permits issued by States with NPDES authority may contain more stringent limitations than those proposed here. In addition, on promulgation, the pretreatment limitations are directly applicable to indirect dischargers.

The previous section discussed the availability of variances and modifications from national limitations, but there are other issues relating to the interaction of these regulations and NPDES permits. One matter which has been subject to different judicial views is the scope of NPDES permit proceedings in the absence of effluent limitations guidelines and standards. Under currently applicable EPA regulations, states and EPA Regions issuing NPDES permits prior to promulgation of these regulations must include a "re-opener clause," providing for permits to be modified to incorporate "toxics" regulations when they are promulgated. See 43 FR 22159 (May 23, 1978). To avoid cumbersome modification procedures, EPA has adopted a policy of issuing short-term permits, with a view toward issuing long-term permits only after promulgation of these and other BAT regulations. The Agency has published rules designed to encourage states to do the same. See 43 FR 58066 (Dec. 11, 1978). However, in the event that EPA finds it necessary to issue long term permits prior to promulgation of BAT regulations, EPA and states will follow essentially the same procedures utilized in many cases of initial permit issuance. The appropriate technology levels and limitations will be assessed by the permit issuer on a case-by-case basis, on consideration of the statutory factors. See *U.S. Steel Corp.* v. *Train*, 556 F. 2d 822, 844, 854 (7th Cir. 1977). In these situations, EPA documents and draft documents (including these proposed regulations and supporting documents) are relevant evidence, but not binding, in NPDES permit proceedings. See 44 FR 32854 (June 7, 1979).

Another noteworthy topic is the effect of these regulations on the power of NPDES permit issuing authorities. The promulgation of these regulations does not restrict the power of any permit-issuing authority to act in any manner not inconsistent with law or these or any other EPA regulations, guidelines or policy. For example, the fact that these regulations do not control a particular pollutant does not preclude the permit issuer from limiting such pollutant on a case-by-case basis, when necessary to carry out the purposes of the Act. In addition, to the extent that state water quality standards or other provisions of state or Federal law require limitation of pollutants not covered by these regulations (or require more stringent limitations on covered pollutants), such limitations *must* be applied by the permit-issuing authority.

With respect to monitoring requirements, the Agency intends to establish a regulation requiring permittees to conduct additional monitoring when they violate permit limitations. The provisions of such monitoring requirements will be specific for each permittee and may include analysis for some or all of the toxic pollutants or the use of biomonitoring techniques. The additional monitoring is designed to determine the cause of the violation, necessary corrective measures, and the identity and quantity of toxic pollutants discharged. Each violation will be evaluated on a case-by-case basis by the permitting monitoring contained in the permit is necessary. A more lengthy discussion of this requirement appears at 44 FR 34407, (June 14, 1979).

One additional topic that warrants discussion is the operation of EPA's NPDES enforcement program, many aspects of which have been considered in developing these regulations. The Agency wishes to emphasize that, although the Clean Water Act is a strict liability statute, the initiation of enforcement proceedings by EPA is discretionary. EPA has exercised and intends to exercise that discretion in a manner which recognizes and promotes good faith compliance efforts and conserves enforcement resources for those who fail to make good faith efforts to comply with the Act.

XX. Summary of Public Participation

On April 21, 1978, EPA circulated a draft technical development document to interested parties, including the American Petroleum Institute (API), the Natural Resources Defense Council (NRDC), and affected state and local authorities. That document did not include recommendations for specific effluent limitations and pretreatment standards. Instead it presented the technical basis for these proposed regulations. A public meeting was held on June 1, 1978 for presentation and discussion of comments by interested parties. A brief summary of major comments is presented below. The Agency received a number of comments relating to specific technical information in the Development Document. These have not been summarized here but have been considered in revising the Development Document.

(1) Comment—A number of participants expressed concern about the limited amount of data available to the Agency for establishing BAT limitations and pretreatment standards, especially for toxic pollutants.

Response—EPA recognizes that the data base for toxic pollutants is limited. Data limitations result from a history of infrequent monitoring or regulation, and the high costs, sophistication, time delays, and limited laboratory availability for toxic pollutant analyses. The Agency has sought and utilized all available data, except to the extent that it has not required mandatory sampling and analyses under Section 308 of the Act. EPA solicits additional voluntary data submissions.

(2) Comment—Reductions in flow have not been documented to result in reductions in pollutant discharge, particularly for Chemical Oxygen Demand.

Response—As stated in the section Available Waste Water Control and Treatment Technology, the Agency has concluded that effluent concentraton from a given size treatment system will not change as effluent flow is decreased. EPA has recognized that Chemical Oxygen Demand may be an exception and is not regulating COD until sufficient information is available to establish the relationship between effluent COD concentration and flow reduction. A technical paper is referenced in the Development Document describing measurements made at one refinery which significantly decreased effluent flow (increased reuse/recycle of wastewaters). That refinery reported that effluent concentrations of all pollutants remained constant after the flow reductions except COD. Total COD discharged was reduced but not in direct proportion to the flow reduction.

(3) Comment—Wastewater reduction and reuse may require extensive additional treatment before it can be used for some applications. In areas where there is a scarcity of suitable raw water, extensive treatment of wastewater for reuse may be economically justified. However, there is a point considerably short of total recycle where it becomes uneconomical to treat wastewater for reuse.

Response—EPA recognizes that the establishment of BAT and NSPS considers factors such as cost and that zero discharge while technically feasible (some refineries have already achieved it) may require very high costs (particularly retrofit costs for existing refineries). EPA has carefully considered costs of technology options in selecting BAT and NSPS technologies. Thus, EPA is proposing a stepwise approach toward higher recycle rates for existing refineries and zero discharge of pollutants only for new sources (see discussion under Option Two of Best Available Technology Economically Achievable and Option Three of New Source Performance Standards).

