ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 440

[WH-FRL 2892-4]

Ore Mining and Dressing Point Source Category; Gold Placer Mining; Effluent Limitations Guidelines and New Source Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed regulation.

SUMMARY: EPA is proposing effluent limitations guidelines and standards under the Clean Water Act to limit effluent discharges of pollutants to waters of the United States from existing and new sources in the gold placer mining segment of the ore mining and dressing industry.

The purpose of this proposed regulation is to propose effluent limitations guidelines based on "best practicable technology" (BPT), "best available technology economically achievable" (BAT) and "best conventional control technology" (BCT), and "new source performance standards" (NSPS) based on best demonstrated technology for direct dischargers. Pretreatment standards for both existing and new sources will not be issued since no known indirect dischargers exist nor are any known to be planned. After considering comments received in response to this proposal, EPA will promulgate a final rule.

DATES: Comments on this proposal must be submitted on or before March 20, 1986. Because of the unique seasonal operation operation of most gold placer mines and remote location of many miners, EPA is providing this extended comment period to allow affected miners adequate time to comment.

ADDRESS: Send comments to: Mr. William Telliard, Industrial Technology Division (WH-552), Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460. Technical information may be obtained from Mr. B. Matthew Jarrett, at the address listed above, or by calling (202) 382-7164. The economic information may be obtained from Mr. Mark Kohorst, Analysis and Evaluation Division (WH-586), Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, or by calling (202) 382-5834.

EPA has prepared two documents to support this proposal: Draft Development Document for Effluent Limitations Guidelines and Standards for the Gold Placer Mining Subpart of the Ore Mining and Dressing Point Source Category and Economic Analysis of the Proposed Effluent Limitations Guidelines and Standards for the Gold Placer Mining Subpart of the Ore Mining and Dressing Point Source Category. On (four weeks after **Federal Register** publication date), copies of these two documents and the entire record for this proposal will be available for public review in EPA's Public Information Reference Unit, Room 2404 (Rear) (EPA Library), 401 M Street, SW., Washington, D.C. At the same time this information will be available in the Alaska Operations Office, Federal Building, Room E556, 701 C Street, Anchorage, AK 99513, and at EPA Region X, 1200 Sixth Avenue, Room xxx, Seattle, WA 98101. The EPA information regulation (40 CFR Part 2) allows the Agency to charge a reasonable fee for copying.

FOR FURTHER INFORMATION CONTACT: B. Matthew Jarrett, at the address above or call (202) 382-7164.

SUPPLEMENTARY INFORMATION:

Organization of this Notice

I. Legal Authority

The regulations described in this notice are proposed under the authority of sections 301, 304, 306, 307, 308, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 *et seq.*, as amended by the Clean Water Act of 1977, Pub. L. 95-217) (the "Act").

II. Background

A. The Clean Water Act

The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program to "restore and maintain the chemical, physical, and biological integrity of the nation's waters," section 101(a). By July 1, 1977, existing industrial dischargers were required to achieve "effluent limitations requiring the application of the best practicable control technology currently available" ("BPT"), section 301(b)(1)(A). By July 1, 1983, these dischargers were required to achieve "effluent limitations requiring the application of the best available technology economically achievable, which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants" ("BAT"), section 301(b)(2)(A). New industrial direct dischargers were required to comply with section 306 new source performance standards ("NSPS"), based on best available demonstrated technology. The requirements for direct dischargers were to be incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued under section 402 of the Act.

Although section 402(a)(1) of the 1972 Act authorized the setting of

requirements for direct dischargers on a case-by-case basis in the absence of nationally applicable effluent limitations guidelines and standards, section 304(b) of the Act authorized the Administrator to promulgate regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of BPT and BAT and sections 304(c) and 306 of the Act required promulgation of regulations for NSPS for certain designated industry categories. In addition to these regulations for designated industry categories, section 307(a) of the Act required the Administrator to promulgate effluent standards applicable to all dischargers of toxic pollutants. Finally, section 501(a) of the Act authorized the Administrator to prescribe any additional regulations "necessary to carry out his functions" under the Act.

EPA was unable to promulgate many of these regulations by the dates contained in the 1972 Act. In 1976, EPA was sued by several environmental groups, and in settlement of this lawsuit, EPA and the plaintiffs executed a "Settlement Agreement" that was approved by the Court. This Agreement required EPA to develop a program and adhere to a schedule for promulgating for 21 major industries BAT effluent limitations guidelines, pretreatment standards, and new source performance standards for 65 "priority" toxic pollutants and classes of pollutants. See, *Natural Resources Defense Council, Inc.* v. *Train*, 8 ERC 2120 (D.D.C. 1976), *modified*, 12 ERC 1833 (D.D.C. 1979), *modified* by orders dated October 26, 1982, August 2, 1983, January 6, 1984, July 5, 1984, and January 7, 1985. EPA promulgated regulations for the ore mining and dressing point source category on December 3, 1982, 40 CFR Part 440, 49 FR 54598. In that rulemaking EPA deferred regulation of gold placer mining.

