Interested persons were again invited to participate in the rulemaking by submitting written comments within 90 days of the date of publication of the proposed regulation. In response to requests for additional time the period for public comment was extended for 23 more days (39 FR 17449).

Thereafter, in order to afford an opportunity for those who had submitted comments to explain the substance of their position in detail and to determine the Agency's interpretation of and basis for its proposals, the Agency convened a public hearing on July 11 and 12, 1974, (39 FR 26030). Agency officials, and members of its technical staff, participated in company of Texas Electric Service Company; Indianapolis Power & Light Company; Carolina Power and Light Company; Foote Mineral Company; Cooperative, Inc.; Wisconsin Public Service Corporation; The Cincinnati Gas and Electric Company; Development Association, Inc.; The Cincinnati Paddling Council; Public Service Company of New Mexico; United Illuminating; Copper Development Association, Inc.; The Cincinnati Gas and Electric Company; Illinois Power Company; Indianapolis Power and Light Company; Tri-State Generation and Transmission Association, Inc.; Western Illinois Power Cooperative, Inc.; Wisconsin Public Service Corporation; N.W. Electric Power Cooperative, Inc.; American Cyanamid Company; Duke Power Company; Duquesne Light Company; Ohio Edison Company; Poole Mine Company; Co-operative Farm Chemicals Association; Pollution and Environmental Problems; Ebasco Services Incorporated; Bresee River Authority; Mid-Continent Area Power Pool; Dr. Charles C. Coulter; Basil A. Bonk; Diamond Shamrock Chemical Company; Offshore Power Systems; Hawaiian Electric Company, Inc.; United for Survival; Mr. James B. Harper, Inc.; Solano Chemical Company; Dow Chemical U.S.A.; Dairyland Power Cooperative; St. Joseph Light and Power Company; Burns and McDonnell Engineering Company; Bethlehem Steel Corporation; The Metropolitan Water District of Southern California; Washington Public Power Supply System; Wright Chemical Corporation; Mr. James W. Errant, Jr.; Texas Water Development Authority; Mr. J. A. Partis, League of Women; Mr. David Allen; Mr. David H. Harvey; Mrs. Marvin Halsey; Mr. Bruce Hallock; Mr. Samuel Lebourse, Jr.; Connie Economy; Mr. Christopher A. Libby; Mr. Zachary A. Smith; Mr. Marion L. Sanford; Mr. Henry Peck; American Association of University Women; Mrs. Leda P. Tomlin; Illinois Paddling Council; Portland General Electric Company; League of Women Voters; Mr. Roger R. Miller; Tesoro Company; Mr. David Burghardt; Calgon Corporation; Stone and Webster Engineering Corporation; The Michigan Paddling Council; The Florida Power and Light Company; Mrs. Martha K. Rudnicki; Don and Lynda Johnson; Mr. Lawrence D. Bain; Mr. Harry L. Stout; B. L. Laboratories, Inc.; Save the Dunes Council; Mr. and Mrs. John N. Lally; United Refining Company. Edward G. Tulbot; Mr. Herlen Sandberg; Mr. Stephen C. Grado; Mr. Scott M. Bailey; Mr. David M. Peterson; Mr. David Lessing; Mr. Don Fulton; A. T. Economy and Tenaya Economy; County of Monroe, New York; Mr. Steve Kraszewski and Roe, Inc.; Mr. R. Penton Ford; Alisha Center for the Environment; Mrs. Mark B. Pettit; General Electric Company; Duke Power Company; Alcoa Alloys and Carbide; Johnson and Anderson, Inc.; United States Atomic Energy Commission; Ohio Paddling Council; Middle South Services, Inc.; Natural Resources Defense Council, Inc.; Lally Michigan Federation Meadow; Edwin Sewell Project; Houston Lighting and Power Company; Kansas City Power and Light Company; Duquesne Light Company; Ohio Edison Company; Louisiana Power and Light; Arizona Public Service Company; Consolidated Edison Company of New York, Inc.; Wisconsin Electric Cooperative Corporation; Toledo Edison; Arkansas Electric Cooperative Corporation; Northern States Power Company; Fluxes Electric Generation and Transmission Company, Inc.; Houghton Chuck Coughlin and Riley; Consumers Power Company; Betz-Page Power Corporation; Ebasco Power Incorporated; Public Service Company of Colorado; Association of California Water Agencies; New Orleans Public Service, Inc.; Public Service Co-op- erative, Inc.; Associated Electric Cooperative; Continental Can Company, Inc.; Niagara Mohawk Power Corp-

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tion; Columbus and Southern Ohio Electric Company; Dolph Briscoe, Governor of Texas; San Diego Gas and Electric Company; Quirk, Lawler and Matsuyka Engineers; Regional Advisory Group of Water and Power of the City of Los Angeles; Basin Electric Power Cooperative; Business and Professional People for the Public Interest; Basin Electric Power Company; Atlantic City Electric; Southern Services, Inc.; Union Electric Company; R.I. duPont deNemours and Company; Tuscan Gas and Electric Company; California Farm Bureau Federation; Regional Planning Council; Mr. Mayne E. Boltin; University of Texas; Mr. & Mrs. William Morlock; Ms. Alice Thones; Mrs. Robert Burke; Ms. Cathleen Benner; Mr. Frank Lahr; Dr. & Mrs. Robert Upton; Dr. & Mrs. Dean Assasel; Dr. & Mrs. D. Steinberg; South Texas Electric Cooperative, Inc.; Union Electric Institute; The American Public Electric Association; The Utility Water Act Group.

The most significant comments received, and the Agency's responses to those comments, are summarized below. The following conclusions and recommendations will be set forth in substantially greater detail than is practicable here in this analysis. The factual basis for the Agency's conclusions will be set forth in substantially greater detail than is practicable here in this analysis, the Agency believes, consistent with the fundamental legislative judgment of the Congress, in enacting the Act. While a "balancing" of these considerations against the reduction of water pollution is implicit in the statutory framework, the proper balance in any case may focus on the objective degree of abatement and reduction and not on a projection of the benefits to the industry, to the industry itself, to the body politic, or to the consumer. An industry group did conduct such an exercise, the results of which were submitted to the Agency as a portion of its comments. On the basis of these considerations, the group recommended that the Agency subcategorize the industry so as to exclude all units for which the cost of cooling exceeded 1 mill per kilowatt hour. This decisional rule, which would exclude virtually all existing units from thermal control while requiring most new plants to employ closed-cycle cooling, was derived from the industry's cost benefit analysis and represented what the commenters considered was the maximum reasonable cost which was justified by its calculation of the benefits to the aquatic environment resulting from closed-cycle cooling. This analysis consisted of a biological modeling study purporting to estimate the environmental improvement associated with reduction of thermal pollution and a related effort to (1) assign monetary values for ensuring the reliability of electric power. On the basis of this information has not been available to the Agency which could affect these limitations as applied to individual units, the limitations may be modified to that unit in accordance with the procedures established by 40 CFR 423.12.

The Agency did not believe that Congress intended to promulgate only advisory rules nor that the Act envisions a wide-ranging reassessment of all of the technological, economic and environmental considerations taken into account by the Agency during this rulemaking process.

In the Agency's view, the Act contemplates a careful analysis of the waste water discharges of each industry and the technology available to abate these discharges to the levels prescribed in sections 301 and 308. The Agency is obligated to consider, not only technical feasibility, but the cost of achieving specified emissions reductions, and the economic and environmental consequences of doing so. On the basis of this analysis, the Department of Water and Power of the City of Los Angeles, in particular, and Congress intended it to establish specific and objective allowances for pollutant discharge for various subcategories within each industry, the categories themselves being defined on the basis of differences in the production methods which influence the engineering feasibility of particular treatment methods as well as the economic and environmental consequences of the subcategory of the other factors enumerated in sections 304(b) and 306. Once these determinations are made, however, the limitations are to be applied on a uniform basis to all plants within the subcategory.

The Agency, over the past year and a half, has assembled and considered extensive information on the electric utility industry and the water pollution problems associated with generation of electric power. On the basis of this information, the Agency believes, consistent with the fundamental legislative judgment of the Congress, in enacting the Act, the Agency is certain that this provision to the degree recommended by some industry representatives would destroy the statutory scheme of uniform treatment of similar plants and impose an insuperable and redundant burden on the resources of the Agency's regional and subregional administrators and State pollution control agencies.

(2) An industry representative contended that the term "best" technology is a relative term and that the phrase "most productive of social good" is not well defined. Sections 304 and 306 direct the Administrator first to identify the most effective technologies for controlling water pollution and thereafter take into account specified factors, e.g., non-water quality environmental effects of a standard as well as costs to the industry. The Agency has identified closed cycle evaporative cooling as a technology which is clearly the most efficient means of virtually eliminating heated water discharges. It is certainly available, since it is in widespread use in the industry at present. The economic reasons newer plants are increasingly employing one of several alternative modes of closed cycle evaporative cooling, i.e., mechanical draft towers, natural draft towers and cooling ponds.

The Agency has, however, also given careful attention to each of the factors which the statute directs it to consider. Thus, because of the time in years that it takes to design, construct and place into operation the various types of cooling towers and because of the necessity for ensuring the reliability of electrical generation over a limited time span for a very large generating capacity that would be affected by 1974, the Agency has concluded that no additional restraint on heat represents the best practicable control technology currently available.

Moreover, taking into account factors specified in 304(b) (2), the Agency has determined closed cycle cooling to represent the most cost acceptable for the economic and environmental reasons plant managers believe to be economically achievable for only specific subcategories of the electric utility industry.

The most fundamental criticism of the Agency's approach was that it had not estimated the improvement in national water quality attendant on conversion to closed cycle evaporative cooling and had not attempted to assign a monetary value to that improvement. A related contention frequently advanced was that this has failed to assign the economic benefits of requiring most existing units to retrofit closed-cycle cooling systems to be shown to be substantially less than the costs.

The law under which the Agency has promulgated this regulation (and which might apply to 50 additional sets of regulations for other industries) does not require that the ultimate social benefits which reduction in industrial pollution of the Nation's waters will produce be quantified in economic terms.
to the predicted increase in fish populations and (2) compare this value to an estimated cost of closed cycle cooling derived from a consulting engineer's final report and estimates supplied by specific utilities.

The Agency has not adopted the suggestion that the physical or the economic study of the changes in aquatic community structure . . .

However, while the Agency did not develop subcategories on the basis of this specified property, it considered the cost of thermal control in determining the portions of the industry to which it should apply. Whereas the regulation as proposed was to apply to only half the units now operating with once-through cooling or expected to be in line by 1978 with once-through systems, the promulgated regulation will apply to less than ten percent of such units. The Agency estimates that the capital cost of its original proposal would, without accounting for exemptions under section 316(a), have aggregated by 1983 $11.8 billion, expressed in constant 1974 dollars. The comparable cost of the revised regulation is estimated to be $5.2 billion. And, while particular units may be required to incur costs in excess of 1 million per kilowatt-hour, the Agency estimates that the capital and operating cost of installing closed-cycle cooling at all plants covered by the regulation (without taking exemptions under section 316(a) into account) will average considerably less than 1 million per kilowatt-hour by 1983, expressed in constant 1974 dollars.

