Attachment II

12/3/81 letter

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November 5, 1981

DIRECT DIAL NO. 804 788- 8340

J. William Jordan
Chief, NPDES Technical
Support Branch (EN-336)
U.S. Environmental Protection
Agency
401 M Street, S.W.
Washington, D.C. 20460

Re: EPA Guidance Memorandum On Utility
NPDES Permits and Mass Limitations

Dear Bill:

Enclosed, at long last, is the briefing paper I promised you on the Utility Water Act Group's views about the use of mass limitations in steam-electric NPDES permits.

As you can see, we urge you to issue an interpretive memorandum construing the steam electric guidelines to require only the use of concentration limits in NPDES permits. We believe that this will accomplish your regulatory objectives directly and simply, with little or no risk to the Agency, and will save both permit writers and the regulated utilities vast amounts of valuable time and energy as NPDES permits are issued.

Alternatively, we urge that you construe the guidelines to require only the use of "flexible" mass limitations, set by use of permit language similar to that now used in the guidelines.

We strongly urge you not to interpret the steam electric guidelines to require use of fixed, numerical mass limitations, because of the extreme complexities and administrative burdens which such a requirement would impose on permit issuers and regulated utilities alike, with little or no tangible environmental benefits.

We would like to have an opportunity to sit down with you and your staff to discuss these issues. Please let us know whether you need any further information from us, and whether such a meeting can be had.

Thank you for your assistance.

Sincerely yours,

Turner T. Smith, Jr.

65/755
Enclosures
cc: Alan W. Eckert
Bruce M. Diamond

UTILITY WATER ACT GROUP

Briefing Paper on

MASS LIMITS IN ELECTRIC POWER INDUSTRY NPDES PERMITS

November 5, 1981

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Introduction

The Utility Water Act Group (UWAG)1/ submits this briefing paper to address three important questions relating to the use of mass limits in utility industry NPDES permits. These questions are:

(1) Whether EPA's rules require fixed numerical mass limits to be imposed in steam electric power plant NPDES permits (hereafter "utility permits").

(2) If not, whether such fixed numerical mass limits should be imposed in those permits.

(3) If such limits are imposed, what wastestream flows should be used in their calculation (and thus what implicit wastestream flow restrictions are to be imposed in permits).

These questions arise because some NPDES permit issuers argue that technology-based effluent limitations for steam electric power plant discharges must contain fixed, numerical

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1/ UWAG is an ad hoc group of 81 electric utility systems that own and operate more than half the nation's generating capacity. The Edison Electric Institute and the National Rural Electric Cooperative Association are also members. UWAG was formed to represent its members' interest in matters relating to regulation under the Clean Water Act.

limits on the mass of pollutants discharged, rather than (or in addition to) limitations on the concentrations of pollutants in effluents.2/ Furthermore, these permit issuers have, in some instances, proposed to use inappropriate values for wastestream flows (e.g., long-term average wastestream flows or historical maximum flows) when calculating such mass limits for certain of the affected wastestreams.

Executive Summary

As discussed below, use of fixed numerical mass limitations in steam electric permits is not required by EPA's rules. And any such use (1) cannot properly accommodate the complex flow variability of utility wastestreams, (2) risks improperly constraining electrical production capability and thus utility system electrical reliability, and (3) is a needlessly awkward and complicated method of making and implementing the basic regulatory decisions on control technology at steam electric power plants. Regulation by concentration, not mass, or at least by flexible mass limits of the "guidelines" sort outlined below, is far simpler, more direct, and better serves the ends of regulatory reform.

2/ See Attachment A, a draft "Rationale for Objection" delivered to Duke Power Company by the State of South Carolina, and which apparently originated in EPA Region IV (hereafter Region IV Rationale).

For these reasons, UWAG urges EPA to abandon efforts to use fixed numerical mass limitations in utility permits. EPA should regulate power plants solely by concentration. EPA headquarters should produce a guidance memorandum for the regions and the states that interprets its steam electric guidelines to this effect.

If mass limits are used at all, they should be flexible (as opposed to fixed numerical) limits, tracking the language in the Agency's own present and proposed steam electric guidelines. If inflexible fixed numerical mass limits are imposed in permits, the wastestream flows used to calculate them must be based on maximum anticipated flows during the permit term, so as to account fully for anticipated wastestream flow variability and to prevent interference with plant operating capability and electric system reliability. In the utility industry, such maximum flows must be measured by design (or "as built") flows and, where precipitation-related flows are involved, by conservative estimates of runoff (e.g., including use of 10-year, 24-hour rainfall events).

Discussion

A steam electric plant contains both continuous and intermittent wastestreams that are extremely variable in flow. Depending upon the particular plant, these wastestreams are combined for treatment in ash or other centralized treatment ponds prior to discharge, (hereafter referred to as combined treatment ash ponds), a practice encouraged by EPA's 1980 Development Document.3/ The particular combinations are accomplished in many different configurations4/ and the flow-through

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3/ EPA's proposed effluent limitations guidelines for electric power plants identify eight separate wastestreams:

1. Once-through cooling water
2. Cooling tower blowdown
3. Fly ash transport water
4. Bottom ash transport water
5. Low volume wastes
6. Metal cleaning wastes
7. Boiler blowdown
8. Area runoff

45 Fed. Reg. 68328, col. 3 (Oct. 14, 1980). (To this might be added sanitary sewage, a small, intermittent flow that is essentially de minimis for the purposes of this paper.) When speaking of "combined streams" hereafter, once-through cooling water is ignored since it is normally discharged separately, directly to navigable waters, and thus is not normally involved in combined streams calculations. While oil-fired, gas-fired and nuclear plants do not have all of these wastestreams and do not normally combine wastestreams in ash ponds, they do sometimes combine wastestreams before or after treatment. The principles discussed in this paper also apply to them.

4/ See Appendix A for typical configurations.

characteristics of the treatment ponds themselves are extremely variable and complex. Thus, variability in the wastestreams ultimately discharged to navigable waters arises from multiple and complex causes. Many of these causes (like precipitation events) are not within the permittee's control. Others (like electric system demand) are virtually independent of the permittee's control--at least in the short-term and at the plant level.

These two fundamental and inescapable facts--complex flows and electric reliability requirements--directly govern the wisdom, practicability, and legality of attempting to impose fixed, numerical mass limits in utility permits.

I. EPA's Rules Do Not Require Fixed Numerical Mass Limits For Electric Power Plants.

EPA's Consolidated Permit Regulations, 40 C.F.R. § 122.63(f), provide that all NPDES permits are to have mass limitations except (among other cases) "[w]hen applicable standards and limitations are expressed in terms of other units of measurement." 40 C.F.R. § 122.63(f)(1)(ii) (1981). The steam electric guidelines, recognizing the unique characteristics of the utility industry, are "expressed in terms of other units."5/ They provide fixed, numerical limits only for

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5/ The "other units" referred to are obviously not limited to such parameters as "pH, temperature, radiation, or other

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pollutant concentrations.6/

It is true that these guidelines speak of limiting the "quantity" of pollutants discharged, but in reality they do not regulate or limit quantity at all. They specify only concentrations, and require that the quantity of pollutants not exceed the specified concentration multiplied by the "flow."7/ Since they do not contain any fixed, numerical limits on maximum allowable flows, they do not limit flow.8/

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pollutants which cannot appropriately be expressed by mass," since these are the subject of a separate exception. 40 C.F.R. § 122.63(f)(1)(i) (1981).

6/ For example, the BPT limits for low volume waste sources are structured as follows:

> 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:

Effluent characteristic	Maximum for any 1 day (mg/l)	Average of daily values for 30 consecutive days shall not exceed--(mg/l)
TSS	100	30
Oil and Grease	20	15

40 C.F.R. § 423.12(b)(3) (1981).

7/ By definition, concentration (mass per volume) multiplied by flow (volume per time) equals quantity per unit of time.

8/ One of EPA's own contractors concurs, observing that the effluent guidelines for the steam electric industry "establish

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The 1980 proposed guidelines for the industry also express the actual limitations only in units of concentration. See 45 Fed. Reg. 68328-56 (Oct. 14, 1980). And the preamble to these proposed rules speaks in terms of concentrations. See 45 Fed. Reg. 68334-39 (Oct. 14, 1980).

In addition to the "expressed in terms of other units" exception, there is another exception from the requirement for use of mass limits that applies to most utility permits. It applies where (1) case-by-case limits are set and (2) "limitations expressed in terms of mass are infeasible because the mass of the pollutant discharged cannot be related to a measure of operation . . . and permit conditions ensure that dilution will not be used as a substitute for treatment." 40 C.F.R. § 122.63(f)(1)(iii) (1981). As for this exception's first requirement, the steam electric guidelines govern only individual wastestreams. Yet, as already noted, these wastestreams are usually combined into combined treatment ash ponds. They are

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only [pollutant] concentration requirements," there being no "flow restrictions," that the "guidelines for [the ore and coal mining and steam electric utility industries] . . . require NPDES permits to be based on concentrations only," and that they contain "concentrations without a corresponding implicit flow limitation." Booz, Allen & Hamilton, The Water Bubble Concept as an Alternative Effluent Limitations Approach, at B-9, 8, (Nov. 25, 1980).