On December 27, 1977, the President signed into law the Clean Water Act of 1977. Sections 301(b)(2)(A) and 301(b)(2)(C) of the Act now require the achievement by July 1, 1984 of effluent limitations requiring application of BAT for "toxic" pollutants, including the 65 "priority" pollutants and classes of pollutants which Congress declared "toxic" under section 307(a) of the Act. Likewise, EPA's program for new source performance standards is now aimed principally at toxic pollutant controls. Moreover, to strengthen the toxics control program, section 304(e) of the Act authorizes the Administrator to prescribe "best management practices" ("BMP") to prevent the release of toxic and hazardous pollutants from plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage associated with, or ancillary to, the manufacturing or treatment process.

The 1977 Amendments added section 301(b)(2)(E) to the Act establishing "best conventional pollutant control technology" (BCT) for discharges of conventional pollutants from existing industrial point sources. Conventional pollutants are those mentioned specifically in section 304(a)(4) (biochemical oxygen demanding pollutants (BOD_5), total suspended solids (TSS), fecal coliform, and pH), and any additional pollutants defined by the Administrator as "conventional." (To date, the Agency has added one such pollutant, oil and grease, 44 FR 44501, July 30, 1979.)

BCT is not an additional limitation but replaces BAT for the control of conventional pollutants. In addition to other factors specified in section 304(b)(4)(B), the Act requires that BCT limitations be assessed in light of a two-part "cost-reasonableness" test, *American Paper Institute* v. *EPA*, 660 F. 2d 954 (4th Cir. 1981). The first test compares the cost for private industry to reduce its conventional pollutants with the costs to publicly owned treatment works for similar levels of reduction in their discharge of these pollutants. The second test examines the cost-effectiveness of additional industrial treatment beyond BPT relative to the cost-effectiveness of attaining BPT. This ratio is then evaluated against an industry cost benchmark which is a ratio of analogous measures. EPA must find that limiations are "reasonable" under both tests before establishing them as BCT. In no case may BCT be less stringent than BPT.

EPA first published its methodology for carrying out the BCT analysis on August 29, 1979 (44 FR 50372). In the case mentioned above, the Court of Appeals ordered EPA to correct data errors underlying EPA's calculation of the first test, and to apply the second cost test. (EPA had argued that a second cost test was not required.) A revised methodology for the general development of BCT limitations was proposed on October 29, 1982 (47 FR 49176), and a notice of availability of additional data was published on September 20, 1984 (49 FR 37046). EPA has not yet republished the BCT methodology.

For non-toxic, nonconventional pollutants, sections 301 (b)(2)(A) and (b)(2)(F) require achievement of BAT effluent limitations within three years after their establishment or July 1, 1984, whichever is later, but not later than July 1, 1987.

The purpose of these proposed regulations is to provide effluent limitations guidelines for BPT, BCT, and BAT and to establish NSPS, under sections 301, 304, 306, and 501 of the Clean Water Act.

Pretreatment standards for Existing Sources (PSES) and Pretreatment Standards for New Sources (PSNS) are designed to control the discharge of pollutants into publicly owned treatment works. Pretreatment standards are not being proposed for the gold placer mining segment of the ore mining and dressing subpart since no known indirect dischargers exist nor are any known to be planned. Gold placer mines are located in remote areas, generally far from a POTW. EPA expects that the cost of pumping mine and mill wastewater to a POTW would be prohibitive and that on-site treatment will be the practice in this industry.

B. History of Current Regulations for Ore Mining and Dressing

On November 6, 1975, EPA published interim final regulations establishing BPT requirements for existing sources in the ore mining and dressing industry (see 40 FR 51722). These regulations became effective upon publication. However, concurrent with their publication, EPA solicited public comments with a view to possible revisions. On the same date, EPA published proposed BAT, NSPS and pretreatment standards for this industry (see 40 FR 51738) including gold placer mines.

On May 24, 1976, as a result of the public comments received, EPA suspended certain portions of the interim final BPT regulations including the portion which applied to gold placer mines and solicited additional comments (see 41 FR 21191). EPA promulgated revised, final BPT regulations for the ore mining and dressing industry on July 11, 1978 (see 43 FR 29711, 40 CFR Part 440), which reserved the subcategory on gold placer mines. On February 8, 1979, EPA published a clarification of the BPT regulations as they apply to storm runoff (see 44 FR 7953). On March 1, 1979, the Agency amended the final BPT regulations by deleting the requirements for cyanide applicable to froth flotation mills in the base and precious metals subcategory (see 44 FR 11546).

On December 10, 1979, the United States Court of Appeals for the Tenth Circuit upheld the BPT regulations, rejecting challenges brought by five

industrial petitioners. *Kennecott Copper Corp.* v. *EPA*, 612 F.2d 1232 (10th Cir. 1979).