(4) Comment—Numerous comments were received stating that the flow model presented in the Draft Development Document was invalid for a number of statistical and technical reasons. The comments also stated that some of the data used in the model were not correct.

Response—EPA has mailed to each refinery which responded to the original questionnaires a printout of important information which EPA used to characterize their refinery and has asked them to verify or correct the information. Considerable additional flow modeling effort has also been expended with the result that a much improved flow model represents the basis for these proposed regulations. EPA will continue its flow modeling efforts, and any improvement will be reflected in the final regulations.

(5) Comment—All major sources of wastewater are not represented as variables in the flow model.

Response—The intent of the flow model is not to identify and quantify each source, or even major source, of wastewater in the refinery. The variables contained in the model are not necessarily the major contributors of wastewater (cooling tower blowdown, for example, although generally one of the largest contributors to wastewater flow is not a variable). The intent is to determine, if possible, the total refinery effluent flow by using a number of process or other variables. By considering the variables in the model (49 processes in 4 groups), the model does predict the effluent flow within statistical acceptability.

(6) Comment—Effluent limitations are obtained by multiplying achievable values of three parameters—(1) wastewater flow, (2) pollutant concentration, and (3) a variability factor to account for short term fluctuations in pollutant concentration. Wastewater flow rates also vary and an additional variability factor should be used to account for fluctuations in wastewater flow.

Response—Pollutant concentrations in final wastewater flow will vary somewhat even with good operation of the treatment system. Additional variability will occur in poorly operated treatment systems. The variability factors used to establish these proposed regulations are intended to account only for uncontrollable variations in pollutant concentrations. The Agency believes that where variations can be controlled with available technology, these sources of variation should be controlled. A large part of the variation in effluent flow (about 75% of the variation) is attributable to variations in amount of crude oil processed. This variation will be considered by the establishment of limitations based on the mass pollutant discharged per unit of crude oil processed (kg of pollutant/1,000 cubic meters of crude throughput).

Technology is available to control the remaining variation in effluent flow. That technology is equalization—providing a large storage volume for the effluent and controlling the rate of discharge. Equalization was considered as a part of BPT technology, and costs and economic impacts for equalization were calculated when BPT was promulgated. Based on the use of equalization, no variability factors were used for flow variations in establishing BPT limitations, and the Agency believes that none are necessary in these regulations if available BPT technology is used.

XXI. Solicitation of Comments

EPA invites and encourages public participation in this rulemaking. The Agency asks that any deficiencies in the record of this proposal be pointed to with specificity and that suggested revisions or corrections be supported by data.

EPA is particularly interested in receiving additional comments and data on the following issues:

(1) The Agency is reviewing the sampling and analytical methods used to determine the presence and magnitude of toxic pollutants, and solicits comments on the data produced by these methods, and the methods themselves.

(2) The Agency is considering the possibility of establishing numerical effluent limitations for toxic pollutants other than phenol and chromium. The Agency is considering mass limitations for the following additional toxic pollutants: ethylbenzene, 50 $\mu g/l$; naphtalene, 50 $\mu g/l$; 2,4 dimethylphenol, 50 $\mu g/l$; benzene, 50 $\mu g/l$; toluene, 50 $\mu g/l$. The concentrations being considered are thirty day average concentrations. Mass limitations would be calculated by multiplying the concentrations by the achievable flow for the selected option. Daily maximum limitations would be calculated by multiplying the thirty day limitation by a variability factor to account for daily fluctuations in pollutant concentration. The technical bases for these limitations

are presented in the development document. EPA requests comments on these limitations and their bases.

(3) In recognition of the limits of available data and the expense of monitoring for the toxic pollutants listed in solicitation of comment (2) above, EPA is also considering the possibility of regulating those toxic pollutants with limitations on "indicator" pollutants rather than or as an alternative to limitations on the specific toxic pollutants discussed above. The sampling and analysis data (see Data Gathering Efforts section above) show that when concentrations of certain traditional pollutants are reduced, concentrations of toxic pollutants are also reduced. While relationships between "indicator" pollutants and toxic pollutants may not be quantifiable on a one-to-one basis, control of the "indicator" would reasonably assure control of toxics with similar physical and chemical properties responsive to similar treatment mechanisms (e.g.: 2,4 dimethyl phenol is treated by biodegradation and could be controlled with BOD5 as an "indicator" of biodegradation performance). This method of toxics regulation could obviate the difficulties, high costs, and delays of monitoring and analysis that could result from limitations solely on the toxic pollutants. Specifically, EPA is considering limitations on oil and grease, total suspended solids, biochemical oxygen demand, and total organic carbon as "indicator" pollutants. Limitations would be based on "indicator" pollutant concentrations and flows achievable with technologies identified as BAT and BADT (See Best Available Technology Economically Achievable and New Source Performance Standards sections above). It is the Agency's position that when used as "indicator" pollutants, BAT limitations may be established for conventional pollutants without regard to the BCT cost test. Moreover, when non-toxic, non-conventional pollutants (such as total organic carbon) are used as "indicator" pollutants, it is the Agency's position that such limitations are not subject to Section 301(c) or Section 301(g) modifications. EPA requests comments on the use of specific limitations on the discharge of "indicator" pollutants as an alternative to limitations on the toxic pollutants described above in this section.

(4) A study by an industry trade association (the American Petroleum Institute) (API) concludes that for new refineries total recycle (no discharge) is not only technically feasible, but may be economically more favorable than treatment for discharge to U.S. waters; fifty-five existing refineries already practice zero discharge. EPA specifically solicits comments and data which would support or refute the achievability of no discharge on a nationwide basis for new refineries. Comments on the other options identified for new source standards are also solicited.