The capital and operating costs of even the revised thermal limitations are large in absolute terms. The Agency nevertheless believes that these costs are reasonable in light of the environmental risks of heat addition to aquatic systems, the recent dramatic increase in both size and waste heat rejection of individual generating units, and the projected expansion of national generating capacity.

(4) Some commenters observed that heat is a fundamental property of matter and should not be directly regulated. Instead, they suggested that the relevant concept is water temperature: specifically, the temperature of the receiving water body. "Heat" is specifically defined as a pollutant by the parent Act. While the effect of heat on aquatic systems is typically investigated in terms of alterations in the receiving water temperature, the significance of discharges of water at the specified temperature, in terms of impact on the aquatic community at any particular site, may of course be the subject of inquiry in proceedings under section 316(a) of the Act which, unlike this regulation, is designed to assess the environmental impact of the heated discharge in specific instances.

(5) Many of the comments asserted that the Agency's subcategorization of the industry considered the cost of thermal control. In essence, the commenters asserted that the Agency had not taken into account a variety of factors which could, at specific locations, weigh against placing the proposed thermal limitations or entail significant adverse effects on other aspects of the environment.

The Agency reviewed the bases on which the thermal limitations were determined to be applicable to units with differing operating characteristics, climatic conditions, and site related features. Additional distinctions among units have been made as a result of this review. A very large number of factors were suggested to be relevant criteria for exemption from thermal control. To address them in an orderly manner requires that those which serve explicitly or implicitly as a basis for distinctions in the applicability of the requirement for closed-cycle evaporative cooling be discussed first.
aneling unit costs is less justifiable and the costs of meeting the thermal limits may not be economically achievable. On this basis the Agency proposed an ex-

The promulgated regulation makes a second distinction based on rated ca-

ually the same percentage of waste heat. Because of their large size and high level of utilization, uncontrolled heated discharges from these units are gen-

and cycling units from thermal control and the Agency essentially has done so in the regulation promulgated today.

though there is no explicit exemption based on capacity utilization, the com-

600 megawatts or greater. In the case of such very large units, the regulation imposes con-

1974, except for units of 500 megaw-

A-500 units of this size which are now less than 5 years old may be expected to be 

40 percent of total effluent heat from 

some comments urged that the Agency liberalize its exemption from thermal 

units generating 60 percent or more of their annual capacity as baseload, those 

mately long distance from the tower. The background salt nuclei contributed 

ate the regulation to total cooling system cost and 

in areas in close proximity to the tower and in the prevailing downwind direction. The regulation therefore pro-

units generating 60 percent or more of their annual capacity as baseload, those 

factors. Capacity utilization is related to age. With few exceptions, units begin opera-

sufficient land on which to construct 

(3) LAND AVAILABILITY

Some comments urged that the Agency liberalize its exemption for plants which do not have sufficient land on which to construct 

The size of the evaporative cooling tower required to be installed, as determined by this study, takes 

The Agency agrees that incremental costs of converting to cold-side blow-

although the environmental effects of saltwater cooling towers vary from case to 

climatic conditions, etc.) the Agency has determined that 28 acres per 1000 megawatts generating capacity is ample land on which any existing plant can construct a mechanical draft cooling tower, the cooling system which is most universally applicable and which provides the basis for the Agency's cost estimates. This conservative area-to-capacity standard is based on Federal Power Commission estimates of mechanical draft cooling tower land requirements and the Agency's review of mechanical draft cooling tower land use requirements at nuclear units, including sufficient allowances for construction and spacing between towers.

In determining whether sufficient land is available at a particular site the regulations require consideration of reassignment of present land uses (parking areas, for example) as well as the practice of alternate evaporative cooling systems. Natural draft towers, for example, require less than 40 percent of the land needed for mechanical draft towers. The judgment of whether or not the reassignment of existing land is practicable cannot be reduced to a single cost per unit of output figure as suggested.

Moreover, in many cases adjoining land may be purchased at reasonable cost, a possibility which is designated by the regulation on present land uses. Nevertheless, adjacent land costs could, in some instances, materially increase the cost of installing closed cycle systems. Hence, the promulgated regulations do not predicate the exemption from thermal limitations on the acquisition of neighboring land. Instead it is based solely on land owned or controlled by the owner or operator of the plant as of the date of proposal of this regulation.

(3) AIRCRAFT SAFETY

Some comments urged the consideration of the possible hazard to aircraft of steam plumes issuing from cooling towers.

An examination of this potential hazard indicates that existing powerplant which will be required to install a recirculated cooling water system would pose a hazard to commercial aircraft during the period of takeoff and landing. However, the vulnerability of aircraft during this portion of the flight pattern requires special consideration of cases where a substantial hazard may be shown to exist. The promulgated regulation reflects this consideration.

The proposed regulation was critized for not indicating the relative priorities assigned to installing technology to comply with thermal limitations, and the land use requirements of other pollution control equipment such as chemical waste treatment and flue gas desulfurization systems.

The promulgated regulation predicated the obligation to comply with thermal limitations on the availability of sufficient land to construct and operate closed cycle cooling systems. No comparable potential exemption from chemical waste discharge requirements is needed or afforded. The Agency claims that power companies, confronted with this regulatory pattern, will construct or expand chemical treatment systems as a matter of the competitive situation. The determination of sufficiency of land for thermal control systems will be made taking into account the land required for the chemical system, subject to the overall evaluation of the potential for land use reassignment.

(7) Some commenters urged that the Agency exempt units discharging into oceans or the Great Lakes. Two reasons were advanced. First, because of the dissipative capacity of oceans, heat discharges were said to be less likely to cause environmental damage. Second, the requirements of closed cycle cooling would exacerbate fresh water shortages which could be expected in certain coastal areas by the year 2000 during extreme low flow conditions.

No water shortage appears evident, or likely to ensue, by the end of the century. In Washington, Oregon, Northern California, most Gulf Coast States, or the Atlantic Coast. Moreover, the projection of increased fresh water evaporative cooling capacity for future plants was predicated on conversion of all existing coastal plants from once-through saline systems to fresh water evaporative systems. Further development of fresh water towers for use in new plants is being considered by all new ocean sited plants. Such an assumption is unrealistic, however, since operation of such systems is dependent upon the availability of fresh water. Use of saline water in evaporative towers would, of course, have no effect on the salt water.

On the other hand, there is evidence to suggest that the discharge of heat into marine waters at sufficient depth and distance from shore plants are presently in operation and available to coastal plants in arid areas. Use of saline water in evaporative towers would, of course, have no effect on the salt water.

(8) Some commenters suggested that the Agency's jurisdiction under the Act does not extend to all artificially created lakes and ponds used as cooling water sources by powerplants and that the Agency should confine the regulation to those in which a significant vested public interest exists.

The Act applies to all "waters of the United States" and the legislative history indicates that the jurisdictional terms were to be given the broadest possible constitutional interpretation. Under controlling decisions of the United States Supreme Court, some man made cooling water bodies may constitute navigable waters for the purposes of water pollution control.

On the other hand, however, the Agency recognized in the proposed regulation that artificial ponds built for cooling and located on the property of the utility constitute an acceptable process for the removal of thermal pollution. In response to criticisms of the lack of clarity of the proposal, the regulation has been revised to make clear that existing artificial ponds or areas otherwise subject to a "no discharge" limitation on heat may discharge heat into existing cooling lakes and ponds. Definitions of each term have also been provided which differentiate between "cooling ponds" (artificial water bodies constructed by means other than impounding the flow of navigable water) and "cooling lakes" (artificial water bodies whose construction does not entail blockage of navigable water flows).

While new units whose cooling system involves creation of an "on stream" cooling lake would remain subject to the limitations on heat discharge from the condenser into such a projected impoundment, the provisions of section 316(a) would be available to such units. Chemical discharges into artificial water bodies will be considered as water bodies under the Act must comply with the limitations on pollutants other than heat.

(9) Some commenters noted that the proposed regulations confer an explicit exemption from the limitations on heat for offshore powerplants and suggested that a separate category of ocean plants be created. Such offshore plants are presently in operation or under construction. That being the case, the Agency for the explicit definition of suitable locations will insure that the thermal discharges from once-through or modified cooling systems at such plants are compatible with the criteria of section 316(a) of the Act and that exemptions under that section for properly sited offshore plants would be forthcoming.

(10) Some commenters questioned the propriety of requiring compliance with limitations defining the degree of thermal effluent reduction attainable by the "best available technology economically achievable," in advance of 1973. In addition, the proposed regulations claimed compliance with the Act's requirement of reliability, particularly during the winter of 1977-78 when reserve capacity would be reduced because the outage time necessary to tie-in these systems would exceed that required for normal maintenance. Since all units are required to comply with the same schedule, commenters claimed that in many cases purchase of replacement capacity from other systems within the same grid would not be possible. Other commenters suggested extension in the compliance dates in order to allow sufficient time for construction of natural draft cooling towers where there are a preferrable alternative to mechanical draft towers. Still others criticized the Agency for imposing no restrictions whatsoever by 1977, and urged that the schedule as proposed be adhered to.