The Agency withdrew the 1975 proposed BPT, NSPS, and pretreatment standards on March 19, 1981 (see 46 FR 17567). On June 14, 1982, the Agency proposed new BAT, BCT, and NSPS limitations and standards for the ore mining and dressing point source category. The final rule was published on December 3, 1982 (see 47 FR 54598). This final rule also reserved limitations for gold placer mines.

C. Overview of Gold Placer Mining Subcategory

This proposed regulation applies to facilities engaged in the mining and processing of gold placer ores. Placer mining is one of the four basic methods of mining metal ores; the other three include underground or deep-mining, open pit mining, and in situ or soilution mining. Placer mining is the mining of alluvial deposits (generally loose gravel, sand, soil, or mud that has been deposited by water or ice) of mineral derived from erosion or weathering of bedrock. Placer mining consists of excavating waterborne or glacial deposits, in this case gold-bearing gravel and sands, which can then be separated by gravity or other physical means. Separation methods that are used today include various dredging techniques (clam shell, continuous bucket, or dragline) and the open cut mining method which uses bulldozers, front end loaders, drag lines, and backhoes. Where water availability and physical characteristics permit, dredging or hydraulic methods are often favored because they are more economical and can process large volumes of ore. At some locations, hydraulic excavation (using water cannons known as monitors) is employed both for overburden removal and for sluicing ores.

Water is used for mining and ore dressing. Five main ore dressing processes use water: gravity concentration (which is covered by this proposed rule), and magnetic separation, electrostatic separation, forth flotation, and leaching (which are not covered by this proposed rule). Most of the processes involve size reduction by classification. In the case of placer mining, size reduction (classification) consists of the separation of the larger non-gold bearing components of the raw pay dirt (ore) from the finer sized components that contain the free gold and black sand. The use of grizzlies (bars spaced in one direction or in a grid pattern to remove [scalp] the larger components), screens (including trommels and vibrating screen decks), and undercurrents are the principal classfication methods employed for this separation.

Gravity concentration processes use differences in specific gravity to further separate the valuable free gold and gold-bearing minerals from the gangue (unwanted portion of the ore). The processes depend upon viscosity forces to suspend and transport gangue away from the heavier, valuable minerals. Several devices are currently employed including sluices, undercurrents, jigs, cyclones, tables, spirals and rotating wheels of various sizes. Each device employs water as the medium through which the separation takes place and the means of removing unwanted lighter minerals. The process water is generally recycled and reused in areas where water is scarce. Recycling often requires extra planning and careful engineering but results in the reduction of pollutants discharged to the environment. Classification prior to and during processing reduces the quantity of water required for processing and further reduces the total amount of pollutants discharged to the environment.

Sluice discharges are extremely high in suspended solids, and depending on geology, these discharges may contain arsenic (at treatable levels) and mercury (at very low levels). There are no organic toxics in these effluents. Raw sluice discharges contain settleable solids averaging over 47 ml/l, total suspended solids averaging over 27,000 mg/l, and turbidity averaging over 20,000 NTU. Undisturbed streams typically contain no settleable solids, TSS at 10–15 mg/l, and turbidity at 50 NTU or less. During spring snowmelt (and for some rivers all summer), TSS and turbidity are upwards of 1000 units, but mines are usually in the upriver tributaries which run fairly clear once the initial ice "breakup" ends in late spring.

Prior to the involvement of EPA and the several States, many of the placer mines did not treat their wastewater and discharged directly to the local stream systems. Several facilities used settling ponds for recirculation purposes to conserve process water; the resultant water treatment was a secondary consequence.

The environmental consequences of placer mining and associated issues are varied and complex; they are similar to those associated with many mining activities where the land surfaces are substantially disturbed, if not permanently altered. Unlike other mining operations moving hundreds or thousands of cubic yards of earth per day, placer operations are conducted directly in streambeds and adjacent property, often with enormous aesthetic and water quality impacts in the immediate vicinity and sometimes for miles downstream. While individual placer mines in the Western U.S. and Alaska are usually very remote (with site-specific impacts that can be at least minimized by proper and complete site management practices), the wilderness setting itself also leads to broader environmental concern about wildlife habitat and scenic destruction or disturbances. Sometimes, though not always, a placer deposit rich in gold ore is located (and being mined) in streams which serve as spawning sites for sensitive species like salmon, trout, or Artic grayling. In these instances, the constant sediment loads downstream from mines disrupt stable stream bottoms, smother breeding areas, and otherwise disturb fish habitat. In other situations, however, mine site streams are very small, flow only intermittently, and do not support fishlife. In these cases, water quality impacts may be reduced.

There are also concerns presented by the construction and installation of treatment plants/technologies which could lead to destruction or disturbances of scenic values or wildlife habitat. The economic feasibility of the use of sand filters (slow and rapid), diatomaceous earth filters or other media filters, or settling tanks is not only highly questionable, but the mere presence of these technologies violates the pristine quality of the wilderness and has profound complications for fish and wildlife. These types of treatment installations encourage construction of permanent facilities; e.g., power poles, lines, reinforced concrete structures and other highly visible support facilities. This construction disturbs the wilderness areas and changes their natural state.