(5) As stated in the section Data Gathering Efforts, EPA found that the seventeen refineries sampled during the data gathering effort were achieving a significantly lower effluent concentration of total phenol (4AAP) than that assumed in establishing BPT limitations. Other technical studies have reached the same conclusion. Therefore, the Agency is proposing to use 19 $\mu g/l$ as the achievable long term concentration for total phenol (4AAP). EPA requests comments and data which would either verify or refute the assumption that a lower concentration of total phenol (4AAP) is achievable in petroleum refineries.

(6) EPA assumes that POTWs have installed secondary treatment in deciding whether pollutants pass through or are incompatible with POTWs. EPA makes this assumption regardless of whether a refinery is actually discharging into a POTW with secondary treatment. The only exception to this assumption would be if a refinery discharges into a POTW which is not required by the Clean Water Act to achieve effluent limitations based on secondary treatment. These are refineries discharging into a POTW which has received a waiver under section 301(h) of the Act. (See discussion under Pretreatment Standards above). EPA solicits comments on this approach to selecting pollutants for control by pretreatment standards.

(7) Possible underestimation of control technology costs was an issue raised during the public comment meeting and in written comments. In order to perform a meaningful comparison of EPA cost data and industry cost data, EPA requests detailed information on salient design and operating characteristics; actual installed cost (not estimates of replacement costs) for each unit treatment operation or piece of equipment, the date of installation and the amount of installation labor provided by plant personnel; and the actual cost for operation and maintenance, broken down into units of usage and cost for energy (kilowatt hours or equivalent), chemicals, and labor (work-years or equivalent).

(8) The Agency is considering best management practices (BMPs) for specific application in this industry (see Best Management Practices). EPA requests comments on the clarity, specificity, and practicability of these BMPs, as well as information and suggestions concerning additional BMPs which may be appropriate.

(9) EPA has obtained from the industry a substantial data base for the control and treatment technologies which serve as the basis for the proposed regulations. Plants which have not submitted data, or which have compiled data more recent than that already submitted, are requested to forward these data to EPA. These data should be individual data points, not averages or other summary data, including flow, production, and all pollutant parameters for which analyses were run. Please submit any qualifications to the data, such as descriptions of facility design, operating procedures, and upset problems during specified periods.

(10) EPA requests that POTWs which receive wastewaters from petroleum refining plants submit data which would document the occurrence of interference with collection system and treatment plant operations, permit violations, sludge disposal difficulties, or other incidents attributable to the pollutants contained in POTW influent.

Dated: November 27, 1979.

Douglas M. Costle,

Administrator.

Appendix A [1]—Abbreviations, Acronyms and Other Terms Used in this Notice

Act—The Clean Water Act.

Agency—The U.S. Environmental Protection Agency.

BAT—The best available technology economically achievable, under Section 304(b)(2)(B) of the Act.

BCT—The best conventional pollutant control technology, under Section 304(b)(4) of the Act.

BMP—Best management practices under Section 304(e) of the Act.

BPT—The best practicable control technology currently available, under Section 304(b)(1) of the Act.

Clean Water Act—The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 *et seq.*), as amended by the Clean Water Act of 1977 (Pub. L. 95-217).

Direct discharger—A facility which discharges or may discharge pollutants into waters of the United States.

Indirect discharger—A facility which discharges or may discharge pollutants into a publicly owned treatment works.

NPDES permit—A National Pollutant Discharge Elimination System permit issued under section 402 of the Act.

NSPS—New source performance standards, under section 306 of the Act.

POTW—Publicly owned treatment works.

[1] Appendix A through H will not appear in the Code of Federal Regulations.

PSES—Pretreatment standards for existing sources of indirect discharges, under section 307(b) of the Act.
PSNS—Pretreatment standards for new sources of direct discharges, under section 307(b) and (c) of the Act.
RCRA—Resource Conservation and Recovery Act (PL 94-580) of 1976, Amendments to Solid Waste Disposal Act.

Appendix B—Toxic Pollutants Not Detected In Treated Effluents (Direct Discharge)

Organics

acrolein
acrylonitrile
chlorobenzene
1,1,1-trichloroethane
1,1-dichloroethane
1,1,2-trichloroethane
chloroethane
2-chloroethylvinyl ether
chloroform
methyl chloride
methyl bromide
bromoform
trichlorofluoromethane
dichlorodifluoromethane
chlorodibromomethane
vinyl chloride
acenaphthene
benzidine
1,2,4-trichlorobenzene
hexachlorobenzene
hexachloroethane
bis(chloromethyl) ether
bis(2-chloroethyl) ether
2-chloronaphthalene
2,4,6-trichlorophenol
2-chlorophenol
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3'-dichlorobenzidine
2,4-dinitrotoluene
2,6-dinitrotoluene
1,2-diphenylhydrazine
4-chlorophenyl phenyl ether
4-bromophenyl phenyl ether
bis(2-chloroisopropyl) ether
bis(2-chloroethoxy) methane
hexachlorobutadiene
hexachlorocyclopentadiene
isophorone
nitrobenzene
2-nitrophenol
2,4-nitrophenol
4,6-dinitro-o-cresol
N-nitrosodimethylamine
N-nitrosodiphenylamine
N-nitrosodi-n-propylamine
pentachlorophenol
butyl benzyl phthalate
di-n-octyl phthalate
3,4-benzofluoranthene
benzo(k) fluoranthane
acenaphthylene
dibenzo(a,h)anthracene
ideno(1,2;3-cd)pyrene
2,3,7,8-tetrochlorodibenzo-p-dioxin (TCDD)

Pesticides

aldrin
dieldrin
chlordane
4,4'DDT
4,4'-DDE
4,4'-DDD
a-endosulfan-Alpha
b-endosulfan-Beta
endosulfan sulfate
endrin
endrin aldehyde
heptachlor
heptachlor epoxide
a-BHC-Alpha
b-BHC-Beta
r-BHC-Gamma
g-BHC-Delta
PCB-1242
PCB-1254