"internal" wastestreams in these cases and the guidelines do not and could not apply to them. Thus, ash pond limits must be set case-by-case for combined treatment ash ponds. As for the exception's second requirement, EPA has already determined, in the context of the Agency's § 122.63(b) "actual production" rules, that the steam electric industry's wastestream flows, and thus its mass discharges, are not "based on production (or other measure of operation)."9/ As a result, they "cannot be related to a measure of operation", and the exception applies to combined treatment ash ponds.

In short, the current effluent limitations guidelines and those more recently proposed do not limit mass discharges in the electric power industry. First, they impose no fixed numerical limit on flow, and thus none on mass. And second, the case-by-case combined treatment ash pond limits that must normally be imposed in utility permits need not use mass limits because utility mass discharges "cannot be related to a measure of operation."

9/ Thus, the "actual production" rules do not apply to the steam electric industry. See Attachment B, letter from Alan Eckert, Acting Senior Litigator, EPA, to Turner T. Smith, Jr., dated September 29, 1981.

II. Mass Limits Should Not Be Required In Power Plant Permits

Fixed numerical mass limits set in guidelines or permits necessarily impose implicit flow restrictions at whatever are the allowable pollutant concentration levels.10/ These flow restrictions impose intolerable rigidity in utility permits.

Masses and flows cannot legally be limited unless some flexible method of taking power plant flow variability into account is found. See Ass'n of Pac. Fisheries v. EPA, 615 F.2d 794, 814 (9th Cir. 1980); Marathon Oil Corp. v. EPA, 564 F.2d 1253, 1269-70 (9th Cir. 1977); FMC Corp. v. Train, 539 F.2d 973, 980-81 (4th Cir. 1976). The method chosen must allow electric utility industry dischargers enough flow to fulfill all the necessary plant functions so as to supply the public with reliable electric service. One could not set the limit at the maximum historical flow ever experienced, let alone the long-term historical average flow, because a coincidence of worst-case events in the future might cause all or most of the plant's internal flows to peak at the same time and set an

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10/ At flows above those amounts, the fixed mass limits in the permit would be violated even if the control technology installed was achieving the pollutant concentrations specified in the guidelines.

all-time flow record at a time when full plant operating capability was needed. A power plant might need, for example, to operate at peak capacity on high-ash coal during a record wet period.

As will be shown below, fixed numerical mass limits, set at the time the permit is issued, are simply too inflexible a regulatory tool to cope successfully with the flow variability conditions and the electrical reliability imperatives of the steam electric industry. The difficulty of their use increases geometrically when the complexities of combined wastestreams, net limits, and recycle and reuse of wastestreams are considered. Other simpler regulatory solutions must be sought.11/

1. Power Plant Wastestream Flow Variability.

Flows in individual power plant wastestreams vary widely from day to day and from month to month. These wastestreams are of three different types; some of them are continuous but fluctuating over time; others are intermittent; and still others vary with rainfall. Metal cleaning waste flow, for example, may occur for two or three days only once every

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11/ This is precisely the conclusion EPA's own Region VI came to in the comments it submitted on the Agency's proposed steam electric guidelines. See Attachment C.

year or two when the boilers are chemically cleaned. Bottom and fly ash sluice water flows vary according to the ash content of the coal being burned, more water being required for higher-ash coal. In addition, those flows may have to continue even when the plant is shut down, since the TSS in ash transport water may settle in plant tubes and cause severe operating problems if a constant flow of ash transport water is not maintained. Substantial quantities of demineralized water are often used when a plant resumes operation after being shut-down, thus producing large flows of demineralizer wastes, despite relatively low plant loads at the time. The volume of cooling tower blowdown depends on the level of dissolved solids in the plant intake water. Cooling water flow varies to some extent with generating output, though a plant may require large flows at no output when it is on "spinning reserve," and nuclear units require cooling water to remove decay heat even when they are shut down. Rainfall-related flows, of course, depend on the vagaries of the weather. The volume of coal pile runoff, for example, will be zero in dry weather and quite large during heavy rainstorms.

Flows <u>from</u> combined treatment ash ponds are equally complex and variable. Such variability mirrors, to some extent, the variability in the larger individual wastestreams

that flow into the ash pond. But pond retention times vary widely (from a few hours to 100 days or more) with the size and configuration of the pond. And long retention times smooth out individual constituent wastestream flow variability. In addition, weather conditions such as precipitation (both that which falls directly on a large ash pond and that which falls on its drainage basin) and wind (which can pile water up on one side or other of a large ash pond) affect ash pond flows. And in any case, flow through the pond itself is normally non-uniform--sometimes good mixing of all streams occurs, sometimes laminated flows occur, and in some ponds plug-type flows can occur. All three types of flows might occur in the same ash pond under different operating or weather conditions. The variability characteristics of flow and concentration at the ash pond outfall may therefore bear little relation to the variability of these parameters in the influent streams. Peaks and valleys of the influent streams may be damped, but new peaks and valleys related to precipitation, other weather conditions, and ash pond flow-through characteristics are introduced.

In short, unlike many industries in which wastestream flow variability is the result of variability in a single factor like production,12/ the electric utility industry, like the

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12/ See 40 C.F.R. Part 420 (1981) (Iron and Steel Manufacturing Point Source Category).

coal industry,13/ has no such single parameter indicative of flow.

Thus, any mass limits imposed in utility permits would have to be flow-based. Yet fixed numerical mass limits of the sort employed in permits for other industries would be extremely difficult, if not impossible, to properly derive and implement in these complex and variable flow regimes. Many intermittent utility wastestreams, for example, are generated by discrete washing or cleaning events. Fixed mass limits are wholly inappropriate there, since the amount of flow (and thus of mass) is determined by the needs of the particular cleaning or washing operation, and will vary with the operating conditions of the plant and the time since the last cleaning or washing.14/ Fixed mass limits are also largely infeasible where the wastestream flow is strongly influenced by rainfall or other precipitation related runoff, as EPA itself has recognized by using concentration limits in the coal industry guidelines. Yet discharges from large utility industry ash ponds are strongly affected by precipitation events in terms of both

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13/ 40 C.F.R. Part 434 (1981) (concentration-based regulations).

14/ This appears to be conceded even by Region IV. Region IV Rationale at 1.

flow and mass. Finally, as noted below, all of these difficulties are greatly exacerbated by utility system electrical reliability requirements and by combined treatment and discharge.

2. The Imperatives of Electric System Reliability.

Any flow restrictions imposed in utility permits must allow full use of the power plant in question during the permit term.15/ Electric utilities, unique among the industries subject to effluent limitations guidelines, are required under state law to supply their product to the public when and to the extent the public demands it. And the product cannot practicably be stored. When system electrical demand fluctuates, power plant production must fluctuate right along with it. When that demand peaks, power plant production must also be capable of peaking.16/ Flow restrictions imposed as part of the

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15/ Whether or not the Agency could impose de facto limits on plant operating levels when implementing water quality standards, it is clear that it cannot do so when setting technology-based limits. In the latter case, the level of plant operation is irrevelant to and cannot be constrained by, e.g., the BAT decision.

16/ In fact, the turbine control valves which limit the steam flow to the turbine and thus regulate the electric power production at many power plants operate automatically, in response to micro-wave communications from a central computer in the company's electrical system control room. This computer continuously operates the system's generating plants in the most

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technology-based standards, if imposed at all, must never be so low as to interfere with plant operation or maintenance17/ and impair the reliability of electric service. In short, a steam electric power plant must always be available to generate needed electricity at its full capability.

3. Combined Wastestreams--The Straw That Breaks The Camel's Back.

Use of fixed, numerical mass limits would be impracticable for the reasons just set out, even if the various utility industry wastestreams for which limits are set in the steam electric guidelines could normally be directly and individually regulated. But they cannot be individually regulated, in any case, in most utility situations. Combined wastestreams and centralized treatment are typical in the utility industry. Trying to apply fixed numerical mass limits in this context in a legally defensible and administratively practicable way is

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efficient mode in order to respond instantaneously to power needs in the company's interconnected regional electrical network.

17/ A flow restriction lower than the plant's actual needs might, for example, restrict the removal of ash so that peak generating capacity could not be achieved or might prevent the operator from cleaning the boilers. And operational needs at one plant are often governed by sudden unscheduled outages for repair or maintenance at another plant.

even more complex than doing so to separate wastestreams--indeed, it is virtually infeasible to do so in any rigorous sort of way.

a. EPA's steam electric guidelines require use of a combined wastestream rule.

EPA's steam electric guidelines separately regulate a number of typical power plant wastestreams. Most of these wastestreams, however, are normally not discharged separately to navigable waters. They are, as already noted, usually combined for treatment in many different, complex configurations. Because the guidelines are written only to apply to individual wastestreams, they do not contain specific limitations for the utility industry's most frequent type of discharge to navigable waters--the discharge from combined treatment ash ponds.

EPA encourages the use of centralized treatment. As EPA's 1980 Steam Electric Development Document says:

> "Consolidation of wastestreams to a centralized treatment system is permitted and encouraged." (Dev. Doc. at 470).

And the Agency has been of this view all along. The 1974 Preamble to the steam electric guidelines says:

> 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. 39 Fed. Reg. 36196 (Oct. 8, 1974).

The Agency can take one of two approaches to regulating combined wastestreams. In the first, it directly regulates the combined wastestream coming from centralized treatment systems (e.g., most utility industry ash ponds), subcategorizing the industry as necessary in order to develop numerical guidelines limitations for the different types of combined treatment discharges within a given industry. These combined treatment discharge types may vary both because different wastestreams are combined and because different treatment technologies are employed. The technology-based standard chosen for each subcategory of combined treatment would directly reflect the treatment characteristics, capabilities, and costs of that type of combined treatment. This alternative is the simpler and more straightforward one. The Agency did not, however, adopt it in the case of the steam electric industry.