Moreover, placer mining activity occurs because of an acquired mineral right (i.e., to mine the gold) at sites usually situated on public (state or federal) lands. These public lands often are set aside for specific or multiple "public use" purposes (mineral development, forestry, wildlife conservation, recreational uses) and mine operators often find themselves confronting a conflict between their right to mine and the impacts of the mining on these "public uses." An example of such a conflict is typified by the results of a recent lawsuit filed by several environmental groups against the U.S. National Park Service (in the United States Department of the

Interior) in the State of Alaska. The United States District Court for the District of Alaska issued a ruling to cease mining within the boundaries of the federal parks in Alaska until all legal requirements are met to allow such activity. These requirements include environmental assessments, environmental impact statements, posting of bonds, submission of mining plans and rehabilitation plans plus the issuance of access permits for each operation by the Park Service. In this particular case, the judge issued a Preliminary Injuction plus a Memorandum and Order simultaneously on July 22, 1985, allowing current operators 45 calendar days to stop mining, while cancelling all existing permits issued by the Park Service. This deadline was later extended to cover the 1985 mining season. Copies of these documents are a part of the record for the gold placer mining rulemaking package.

Many state and federal agencies administer the different programs to implement (or control) the various uses of public land. In this regard, seasonal placer mine site rehabilitation, post-mining reclamation requirements, and site management assistance during active mining are all activities, administered by other state and federal agencies, which can go far to eliminate adverse environmental impacts from placer mining.

D. History of Regulation of Gold Placer Mining

Effluent limitations guidelines and standards are not directly enforceable against dischargers. Instead, they are incorporated into a National Pollutant Discharge Elimination System (NPDES) permit, which is required by section 402(a)(1) of the Clean Water Act for the discharge of pollutants from a point source into the waters of the United States. If EPA has not established industry-wide effluent limitations guidelines and standards to cover a particular type of discharge, section 402(a)(1) of the Act expressly authorizes the issuance of permits upon "such conditions as the Administrator determines are necessary to carry out the provisions of this Act." In other words, this section authorizes a determination of the appropriate effluent limitations (e.g., BPT, BCT, BAT), on a case-by-case basis, based on the Agency's "best professional judgment" (BPJ).

The establishment of technology-based effluent limitations in NPDES permits is a two-step process. First, EPA must identify the appropriate technology basis. The second step in the permitting process is the setting of precise effluent limitations which can be met by application of that technology. The Clean Water Act does not require dischargers to install the technology which is the basis of the limitations; dischargers may choose how to meet the effluent limitations. In addition to technology-based standards, sections 402 and 301(b)(1)(C) of the Clean Water Act require a permit to include any more stringent limitations including those necessary to meet water quality standards established pursuant to any state law or regulation or any other Federal law or regulation. Under section 401 of the Act, no NPDES permit may be issued unless the state has granted or waived certification that the discharge will comply with the applicable provisions of the Act; if the state includes conditions as part of a valid certification, EPA must include those conditions in the permit.

1. The 1976–1977 Alaska BPT Permits

In 1976 and 1977, EPA issued 170 permits to Alaska placer miners. Because there were no effluent limitations guidelines promulgated for the placer mining industry at that time, these permits were based on BPJ. In addition, these permits included limitations designed to satisfy Alaska's water quality standards.

Each of the permits had identical effluent limitations, monitoring requirements, and reporting requirements. The permits required treatment of process wastes so that the maximum daily concentration of settleable solids was 0.2 milliliters per liter (ml/l). In addition, the permits required monthly monitoring for this pollutant or instead of monitoring to establish compliance with the settleable solids limitation, each permittee was given the option of installing a settling pond with the capacity to hold 24 hours' water use. In addition, the permittee could not cause an increase in turbidity of 25 JTU (Jackson Turbidity Units) over natural turbidity in the receiving stream at a point measured 500 feet downstream from the final discharge point. EPA added the turbidity limitation to the request of the State of Alaska, which included this requirement in its certification of these permits under Section 401 of the Clean Water Act, to ensure compliance with its state water quality standards. The technology basis for the settleable solids limitation was settling ponds.

In June 1976, Gilbert Zemansky (a citizen) requested an adjudication of the 1976 NPDES permits as an interested party. Subsequently, the Trustees for Alasks (Trustees) and the Alasks Miners Association (Miners), as well as others, were admitted as additional parties to the proceeding. The Trustees and Zemansky argued that the permit terms were not stringent enough and that EPA should have selected recycle as the model BPT technology and required zero discharge of any pollutants, while the Miners argued that the terms were too stringent and not achievable. After the initial adjudicatory hearing, the Regional Administrator for Region X issued his Initial Decision on October 25, 1978, upholding the terms of the permits.