Others

asbestos (fibrous)

Appendix C—Toxic Pollutants Found in Only One Refinery Effluent (at Concentrations Higher Than Those Found in the Intake Water) and Which Are Uniquely Related to the Refinery at Which it Was Detected (Direct Discharge)

1. Organics

Carbon tetrachloride
1,1-dichloroethylene
1,2-dichloropropane
1,2-dichloropropylene
2,4-dichlorophenol
di-n-butyl phthalate
dimethyl phthalate

2. Pesticides

None

3. Metals

None

4. Others

None

Appendix D—Toxic Pollutants Detected in Treated Effluents of More Than One Refinery or Detected in the Treated Effluents of One Refinery But Not Uniquely Related to the Refinery at Which it Was Detected (Direct Discharge)

1. Organics

Benzene
1,2-dichloroethane
1,1,2,2-tetrachloroethane
parachlorometa cresol
1,2-trans-dichloroethylene
2,4-dimethylphenol
ethylbenzene
fluoranthene
methylene chloride
dichlorobromomethane
naphthalene
4-nitrophenol
N-nitrosodi-n-propylamine
bis(2-ethylhexyl) phthalate
diethyl phthalate
benzo(a)anthracene
benzo(a)pyrene
chrysene
anthracene
benzo(ghi)perylene
fluorene
phenanthrene
pyrene
tetrachloroethylene
toluene
trichloroethylene

2. Metals

antimony (total)
arsenic (total)
beryllium (total)
cadmium (total)
copper (total)
cyanide (total)
lead (total)
mercury (total)
nickel (total)
selenium (total)
silver
thallium (total)
zinc (total)

Appendix E—Toxic Pollutants Not Detected in Discharges to POTWs (Indirect Discharge)

1. Organics

acrolein
acrylonitrile
carbon tetrachloride
1,1-dichloroethane
1,1,2-trichloroethane
1,1,2,2-tetrachloroethane
chloroethane
2-chloroethylvinyl ether
1,1-dichloroethylene
1,2-trans-dichloroethylene
1,2-dichloropropane
1,2-dichloropropylene
methyl chloride
methyl bromide
bromoform
dichlorobromomethane
trichlorofluoromethane
dichlorodifluoromethane
chlorodibromomethane
trichloroethylene
vinyl chloride
benzidine
1,2,4-trichlorobenzene
hexachlorobenzene
hexachloroethane
bis(chloromethyl) ether
bis(2-chloroethyl) ether
2-chloronaphthalene
2,4,6-trichlorophenol
parachlorometa cresol
2-chlorophenol
1,2-dichlorophenol
parachlorometa cresol
2-chlorophenol
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3'-dichlorobenzidine
2,4-dichlorophenol
2,6-dinitrotoluene
fluoranthene
4-chlorophenyl phenyl ether
4-bromophenyl phenyl ether
bis(2-chloroisopropyl) other
bis(2-chloroethoxy) methane
hexachlorobutadiene
hexachlorocyclopentadiene
nitrobenzene
2-nitrophenol
4-nitrophenol
2,4-dinitrophenol
4,6-dinitro-o-cresol
N-nitrosodiphenylamine
N-nitrosodi-n-propylamine
bis(2-ethylhexyl) phthalate
dimethyl phthalate
benzo(a)pyrene

3,4-benzofluoranthene
benzo(k)fluoranthene
acenaphthylene
benzo(ghi)perylene
dibenzo(a,h)anthracene
ideno(1,2,3-cd)pyrene
2,3,7,8-tetrachloro-dibenzo-p-dioxin(TCDD)

2. Pesticides

dieldrin	g-BHC-Delta
chlordane	PCB-1242
4,4'-DDD	PCB-1254
a-endosulfan-Alpha	PCB-1221
b-endosulfan-Beta	PCB-1232
endosulfan sulfate	PCB-1248
endrin	PCB-1260
endrin aldehyde	PCB-1016
heptachlor	toxaphene
4-BHC-Gamma	

3. Metals

antimony (total)	silver (total)
beryllium (total)	thallium (total)
cadmium (total)	

4. Others (Asbestos, 4AAP Phenol)

Not analyzed

Appendix F—Toxic Pollutants Detected in Discharges to POTW (Indirect Discharge)

1. Organics

benzene
chlorobenzene
1,2-dichloroethane
1,1,1-trichloroethane
chloroform
ethylbenzene
methylene chlroide
tetrachloroethylene
toluene
acenaphthene
2,4-dimethylphenol
2,4-dinitortoluene
1,2-diphenylhydrazine
isophorone
naphthalene
N-nitrosodiphenylamine
pentachlorophenol
phenol
butyl benzyl phthalate
di-n-butyl phthalate
di-n-octyl phthalate
diethyl phthalate
benzo(a)anthracene
chrysene
anthracene
fluorene
phenanthrene
pyrene

2. Pesticides

aldrin	hepatachlor epoxide
4,4'-DDT	a-BHC-Alpha
4,4'-DDE	b-BHC-Beta

3. Metals

arsenic (total)	mercury (total)
chromium (total)	nickel (total)
copper (total)	selenium (total)
lead (total)	zinc (total)

4. Others (Asbestos, 4AAP Phenol)

Not analyzed

Appendix G—Toxic Pollutants Found to Pass Through POTW with Only Primary Treatement (Indirect Discharge)

1. Organics

benzene
1,2-dichloroethane
1,1,1-trichloroethane
chloroform
ethylbenzene
methylene chloride
tetrachloroethylene
toluene
2,4-dimethylphenol
naphthalene
phenol
butyl benzyl phthalate
di-n-butyl-phthalate
di-n-octyl phthalate
diethyl phthalate

2. Pesticides

4,4'-DDT	a-BHC-Alpha
4,4'-DDE	b-BHC-Beta

3. Metals

arsenic (total)	mercury (total)
chromium (total)	nickel (total)
copper (total)	selenium (total)
lead (total)	zinc (total)

4. Others (Asbestos, 4AAP Phenol)

Not analyzed

Appendix H

The following derivation presents the development of mass limitations for phenol, based upon Option 2, from the flow model discussed in Section V.