The Agency believes that there is clear statutory authority to impose the requirements of section 316(b) earlier than 1973 if the technology is...
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available. The dates specified in the Act are ultimate deadlines: not the earliest dates by which technological progress may be required. It would be consistent with national objectives of the Act and its legislative history, for the Agency to sanction the discharge of pollutants for nine more years if a class or category of discharge cannot be controlled economically and technically, to reduce that discharge by an earlier date. The Agency is convinced that the electric utility industry has both the economic and technological capability to install closed cycle cooling systems on those units whose thermal discharges are controlled, designed, and constructed to do so by the compliance date established. The estimates of reduced reserve capacity submitted, were, the Agency believes, overestimated since they assume that no units would obtain exemptions under section 316(a). Moreover, significant revisions to the proposed regulation have been made to insure that the required conversion to closed-cycle is realistic and that compliance with it entails no risk to the continued reliable supply of electric power. First, the number of units potentially subject to it has been reduced drastically. Second, the date by which the largest units are subjected to control was extended by two years; the compliance date now being nearly seven years in the future. Finally, the permitting authority is authorized to defer compliance for an additional two years if, despite the above described revisions, costs for the units in a related system could, by virtue of outages during tie-in to the cooling system, seriously impact system reliability. This will permit each utility to plan, design, and construct off-stream cooling systems at the optimum time in accordance with planned maintenance schedules as well as in consideration of reliability factors. (11) A related comment was that the Agency should not impose limitations under best available technology economically achievable in advance of the National Study Commission Report required by section 315 of the Act. There is no conflict between the provision of that report and the report of the National Study Commission, which is to be submitted to Congress in October, 1975. While that study is an integral part of the Act's program to regulate thermal pollution, it is not intended to control discharges in advance of the Act's compliance date now being nearly seven years in the future. Inasmuch as the Act's legislative history, for the Agency to establish the "best available" standards will be sufficient time for any "mid-course corrections" to be made by the Congress in the regulation of thermal pollution from the electric power industry, without the industry's having committed itself to any significant capital expenditures for thermal pollution abatement due to these regulations. (12) Several comments observed that the cost per unit of production of installing closed cycle cooling varies as a function of numerous factors. Some of these factors (such as fuel type, back-end loading, heat rate and flow rate) pertain to the mode of operation and other physical characteristics of the unit. Other factors (such as wet-bulb temperature and intake water temperature) relate to climatic or geographic conditions at the discharge site. Still other factors, while also related to local conditions, concern the potentially adverse impacts (such as non-generation due to consumption) which may be significant in individual instances. If unaddressed, the combined impact of the factors were said to impose physical, though not necessarily economically evident, costs on the local environment. If steps were taken to alleviate the problem, on the other hand, abatement of the environmental deficit would entail direct monetary costs on the utility. A rule was suggested which would exempt any unit at which the sum of these factors imposed costs in excess of 1 mil per kilowatt-hour. The Agency has reviewed the significance of the collective factors considered independently as well as their aggregate impact. A summary of its conclusions is as follows: (1) The collective significance of site dependent factors and each individual variable follows. (A) SITE-DEPENDENT FACTORS IN GENERAL During the comment period, industry representatives supplied two sets of data to reflect the estimated cost of mechanical and draft cooling towers. The first was a report of an engineering firm experienced with the construction of cooling towers. The second was based on a survey of six plants, the capital costs of retrofitting, on a per kilowatt basis, was only slightly higher than that used in the Agency's present cost estimates of the proposed regulation. The second was based on a survey of 60 plants, in several utility systems, which represent approximately 12 per cent of the total steam electric generating capacity in the United States. The average capital cost of this survey was significantly higher than the previous industry estimate; the disparity being accounted for by the commenter on the ground that the higher estimates reflected additional costs attributable to site specific factors. The variability of costs is greater for units which reject more waste heat. Nevertheless, the costs of installing thermal control technology are greater for units which reject more waste heat. Nevertheless, the cost differential due to type of generation is approximately equivalent to the additional waste heat discharged by nuclear plants and is within the range of costs reflecting the normal variability among site-dependent factors in general as discussed above. In either case, the costs per unit of heat removed by once cycle cooling would be the same. Therefore, no distinction need be made between nuclear and fossil-fueled units. Conversion from once through cooling to a closed cycle system may entail associated modifications to the radioactive waste disposal system. Units employing once through cooling normally discharge treated liquid radioactive wastes to the large volumes of non-recirculating cooling water, relying on dilution in that stream to meet water quality standards on the discharge of radioactive materials. The use of the blowdown of the closed cycle cooling system may not provide sufficient dilution for this practice to be continued. However, in three cases in which closed cycle cooling systems were retrofitted to nuclear powerplants, none of the additional costs for radioactive
within the range of costs reflecting the normal variability among site-dependent factors in general as discussed above, no distinction need be made for this factor.

(E) WET-BULB TEMPERATURE

EPA tested the significance of wet-bulb temperature as a factor by costing various types of evaporative cooling systems considering four geographic locations representative of the range of wet-bulb temperatures in the United States. The cost of cooling equipment at the most unfavorable location based on wet-bulb temperature was 25 percent higher than the average cost of all locations tested for conditions otherwise identical. In the cost analysis submitted to the Agency in support of the proposed subcategorization criteria, this factor, all other factors being equal, added a maximum of 22 percent to the total thermal control equipment cost for the average of subcases covered for the most costly case analyzed. This 24 percent cost differential is within the range of costs reflecting the normal variability among site-dependent factors in general as discussed above, no distinction need be made for this factor.

(F) BACK-END LOADING

The back-end loading of an unit is the maximum steam flow which the unit can pass through the last stage blades of the low pressure turbine expressed as a percentage of the maximum steam flow through the last stage blades which the turbine is capable of accepting.

In the cost analysis submitted to the Agency in support of the proposed subcategorization criteria, this factor, all other factors being equal, added a maximum of 22 percent to the thermal control equipment costs compared to the average of the cases covered. The maximum cost reflected the cost for a unit with the highest back-end loading. The 22 percent more than 15 percent. Generation costs in mills per kilowatt-hour for the worst case of a 15 percent back-end loading were estimated to be about 1 mill per kilowatt-hour. This 22 percent differential in equipment costs is within the range of costs reflecting the normal variability among factors in general, as discussed above. The worst case generation cost is in the range recommended by industry, therefore, no distinction need be made for this factor.

(G) PLUME ABATEMENT

Cooling towers can produce visible plumes consisting of minute water droplets. Plumes are normally not a problem unless they reach the ground and obstruct vision or cause icing conditions. Under normal conditions, cooling tower plumes rise due to their initial velocity and buoyancy and arc not recondensed on the ground before mixing with the ambient air and dissipated. However, under adverse climate conditions (i.e. back-end loading of approximately), the moisture could produce a fog condition if it were trapped in the lower levels of the atmosphere during an inversion, i.e.,

a period of high atmospheric stability. In almost all cases, natural draft towers are less likely to cause fogging problems than mechanical draft towers. Even with mechanical draft towers, in most cases fogging or icing would be on-site (i.e., within 1000-3000 ft of the tower). Flume abatement technology, e.g. wet-dry cooling towers, is currently available. While wet-dry towers are more costly than conventional wet towers, the Agency has accounted for this cost in its final environmental statement. The cost of cooling equipment at the most unfavorable location based on wet-bulb temperature was 25 percent higher than the average cost of all locations tested for conditions otherwise identical. In the cost analysis submitted to the Agency in support of the proposed subcategorization criteria, this factor, all other factors being equal, added a maximum of 22 percent to the total thermal control equipment cost for the average of subcases covered for the most costly case analyzed. This 24 percent cost differential is within the range of costs reflecting the normal variability among site-dependent factors in general as discussed above, no distinction need be made for this factor.

(H) MISCELLANEOUS FACTORS

Certain additional site-dependent factors have been suggested by commenters which should be considered in subcategorization for illustrative limits on heat because they can materially affect cost; existing system layout, soil conditions, site geology, and topography. While it is
acknowledged that these factors may affect case-by-case costs, the costs attributes. The dependent factors have been included in the computation of the economic costs of municipal ordinances which, while permitting construction of a powerplant and the associated stacks, would preclude con- sumptive use of freshwater. Moreover, saltwater cooling towers could be used at coastal sites with the result that no freshwater would be consumed.

In other arid regions, such as Texas, use of closed cycle evaporative cooling systems (both towers and cooling ponds) is widespread for technological reasons, since the available surface water supply is not adequate for once-through cooling to be effective. Much of the increase in the projected consumptive use appears attributable to the assumption that cooling towers would have to be constructed at existing sites using inlet and out- stream cooling ponds. The regulation has been revised to make clear that cooling lakes and ponds meet certain specification requirements are considered acceptable heat abatement mechanisms and that towers need not be constructed if such a system is in operation.

Many comments were received to the effect that the Agency's estimate of the capital and operating costs of closed cycle cooling was understated and that the Agency underestimated the impact of the regulation was therefore inaccurate. The most significant of these claimed deficiencies are discussed in the following section.

(A) The Agency's capital cost estimates for installing cooling towers at non-nuclear plants were based on a summary of costs actually incurred or, if costs were not available, on past experience. It was also claimed that the Agency had underestimated the cost of the spray canal retro- fit project which the Agency had estimated at $14 per kilo- watt-hour. The Agency has recalculated costs of backfitting mechanical draft towers and higher per kilowatt hour costs have been employed in this analysis.

(B) Commenters criticized the Agency's failure to include a capital cost for new generating capacity to replace existing generating capacity lost during outages for tie-in of closed cooling systems.

Powerplants normally place generator outage data in a cycle, out-of-service capacities, and the time to time for units to be out for planned maintenance. When units are shut down, the lost generating capacity is supplied by some- what less efficient units within the sys- tem or by purchase of power from outside the system. The installation of new generating capacity in a system takes into account, on a projected basis, the time lost in the future by units and such additional factors as scheduled outages and probabilities of unsched- uled outages. A well-engineered retro- fit design could be scheduled for tie-in to an existing system in from one week to five weeks of actual unit outage time. The regulation has been revised to ex- clude most existing units from thermal control and to defer the date of conver- sion for the remaining affected units from 1978 to 1981. Moreover, the final regulation incorporates commenters' suggestions for flexibility in further extending compliance dates in order to avoid adversely impacting regional reliabil- ity. The Agency has determined that H- outages can be scheduled concur- rently with planned maintenance in such a manner that one month outage time would be required in addition to normal maintenance and that replacement power during this period can be supplied from the system's cycling units. Since no net loss in generating capacity need occur for closed-cycle tie-ins, there is no need for capital expenditures to be delayed against outages during construction.

(C) Similarly, comments suggested that the Agency had underestimated the operating cost of replacement capacity, principally by employing pre-embargo fuel prices.

The fuel costs employed by the Agency in its analysis of the incremental costs of replacement capacity have been revised to reflect the best estimate of future fuel prices, $7.50 per barrel of oil and $12.50 per ton of coal (in 1974 dollars). EPA assumed a heat rate of 12,500 BTU per kilowatt hour and a fuel mix of 80 percent coal and 20 percent oil in making its estimates. The expected cost savings from a 20 percent increase in the capital cost of replacement capacity operating costs.

(D) An industry Representative claimed that the Agency had underes- timated the incremental cost of closed- cycle cooling because it had assumed that an unrationally high percentage of plants would use closed-cycle cooling regardless of whether or not they were required to do so by these regulations. Approximately 66 percent of the capac- ity now under construction is committed to closed-cycle cooling. Based on a review of information submitted to the Agency by industry representatives, EPA estimated that 50 percent of units now planned to install closed-cycle cooling were doing so for economic, rather than...
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environmental considerations. The costs incurred by these units should not be included in the costs and economic impacts attributable to the regulations.

(2) Industry representatives contended that in order to raise the capital needed to finance water pollution treatment, it was important to weigh the benefits of the cost of return on both debt and equity would be required, and that this additional cost of capital would increase the operating revenues required by the regulations.

The Agency has reevaluated its rate of return assumptions as follows: The Agency has assumed a cost of long-term debt of 8.0 percent, rather than 7.5 percent. Required rate of return on common equity is assumed to be 14.0 percent rather than 12.0 percent. The return rates are based on those used by the Technical Advisory Committee on Finance for the National Power Survey. Since the regulations will increase the capital requirements of the utility industry by less than four percent, without taking into account the exemptions re- ceived under section 316(a), they will not themselves raise the required rate of return on either debt or common equity.