The Trustees, Zemansky, and the Miners each petitioned the Administrator of EPA to review the initial decision. On March 10, 1980, the EPA Administrator issued his decision on review. The Administrator held that the Regional Administrator's findings regarding settling pond technology "conclusively establish that any less stringent control technology does not satisfy the requirements of BPT." Decision of the Administrator (Ad. Dec.) Ad. Dec. at 15. The Administrator also found that "the Regional Administrator was in doubt about the facts respecting the extra costs of recycling. . . ." Therefore, the Administrator remanded the proceedings to the Regional Administrator "for the limited purpose of reopening the record to receive additional evidence on the extra cost of recycling in relationship to the effluent reduction benefits to be achieved from recycling." Ad. Dec. at 22. The Administrator directed the Regional Administrator to determine whether recycling constitutes BPT based on the additional evidence received.

After the Administrator rendered his decision, the Trustees requested the Administrator to: (1) Determine the effluent limitations necessary to meet state water quality standards; (2) determine appropriate effluent monitoring requirements in the event the Regional Administrator did not determine that zero discharge was required; and (3) direct the Regional Administrator on remand to determine effluent limitations for total suspended solids or turbidity, for arsenic, and for mercury based on BPT in the event he did not determine that zero discharge is required. On July 10, 1980, the Administrator issued a Partial Modification of his decision, directing the Presiding Officer "to allow additional evidence to be received if he determines on the basis of the record that such additional evidence is needed to make the requested determinations." Partial Modification on Remand at 3.

The hearing on remand was held in March and June 1981, and the Presiding Officer issued his Initial Decision on Remand (Rem. Dec.) on March 17, 1982. After reviewing the costs and effluent reduction benefits associated with both settling ponds and recycle, the Presiding Officer held that "the preponderance of the evidence in this case indicates that zero discharge is not 'practicable' for gold placer miners in Alaska." Rem. Dec. at 17. He also ordered EPA to modify the permits to include monitoring requirements for settleable solids and turbidity, and to require monitoring for arsenic and mercury, for at least one season, "to determine whether or not [they] constitute a problem with placer mining." Rem. Dec. at 19–20.

On September 20, 1983, the Administrator denied review of the Initial Decision on Remand. Both the Trustees for Alaska and Zemansky, as well as the Alaska Miners Association, petitioned the Ninth Circuit Court of Appeals for review. (Case No. 83–7764 and Case No. 83–7961). The Ninth Circuit consolidated the cases and issued its decision in *Trustees for Alaska* v. *EPA* and *Alaska Miners Association* v. *EPA* on December 10, 1984 (749 F.2d 549).

In this court proceeding, the Miners raised various legal issues, including certain constitutional challenges, each of which was dismissed by the Court. Specifically, the Court held that: (1) The Clean Water Act's permit requirements applied to placer mining, *i.e.*, when discharge water is released from a sluice box it is a point source; (2) EPA's failure to establish effluent limitations guidelines and standards for the placer mining industry could only be challenged in district court; and (3) the Miners' challenge to the assignment of the burden of proof in the administrative hearings was not timely; it should have been raised when the permit regulations establishing that standard were promulgated.

The Court also dismissed the Miners' constitutional claims as too speculative or premature. The Miners had claimed, *e.g.*, that the permit conditions constituted a taking of their vested property rights in violation of the Fifth Amendment; the permits' self-monitoring, reporting, and recordkeeping provisions infringed their constitutional privilege against self-incrimination; and the permits' inspection provisions infringed their rights under the Fourth Amendment to be free from unreasonable searches.

The Court dismissed most other challenges to the permits as moot since the permits expired before this case reached the Ninth Circuit, and EPA had issued two sets of subsequent permits (in 1983 and 1984) based on newer, more complete records by the time the Court heard this case. The Court specifically held that EPA's choice of settling ponds as "best practicable control technology" (BPT) was moot because a different standard, "best available technology" (BAT), now applies.

However, the Court held that the form of the limitations included in the permits to ensure achievement of state water quality standards was not moot since both the permits at issue and the subsequent permits incorporated state water quality standards directly into the permits. After reviewing the definition of "effluent limitation," the legislative history of the 1972 amendments to the Clean Water Act, and relevant court cases, the Court held that EPA should not have incorporated the state water quality standard for turbidity, which was a receiving water standard, directly into the permits. Instead, the Court held that the permits must include end-of-pipe effluent limitations necessary to achieve the water quality standards. The Court also held that EPA should have given the Trustees the "opportunity to present in a public hearing their case for proposed effluent limitations or monitoring requirements for arsenic and mercury."

2. The 1983 Alaska Permits

During the proceedings on the 1976–1977 permits, EPA issued additional permits to Alaskan placer miners. In 1983, EPA issued 269 new permits. The 1983 permits were issued for the 1983 mining season and differed from the 1976 permits in several respects. For example, the 1983 permits contained a daily maximum discharge limit of 1.0 ml/l and a monthly average discharge limit of 0.2 ml/l on settleable solids. The 1983 permits also included a limit on arsenic based on the Alaska state water quality standards.