(1) Mass=Flow x concentration x variability (equation 1)
BAT Mass=.48 x Mass (based on average 1976 industry flow)
(2) Flow Model (See Section IV of the Development Document)=0.004C + 0.048K + 0.48(A+L) (equation 2)
Where:
Flow=million gallons per day/1000 barrels of petroleum liquid and natural gas liquids
C=summation of the crude oil and fed natural gas liquids to the atmospheric distillation, vacuum distillation, crude desalting (in units of 1,000 bbls/day)
K=summation of the petroleum liquids fed to the catalytic cracking processes (in unit of 1,000 bbls/day)
A=summation of the petroleum liquids fed to the asphalt processes (in units of 1,000 bbls/day)
L=summation of the petroleum liquids fed to the lube processes (in units of 1,000 bbls/day)
(3) Concentration and variability factor
Phenol=19 μg/l (concentration)
1.7 (variability factor for 30 day averages)
(4) Sample Calculation
Mass=Flow x concentration x variability factor x .48=(.004C+.046 K+.048 $(A+L)$) x .019 mg/l x 1.7 x 8.34 x .48
Mass (lbs of Phenol)=0.0005C+0.0060K+0.0062(A+L)

Part 419 is revised to read as set forth below:

PART 419—PETROLEUM REFINING POINT SOURCE CATEGORY

General Provisions

Sec.
419.10 Applicability.
419.11 General Definitions.

BPT Limitations

Subpart A—Topping Subcategory

419.20 Applicability; description of the topping subcategory.
419.21 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Subpart B—Cracking Subcategory

419.30 Applicability; description of the cracking subcategory.
419.31 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Subpart C—Petrochemical Subcategory

419.40 Applicability; description of the petrochemical subcategory.
419.41 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Subpart D—Lube Subcategory

419.50 Applicability; description of the lube subcategory.
419.51 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Subpart E—Integrated Subcategory

419.60 Applicability; description of the integrated subcategory.
419.61 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

BAT, BCT Limitations and New Source and Pretreatment Standards

Subpart F—Petroleum Refining Point Source Category

419.70 Applicability; description of the petroleum refining subcategory.
419.71 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).
419.72 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application the best conventional pollutant control technology (BCT).
419.73 New source performance standards (NSPS).
419.74 Pretreatment standards for new and existing sources.

419.75 Pretreatment standards for facilities discharging into certain publicly owned treatment works with only primary treatment.

Appendix—Sample calculation of phenol effluent limitations for a typical refinery.

Authority: Sections 301, 304(b), (c), (e), and (g), 306(b) and (c), 307(b) and (c), and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, as amended by the Clean Water Act of 1977), (the "Act"); 33 United States. 1311, 1314(b), (c), (e), and (g), 1316(b) and (c), 1317(b) and (c), and 1361; 86 Stat. 816, Pub. L. 92–500; 91 Stat. 1567, Pub. L. 95–217.

General Provisions

§ 419.10 Applicability.

This part applies to any petroleum refinery which discharges or may discharge pollutants to waters of the United States or which introduces or may introduce pollutants into a publicly owned treatment works.

§ 419.11 General definitions.

In addition to the definitions set forth in 40 CFR Part 401, the following definitions apply to this part:

(a) The term "ballast" means the flow of waters, from a ship, which is treated at the refinery.

(b) The term "feedstock" means the crude oil and natural gas liquids fed to the topping units.

(c) The term "once-through cooling water" means those waters discharged that are used for the purpose of heat removal and do not come into direct contact with any raw material, intermediate, or finished product.

(d) The term "crude throughput" or "C" means the summation of the crude oil and natural gas liquids fed to the crude processes in unit of 1,000 bbl/day (when using the English unit tables) or 1,000 cubic meters/day (when using the metric unit tables).

(e) The term "crude processes" means atmospheric distillation, vacuum distillation and crude desalting processes.

(f) The term "cracking throughput" or "K" means the summation of the petroleum liquids fed to the cracking processes in unit of 1,000 bbl/day (when using the English unit tables) or 1,000 cubic meters/day (when using the metric unit tables).

(g) The term "cracking processes" means hydrocracking, visbreaking, thermal cracking, fluid catalytic cracking and moving bed catalytic cracking processes.

(h) The term "asphalt and lube throughput" or "AL" means the summation of the petroleum liquids fed to the asphalt and lube processes in unit of 1,000 bbl/day (when using the English unit tables) or 1,000 cubic meters/day (when using the metric unit tables).

(i) The term "asphalt and lube processes" means asphalt production, asphalt oxidizing, asphalt emulsifying, hydrofining, hydrofinishing, lube hydrofining, white oil manufacturing, propane dewaxing, propane deasphalting, propane fractioning, propane deresining, Duo Sol solvent treating, solvent extraction, duotreating, solvent dewaxing, solvent deasphalting, lube vacuum tower, oil fractionation, batch still (naphta strip), bright stack treating, centrifuge and chilling MEK dewaxing, butane dewaxing, MEK-Toluene dewaxing, deoiling (wax), naphthenic lube production, SO_2extraction, wax pressing, wax plant (with neutral separation), furfural extracting, clay contacting-percolation, wax sweating, acid treat, phenol extraction, lube and fuel additives, sulfanate plant, MIBK, wax slabbing, rust preventives, petrolatum oxidation, grease manufacture processes. These processes are described in more detail in Sections IV and V of the development document.