(F) Some commenters suggested that, for the purposes of the base-line cost estimates, the costs of compliance with other environmental regulations associated with the FWPCA, the Clean Air Act of 1970, or any state or local requirements would be included and, furthermore, that an annual inflation rate of greater than seven percent for nuclear plants for the Industry over the next decade; (G) an additional assumption for fossil plants and oil plants respectively; (H) a related comment was that the economic analysis should include the costs of compliance with alternate effluent limitations which are expected to ensue under that section. The Agency has calculated the capital and operating costs for the power generating industry attributable to complying with section 316(a), the mal limitations. The increased retrofitting costs are consistent with an industry survey which includes incremental costs attributable to site dependent factors. Covered by the regulations will increase the operating revenues of the industry-wide costs of compliance with the regulations.

In consideration of these comments and additional data, several base line cost estimating assumptions were modified as follows: (a) capital requirements were based on current projections of a 5.5 percent growth rate in capital expenditures for the industry over the next decade; (b) the inflation rate of 5.5 percent was assumed for fossil plants and 15.5 percent for nuclear plants for the 1970-75 period. Corresponding figures for the 1970-75 period were 6.0 and 9.3 percent respectively; (c) while the costs of compliance with other environmental regulations were not quantified and included in the baseline, the Agency con- sidered the additional costs to the Industry attributable to complying with these requirements in revising the thermal capacity assumption.

(f) A commenter contended that because of the difficulty in accurately assessing the economic effects of section 316(a), the economic effects of the thermal capacity and 50 percent of new capacity which would receive exemptions under section 316(a). The final regulation has been substantially modified and, as promulgated, applies to a much smaller percentage of presently operating units. Those which are covered are the largest new units and units rated at greater than 50 percent of full capacity, which discharge the largest volumes of heat and will do so for the rest of the century. Accordingly, since the units which remain subject to these regulations are those which it is reasonable to anticipate will pose the greatest degree of environmental risk, the percentage of exemptions assumed has been correspondingly reduced. The Agency has received the comments and suggestions described in detail in the "Economic Analysis of the Effluent Limitations for Steam Electric Powerplants" which will be published by the Office of Planning and Evaluation as soon as possible.

In summary, the assumptions used in estimating the percentage of capacity located on rivers which would be likely to receive exemptions are that no units which at full capacity withdraw greater than 70 percent of the average stream flow would receive exemptions and that 50 percent of units will capacity withdraw between 50 percent and 70 percent of the average flow would not receive an exemption. Units representing 50 percent of the total generating capacity in 1970, which discharge the largest volumes of heat and will do so for the rest of the century. Accordingly, since the units which remain subject to these regulations are those which it is reasonable to anticipate will pose the greatest degree of environmental risk, the percentage of exemptions assumed has been correspondingly reduced. The Agency has received the comments and suggestions described in detail in the "Economic Analysis of the Effluent Limitations for Steam Electric Powerplants" which will be published by the Office of Planning and Evaluation as soon as possible.

The Agency has taken these costs into account in its economic evaluations as to the units which would receive exemptions under section 316(a). The "high risk" units (those described in the preceding para- graph) were assumed to receive no exemption and thus to employ close cycle mechanical draft cooling towers on a continuous year-round basis. In fact, some such units could receive partial exemptions, i.e.; modified restrictions on heated discharge—which could be met by open or partially open cooling systems in units, those over 200 megawatts in capacity, towers during all or some portion of the year. The costs of such modified systems would be less than those of continuous operation of a mechanical draft tower system. If, on the other hand, if they were not in some unusual instance, the cost of that tower would be the maximum cost incurred since it would certainly meet any modified thermal pollution standards. The estimated costs of such systems are therefore conservatively high since they are based on the most costly technolog- ical alternative in cases where partial exemptions may be obtained under section 316(a).

(1) The Agency's capital cost estimates for retrofitting cooling towers were said to be underestimated because of a failure to consider the additional costs imposed by specific site dependent factors such as the total costs of generating plant location, the need in individual instances to install additional equipment to abate noise, control plumes, etc.

The cost of cooling water consumption costs about 50 percent more water than does once-through cooling systems. While this incremental water consumed does have an associated cost in some States it is only in arid regions of the United States that unit water costs themselves are significant. A typical site in the arid regions, the cost of additional water to compensate for incremental water consumed by closed cycle cooling would be approximately 0.62 mill per kilowatt-hour of electricity generated, assuming water consumption costs of $1.0 per acre-foot. By comparison, the cost of total generating costs is approximately 10 mills per kilowatt-hour at this site. Even under the "worst case" assumption of a highly inefficient plant located in the area in which water costs are five times higher than those typical of arid locations, incremental water consumption costs would represent only 0.1 mill per kilowatt-hour, or 1 percent of total generating costs.

The non-monetary, environmental effects of increased water consumption and pollution imposed above are difficult to be quantified at greater length in the Development Document.

(16) Several commenters suggested that chemical pollutant limitations be applied to individual low volume waste streams rather than on all low volume streams taken as one source. In general it was advocated that this suggestion was not only technically feasible, but would result in a higher level of effluent reduction benefits compared to total cost of application of technology to achieve the limitation. The regulations have been changed to reflect this suggestion.

(17) Some commenters contended that the limitations of total suspended solids in blowdown from recirculating cooling water systems and other waste streams should be applied on a "net" rather than a "gross" basis. That is, the limitations...
should take into account the presence of pollutants in water intake supplies.

The effluent limitations which have been developed on a gross or absolute basis. In most cases the technologies which are available to control the pollutants are either not demonstrated or are not demonstrated to achieve the effluent limitations established regardless of the presence of these pollutants in indutrial water. However, the Agency recognizes that in certain instances pollutants will be present in navigable waters which supply a plant's intake in significant concentrations, which may not be removed to the levels specified in the limitations, by the application of treatment technology contemplated by these regulations. Accordingly, the Agency is currently developing amendments to its NPDES permit regulations (40 CFR 129) which will specify the situations in which the permit issuing authority may allow a credit for such pollutants. The amendment will be proposed for public comment in the near future. Alteration of net versus gross effluent limitations for this category will be discussed in greater detail in the Development Document.

The promulgated regulations contain no limitation on suspended solids discharged in cooling tower blowdown. The Agency has removed restrictions on the discharge of suspended solids from this source because they consist almost entirely of suspended solids not added by the plant.

Several commenters complained that certain of the proposed limitations of no discharge for best available technology economically achievable had not been fully demonstrated for general application.

The no discharge limitations on low volume wastes which were included in the original proposal have been removed from the present regulations for BATEA since the technology has not been demonstrated adequately for this industry and costs appear to be excessive at this time. Mechanical cleaning systems for maintaining condenser tube cleanliness require the addition of biocide addition to cooling water has been determined not to be adequately demonstrated for new source limitations at the proposed levels. While the use of these no discharge technologies does not constitute best available technology economically achievable or demonstrated technology, their use on a case-by-case basis may be necessary to meet effluent limitations based on water quality standards.

The limitations reflecting recycle of bottom ash sluice water have been retained for both the BATEA and new source performance standards, having been adequately demonstrated. The new source performance standard of no discharge of corrosion inhibitors, reflecting demonstrated technology of design for corrosion protection rather than chemical addition for corrosion control in closed-cycle cooling systems, has been retained in the regulations.

Several commenters reported that the specific numerical limitations in the proposed regulation for total suspended solids, oil and grease, and iron and corrosion control in BATEA demonstrate more than one period a day provided no two units could be chlorinated simultaneously; (g) that the limitations should allow chlorination for more than one period a day provided that the total span of chlorination did not exceed two hours a day; (h) that where two or more units share common intake and discharge conduits, the discharge of free available chlorine might be minimized by simultaneous chlorination of the units; (i) that that chlorination be limited to individual units during periods of low flow through the condenser of the unit undergoing chlorination and high flow through other units; (j) that chlorine limitations be based on total residual chlorine rather than free available chlorine since it is the former that determines damage to aquatic life; (k) that ozone offered promise as a substitute for chlorine; (l) that the discharge of biocides other than chlorine be allowed but not in excess of the 50 hour limit.

The Agency has developed the methodology for assessing the availability of treatment technologies, and the application of treatment technologies to specific industries. The methodology for assessing the availability of treatment technologies, and the application of treatment technologies to specific industries.

Further analysis, stimulated in part by these comments, revealed that based on the application of available technology economically achievable and on the numerical limitations of the proposed limitations was necessary. The specific numerical limitations in the regulations were revised, as follows:

The originally proposed total suspended solids limit of 15 mg/l x flow was reduced to 30 mg/l x flow; the oil and grease limit of 15 mg/l x x flow was increased to 15 mg/l x flow. The originally proposed limitations on iron and copper of 1 mg/l were verified as achievable.

Several commenters addressed to the definitions used in the effluent limitations for chlorination. It was suggested that the definitions of the terms "free available chloramine" and "total residual chlorine" be based on ASTM methods D-1253 and D-1427, and the use of the simplicity of an amperometric titration method rather than the amperometric titration method which requires the use of a skilled technician.

Total residual chlorine is the sum of free available chloramine and combined available chloramine. EPA has issued "Standard Methods for the Examination of Water and Wastewater" (1971) page 338 and in "Annual Book of Standards, Part 23, Water Atmospheric Analysis, 1972" page 256, which prescribes an amperometric titration method for chloramine and combined available chloramine. The method is largely unaffected by the presence of common inorganic anions, tertiary amine and turbidity and color, which interfere with the accuracy of the other methods. Further analysis, stimulated in part by these comments, revealed that based on the application of available technology economically achievable and on the numerical limitations of the proposed limitations was necessary.

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are not always adequate and must be supplemented with additional treatment to assure no discharge limitation on total residual chlorine or other biocides used for biological control in main condenser tubes of closed-cycle cooling systems. The limitation is not generally achievable; (n) that no discharge limitations are not consistent with requirements for sewage treatment plants to maintain chlorine residuals; (p) that even if effective mechanical means were employed to maintain condenser tube cleanliness, chlorine addition would be required from time to time to prevent biological fouling of other parts of the cooling systems; (q) that discharge limitations on other biocides be considered; and (r) that no discharge limitations on biocides would discourage development of biocides that will not have adverse environmental effects.