The Trustees for Alaska and Gilbert Zemansky requested an evidentiary hearing on the 1983 permits which the EPA Region X Regional Administrator granted. On February 16, 1984, the proceedings were dismissed for several reasons, including expiration of the 1983 permits and the Agency's intent to issue new permits that would take effect in the next mining season (*i.e.*, the summer of 1984). No one appealed the decision within the Agency or petitioned for judicial review of the decision.

3. The 1984 and 1985 Alaska Permits

In 1984, EPA issued BAT permits to 445 placer miners (the first set was issued on June 8, 1984; additional permits were issued on June 14, 1984). The technology basis for the BAT permits, like the BPT permits, is settling ponds. Based on additional data developed since the BPT permits were issued, the instantaneous maximum settleable solids discharge limit is 1.5 ml/l and the monthly average limit is 0.7 ml/l. Monitoring is required twice a day, each day of sluicing. The permits incorporate Alaska's state water quality standards for turbidity and arsenic and require visual monitoring for turbidity.

On January 31, 1985, in response to the Ninth Circuit opinion which held that permits must include end-of-pipe effluent limitations necessary to achieve state water quality standards (see above), EPA proposed to modify the 1984 permits to include effluent limitations for turbidity (5 NTU's above background) and arsenic (0.05 mg/l). On February 12, 1985, EPA proposed permits for 93 additional miners. These permits proposed the same limitations as the 1984 permits, except they include the effluent limitations for turbidity and arsenic just mentioned, rather than simply citing the state water quality standards. On May 10, 1985, EPA issued both the modified permits to miners holding permits in 1984 and the new permits to the 1985 applicants. Various parties have challenged these permits; they are currently being adjudicated. Several of the other States require total recycle for all mines and thus NPDES permits are not required.

III. Scope of This Rulemaking and Summary of Methodology

This proposed regulation is a part of the Agency's continuing effort in water pollution control requirements.

In this rulemaking EPA is proposing to establish both nationally applicable BPT effluent limitations guidelines and nationally applicable effluent limitations guidelines based on the best available technology economically achievable (BAT), best conventional technology (BCT) for control of conventional pollutants and new source performance standards (NSPS).

In developing this proposed regulation, EPA studied the gold placer mining industry to determine whether differences in placer deposits, extraction processes, equipment, age and size of mines, water usage, wastewater constituents, or other factors required the development of separate effluent limitations guidelines and standards for different segments of the industry. This study included the identification of raw waste and treated effluent characteristics, including: (1) the sources and volume of water used, the processes employed, and the sources of pollutants

and wastewaters, and (2) the constituents of wastewaters, including toxic pollutants. EPA then identified the constituents of wastewaters which should be considered for effluent limitations guidelines and standards of performance, and statistically analyzed raw waste constituents, as discussed in detail in Section VI of the Development Document.

Next, EPA identified several actual and potential control and treatment technologies (including both in-process and end-of-process technologies). The Agency compiled and analyzed both historical data and newly generated data on the performance, operational limitations, and reliability of each of these treatment and control technologies. In addition, EPA considered the nonwater quality environmental impacts on these technologies, including impacts of air quality, solid waste generation, water scarcity, and energy requirements.

The Agency then estimated the costs of each control and treatment technology using cost equations developed by standard engineering analysis as applied to gold placer mining wastewater characteristics. EPA derived these costs for five model operations, representative of the entire gold placer mining subcategory. These unit process costs were derived using data and characteristics (production and flow) applied to each treatment level. The Development Document discusses in detail the method used to extrapolate the costs for each subcategory from the costs estimated for the five representative operations.

After confirming the reasonableness of this methodology by comparing EPA cost estimates to treatment system costs supplied by the industry, the Agency evaluated the economic impacts of these costs. (Costs and economic impacts are discussed in detail under the various technology options, and in Section XIV of this notice).

On the basis of these factors, as more fully described below, EPA identified various control and treatment technologies as BPT, BCT, BAT and NSPS. It is important to note, however, that the proposed regulations would not require the installation of a particular technology. Rather, it would require the achievement of specified limitations, equivalent to those achieved by the proper operation of these or equivalent technologies.

IV. Data Gathering Program

A. Data Gathering Efforts

EPA's program for gathering data to support the proposed regulation is described in detail in Section V of the Development Document. A summary of this program follows.

In the course of developing the 1982 Ore Mining and Dressing Point Source Category regulation, EPA collected some data on gold placer mining. However, as noted earlier, these data were insufficient to promulgate a regulation. Since then EPA Headquarters, EPA Region X, several agencies in the State of Alaska, the U.S. Department of the Interior (USGS), other state agencies in the lower 48 states, and others have been gathering data on gold placer mining. Various tests were performed in the field, at various mine sites, and in laboratories. The results of this combined effort form the basis for the proposed regulation.

During the summer (operating season) of 1982, EPA conducted reconnaissance sampling visits to obtain basic site information and effluent data at 51 mines. Subsequently, certain errors were found in sample handling and corresponding site-specific field data were found to be incomplete. As a result, these data were only used to define more specific information needs for additional engineering and field sampling in 1983 and 1984.