In the second approach, which it did use for the utility industry, EPA sets effluent limitations guidelines for one or more of the constituent wastestreams of a combined wastestream discharge, as if each were discharged separately.

The Agency then provides a separate "combined wastestream rule" that governs how limitations are to be set for that stream when it is combined with other regulated or unregulated streams18/ for treatment prior to discharge. When applied at the time of permit issuance, the combined wastestream rule has the effect of establishing effluent limitations for the first time for the unregulated streams, since it determines an allowable limitation for the whole combined wastestream discharge, including both the "regulated" and the previously unregulated streams. This was done in the case of the utility industry by providing a combined wastestream rule in the steam electric industry guidelines.19/ This rule calculates an appropriate effluent limitation for the combined stream discharge by summing allowable contributions from each individual wastestream combined into the ash pond. For the reasons already noted the steam electric effluent guidelines cannot actually be applied, in most cases, without the use of this combined wastestream rule.

18/ As used here, the term "regulated streams" means a wastestream for which the applicable guidelines provide a limit for the pollutant in question when the stream is separately discharged directly to navigable waters. The term "unregulated stream" means a wastestream which the applicable guideline does not regulate at all or for which the guideline imposes no limit for the pollutant in question. For example, low volume wastes is a "regulated" stream for TSS but an "unregulated" stream for iron. Area run-off other than from coal piles is an unregulated stream for all pollutants.

19/ E.G., 40 C.F.R. § 423.12(b)(10) (1981).

b. EPA's combined wastestream rule is almost impossible to apply rigorously to the utility situation, particularly since many utility wastestreams are intermittent, precipitation events must be considered, net limits are frequently needed, and recycle of certain wastestreams is sometines employed.

To set a precise fixed numerical combined treatment mass limit by summing up the allowable mass limits for the contributing wastestreams, one must know the discharge flows for the variety of different wastestreams of different characteristics, volume, and timing which move through the ash pond in non-uniform ways and times. One would determine the flow of each separate wastestream, make allowance for the transit time of the stream to the ash pond discharge point, and add up the mass units allocable to each stream as it passes that point.

In practice, however, it will often be difficult and costly to determine the flows of the separate streams, because their flow is not monitored in most plants. In addition, each of the constituent wastestream flows is highly variable. For the reasons indicated earlier, the flows assigned to each would have to be high enough to "bound" such variability. Design flows would have to be used in the utility industry, since there are virtually no adequate historical flow records for these internal streams.

Further complications ensue since many of these wastestreams are intermittent. The full allowable mass for each would either have to be included in the allowable limits at all times, or complex "building block" mass limits would have to be devised that applied different increments of allowable mass depending upon which intermittent streams were in operation. And knowledge of the transit time through the ash pond would be necessary to set the duration of the increments for the intermittant streams.

Another difficulty is that rainfall and other precipitation induced runoff constitutes, at certain times, a substantial portion of the total flow through many ash ponds, particularly those with large drainage areas. These precipitation flows are, of course, intermittent, but they occur randomly. The volume of runoff can vary dramatically, even within the same drainage area, depending upon weather factors such as whether the ground is frozen. Furthermore, any "wet weather" increment devised for supplementing "dry weather" mass limits from the combined wastetreatment facility would again raise the transit time question, since the "wet weather" increments would have to apply for a sufficient period of time to cover the precipitation-induced increase in ash pond discharges. Unless different wet weather incremental mass allowances were devised

for differing levels of precipitation, conservative, "bounding" estimates (e.g., assuming a 10-year, 24-hour rainfall event) would have to be used in setting these limits.

Finally, it will be difficult, if not impossible, to determine uniformally applicable fixed transit times for these individual streams from the point in each stream where flow is determined to the common point at the ash pond outfall, particularly in the case of large combined treatment ash ponds with long retention times and variable, non-uniform flows through the pond. Yet where the streams are large and highly variable, or where intermittant or precipitation-related flows are involved, transit time assumptions would be crucial. And where net limits were used, the transit time from the point of raw water intake would also have to be determined so as to properly match up intake credits with discharges.

In short, calculated maximum fixed numerical mass limits for combined discharges would be extremely complicated, if not impossible, to derive in an administratively practicable and legally defensible manner.

4. The Agency Should Use Concentration-Based Limits In Utility NPDES Permits.

Concentration-based limits are simple to set and administer, bypass the problems caused by flow restrictions, and are

a far more direct measure of the treatment performance of the concentration-limited sedimentation (and sometimes precipitation and oxidation) treatment technology employed by the utility industry in its ash and other centralized treatment ponds.20/ It is undoubtedly for these sound, common sense reasons that many of the first round of utility industry permits imposed only concentration limits.

Fixed numerical mass limits in the utility situation dramatically overcomplicate a very simple problem. Utilities routinely use combined treatment ash ponds at their coal-fired stations. Those ponds are not complicated to design or operate. When properly designed and installed, they accomplish a certain level of treatment under normal plant operating conditions--a level that is largely, but not wholly, independent of any further decisions or actions by the permittee.21/

20/ The Agency has long recognized that "available waste water treatment systems are generally effluent concentration limited." 39 Fed. Reg. 36196 (Oct. 8, 1974) (Preamble to steam electric guidelines).

21/ Of course, there are things that can be done to affect a pond's flow-through characteristics, like installing baffles or other devices to increase pond mixing and retention time. And in some cases certain decisions, including whether to combine certain wastestreams in the ash ponds, can act to increase ash pond alkalinity and thus the amount of precipitation that takes place.

Once the regulatory decision is made that sedimentation technology (e.g., ash ponds) is BAT for steam electric plants, the only further regulatory decision is what concentration levels the sedimentation technology should be expected to achieve. And once those concentration levels are fixed, the simple and efficient way for a regulator to ensure that ash ponds are designed and installed to achieve those levels is to impose the chosen concentration limits directly, not to impose them indirectly through their incorporation into mass limits. This is particularly true when these mass limits would have to be set at such conservative, "bounding" levels of flow that they would not, as a practical matter, constrain the permittee under most operating conditions.

The Agency need not be concerned that power plant operators would engage in bad faith dilution of their wastestream discharges to meet concentration limits. Such dilution is unlikely to occur in the electric power industry for two reasons. First, the volumes of water used at power plants are large, and they must typically be pumped such long distances that it would be expensive to increase the flow merely to dilute the pollutants and meet concentration limits. Second, increasing ash pond flows in some cases may increase, rather than decrease, the pollutant concentrations, since increased flow into ash

ponds will decrease retention time, providing less time for pollutants to settle and thereby sometimes increase the pollutant concentration levels in the ash pond discharge.

Thus, EPA should use concentration-based limits, not fixed numerical mass limits, in utility industry NPDES permits. It is so much simpler and more direct. The steam electric effluent guidelines allow it. Common sense and the goals of regulatory reform demand no less.

5. Even If Mass Limits Are Imposed In Utility Industry NPDES Permits, Flexible "Guidelines" Type Limits, Not Fixed Numerical Limits, Should Be Used.

Given the facts outlined above, mass limits should be implemented in the electric industry, if at all, by a permit term drafted to track the language in the guidelines22/ --one which imposes flexible quantity limits that are enforced by multiplying actual "existing" effluent flow as measured at the time of enforcement by the actual concentration as then measured and comparing the resulting quantity to that determined by multiplying the same actual effluent flow by the

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22/ Such a permit term would read:

> The quantity of pollutants discharged [for the outfall in question] shall not exceed the quantity determined by multiplying the flow of [the stream in question] times [the appropriate concentration].

concentration allowable for the combination of wastestreams in question. Such permit terms would allow the Agency to impose mass limits if it must, but to do so in a way that avoids most of the difficulties outlined above.23/ And even if the Agency tried to impose fixed, numerical mass limits, it would have to use this type of permit condition during a several year transition to the new mass-based system (at least for those streams where design flows are not available). Neither the permit issuers nor the utilities have sufficient flow data at present to make reliable enough estimates of ash pond or internal wastestream flows to set flow-constraining permit limits.

III. If Fixed Numerical Mass Limits Are Imposed At Power Plants, "Design Flows" Should Be Used For Calculating Them.

If fixed numerical mass limits are imposed in utility permits, the permit issuer needs guidance on what the word "flow" in the guidelines means, and thus how to calculate the allowable mass limits. The Agency's 1974 Development Document provides the necessary guidance. It indicates clearly that any mass-based effluent limitations are to be set on the basis of the actual or planned flow at the power plant, whatever it might be:

23/ Even so, this method imposes costs for discharge flow monitoring while concentration-based limits do not.

> The effluent limitations for a power plant are determined based on the existing or planned flow rates of the individual waste sources at the plant and the effluent limitations corresponding to each of the waste sources.