The Agency recognizes the significance of the effluent limitations on chlorine in view of the extremely large volume of cooling water discharged by powerplants, the large quantities of chlorine added to cooling water by powerplants, and the known adverse effects of chlorine on aquatic organisms. It is further recognized by EPA that the chlorine residuals required to maintain adequate condenser tube cleanliness and to prevent biological fouling in other parts of cooling systems and the effectiveness of means other than chlorine vary seasonally and from site-to-site largely due to widespread differences in the type and quantities of organisms encountered. Thus, rather than establishing technology-based effluent limitations on chlorine which can be met by all dischargers at all times and which would therefore of necessity be very lenient in all but the worst cases, EPA has established effluent limitations on the concentrations in which chlorine may be discharged and the times during which chlorine may be discharged, to protect aquatic life and to prevent biological fouling of other parts of a unit's cooling system. The establishment of effluent limitations on chlorine does not preclude the necessity for the addition of antiscalants and other materials where needed for control of cooling system water chemistry for reasons other than corrosion inhibition, no limitation on these materials is established by these regulations. The regulation reflecting best available technology economically achievable is based on chemical treatment technology for the removal of phosphate, zinc, and phosphorus from cooling tower blowdown. The effluent limitations prescribed reflect the use of alternative corrosion inhibitors and are based on generally achievable limits for chemical treatment to remove all three pollutants. Chemical treatment for phosphorus removal from sewage treatment plant effluents could be designed for phosphorus removal only, hence, lower effluent phosphorus concentrations may be achievable for sewage plants on Lake Michigan. According to NPDPS permit application data, major steam electric powerplants discharge an estimated 365,000 pounds per year of chromium and 7,300,000 pounds per year of zinc. These amounts represent, respectively, 50 percent and 21 percent of the total amounts of these materials discharged by all major industrial dischargers combined. Hence, the importance of effluent limitations on the discharge of these pollutants from steam electric powerplants is demonstrated.

(22) Several commenters addressed the general subject of corrosion inhibitors in closed-cycle cooling systems. The most significant issues raised were as follows: (a) that a no discharge limitation on corrosion inhibition would discourage development of inhibitors having no significant adverse environmental impacts; (b) that since antiscalants could not be used, higher boiler water hardness would be needed to adequately control the higher calcium sulfate concentration arising due to acid addition for corrosion control in cooling systems; (c) that the discharge of phosphorous is lenient considering that discharges from sewage treatment plants into Lake Michigan are limited to 1 mg/l; (d) that for non-chromate corrosion inhibitors the discharge levels should not exceed the 96 hour TLM 50 for chromium in which a chromate limit of 5 mg/l would permit low chromate treatment for corrosion control without the addition of a chromate recovery system; (e) that a no discharge limitation on corrosion inhibitors would result in the need for expensive corrosion resistant steels, many of which are in short supply; and (g) that non-toxic corrosion inhibitors are available and in use and should not be prohibited.

The development and use of non-toxic corrosion inhibitors would continue to the extent that many powerplants and other users of closed-cycle water systems are not required to meet the no discharge effluent limitation, which applies only to new steam electric powerplants. Since design for corrosion protection does not preclude the necessity for the addition of antiscalants and other materials where needed for control of cooling system water chemistry for reasons other than corrosion inhibition, no limitation on these materials is established by these regulations. The regulation reflecting best available technology economically achievable is based on chemical treatment technology for the removal of chromium, zinc, and phosphorus from cooling tower blowdown. The effluent limitations prescribed reflect the use of alternate corrosion inhibitors and are based on generally achievable limits for chemical treatment to remove all three pollutants. Chemical treatment for phosphorus removal from sewage treatment plant effluents could be designed for phosphorus removal only, hence, lower effluent phosphorus concentrations may be achievable for sewage plants on Lake Michigan. According to NPDPS permit application data, major steam electric powerplants discharge an estimated 365,000 pounds per year of chromium and 7,300,000 pounds per year of zinc. These amounts represent, respectively, 50 percent and 21 percent of the total amounts of these materials discharged by all major industrial dischargers combined. Hence, the importance of effluent limitations on the discharge of these pollutants from steam electric powerplants is demonstrated.

(23) Some commenters suggested that maximum design rainfall runoff, and areas required by NPDES permit application data, major steam electric powerplants discharge an estimated 365,000 pounds per year of chromium and 7,300,000 pounds per year of zinc. These amounts represent, respectively, 50 percent and 21 percent of the total amounts of these materials discharged by all major industrial dischargers combined. Hence, the importance of effluent limitations on the discharge of these pollutants from steam electric powerplants is demonstrated.

(24) Some commenters suggested that the regulations allow sufficient flexibility for a variety of water reuse and treatment schemes, e.g., the use of cooling tower blowdown and other reclaimed water as a source for the transport of fly ash.

It is the position of the Agency that, since available waste water treatment systems are generally effluent concentration-based, reduction in the quantities of waste water requiring treatment should be encouraged in order to reduce the amounts of pollutants discharged to receiving waters. In-plant water reuse can reduce the quantities of waste water requiring treatment and, hence, the amounts of pollutants discharged. It is also recognized by EPA that, due to the economies of scale, combining similar waste streams for treatment to remove the same pollutants is generally less costly than separate treatment of these waste streams. The employment of cost-saving alternatives in meeting the effluent limitations should not be discouraged. Therefore, the regulations provide that, where various parallel waste streams are combined for treatment or discharge, the quantity of each pollutant at the discharge and attributable to each waste source shall not exceed the limitation specified for that waste source. Such a provision is intended to allow generally for combined treatment but to require the more stringent limitations that would be applicable if the waste streams were treated separately. Furthermore, the regulations allow for a variety of possible combinations for treatment or discharge of waste streams, so long as the quantity of each controlled pollutant attributable to each waste source does not exceed the specified limitation for that waste source.

(25) Some commenters suggested that, based on cost considerations, many powerplants and plants scheduled to be retired within six years following the BATEA compliance date be exempted from the BATEA requirements for the proposed guidelines for pollutants other than heat.

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The proposed BATEA limitations were based on a significantly more costly technology than that upon which the final regulations are based. EPA recognizes that the cost of equipment is greater in relation to the generating capacity of the plant for a small plant than for a large plant. However, technologies for dehydrating powerplant waste are available which require lower capital expenditure than the treatment methods used by EPA to estimate the costs for achieving the BATEA limitations. Operating costs for meeting BATEA would reflect the extent of the operation of the plant in any case, as would the pollutant discharges that would ensue. Therefore, costs do not justly a general exemption of either old or ambiguous from the BATEA limitations on pollutants other than heat.

(26) Some commenters suggested that the regulations for chemical pollutants should permit a discharger to proceed directly to a system to meet the 1983 standards by an accelerated date, even if this precludes meeting the 1977 effluent limitations by July 1, 1977. This could then avoid the wasteful backfitting required to substantially alter the best available technology treatment system to meet the 1983 limitations.

This comment was based on the proposed BATEA chemical limitations which have been significantly revised in the final regulation. The Agency has established best practicable and best available technologies to represent a logical progression toward meeting the goals of the Act. The treatment and control systems which provide the basis for best available technology are add-on control systems which require no significant backfitting to the best practicable treatment and control technology. Accordingly, there would be no technical reason for delaying compliance with the deadlines of the Act.

(27) Some commenters suggested that EPA had not adequately analyzed the costs for disposal of chemical wastes from treatment of powerplant effluents and waste solids such as sludge. The cost analyses, which are large volumes of soluble salts would have a substantial environmental impact which could be greater than the impact of discharging these solids.

The Agency has determined, based on the above and other factors, that the effluent limitations on low volumes waste sources should reflect the technology of chemical treatment and solids removal rather than concentration by evaporation and total recycle to achieve no disposal of sludges. Nationally uniform application of this latter technology would have required the land disposal of the sludges removed from low volume waste waters of all U.S. powerplants. The remaining sludges from the application of chemical treatment and solids removal technology require some dewatering prior to land disposal. Costs for dewatering by filtration have been considered. EPA estimates that for a typical new 1000 megawatt coal-fired plant, about 5 acres of land would be required for disposal of chemical treatment sludges over the life of the plant. The removal of this 0.5 acres required for ash disposal. Plants with wet scrubber air pollution control devices would require considerably more land, as a base, for ash disposal. All other powerplants would require typically an estimated less than one acre of land per 1000 megawatts of generating capacity for disposal of chemical treatment sludges over the life of the plant.

(28) Some commenters suggested that EPA underestimated the costs of compliance with the proposed effluent limitations for pollutants other than heat. In support of this suggestion, additional data was submitted on the quantities of waste water from the individual waste sources requiring treatment. It was also suggested, in support of an alternative cost analysis submitted by commenters, the installation costs for waste water treatment and control at existing plants would be best estimated on the basis of pollution control facilities rather than the 50 percent figure used in the EPA cost analysis. The incremental 100 percent would reflect the incremental costs of attending those controls, while the 50 percent figure would reflect only installations which would not require backfitting, as would be the case for new sources. Additional information was submitted concerning the costs of modifications to once-through ash handling systems to achieve recycle of bottom ash transport water, the cost of dry ash handling systems, the costs of rainfall runoff control and treatment, and the additional costs that would be incurred to treat ash pond discharges in the cases where bottom ash sluice water and fly ash sluice water already are combined in the same ash pond and the resulting ash pond discharge, after incorporation of recycle to bottom ash handling, would require final treatment to meet the effluent limitations. Some of the industry-wide cost analyses submitted by commenters were based, however, on applying the worst case across the total generating capacity.

In consideration of these comments for the purpose of estimating the cost of compliance, EPA has modified the industry-wide cost estimates for some of the individual waste sources, has used an installation cost factor of 100 percent of equipment costs for existing plants, and has revised its estimates of the costs of meeting the effluent limitations on ash sluice transport water and on rainfall.

(29) Some commenters suggested that EPA has failed to consider the benefits that would result from the chemical effluent limitations.

EPA has determined that the effluent reduction benefits of the chemical limitations in coal-fired plants alone by 1983 would be the removal of approximately 280,000,000,000 pounds per year of total suspended solids (not including ash solids normally removed by ash ponds), 4,470,000 pounds per year of total iron, and 155,000 pounds per year of total copper that would otherwise be discharged. For large plants, large amounts of chemical pollutants such as phosphorus, chromium, zinc and other heavy metals would also be removed. Powerplants operating, based on modified limits, applications, to currently discharge approximately 5,650,000 pounds of chromium per year and 7,300,000 pounds of zinc per year, which are, respectively, 50 percent and 21 percent of the total quantities currently discharged by all major industrial dischargers in the U.S.

(30) Some commenters suggested that the proposed limitations on chemical pollutants would impose enormous costs. EPA has determined that the increased costs, as follows: the increased costs of the $1.4 billion, the increase in electrical generating costs is 0.2 mills per kilowatt hour. The increase in fuel consumption, the benefits of generating capacity be negligible. The Agency has concluded that the cost of installing and operating chemical treatment systems are reasonably in view of the effluent reduction benefits.

(31) Some commenters noted that the proposed regulations were not made directly applicable to discharges from electrical generating facilities using sources of heat other than coal, oil, gas, or nuclear fuel. Such sources would potentially include geothermal steam and industrial by-products such as carbon monoxide, blast-furnace gas, pitch and tar, bagasse, and wood refuse.