The Agency and its contractors, with the cooperation of the miners, conducted a two-year information gathering effort (during 1983 and 1984) to sample influent water, in-plant process flow water, effluent water, and receiving stream water quality. In addition, this two-year study was expanded to acquire economic and financial data, which form the basis for the economic impact analysis of this proposed rule.

The 1983 reconnaissance site visits were conducted at 60 mines by the Agency and its contractors. Except for one mine which ceased to operate at the time of the inspection, contractor work entailed both a preliminary site visit and detailed follow-up sampling and engineering surveys.

During the 1984 operating season EPA Region X personnel visited 7 mines. EPA Headquarters with contractor assistance conducted engineering assessment visits at 20 mines from which 10 mines were selected for follow-up sampling visits to verify in-place technology and performance. Four of the ten mines had to be eliminated from further study due to various operational problems, e.g. pond scouring (re-mixing solids), and process water bypasses (which resulted in no control on discharges), that would have rendered any subsequent data unless for study purposes. Contractor personnel also visited six gold placer mines in the lower 48 states during the summer of 1984 to obtain operational, economic, and water quality information.

Treatability tests were conducted at a total of 19 different mines during the 1983 and 1984 seasons. These treatability tests consisted of jar tests and settling tube tests (using large 8 inch diameter, clear plastic tubes four and eight feet long) and involved both chemically assisted (flocculant-aided) and plain settling. Procedural details and results are presented in Sections V and VI of the Development Document.

In addition to the foregoing data sources, supplementary data were obtained from NPDES permit files in EPA regional offices, engineering studies on treatment facilities, contacts with state pollution control offices, and reports from two demonstration projects sponsored by EPA.

In response to comments received to date (both written and oral) from the industry, EPA recognized that further site-specific data would be useful to provide a more detailed data base to support this rulemaking. Accordingly, the Agency had several teams in the field during the summer of 1985 to acquire information covering all aspects of the industry (i.e., revenue, cost, equipment requirements, personnel requirements, operating conditions, etc.). In addition, the Agency conducted a Method Detection Limit analysis to determine the lowest level of repeatable detection limit for settlement solids for the gold placer mining industry. These data will be provided for public comment before the close of the public comment period on this proposed rule.

B. Sampling and Analytical Methods

The sampling and analysis program conducted in 1983 and 1984 covered a wide range of locations, operating conditions, processes, water use rates, topography, production rates, and existing treatment technologies. The Agency studied placer mining wastewaters to determine the presence or absence of conventional, nonconventional, and toxic pollutants designated in the Clean Water Act.

As Congress recognized in enacting the Clean Water Act of 1977, the state-of-the-art ability to monitor and detect toxic pollutants was limited. Most toxic pollutants were relatively unknown until only a few years ago, and only on rare occasions had EPA regulated these pollutants or had industry monitored or even developed methods to monitor these pollutants. Section 304(h) of the Act, however, requires the Administrator to promulgate guidelines to establish test procedures for the analysis of toxic pollutants. As a result,

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

Because section 304(h) methods were available for most toxic metals, pesticides, cyanide, and phenolics (4AAP), the analytical effort focused on developing methods for sampling and analyses of organic toxic pollutants. The three basic analytical approaches considered by EPA were infrared spectroscopy (IS), gas chromatography (GC) with multiple detectors, and gas chromatography/mass spectrometry (GC/MS). Evaluation of these alternatives led the Agency to propose analytical techniques for 113 toxic organic pollutants (see 44 FR 69464, December 3, 1979, amended 44 FR 75028, December 18, 1979) based on (1) GC with selected detectors, or high-performance liquid chromatography (HPLC), depending on the particular pollutant; and (2) GC/MS. On October 26, 1984, the Agency promulgated a final rule and an interim final rule for Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act (see 49 FR 43234). This regulation established new test procedures (including quality control requirements) for the analysis of toxic organic pollutants; a new test procedure based upon inductively coupled plasma optical emission spectroscopy for the analysis of toxic heavy metal pollutants; and mandatory sample handling requirements. EPA applied these test procedures in the study supporting this proposed rulemaking and the Agency believes they represent the best state-of-the-art methods for toxic pollutant analysis available when the study was begun.

To develop effluent limitations guidelines and standards, EPA defined specific toxic pollutants for the analyses. The list of 65 pollutants and classes of pollutants potentially includes thousands of specific pollutants, and the expenditure of resources in government and private laboratories would be overwhelming if analyses were attempted for all these pollutants. Therefore, to make the task more manageable, EPA selected 129 specific toxic pollutants for study in this rulemaking and other industry rulemaking.

For each subcategory, including placer mining, EPA analyzes toxic pollutants according to groups of chemicals and associated analytical schemes. Organic toxic pollutants include volatile (purgeable), base-neutral, and acid (extractable) pollutants, and pesticides. Inorganic toxic pollutants include toxic metals. The primary method used in screening and verification of the volatile, base-neutral, and acid organics was gas chromatography with confirmation and quantification on all samples by mass spectrometry (GC/MS). Phenolics (total) were analyzed by the 4-aminoantipyrine (4AAP) method. GC was employed for analysis of pesticides with limited MS confirmation. The Agency analyzed the toxic metals by atomic adsorption spectrometry (AAS), with flame or graphite furnace atomization following appropriate digestion of the sample.