1974 Dev. Doc. at 414 (emphasis added).

Any flow restrictions on electric power plants should, to be consistent with the Development Document, be no less than the actual flows anticipated to be used by the plant for its operations during the permit term. When determining what flows represent the actual flows anticipated to be used by a steam electric plant during the permit term, the fact that it must be capable of going to full power production for as long as necessary must be dispositive. Thus, maximum flows must be used--flows set at the most conservative level in order to "bound" the highest anticipated flow. The only reliable estimates of those flows now available are design flows (including the "as built" flows, if they are higher).24/

24/ Allowance for recycling or re-use of wastewater streams that are included in the combined waste effluent--such as recycling of ash-transport water or use of cooling tower blowdown for ash transport--must be made by including in any combined streams calculation the amount of make-up water lost by cooling-tower evaporation from the reused blowdown and/or the amount of make-up water that would have been required if no recycling or reuse was made. Otherwise, no allowance is made for the amount of pollutants in the recycled or reused wastestream, even though those pollutants eventually contribute to the plant's discharge. There must also be no penalty for recycle and reuse of wastestreams. The 1974 Development Document

(footnote cont'd)

When a utilities' intermittent or precipitation-influenced flows are involved, fixed flows of any sort could be set only with the greatest difficulty. For these wastestreams, it would make far more sense to use the more flexible "guidelines-type" quantity limits of the sort discussed above.25/ If this were not done, then conservative "bounding" estimates would have to be used, based on

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(footnote cont'd)

is quite explicit on this point:

> In each case, the effluent limitations for a particular wastewater source are based on the wastewater flow emanating from that source, regardless of the subsequent reuse, recycling, or combination of the wastewater with other streams, and regardless of the source of the water used by that source. A discharger may find that the reuse of certain wastestreams results in a less costly pollutant removal scheme than one employing no reuse due to the reduction in the final flow volume requiring treatment. Water reuse may also be employed to reduce the volume of water required by the plant or to reduce the cost of influent water treatment. (emphasis added).

1974 Dev. Doc. at 417 (emphasis added); accord, id. at Figure A-X-1, Table A-X-1 (sample calculation of effluent limitations for a hypothetical plant); 39 Fed. Reg. 36196, Col. 3 (Oct. 8, 1974).

25/ Even Region IV apparently agrees. See Region IV Rationale at 1.

assumptions that intermittent flows are at maximum levels and are continuous26/ and that precipitation-influenced flows are, e.g., caused by 10-year, 24-hour precipitation events.

26/ The 1974 Development Document makes just this assumption in its cost analysis and sample calculation of effluent limitations for a hypothetical plant. 1974 Dev. Doc. at 417, Table A-X-1.

TECHNICAL APPENDIX

A. COAL-FIRED STEAM ELECTRIC POWER PLANT FLOWS

The wastestreams in a typical coal-fired plant are of three types: (1) those that depend on rainfall, like coal pile runoff and runoff from drains in the plant yard; (2) more or less continuous flows that may nevertheless vary over time, like once-through cooling water, and (3) intermittent streams that occur only now and then, like boiler blowdown and metal cleaning wastes. Each of the wastestreams in these three categories varies in flow and differs in the pollutants for which it is subject to limitations under the current regulations.

Rainfall Runoff

Rainfall-dependent flows consist of material storage runoff (rainwater that soaks through coal and ash piles, carrying off pollutants in the process) and other area runoff (e.g., rainfall flowing into roof drains and yard drains, falling on or running into the ash pond from the surrounding territory (the drainage basin of the pond), and running through construction areas). Coal pile runoff is regulated for TSS and pH. Other runoff is unregulated. These streams may be quite high in volume, depending on how large the rainfall is and, in the case of runoff to ash ponds, such factors as how large the ash

pond's drainage basis is and what percentage of the rainfall runs off.

Continuous Flows

"Continuous" flows consist of once-through cooling water, fly ash transport water (which is essentially continuous), and cooling tower blowdown. Once-through cooling water is regulated only for chlorine and pH. Its volume is very large. Fly ash transport water is regulated for TSS, oil and grease, and pH. Its volume is very large. Cooling tower blowdown is regulated for chlorine and pH. Its volume may be large, but depends on the concentration in the intake water. Hypothetical flows for these and other streams are set out in Table A-X-1 in the 1974 Steam Electric Industry Development Document.

Intermittent flows

Boiler blowdown is an intermittant stream that is regulated for TSS, oil and grease, pH, iron and copper. Its volume is generally small.

Chemical metal cleaning wastes are regulated, like boiler blowdown, for TSS, oil and grease, pH, iron, and copper. Chemical cleaning may take place every year or two, and the volume of wastes is small.

Low volume wastes represent a mix of intermittent flows from a variety of sources. They are regulated for TSS, oil and grease, and pH. Despite their name, the total volume is intermediate. They include metal cleaning wastes when only water is used to clean the boilers (fireside wash water), which may be done every six months or so.

Bottom ash transport water is regulated for TSS, oil and grease, and pH. It is a large volume flow. Ash may be sluiced once or twice a shift (3-6 times daily) in some plants, and the volume is high.

Sanitary sewage has a minimum allowable chlorine concentration and is also regulated for TSS and oil and grease. Its volume is small.

B. EXAMPLE COMBINED WASTESTREAM CONFIGURATIONS

The complexity and great variety of ways in which wastewater streams are combined in steam-electric generating stations is illustrated by the following nine figures. They are water balance diagrams actually submitted pursuant to Item II.A of NPDES Application Form 2C. Included in the group are seven coal-fired plants, one nuclear plant, and one oil-fired plant. They range in size from 250 megawatts to 2900 megawatts, and are located in seven states and six different EPA regions. Some of the facilities are equipped with once-through cooling, and others have closed cycle cooling.

The flow diagrams show several types of wastestream combinations and several examples of wastestream reuse. Specifically:

a) low-volume wastes are discharged to ash ponds from all seven coal-fired plants;

b) chemical cleaning wastes are shown as being discharged into ash ponds on four of these diagrams, and are otherwise known to be discharged to ash ponds at two other plants in the sample;

c) cooling tower blowdown is used for ash transport in three cases;

d) bottom ash transport water is reclaimed from the bottom ash pond or settling basin and used for transport of bottom ash or fly ash in three cases, and

e) material storage (coal pile) runoff is discharged into ash ponds in all seven coal-fired cases.

It should be noted that stormwater runoff will probably affect the ash pond discharge flow rate shown on most of these illustrations, but flow data has been provided only on Figures 3, 4, and 7. It should also be noted that the dry weather flow of 22 MGD on Figure 7 would be increased to a flow of 85 MGD after the "design storm," which is the 10 year, 24 hour rainfall event.