(j) The term "process wastewater" means all the wastewater from the refinery with exception to storm water, ballast water, sanitary wastewater, and noncontact once through cooling water.

(k) The following abbreviations shall mean: (1) "bbl" means barrel (one barrel equals 42 gallons), and (2) "R" means the ratio of cooling tower blowdown flow to total effluent flow.

BPT Limitations

Subpart A—Topping Subcategory

§ 419.20 Applicability; Description of the topping subcategory.

The provisions of this subpart are applicable to discharges from any facility which produces petroleum products by the use of topping and catalytic reforming whether or not the facility includes any other process in addition to topping and catalytic reforming. The provisions of this subpart are not applicable to facilities which include thermal processes (coking, visbreaking, etc.) or catalytic cracking.

§ 419.21 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 establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	22.7	12.0
TSS	15.8	10.1
COD [1]	117	60.3
Oil and grease	6.9	3.7
Phenolic compounds	.168	.076
Ammonia as N	2.81	1.27
Sulfide	.149	.068
Total chromium	.345	.20
Hexavalent chromium	.028	.012
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	8.0	4.25
TSS	5.6	3.6
COD [1]	41.2	21.3
Oil and grease	2.5	1.3
Phenolic compounds	.060	.027
Ammonia as N	.99	.45
Sulfide	.053	.024
Total chromium	.122	.071
Hexavalent chromium	0.10	.0044
pH	Within the range 6.0 to 9.0	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day:	*Size factor*
Less than 24.9	1.02
25.0 to 49.9	1.06
50.00 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125 to 149.9	1.50
150 or greater	1.57

(2) Process factor.

Process configuration:	*Process factor*
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73

Process configuration:	Process factor
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.00 or greater	4.36

(3) See the comprehensive example Subpart D § 419.51(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged after the application of best practicable control technology currently available, by a point source subject to the provisions of this subpart, in addition to the discharge allowed by paragraph (b) of this section:

(1) *Ballast.* The allocation allowed for ballast water flow, as kg/cu m (lb/M gal), shall be based on those ballast waters treated at the refinery.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
	metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	.033	.021
CAOD	.47	.24
Oil and grease	.015	.008
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	.28	.17
COD	3.9	2.0
Oil and grease	.126	.067
pH	Within the range 6.0 to 9.0	

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

Subpart B—Cracking Subcategory

§ 419.30 Applicability; description of the cracking subcategory.

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum products by the use of topping and cracking, whether or not the facility includes any process in addition to topping and cracking. The provisions of this subpart are not applicable however, to facilities which include the processes specified in Subparts C, D, or E of this part.

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

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

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	23.2	15.6
TSS	19.5	12.6
COD	210	109
Oil and grease	8.4	4.5
Phenolic compounds	.21	.10
Ammonia as N	18.8	8.5
Sulfide	.18	.082
Total chromium	.43	.25
Hexavalent chromium	.035	.016
Ph	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	9.9	5.5
TSS	6.9	4.4
COD	74	38.4
Oil and grease	3.0	1.6
Phenolic compounds	.074	.036
Ammonia as N	6.6	3.6
Sulfide	.065	.029
Total chromium	.15	.088
Hexavalent chromium	.012	.0056
pH	Within the range 6.0 to 9.0	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example Subpart D § 419.51(b)(3)

(c) The provisions of § 419.21(c)(1) apply to discharges of process waste water pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged a total organic carbon concentration not to exceed 5 mg/1.

Subpart C—Petrochemical Subcategory

§ 419.40 Applicability; description of the petrochemical subcategory.

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum products by the use of topping, cracking and petrochemical operations, whether or not the facility includes any process in addition to topping, cracking and petrochemical operations. The provisions of this subpart shall not be applicable however, to facilities which include the processes specified in Subparts D or E of this part.

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

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

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Average of daily values for thirty consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	34.6	18.4
TSS	23.4	14.8
COD	210	109
Oil and grease	11.1	5.9
Phenolic compounds	.25	.120
Ammonia as N	23.4	10.6
Sulfide	.22	.099
Total chromium	.52	.30
Hexavalent chromium	.046	.020
pH	Within the range 6.0 to 9.0	

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	12.1	6.5
TSS	8.3	5.25
COD	74	38.4
Oil and grease	3.9	2.1
Phenolic compounds	.088	.0425
Ammonia as N	8.25	3.8
Sulfide	.078	.035
Total chromium	.183	.107
Hexavalent chromium	.016	.0072
pH	Within the range 6.0 to 9.0	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor:

1,000 bbl of feeds per stream-day:	*Size factor*
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100.0 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor:

Process configuration:	*Process factor*
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example Subpart D § 419.51(b)(3).

(c) The provisions of § 419.21(c)(1) apply to discharges of process waste water pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the disclosure allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not be exceed 5 mg/1.

Subpart D—Lube Subcategory

§ 419.50 Applicability; description of the lube subcategory.

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum products by the use of topping, cracking and lube oil manufacturing processes, whether or not the facility includes any process in addition to topping, cracking and lube oil manufacturing processes. The provisions of this subpart are not applicable however, to facilities which include the processes specified in Subparts C and E of this part.

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

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

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000m ^{3} of feedstock)	
BOD5	50.6	25.8
TSS	35.6	22.7
COD	360	187
Oil and grease	16.2	8.5
Phenolic compounds	.38	.184
Amonia as N	23.4	1056
Sulfide	.33	1.0
Total chromium	.77	.45
Hexavalent chromium	.068	.030
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	19.9	9.1
TSS	12.5	8.0
COD	127	66
Oil and grease	5.7	3.0
Phenolic compounds	.133	.065
Ammonia as N	8.3	3.8
Sulfide	.118	.053
Total chromium	.273	.160
Hexavalent chromium	.024	.011
pH	Within the range 6.0 to 9.0	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor:

1,000 bbl of feedstock per stream day:	*Size factor*
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration:	*Process factor*
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

(3) Example of the application of the above factors.