These regulations apply to the operation of steam electric power generating point sources by an establishment primarily engaged in the generation of electric power for distribution and sale, which generation results primarily from a process utilizing fossil-type fuel (coal, oil, or gas) or nuclear fuel in conjunction with a thermodynamic cycle employing the steam water system as a thermodynamic medium. It is estimated that very few utility-type steam electric units are not covered by this regulation. Other electric generating sources, such as those employed as captive operations at other industrial point sources, e.g., steel mills, chemical plants, etc., will be covered in a separate regulation.

(C) Economic Impact

The revisions to the regulations described above will significantly reduce its costs. The economic impact report estimates that the regulations will increase the utility industry’s capital requirements by an additional 8.8 billion dollars by 1985, without allowing for the
In conformance with the requirements of section 304(c) of the Act, a manual entitled "Development Document for Final Effluent Limitations Guidelines and New Source Performance Standards for the Steam Electric Power Generating Point Source Category" is being published and will be available from the Government Printing Office, Washington, D.C. 20402 for a nominal fee.

The Agency anticipates that approximately six weeks will be required to complete preparation of the final Development Document so that it accurately describes the regulation, as indicated above. The Development Document, of course, will be prepared on the basis of information and data now available to the Agency; no additional data will be solicited, collected or accepted. As soon as the Development Document is submitted to the Government Printing Office, copies will be made available for review and duplication in the Agency's Public Information Office.

(E) FINAL RULEMAKING

In consideration of the foregoing, 40 CFR Chapter I, Subchapter N, is hereby amended by adding a new Part 423, 'Steam Electric Power Generating Point Source Category,' to read as set forth below.

An order of the Federal District Court for the District of Columbia entered in Natural Resources Defense Council, Inc. v. Train (Cv. No. 1609-73) required that Administrator's decisions be made available for review and duplication in the period November 26, 1974. Subsequent modifications of that order extended the date for promulgation until September 26, 1974. However, on March 15, 1974, the District Court ordered that the effective dates for regulations established by its initial order remain applicable and not be affected by extensions in the promulgation date. That initial order requires that effluent limitations guidelines establishing "best practicable control technology currently available" for this industry be effective upon publication. Accordingly, good cause is found for the regulations establishing best practicable control technology currently available for each subcategory to be effective upon publication in the Federal Register.

The regulations establishing the best available technology economically achievable, the standards of performance for new sources and the new source performance standards shall become effective on November 7, 1974.

Dated: October 2, 1974.

RUSSELL E. TRAIN, Administrator.

Subpart A—Generating Unit Subcategory

Sec. 423.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

[Reserved.]

Sec. 423.15 Standards of performance for new sources.

Sec. 423.16 Pretreatment standards for new sources.

Subpart B—Small Unit Subcategory

Sec. 423.20 Applicability; description of the small unit subcategory.

Sec. 423.21 Specialized definitions.

Sec. 423.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Sec. 423.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

Sec. 423.24 [Reserved.]

Sec. 423.25 Standards of performance for new sources.

Sec. 423.26 Pretreatment standards for new sources.

Subpart C—Old Unit Subcategory

Sec. 423.30 Applicability; description of the old unit subcategory.

Sec. 423.31 Specialized definitions.

Sec. 423.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Sec. 423.33 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

Sec. 423.34 [Reserved.]

Subpart D—Area Runoff Subcategory

Sec. 423.40 Applicability; description of the area runoff subcategory.

Sec. 423.41 Specialized definitions.

Sec. 423.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Sec. 423.43 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

Sec. 423.44 [Reserved.]

Sec. 423.45 Standards of performance for new sources.

Sec. 423.46 Pretreatment standards for new sources.

Amendmenrs: Secs. 301, 305 (b) and (c), 306 (b) and (c), 307 (o) and 601 (a) of the Federal Water Pollution Control Act as amended (33 U.S.C. 1251, 1261, 1281 and (c), 1361 (b) and (c), 1377 (e) and (f), 1397 (e) and 1301 (a),) 86 Stat. 816 et seq., Pub. L. 90-503.

Subpart A—Generating Unit Subcategory

§423.10 Applicability; description of the generating unit subcategory.

The provisions of this subpart are applicable to discharges originating from the operation of a generating unit by an establishment primarily engaged in the generation of electricity for distribution and sale which result primarily from a process utilizing fossil-type fuel (coal, oil, or gas) or nuclear fuel in conjunction with a thermal cycle employing the steam-water system as the thermodynamic medium.
§ 423.11 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in 40 CFR Part 401 shall apply to this subpart.

(b) The term "generating unit" shall mean any generating unit subject to the provisions of this part, except those units defined below as small, or old.

(c) The term "small unit" shall mean any generating unit subject to the provisions of this part, except a unit defined below as old, less than 25 megawatts rated net generating capacity or any unit which is part of an electric utilities system with a total net generating capacity of less than 150 megawatts.

(d) The term "old unit" shall mean any generating unit, subject to the provisions of this part, of 500 megawatts or greater net rated generating capacity which was first placed in service on or before January 1, 1970 and any generating unit of less than 500 megawatts net generating capacity which was first placed in service on or before January 1, 1974.

(e) The term "blowdown" shall mean the minimum discharge of circulating water for the purpose of discharging materials contained in the water, the further buildup of which would cause concentrations of contaminants exceeding limits established by best engineering practice.

(f) The term "free available chlorine" shall mean the value obtained using the amperometric titration method for free available chlorine described in "Standard Methods for the Examination of Water and Wastes", page 112 (13th edition).

(g) The term "sufficient land" shall mean 100 sq m (110 sq ft) or more per megawatt of nameplate generating capacity.

(h) The term "low volume waste sources" shall mean, taken collectively as if from one source, wastewater from all sources except those for which specific limitations are otherwise established in this subpart. Low volume waste include but are not limited to waste waters from wet scrubber air pollution control systems, low volume water treatment evaporator blowdown, laboratory and sampling streams, floor drainage, cooling tower basin cleaning waste and blowdown from recirculating house service water systems.

(i) The term "ash transport water" shall mean water used in the hydraulics of the transport of either fly ash or bottom ash.

(j) The term "metal cleaning wastes" means any cleaning compounds, rinses waters, or any other waterborne residues derived from cleaning any metal process equipment including, but not limited to, boilers, tubes, cleaning boiler firesides and cleaning and air preheater cleaning.

(k) The term "once through cooling water" shall mean water passed through the main cooling condensers in one or two passes for the purpose of removing waste heat from the generating unit.

(l) The term "recirculated cooling water" shall mean water which is passed through the main condensers for the purpose of removing waste heat from the generating unit through a cooling tower or other cooling device, other than a cooling pond or a cooling lake, for the purpose of removing such heat from the water and then passed again, except for blowdown, through the main condenser.

(m) The term "cooling lake" shall mean any manmade water impoundment which does not impede the flow of a navigable stream and which is used to remove waste heat from heated condenser water prior to returning the recirculated cooling water to the main condenser.

(n) The term "cooling lake" shall mean any manmade water impoundment which impedes the flow of a navigable stream and which is used to remove waste heat from heated condenser water prior to returning the recirculated cooling water to the main condenser.

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

(a) In establishing the limitations set forth in this section, EPA took into account all information it was able to collect, develop and solicit with respect to factors such as age and size of plant, utilization of facilities, raw materials, manufacturing process, non-water quality environmental impacts, control and treatment technology available, energy requirements and costs which can affect the industry subcategorization and effluent limits established. It is, however, possible that data which would affect these limitations have not been available and, as a result, these limitations should be adjusted for certain plants in this industry. An individual discharger or other interested person may submit evidence to the Regional Administrator (or to the State, if the State has the authority to issue NPDES permits) for the equipment or facilities involved, the process applied, or other such factors related to such discharger are fundamentally different from the factors considered in the establishment of the guidelines. On the basis of such evidence or other available information, the Regional Administrator (or the State) will make a written finding that such factors are or are not fundamentally different for that facility compared to those specified in the Development Document. If such fundamentally different factors are found to exist, the Regional Administrator or the State shall establish for the discharger effluent limitations in the NPDES permit either more or less stringent than the limitations established herein to the extent dictated by such fundamentally different factors. Such limitations must be approved by the Administrator of the Environmental Protection Agency. The Administrator may approve or disapprove such limitations, specify other limitations, or initiate proceedings to revise these regulations.

(b) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this section, 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:

1. The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.

2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

3. The quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of ash transport water times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TES 75</td>
<td>100 mg/l</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/l</td>
<td>15 mg/l</td>
</tr>
</tbody>
</table>

4. The quality of pollutants discharged in ash transport water shall not exceed the quantity determined by multiplying the flow of ash transport water times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TES 75</td>
<td>100 mg/l</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/l</td>
<td>15 mg/l</td>
</tr>
</tbody>
</table>

5. The quantity of pollutants discharged in metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TES 75</td>
<td>100 mg/l</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>Copper Total</td>
<td>10 mg/l</td>
<td>1.0 mg/l</td>
</tr>
<tr>
<td>Iron Total</td>
<td>10 mg/l</td>
<td>1.0 mg/l</td>
</tr>
</tbody>
</table>

6. The quantity of pollutants discharged in boiler blowdown shall not exceed the quantity determined by multiplying the flow of boiler blowdown times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TES 75</td>
<td>100 mg/l</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/l</td>
<td>15 mg/l</td>
</tr>
</tbody>
</table>

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(7) The quantity of pollutants discharged in once through cooling water shall not exceed the quantity determined by multiplying the flow of once through cooling water sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Effluent characteristic</th>
<th>Maximum Average of daily value for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fre available chlorine</td>
<td>0.5 mg/L... 0.2 mg/L</td>
</tr>
</tbody>
</table>

(8) Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the regional administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

(9) In the event that the specific limitations for any one day total residual chlorine may be discharged from the bottom ash transport water times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Effluent characteristic</th>
<th>Maximum Average of daily value for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fre available chlorine</td>
<td>0.5 mg/L... 0.2 mg/L</td>
</tr>
</tbody>
</table>

(10) The quantity of pollutants discharged in the best available technology economically achievable shall not exceed the quantity determined by multiplying the flow of once through condenser water times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Effluent characteristic</th>
<th>Maximum for any one day Average of daily value for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fre available chlorine</td>
<td>100 mg/L... 30 mg/L</td>
</tr>
</tbody>
</table>

(11) Other corrosors Limit

<table>
<thead>
<tr>
<th>Effluent characteristic</th>
<th>Maximum for any one day Average of daily value for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fre available chlorine</td>
<td>100 mg/L... 30 mg/L</td>
</tr>
</tbody>
</table>

(12) Heat may be discharged in blowdown from recirculated cooling water systems provided the temperature at which the blowdown is discharged does not exceed the lowest temperature of the recirculated cooling water prior to the addition of the make-up water.