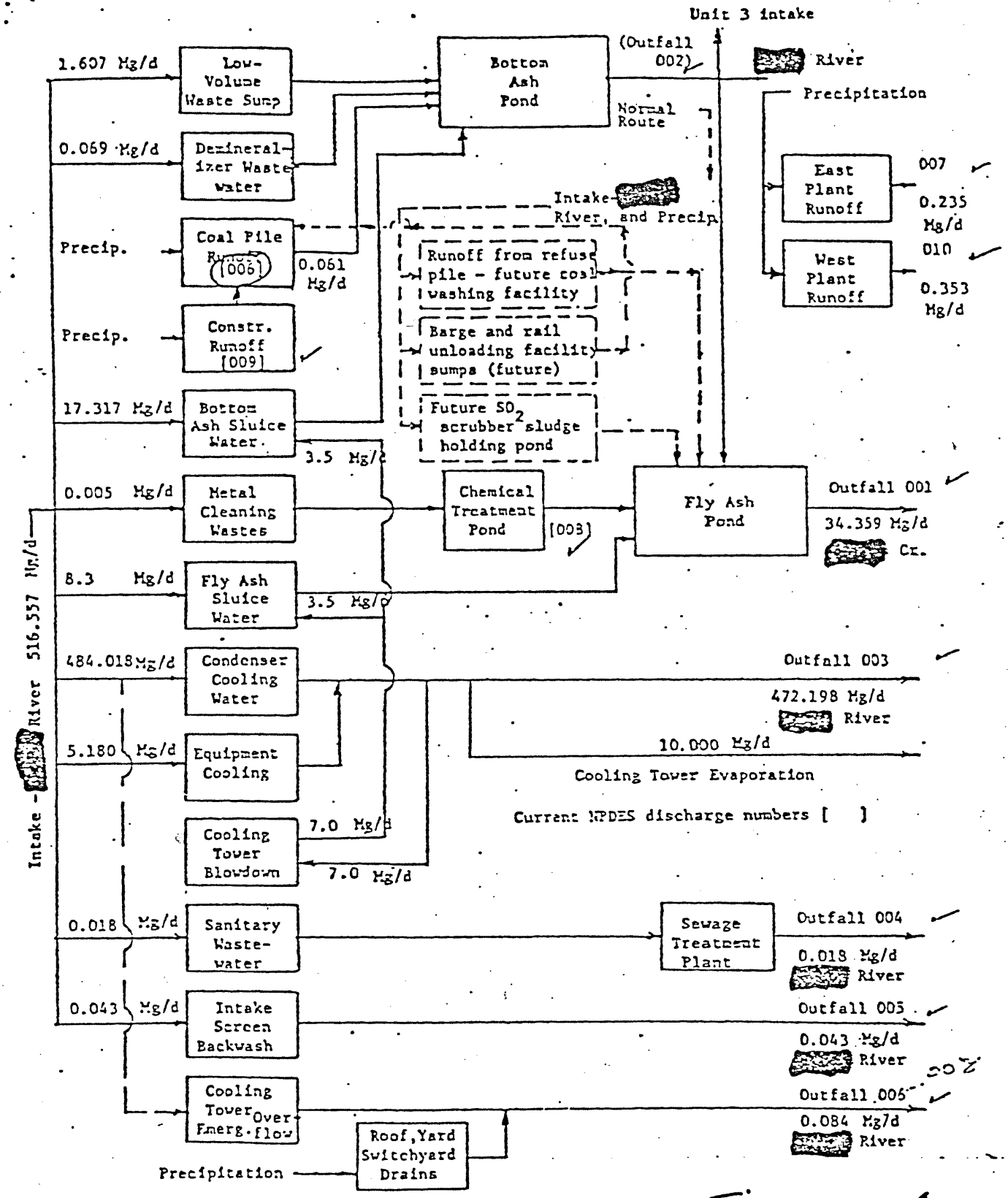


Figure 1

Coal

2700 MW

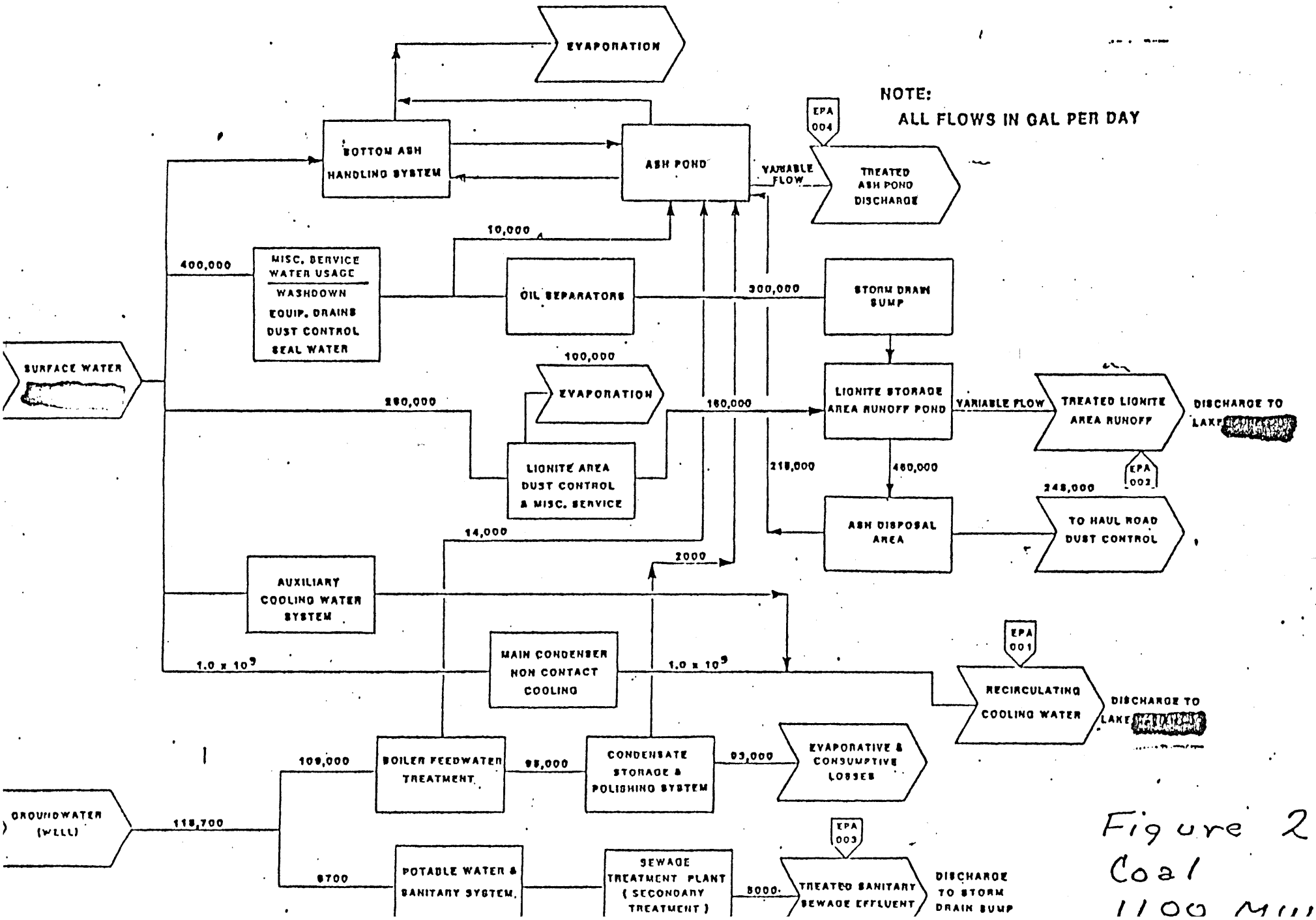
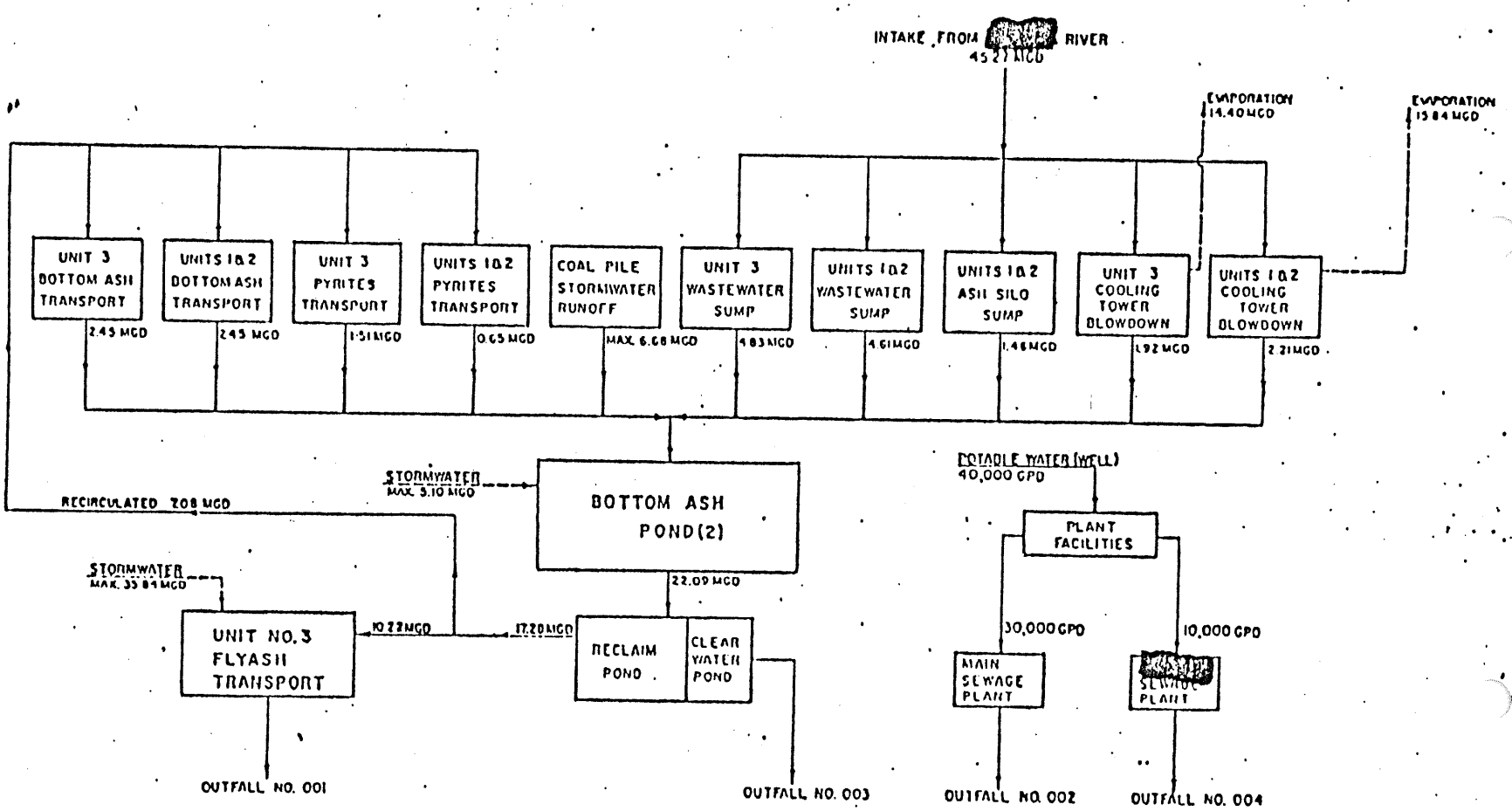


Figure 2
Coal
1100 MW



OUTFALL NO.	RECEIVING WATER	AV. FLOW	MAX. FLOW*
001	[redacted]	10.22 MGD	46.05 MGD
002		0.030 MGD	
003		4.81 MGD	16.59 MGD
004		0.010 MGD	