Calculation of the Process Configuration

Process category	Processes included	Weighting factor
Crude	Atm. crude distillation	1
	Vacuum crude distillation	
	Desalting	
Cracking and coking.	Fluid cat. cracking	6
	Vis-breaking	
	Thermal cracking	
	Moving bed cat. cracking	
	Hydrocracking	
	Fluid coking	
	Delayed coking	
Lube	Further defined in the development document.	13
Asphalt	Asphalt production	12
	Asphalt oxidation	
	Asphalt emulsifying	

(c) The provisions of § 419.21(c)(1) apply to discharges of process waste water pollutants attributable to point source subject to the provisions of ballast water by this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

Example.—*Lube Refinery 125,000 bbl per Stream Day Throughput*

Process	Capacity (1,000 bbl per stream day)	Capacity relative to throughput		Weighting factor		Processing configuration
Crude:						
Atm	125	1				
Vacuum	60	.48				
Desalting	125	1				
Total		2.48	×	1	=	2.48

Example.—*Lube Refinery 125,000 bbl per Stream Day Throughput*—Continued

Process	Capacity (1,000 bbl per stream day)	Capacity relative to throughput		Weighting factor		Processing configuration
Cracking—FCC	41	.328				
Hydrocracking	20	.160				
Total		.488	×	6	=	2.93
Lubes	5.3	.042				
	4.0	.032				
	4.9	.039				
Total		.113	×	13	=	1.47
Asphalt	4.0	.032	×	12	=	.38
	Refinery process configuration				=	7.28

NOTES

See table § 419.42(b)(2) for process factor. Process factor=0.88.
See table § 419.42(b)(1) for size factor for 125,000 bbl per stream day lube refinery. Size factor=0.93.
To calculate the limits for each parameter, multiply the limit § 419.42(a) by both the process factor and size factor
BOD5 limit (maximum for any 1 day)=17.9×0.88×0.93=14.6 lb. per 1,000 bbl of feedstock.

Subpart E—Integrated Subcategory

§ 419.60 Applicability; description of the integrated subcategory.

The provisions of this subpart are applicable to all discharges resulting from any facility which produces petroleum products by the use of topping, cracking, lube oil manufacturing processes, and petrochemical operations, whether or not the facility includes any process in addition to topping, cracking, lube oil manufacturing processes and petrochemical operations.

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

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

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	54.4	28.9
TSS	37.3	23.7
COD	388	198
Oil and grease	17.1	9.1
Phenolic compounds	.40	.192
Ammonia as N	23.4	10.6
Sulfide	.35	.158
Total chromium	.82	.48
Hexavalent chromium	.068	.032
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	19.2	10.2
TSS	13.2	8.4
COD	136	70
Oil and grease	6.0	3.2
Phenolic compounds	.14	.068
Ammonia as N	8.3	3.8
Sulfide	.124	.056
Total chromium	.29	.17
Hexavalent chromium	.025	.011
pH	Within the range 6.0 to 9.0	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and the maximum average of daily values for thirty consecutive days.

(1) Size factor:

1,000 bbl of feedstock per stream day:	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.76
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225 or greater	1.04

(2) Process factor:

Process configuration:	Process factor
Less than 6.49	0.75
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10
9.0 to 9.49	1.20
9.5 to 9.99	1.30
10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

(3) See the comprehensive example Subpart D § 419.51(b)(3).

(c) The provisions of § 419.21(c)(1) apply to discharges of process waste water pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants of pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic concentration not to exceed 5 mg/l.

BAT, BCT Limitations and New Source and Pretreatment Standards

Subpart F—Petroleum Refining Point Source Subcategory

§ 419.70 Applicability; description of the petroleum refining subcategory.

This subpart applies to discharges to waters of the United States, and introductions of pollutants into publicly owned treatment works from any petroleum refinery.

§ 419.71 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30–125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

(a) The quantity of pollutants discharged from process wastewater shall not exceed the sum of the allocations specified below (3C means 3 multiplied by C):

(1)

Subpart F

Pollutant or pollutant property	BAT crude allocation: Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0031C	0.0015C
Total chromium	0.0332C	0.0194C
Hexavalent chromium	0.0028C	0.0013C
	English units (pounds per day)	
Phenol	0.0011C	0.00056C
Total chromium	0.0116C	0.0068C
Hexavalent chromium	0.0010C	0.005C

(2)

Subpart F

Pollutant or Pollutant property	BAT cracking allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0351K	0.0170K
Total chromium	0.3812K	0.2234K
Hexavalent chromium	0.0326K	0.0147K
	English units (pounds per day)	
Phenol	0.0123K	0.0060K
Total chromium	0.1336K	0.0785K
Hexavalent chromium	0.0114K	0.0052K

(3)

Subpart F

Pollutant or pollutant property	BAT asphalt and lube allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0365AL	0.0177AL
Total chromium	0.3975AL	0.2332AL
Hexavalent chromium	0.0340AL	0.0154AL
	English units (pounds per day)	
Phenol	0.0128AL	0.0062AL
Total chronium	0.1393AL	0.0817AL
Hexavalent chromium	0.0119AL	0.0054AL

(b) The limitations for COD, ammonia (as N), sulfide and TOC are the same as those specified in §§ 419.21, 419.31, 419.41, 419.51, and 419.61.

(c) The limitations for ballast water and once through cooling water are the same as those specified in §§ 419.21, 419.31, 419.41, 419.51, and 419.61.

Note.—See Appendix to this regulation for sample calculation of a BAT effluent limitation.