(13) Heat may be discharged in blowdown from recirculated cooling water systems which have been designed to discharge blowdown water at a temperature above the lowest temperature of the recirculated cooling water prior to the addition of make-up water providing such recirculating cooling systems have been placed in operation or are under construction prior to the effective date of this regulation.

(14) Heat may be discharged where the owner or operator of a unit otherwise subject to this limitation can demonstrate that a cooling pond or cooling tower is not used or is under construction as of the effective date of this regulation to cool
recirculated cooling water before it is returned to the main condensers.

4. Heat may be discharged where the owner or operator of a unit otherwise subject to this limitation can demonstrate that the total dissolved solids concentration in blowdown exceeds 30,000 ppm on a land not owned or controlled by the owner or operator as of March 4, 1974, and that no alternate recirculating cooling system is practicable.

5. Heat may be discharged where the owner or operator of a unit otherwise subject to this limitation can demonstrate that the dissolved solids concentration in blowdown exceeds 30,000 ppm on a land not owned or controlled by the owner or operator as of March 4, 1974, and that no alternate recirculating cooling system is practicable.

6. Heat may be discharged where the owner or operator of a unit otherwise subject to this limitation can demonstrate that the dissolved solids concentration in blowdown exceeds 30,000 ppm on a land not owned or controlled by the owner or operator as of March 4, 1974, and that no alternate recirculating cooling system is practicable.

7. Heat may be discharged where the owner or operator of a unit otherwise subject to this limitation can demonstrate that the dissolved solids concentration in blowdown exceeds 30,000 ppm on a land not owned or controlled by the owner or operator as of March 4, 1974, and that no alternate recirculating cooling system is practicable.

§ 423.14 Standards of performance

The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this section, which may be discharged by a new source subject to the provisions of this subpart:

The pH of all discharges, except those that are subject to section 306 of the Act for a source within the generating unit subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in 40 CFR Part 123, except that,

<table>
<thead>
<tr>
<th>Effective Characteristic</th>
<th>Maximum Concentration</th>
<th>Average of Daily Values for Thirty Consecutive Days</th>
<th>Average of Daily Values for Thirty Consecutive Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>100 mg/L</td>
<td>25 mg/L</td>
<td>25 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>50 mg/L</td>
<td>15 mg/L</td>
<td>15 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>30 mg/L</td>
<td>15 mg/L</td>
<td>15 mg/L</td>
</tr>
<tr>
<td>Sulfate</td>
<td>80 mg/L</td>
<td>40 mg/L</td>
<td>40 mg/L</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>50 mg/L</td>
<td>25 mg/L</td>
<td>25 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>25 mg/L</td>
<td>12.5 mg/L</td>
<td>12.5 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>0.5 mg/L</td>
<td>0.5 mg/L</td>
<td>0.5 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>0.5 mg/L</td>
<td>0.5 mg/L</td>
<td>0.5 mg/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>75 mg/L</td>
<td>37.5 mg/L</td>
<td>37.5 mg/L</td>
</tr>
<tr>
<td>Sulfate</td>
<td>150 mg/L</td>
<td>75 mg/L</td>
<td>75 mg/L</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>150 mg/L</td>
<td>75 mg/L</td>
<td>75 mg/L</td>
</tr>
</tbody>
</table>

(1) The project of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of bottom ash transport water times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Effective Characteristic</th>
<th>Maximum Concentration</th>
<th>Average of Daily Values for Thirty Consecutive Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>100 mg/L</td>
<td>25 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>25 mg/L</td>
<td>15 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
</tbody>
</table>

(2) The pH of all discharges, except those that are subject to section 306 of the Act for a source within the generating unit subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in 40 CFR Part 123, except that,
for the purpose of this section, 40 CFR 128.133 shall be amended to read as follows:

In addition to the prohibitions set forth in 40 CFR 128.131, the pretreatment standard for incompatible pollutants introduced into a point source subject to a permit shall be the best practicable control technology currently available:

- The term "low volume waste sources" shall mean, taken collectively as if from one source, wastewater from all sources except those for which specific limitations are otherwise established in this subpart.
- The term "ash transport water" shall mean water used in the hydraulically transported discharge of fly ash or bottom ash.
- The term "metal cleaning wastes" shall mean any manmade water impoundment as the thermodynamic medium.
- The term "old unit" shall mean any generating unit, subject to the provisions of this part, of operating capacity of less than 150 megawatts or any generating unit of less-than 500 megawatts rated net generating capacity which was first placed in service on or before January 1, 1970 and any generating unit subject to the prohibitions set forth in this section, 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:
- The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.
- There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluids.
- The quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Different characteristics</th>
<th>Maximum for any day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>20 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>15 mg/L</td>
</tr>
</tbody>
</table>

(4) The quantity of pollutants discharged in ash transport water shall not exceed the quantity determined by multiplying the flow of ash transport water times the concentration listed in the following table:

(5) The quantity of pollutants discharged in metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Different characteristics</th>
<th>Maximum for any day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>20 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>15 mg/L</td>
</tr>
</tbody>
</table>

The above regulations apply to discharges resulting from the operation of a small unit by an establishment primarily engaged in the generation of electricity from fossil or nuclear fuel in conjunction with a thermal cycle employing the steam-water system as the thermodynamic medium.
§ 423.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

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

(a) The quantity of pollutants discharged from low volume waste sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
</tbody>
</table>

(b) The quantity of pollutants discharged in once through cooling water sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
</tbody>
</table>

(c) The quantity of pollutants discharged in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of bottom ash transport water times the concentration listed in the following table and dividing the product by 12.5:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
</tbody>
</table>

(d) The quantity of pollutants discharged in fly ash transport water shall not exceed the quantity determined by multiplying the flow of fly ash transport water times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
</tbody>
</table>

(e) The quantity of pollutants discharged in fly ash transport water shall not exceed the quantity determined by multiplying the flow of fly ash transport water times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
</tbody>
</table>

(f) The quantity of pollutants discharged in boiler blowdown shall not exceed the quantity determined by multiplying the flow of boiler blowdown times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
</tbody>
</table>

(g) The quantity of pollutants discharged in boiler blowdown shall not exceed the quantity determined by multiplying the flow of boiler blowdown times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
</tbody>
</table>

(h) The quantity of pollutants discharged in once through condenser water sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
</tbody>
</table>

(i) The quantity of pollutants discharged in once through condenser water sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>1.0 mg/L</td>
</tr>
</tbody>
</table>

(9) Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the regional administrator or state, if the state has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

(10) In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property controlled in paragraphs (a) through (9) of this section attributable to each controlled waste source shall not exceed the specified limitation for that waste source.
treatment or discharge, the quantity of each pollutant or pollutant property con-
trolled in paragraphs (a) through (j) of this section attributable to each con-
trolled waste source shall not exceed the specified limitation for that waste source.

§ 423.24 [Reserved]

§ 423.25 Standards of performance for new sources.

The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this section, which may be discharged by a new source subject to the provisions of this subpart:

(a) The pH of all discharges, except once through cooling water, shall be within the range of 6.0–9.0.

(b) There shall be no discharge of polychlorinated biphenol compounds such as those commonly used for transformer fluid.

(c) The quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/l</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/l</td>
<td>15 mg/l</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/l</td>
<td>1.0 mg/l</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.5 mg/l</td>
<td>1.5 mg/l</td>
</tr>
</tbody>
</table>

(d) The quantity of pollutants discharged in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of bottom ash transport water times the concentration listed in the following table and dividing the product by 20:

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/l</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/l</td>
<td>15 mg/l</td>
</tr>
</tbody>
</table>

(e) There shall be no discharge of TSS or oil and grease in fly ash transport water.

(f) The quantity of pollutants discharged in metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/l</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/l</td>
<td>15 mg/l</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/l</td>
<td>1.0 mg/l</td>
</tr>
</tbody>
</table>

(g) The quantity of pollutants discharged in boiler blowdown shall not exceed the quantity determined by multiplying the flow of boiler blowdown times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/l</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/l</td>
<td>15 mg/l</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/l</td>
<td>1.0 mg/l</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.5 mg/l</td>
<td>1.5 mg/l</td>
</tr>
</tbody>
</table>

(1) Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any single point in the waste stream at a level which can demonstrate to the regional administrator or state, if the state has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

(k) In the event that waste steam from various sources are combined for treatment, or discharge, the quantity of each pollutant or pollutant property controlled in paragraphs (a) through (j) of this section attributable to each controlled waste source shall not exceed the specified limitation for that waste source.

(l) There shall be no discharge of heat from the main condenser except:

(1) Heat may be discharged in blowdown from recirculated cooling water systems provided the temperature at which the blowdown is discharged does not exceed at any time the lowest temperature of recirculated cooling water prior to the addition of the make-up water.

(2) Heat may be discharged in blowdown from cooling ponds provided the temperature at which the blowdown is discharged does not exceed at any time the lowest temperature of recirculated cooling water prior to the addition of the make-up water.

§ 423.26 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act for sources within the small unit subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 307(c) of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in 40 CFR Part 128, except that, for the purpose of this section, 40 CFR Part 128 may be amended to read as follows:

In addition to the prohibitions set forth in 40 CFR Part 128, the pretreatment standards for incompatible pollutants introduced into a publicly owned treatment works shall be the standard of performance for new sources specified in 40 CFR Part 40.25 except for the following pollutants or pollutant parameters for which the following pretreatment standards are established:

<table>
<thead>
<tr>
<th>Pollutant or pollutant parameter</th>
<th>Pretreatment standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat</td>
<td>No limitation</td>
</tr>
<tr>
<td>Free available chlorine, Do</td>
<td>Total residual chlorine, Do</td>
</tr>
</tbody>
</table>

Subpart C—Old Unit Subcategory

§ 423.30 Applicability; description of the old unit subcategory.

The provisions of this subpart are applicable to discharges resulting from the operation of an old unit by an establishment primarily engaged in the generation of electricity for distribution and sale which generally results primarily from a process utilizing a low-bulk-fuel (coal, oil, gas) or nuclear fuel in conjunction with a thermal cycle employing the steam-water system as the heat carrying medium.

§ 423.31 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in 40 CFR Part 40 shall apply to this subpart.

(b) The term "old unit" shall mean any generating unit, subject to the provisions of this part, of 500 megawatts or greater rated net generating capacity which was first placed in service on or before January 1, 1970 and any generating unit of less than 500 megawatts rated net generating capacity which was first placed in service on or before January 1, 1974.

(c) The term "blowdown" shall mean the minimum discharge of recirculating water for the purpose of discharging materials contained in the water, the further buildup of which would cause con-
centrations in amounts exceeding limits established by best engineering practice.

(d) The term “free available chlorine” shall mean the value obtained using the amperometric titration method for free available chlorine described in "Standard Methods for the Examination of Water and Wastewater", page 113 (19th Edition).