* CONTAINS MAX. RUNOFF BASED ON 10 YR-24 HR. STORM

LEGEND

---------- PRECIPITATION OR EVAPORATION

Figure 3
Coal

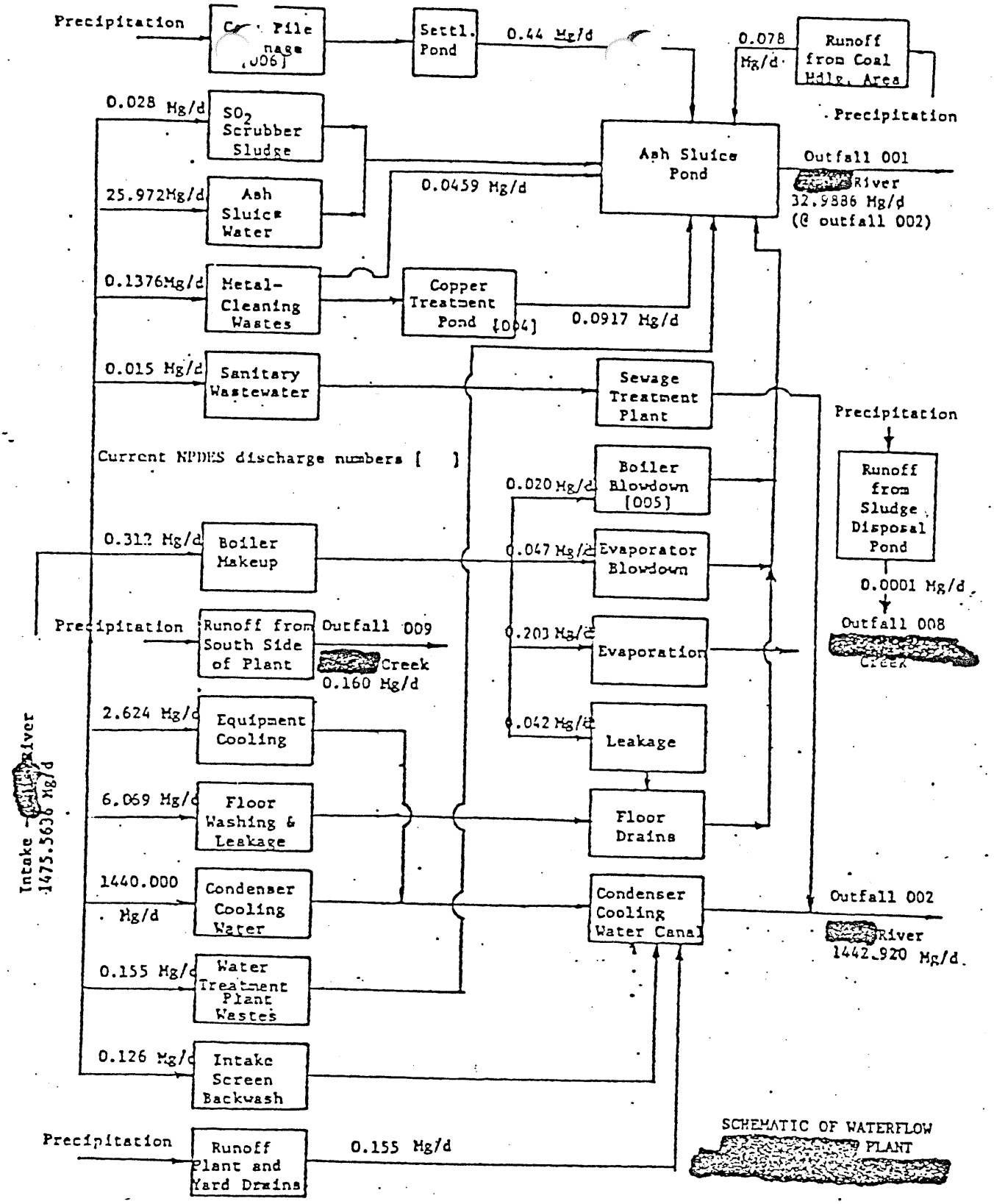


Figure 4
Coal
1750 MW

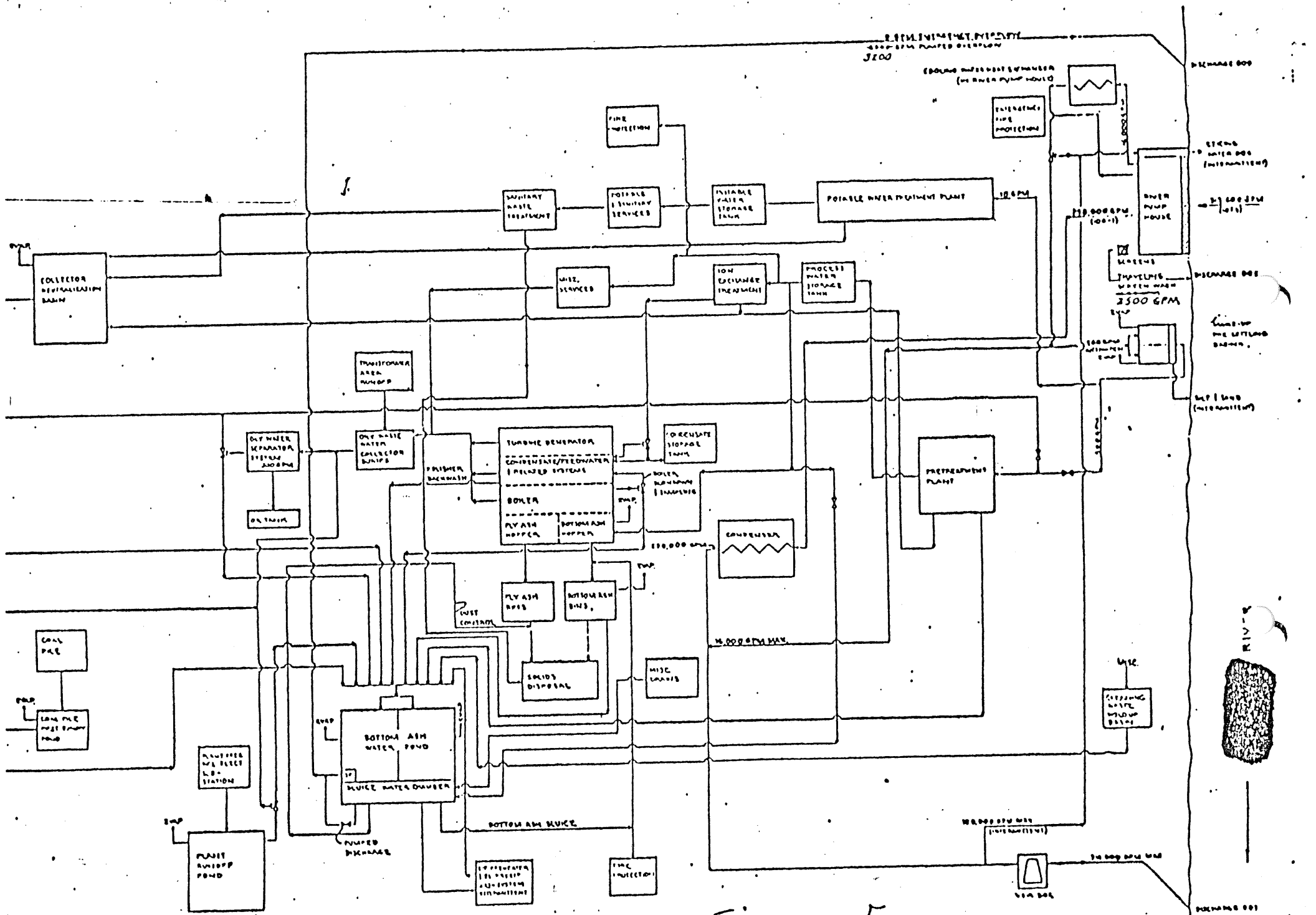

3500
SANITARY WASTE TREATMENT
POTABLE & SANITARY SERVICES
POTABLE WATER TREATMENT PLANT
POTABLE WATER STORAGE TANK
FIRE PROTECTION
EMERGENCY FIRE PROTECTION
RIVER PUMP HOUSE
DISCHARGE 002
DISCHARGE 001
3500 GPM
COLLECTOR RECIRCULATION BASIN
MISC. SERVICES
ION EXCHANGE TREATMENT
PROCESS WATER STORAGE TANK
TRANSFORMER AREA SUMPS
OILY WASTE WATER COLLECTOR SUMPS
OILY WATER SEPARATOR SYSTEM AND OWS
OIL TANK
TURBINE GENERATOR
CONDENSATE/FEEDWATER & HEATER SYSTEMS
BOILER
FLY ASH HOPPER
BOTTOM ASH HOPPER
PRISHER BACKWASH
BOILER BLOWDOWN & SAMPLING
FORECOURT SLOPPOL TANK
PRETREATMENT PLANT
CONDENSER
FLY ASH SILOS
BOTTOM ASH SILOS
SOLIDS DISPOSAL
MISC. WASTES
COAL PILE
COAL PILE RUNOFF POND
BOTTOM ASH WATER POND
SLUICE WATER CHAMBER
BOTTOM ASH SLUICE
PUMPED DISCHARGE
PLANT RUNOFF POND
SEDIMENTATION BASIN
RIVER