§ 419.72 Effluent limitations guide lines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30–125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

(a) The quantity of pollutants discharged from process wastewater shall not exceed the sum of the allocations specified below (3C means 3 multiplied by C):

(1)

Subpart F

Pollutant or pollutant property	BAT crude allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
BOD5	2.195C	1.166C
TSS	1.509C	0.9601C
Oil and grease	0.686C	0.366C
	English units (pounds per day)	
BOD5	0.7691C	0.4086C
TSS	0.5288C	0.3365C
Oil and grease	0.240C	0.128C

(2)

Subpart F

Pollutant or pollutant property	BCT cracking allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
BOD5	25.24K	13.41K
TSS	17.35K	11.04K
Oil and grease	7.89K	4.21K
	English units (pounds per day)	
BOD5	8.845K	4.699K
TSS	6.081K	3.870K
Oil and grease	2.76K	1.47K

(3)

Subpart F

Pollutant or pollutant property	BCT asphalt and lube allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per d9ay)	
BOD5	26.33AL	13.99AL
TSS	18.10AL	11.52AL
Oil and grease	8.23AL	4.39AL
	English units (pounds per day)	
BOD5	9.229AL	4.903AL
TSS	6.345AL	4.038AL
Oil and grease	2.88AL	1.54AL

(b) the pH shall be within the range of 6 to 9.

(c) The limitations for ballast water and once through cooling water are the same as those specified in §§ 419.21, 419.31, 419.41, 419.51, and 419.61.

§ 419.73 New source performance standards (NSPS).

Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

(a) There shall be no discharge of pollutants from process wastewaters to the waters of the United States.

(b) The limitations for ballast water and once through cooling water are the same as those specified in §§ 419.21, 419.31, 419.41, 419.51, and 419.61.

§ 419.74 Pretreatment standards for new and existing sources.

Any point source subject to this subpart which introduces pollutants into a publicly owned treatment works which has not been granted a waiver from achieving effluent limitations based on secondary treatment under section 301(h) of the Act must achieve the following pretreatment standards (in addition to complying with 40 CFR Part 403 in the case of new sources and except as provided in 40 CFR Part 403.13 in the case of existing sources):

(a) The following standards apply to the total refinery flow contribution to the POTW.

Subpart F

Pollutant or pollutant property	Pretreatment standards—Maximum for any 1 day
	Milligrams per liter (mg/1)
Oil and grease	100
Ammonia	100

(b) The following standard is applied to the cooling tower blowdown portion of the refinery flow to the POTW or may be applied to the total refinery flow by multiplying the standard by the ratio of the cooling tower blowndown flow to the total refinery flow to the POTW.

Subpart F

Pollutant or pollutant property	Pretreatment standards—Maximum for any 1 day
	Milligrams per liter (mg/1)
Total chromium	1

(c) Informational mass limitations are as follows:

Subpart F

Pollutant or pollutant property	Pretreatment standards—Maximum for any 1 day
	Metric units (kilograms per day)
Oil and grease	9.57C+109.52K+114.30AL
Ammonia	9.57C+109.52K+114.30AL
Total chromium	R×(0.0957C+1.0952K+1.1430AL)
	English units (pounds per day)
Oil and grease	3.35C+38.35K+40.02AL
Ammonia	3.35C+38.35K+40.02AL
Total chromium	R×(0.0335C+0.3835K+0.4002AL)

§ 419.75 Pretreatment standards for facilities discharging into certain publicly owned treatment works with only primary treatment.

Any point source subject to this subpart which introduces pollutants into a publicly owned treatment works which has been granted a waiver from achieving effluent limitations based on secondary treatment under section 301(h) of the Act must achieve the following pretreatment standards (in addition to complying with 40 CFR Part 403 in the case of new sources and except as provided in 40 CFR 403.13 for Existing Sources):

Subpart F

Pollutant or pollutant property	Pretreatment standards—301(h) Waivers	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Milligrams per liter (mg/1)	
Phenol	0.067	0.032
Total chromium	0.725	0.425
Hexavalent chromium	0.06	0.03

(b) Information mass limitations are as follows:

(1)

Pollutant or pollutant property	Crude allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0031C	0.0015C
Total chromium	0.0332C	0.0194C
Hexavalent chromium	0.0028C	0.0013C
	English units (pounds per day)	
Phenol	0.0011C	0.00052C
Total chromium	0.0116C	0.0068BC
Hexavalent chromium	0.0010C	0.0005C

(2)

Pollutant or pollutant property	Cracking allocation	
	Mmaximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0351K	0.0170K
Total chromium	0.3812K	0.2234K
Hexavalent chromium	0.0326K	0.0147K
	English units (pounds per day)	
Phenol	0.0123K	0.0060K
Total chromium	0.1336K	0.0783K
Hexavalent chromium	0.0114K	0.0052K

(3)

Pollutant or pollutant property	Asphalt and lube allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0365AL	0.0177AL
Total chromium	0.3975AL	0.2332AL
Hexavalent chromium	0.0340AL	0.0154AL
	English units (pounds per day)	
Phenol	0.0128AL	0.0062AL
Total chromium	0.1393AL	0.0817AL
Hexavalent chromium	0.0119AL	0.0054AL

Appendix—Sample Calculation

The following example presents the derivation of a BAT phenol effluent limitation for a typical refinery

Refinery X Y Z

Refinery processes	Refinery throughput 1000 bbl/day
Atmospheric crude distillation	100
Vacuum crude distillation	75
Desalting	50
Total crude processes (C)	225
FCC	25
Hydrocracking	20
Total cracking processes(K)	45
Asphalt production	5
Hydrofining	3
Was processing	1
Total asphalt and lube processes (AL)	9

Monthly average phenol discharge (lbs/day) $= 0.0005(225) + 0.0060(45) + 6.2 \times 10^{-3}(9) = 0.44$.

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