(e) The term “low volume waste sources” shall mean, taken collectively as if from one source, wastewater from all sources except those for which specific limitations are otherwise established in this subpart. Low volume waste sources include but are not limited to waste waters from wet scrubber air pollution control systems, ion exchange water treatment systems, water treatment evaporator blowdown, laboratory and sampling streams, floor drainage, cooling tower basin cleaning, blowdown from recirculating house and treatment technology available.

(f) The term “ash transport water” shall mean water used in the hydraulic transport of either fly ash or bottom ash.

(g) The term “metal cleaning wastes” shall mean any cleaning compounds, rinse water, or any other waterborne sediments derived from cleaning any metal process equipment including but not limited to boiler tube cleaning, boiler residue cleaning and air preheater cleaning.

(h) The term “once through cooling water” shall mean water passed through the main condenser for the purpose of removing low volume waste process heat from the generating unit.

(i) The term “recirculated cooling water” shall mean water which is passed through the main condenser for the purpose of removing waste heat from the generating unit passed through a cooling device for the purpose of removing such heat from the water and then passed again through the main condenser.

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

(a) In establishing the limitations set forth in this section, EPA took into account all information it was able to collect, develop and solicit with respect to factors (such as age and size of plant, utilization of facilities, raw materials, manufacturing processes, non-water quality environmental impacts, control and treatment technology available, energy requirements and costs) which may affect the industry subcategorization and effluent levels established. It is, however, possible that data which would affect these limitations have not been available and, as a result, these limitations should be adjusted for certain plants in this industry. An individual discharger or other interested person may submit evidence to the Regional Administrator (or to the State, if the State has the authority to issue NPDES permits) that factors relating to the equipment or facilities involved the process applied, or other such factors related to the best practicable control method, are fundamentally different from the factors considered in the establishment of the guidelines. On the basis of such evidence or other available information, the Regional Administrator (or the State) will make a written finding that such factors are or are not fundamentally different for that facility compared to those specified in the Development Document. If such fundamentally different factors are found to exist, the Regional Administrator or the State shall establish for the discharger effluent limitations in the NPDES permit either, more or less stringent than the limitations established herein, to the extent dictated by such fundamentally different factors. Such limitations must be approved by the Administrator of the Environmental Protection Agency. The Administrator may approve or disapprove such limitations, specify other limitations, or initiate proceedings to revise these regulations.

(b) The following limitations establish the quantity or quality of pollutants from each pollutant source controlled by this section, 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:

(1) The pH of all discharges, except once through cooling water, shall be within the range of 6.0 to 9.0.

(2) There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

(3) The quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum Concentration</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS, mg/L</td>
<td>100 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>2 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>12 mg/L</td>
<td>1 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>50 mg/L</td>
<td>5 mg/L</td>
</tr>
</tbody>
</table>

(4) The quantity of pollutants discharged in ash transport water shall not exceed the quantity determined by multiplying the flow of ash transport water times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum Concentration</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS, mg/L</td>
<td>100 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>2 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>12 mg/L</td>
<td>1 mg/L</td>
</tr>
</tbody>
</table>

(5) The quantity of pollutants discharged in metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum Concentration</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS, mg/L</td>
<td>100 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>2 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>12 mg/L</td>
<td>1 mg/L</td>
</tr>
</tbody>
</table>

(6) The quantity of pollutants discharged in boiler blowdown shall not exceed the quantity determined by multiplying the flow of boiler blowdown times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum Concentration</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS, mg/L</td>
<td>100 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>2 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>12 mg/L</td>
<td>1 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>50 mg/L</td>
<td>5 mg/L</td>
</tr>
</tbody>
</table>

(7) The quantity of pollutants discharged in once through cooling water shall not exceed the quantity determined by multiplying the flow of once through cooling water sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum Concentration</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS, mg/L</td>
<td>100 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>2 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>12 mg/L</td>
<td>1 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>50 mg/L</td>
<td>5 mg/L</td>
</tr>
</tbody>
</table>

(8) The quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Maximum Concentration</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS, mg/L</td>
<td>100 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>2 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>12 mg/L</td>
<td>1 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>50 mg/L</td>
<td>5 mg/L</td>
</tr>
</tbody>
</table>

(9) Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the regional administrator or state, if the state has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

(10) In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property controlled in paragraphs (a) (1) through (10) of this section attributable to each controlled waste source shall not exceed the specified limitation for that waste source.
§ 423.33 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

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

(a) The pH of all discharges, except once through cooling water, shall be within the range of 6.0–9.0.

(b) There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

(c) The quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Effluent Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>30 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>30 mg/L</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>0.3 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>0.3 mg/L</td>
</tr>
</tbody>
</table>

(g) The quantity of pollutants discharged in boiler blowdown shall not exceed the quantity determined by multiplying the flow of boiler blowdown times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Effluent Characteristic</th>
<th>Maximum for any one day</th>
<th>Average of daily values for thirty consecutive days shall not exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>100 mg/L</td>
<td>20 mg/L</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>20 mg/L</td>
<td>6.0 mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>1.0 mg/L</td>
<td>0.3 mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0 mg/L</td>
<td>0.3 mg/L</td>
</tr>
</tbody>
</table>

(h) The quantity of pollutants discharged in once through condenser water shall not exceed the quantity determined by multiplying the flow of once through condenser water sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Effluent Characteristic</th>
<th>Concentration</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free available chlorine</td>
<td>0.5 mg/L</td>
<td>0.2 mg/L</td>
</tr>
</tbody>
</table>

(i) The quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table:

<table>
<thead>
<tr>
<th>Effluent Characteristic</th>
<th>Concentration</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free available chlorine</td>
<td>0.5 mg/L</td>
<td>0.2 mg/L</td>
</tr>
</tbody>
</table>

(j) Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the regional administrator or state, if the state has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

(k) In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property controlled in paragraphs (a) through (j) of this section attributable to each controlled waste source shall not exceed the specified limitation for that waste source.

§ 423.34 [Reserved]

Subpart D—Area Runoff Subcategory

§ 423.40 Applicability; description of the area runoff subcategory.

The provisions of this subpart are applicable to discharges resulting from material storage runoff and construction runoff which are used in or derived from units subject to the limitations in subparts A, B, or C of this part.

§ 423.41 Specialized definitions.

For the purposes of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in 40 CFR Part 401 shall apply to this subpart.

(b) The term "material storage runoff" shall mean the rainfall runoff from or through any coal, ash or other material storage pile.

(c) The term "construction runoff" shall mean the rainfall runoff from any construction activity and any earth surface disturbed by such activity from the inception of the construction until construction is complete and any disturbed earth is returned to a vegetative or other cover commensurate with the intended land use.

(d) The term "10 year, 24 hour rainfall event" shall mean a rainfall event with a probable recurrence interval of once in ten years as defined by the National Weather Service in Technical Paper No. 40, "Rainfall Frequency Atlas of the United States." May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

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

In establishing the limitations set forth in this section, EPA took into account all information it was able to collect, develop and solicit with respect to factors (such as age and size of plant, utilization of facilities, raw materials, manufacturing processes, non-water quality environmental impacts, control and treatment technology available, energy requirements and costs) which can affect the industrial subcategory and effluent levels established. It is, how-
ever, possible that data which would af-
fect these limitations have not been
available and, as a result, these limi-
tations should be adjusted for certain
plants in this industry. An individual
discharger or other interested person
may submit evidence to the Regional Ad-
ministrator (or to the State, if the State
has the authority to issue NPDES per-
mits) that factors relating to the equip-
ment or facilities involved, the process
applied, or other such factors related to
such discharger are fundamentally
different from the factors considered in
the establishment of the guidelines. On
the basis of such evidence or other avail-
able information, the Regional Adminis-
trator (or the State) will make a writ-
ten finding that such factors are or are
not fundamentally different for that fa-
cility compared to those specified in the
Development Document. If such funda-
mentally different factors are found to
exist, the Regional Administrator or the
State shall establish for the discharger
effluent limitations in the NPDES permit
either more or less stringent than the
limitations established herein, to the ex-
tent dictated by such fundamentally
different factors. Such limitations must
be approved by the Administrator of the
Environmental Protection Agency. The
Administrator may approve or disap-
prove such limitations, specify other limi-
tations, or initiate proceedings to revise
these regulations.

(a) Subject to the provisions of para-
graph (b) of this section, the following
limitations establish the quantity or
quality of pollutants or pollutant prop-
erties, controlled by this section, which
may be discharged by a point source sub-
ject to the provisions of this subpart after
application of the best practicable con-
trol technology currently available:

<table>
<thead>
<tr>
<th>Effluent character:</th>
<th>Effluent limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>Not to exceed 50 mg/l.</td>
</tr>
<tr>
<td>pH</td>
<td>Within the range 6.0 to 9.0.</td>
</tr>
</tbody>
</table>

(b) Any untreated overflow from fa-
cilities designed, constructed and oper-
ated to treat the volume of material stor-
age runoff and construction runoff which
is associated with a 10 year, 24 hour rain-
fall event shall not be subject to the
limitations in subparagraph (a) of this
section.

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

(a) Subject to the provisions of para-
graph (b) of this section, the following
limitations establish the quantity or
quality of pollutants or pollutant prop-
erties, controlled by this section, which
may be discharged by a point source sub-
ject to the provisions of this subpart after
application of the best practicable con-
trol technology currently available:

<table>
<thead>
<tr>
<th>Effluent character:</th>
<th>Effluent limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>Not to exceed 50 mg/l.</td>
</tr>
<tr>
<td>pH</td>
<td>Within the range 6.0 to 9.0.</td>
</tr>
</tbody>
</table>

(b) Any untreated overflow from fa-
cilities designed, constructed and oper-
ated to treat the volume of material stor-
age runoff and construction runoff which
results from a 10 year, 24 hour rainfall
event shall not be subject to the pH and
TSS limitations stipulated in paragraph
(a) of this section.

§ 423.46 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act for a source within the area runoff subcategory, which is a user of a publicly owned treat-
ment works (and which would be a new
source subject to section 306 of the Act,
if it were to discharge pollutants to the
navigable waters), shall be the standard
set forth in 40 CFR Part 128, except that,
for the purpose of this section, 40 CFR
128.133 shall be amended to read as
follows:

In addition to the prohibitions set forth in
40 CFR 128.131, the pretreatment standard
for incompatible pollutants introduced into
a publicly owned treatment works shall be
the standard of performance for new sources
specified in 40 CFR 423.45; Provided, That,
if the publicly owned treatment works which
receives the pollutants is committed, in its
NPDES permit, to remove a specified per-
centage of any incompatible pollutant, the
pretreatment standard applicable to users of
such treatment works shall, except in the
case of standards providing for no discharge
of pollutants, be correspondingly reduced in
stringency for that pollutant.

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