Figure 5

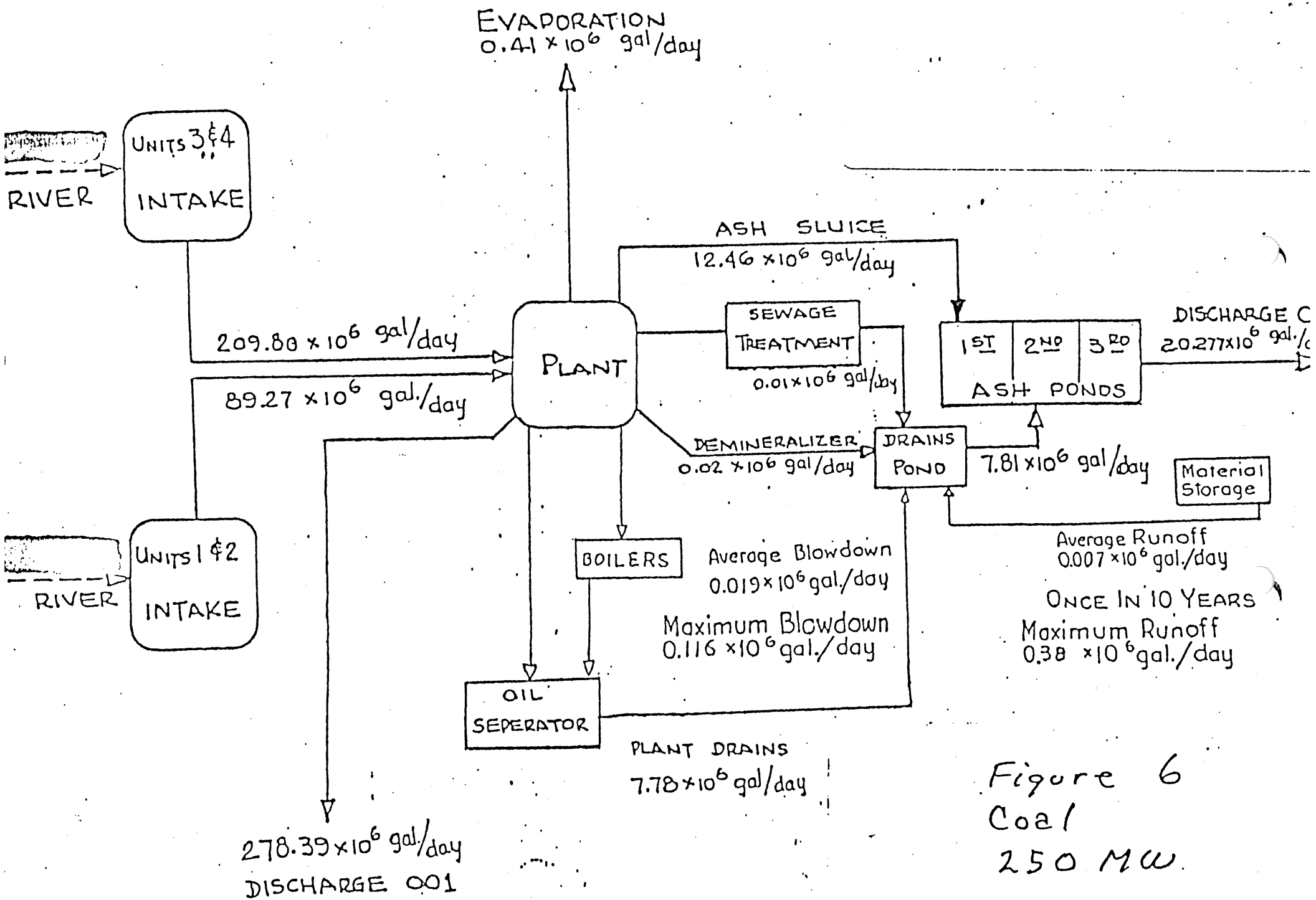


Figure 6
Coal
250 MW

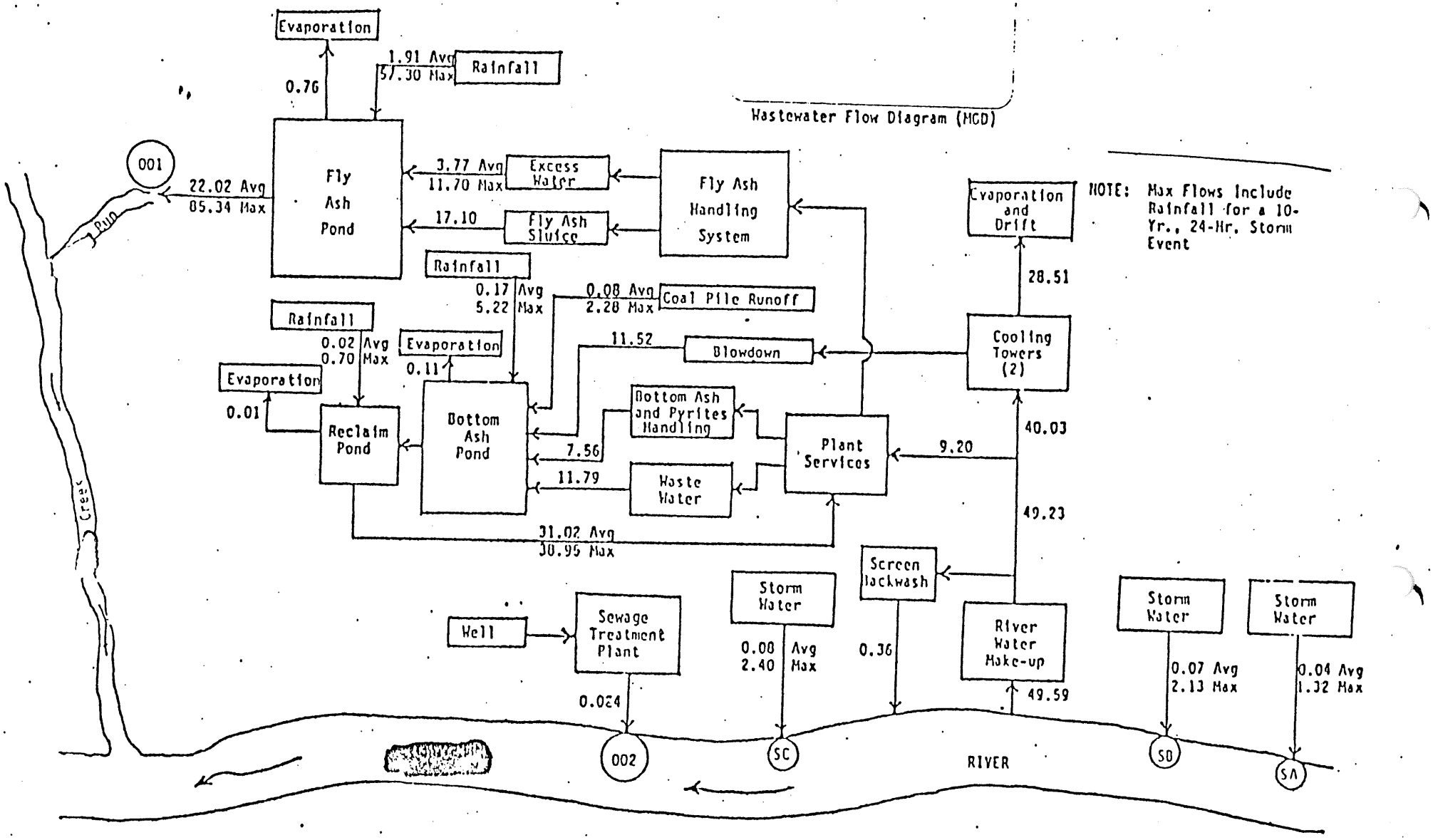


Figure 7
C021

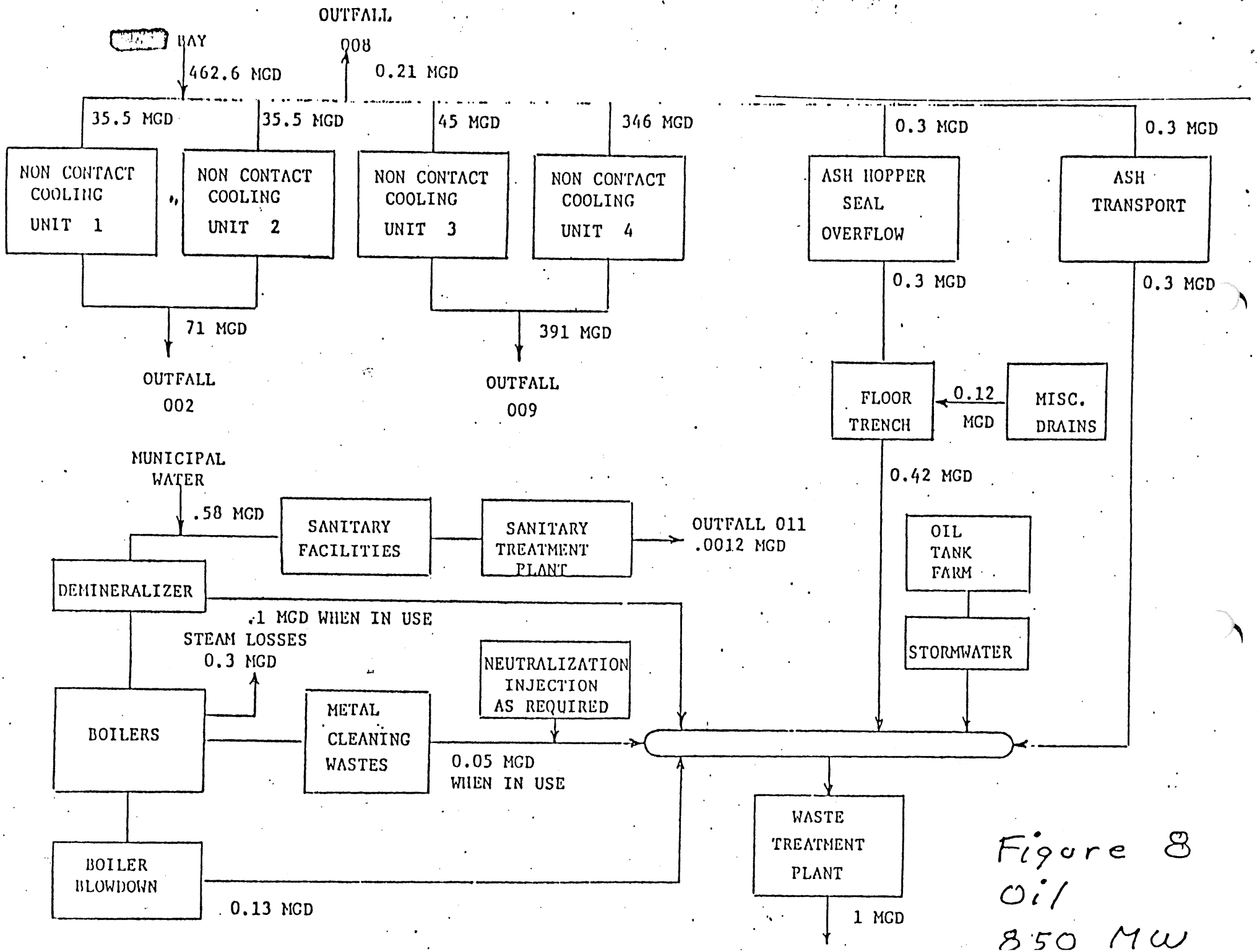


Figure 8
Oil
850 MW

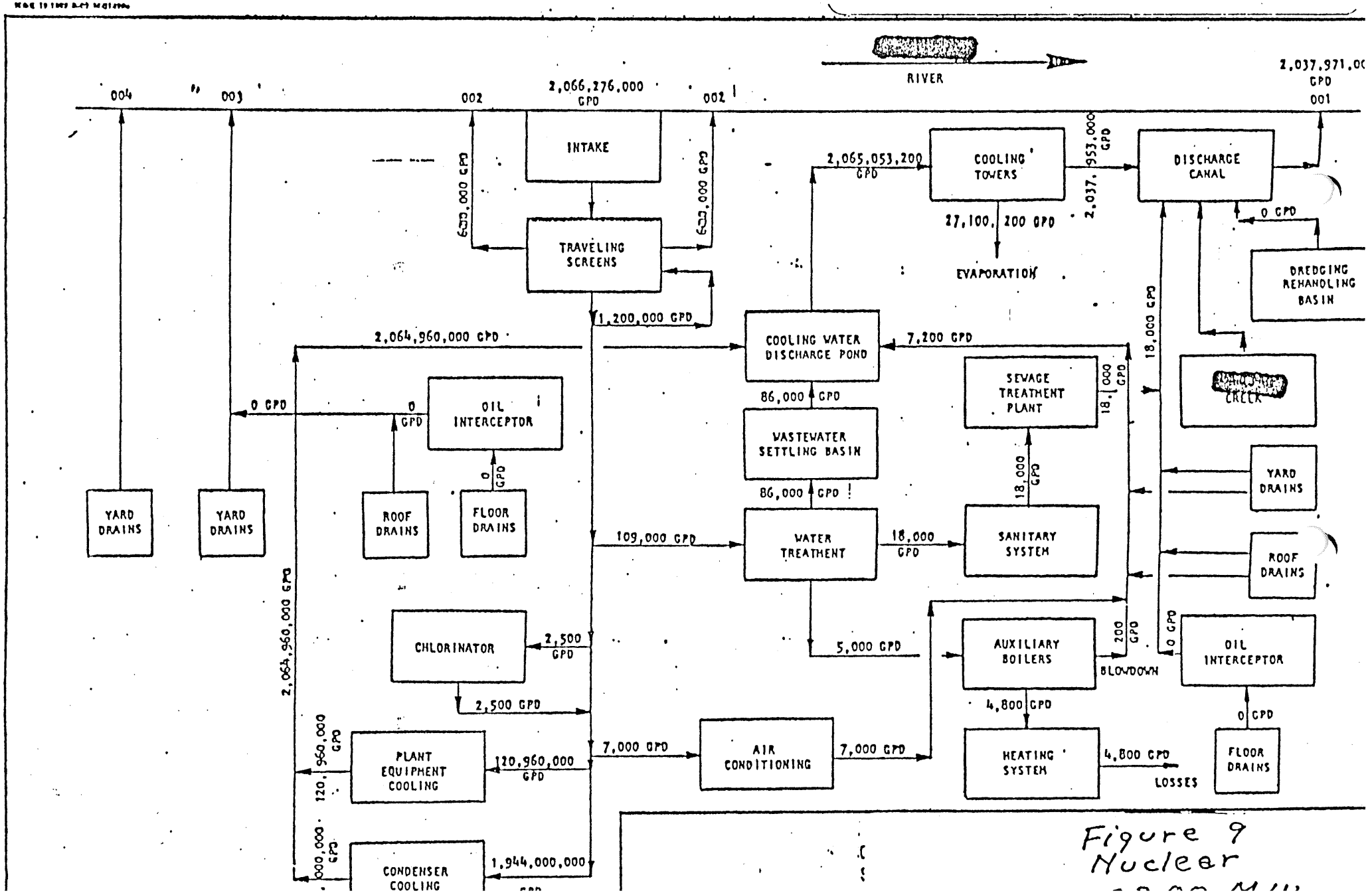


Figure 9
Nuclear

Rationale for Objection

Quantity limitations: EPA regulations and Effluent Guidelines for the Steam Electric Power Generating Point Source Category require quantity limitations as well as concentration limitations. Earlier (first-round) permits for power plants were issued with only concentration limits due to the absence of definitive data on some waste flows; however, permits are now being issued with quantity limitations (kg/day and lb/day) also. Waste Streams requiring quantity limitations include low volume wastes, [ash pond discharge,] metal cleaning wastes and boiler blowdown. In some cases, where metal cleaning wastes or boiler blowdown are intermittent, batch treated, and/or extremely variable in flow, use of a sentence on applicable permit pages such as the following would be acceptable: "Quantity of pollutants discharged shall not exceed the quantity obtained by multiplying the flow of metal cleaning wastes (boiler blowdown) times the concentrations listed above." Effluent guidelines (40 CFR 423.12(b) and (b)(3) through (6)) limit each point source to a quantity of pollutants (See Attachment A). Further, 40 CFR 423.12(b)(10) requires "In the event that waste streams from various

sources are combined for treatment or discharge, the quantity (emphasis added) of each pollutant or pollutant property controlled by paragraphs (b)(1) through (9) of this section attributable to each controlled waste source shall not exceed the specified limitations for that waste source." EPA regulations relative to calculating limitations are contained in 40 CFR 122.63 (Attachment B) as promulgated on May 19, 1980. Sample calculations were included in the 1974 Development Document on pages 414-417.

Attachment B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
GENERAL COUNSEL

September 29, 1981

Turner T. Smith, Jr., Esq.
Hunton & Williams
707 East Main Street
P.O. Box 1535
Richmond, Virginia 23212

Dear Turner:

In response to your September 14, 1981 letter, I am writing to confirm that the actual production rule in §122.63(b)(2) does not apply to the electric utility industry. Since mass limitations for power plants are based on flow and concentrations contained in the steam electric guidelines, and not on production or other measure of operation, the requirements of §122.63(b)(2) do not apply.

Sincerely,

Alan W. Eckert

Alan W. Eckert
Acting Senior Litigator

Attachment C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: NOV 24 1980

SUBJECT: Comments on Effluent Guidelines, 40 CFR Part 423, Steam Electric Generating Point Source Category, F.R. October 14, 1980

FROM: Fred Humke, 6AEWP
Enforcement Division
Region VI, EPA
1201 Elm Street
Dallas, Texas 75270

7024

TO: John W. Lum
EPA Public Information Reference Unit
Room 2404 (Rear) PM 213 (EPA Library)
401 M Street, S.W.
Washington, D.C. 20460

It is recommended that clarifications be incorporated in the regulations that acknowledge the permissible use of either mass and/or concentration limits in the drafting of NPDES permits where the permit drafter has assured that "the quantity of pollutants discharged from each source will not exceed the quantity determined by multiplying the flow times the concentration."

The steam electric category guidelines are not production based (i.e., the mass of each pollutant is not related to the generating capacity of the facility). The guidelines are based on the concentration levels (quality) of the pollutants in each waste source category. Consolidated regulations under 40 CFR Part 122.63(f)(ii) and previous June 1979 regulations under Part 122.16(d)(2) specifically exempted the strict adherence to mass limitations for concentration based regulations. In fact, the regulations under art 423 are comparable to the milling guidelines under Part 440, such as 440.52(2).

While it is agreed that mass limitations should be developed and applied where feasible, six years of work with these guidelines has shown that many of the sources at typical plants are not continuous but are periodic (see June 1979 regulation under Part 122.16(C)(1)) and associated with high flow variabilities. In the case of new source facilities it is often impossible to predict years in advance the levels of discharge which may be encountered under operating conditions. Even in the case of existing facilities, great flow variabilities are often encountered on a day-to-day or month-to-month basis.

If fixed flow levels are assumed, combined waste treatment limitations often result in the total loss of identity or control of the smaller flow sources in the total waste stream unless the permit drafter establishes a basis for correcting these flow assumptions on a periodic basis.

For these reasons, it is strongly recommended that the guidelines acknowledge that the permit drafter has the freedom to optimize each permit and its associated limitations to assure that "the quantity of pollutants associated with each source does not exceed the quantity determined by multiplying the flow times the concentration" rather than to inadvertently require the application of fixed mass limitations developed from pre-established flows.