On the basis of EPA's study of the rest of the ore mining and dressing industry, EPA previously excluded 114 of the toxic organic pollutants from regualation during the BAT rulemaking (see 47 FR 54598, December 3, 1982). The toxic organic compounds are primarily synthetic and are not naturally associated with metal ores. No information has been developed during the study supporting this proposed rule or provided to EPA by the public indicating that any of the organic toxic pollutants are present in amounts which are treatable. In addition, final effluent samples from ten mines were analyzed for the presence of toxic organics. Two organics were detected in the final effluent, but in concentrations that are too low to treat and are considered to be attributable to sample and laboratory contamination. The remaining 117 toxic organics were not detected.

Sampling and analysis for each of the 13 toxic metals were performed at the same 10 mines. Of all the toxic metals, 11 were not detected or were present at or near the analytical detection limit and so were present in amounts too small to be treated. The toxic metals arsenic and mercury were found in placer mine wastewater in the 1983 and 1984 studies, and earlier studies. Analysis for the conventional pollutants, TSS and pH, and the nonconventional pollutants, turbidity and settleable solids, were routinely performed. Settleable solids is a measure of residual wastewater solids that settle in one hour; whereas, turbidity is a measure of light scatter in water due to the presence of suspended solids. Suspended solids is a measure of the total particulate solids in a water sample.

In planning data generation for this rulemaking, EPA considered requiring dischargers to monitor and analyze toxic pollutants under section 308 of the Act. The Agency did not use this authority, however, because it was reluctant to impose this cost on the industry and because it wanted to keep direct control over sample analyses—particularly the need for close quality control. Although EPA believes that the available data support these regulations, it would have preferred a larger data base for some of the pollutants and therefore will continue to seek additional data.

V. Subcategorization

In developing this proposed regulation, it was necessary to determine whether different effluent limitations guidelines and standards were appropriate for different segments (subcategories) of the gold placer mining subcategory. The major factors considered during this review included: wastewater characteristics, mining processes employed, water use, water pollution control technology, treatment costs, solid waste generation, size of the operation, location, weather, topography, geology, and age of the mine. Section IV of the Technical Development Document contains a detailed discussion of these factors and the rationale for the basis for the placer mining industry subcategorization scheme. EPA is proposing to develop separate limitations and standards for placer mines based on the size of the mine (defined by sluicing or process throughput, expressed in yd^3/day of bank run material prior to extraction) and mining process employed (see the Economic Development Document for a detailed discussion of these operating parameters).

As noted earlier, gold placer mining is part of the Ore Mining and Dressing Point Source Category, which generally deals with mining and processing gold ores. The effluent limitations guidelines and standards for this category, which were promulgated at 47 FR 54598 on December 3, 1982, covered discharges from mines that produce gold from open-pit or underground operations or use the cyanidation process or froth flotation process to extract gold. However, the 1982 regulation specifically reserved regulation of gold placer mines.

Because placer mining takes place in stream beds, generally uses sluices for ore processing, and does not use refined ore extraction methods, the basic processes for mining and processing placer deposits are different from the processes for mining and processing at "hard rock" gold mines and mills. Accordingly, we are creating a separate subcategory for gold placer mining.

Within gold placer mining, the most important of the factors considered in determining a need for further subcategorization into segments is the size of the operation as measured in yd^3/day of "bank run pay dirt" processed and the mining process employed. The term "bank run pay dirt" is defined as the actual mine/plant through-put of ore as measured in place prior to the "swell" that occurs once the material is removed from its natural state (which is approximately 20 to 30 percent in volume). Most mines calculate yd^3 mined prior to swell. Mines vary in size from very small recreational or assessment operations that process less that 20 yd^3/day up to and beyond 4,000 yd^3/day for commercial operations using conventional mechanical methods, i.e., bulldozers, loaders, and sluices, while the very large dredges process in excess of twice that amount daily. There exists a natural division between non-commercial and commercial mines (i.e., very small capacity versus large capacity). There are a large number of non-commercial (i.e., recreational, hobby, and assessment) operations periodically active in any mining season that process less than 20 yd^3/day of ore. The exact number of mines in this group varies considerably year to year and the amount of pollutants discharged by this group is unknown. However, because these small mines generally operate intermittently, and individually have little or no mechanized equipment, process a low total volume of ore, and thus discharge a low total volume of wastewater, the Agency believes they are not a major pollution source.

The pollutants present in the wastewater from the various commercial types of placer mines (larger than 20 yd^3/day) are essentially the same, while the quantity of the wastewater and the amounts (mass) of settleable solids (SS) and total suspended solids (TSS) discharged varies. The gold recovery (sluicing) operation suspends soil particles in the wastewater. Concentrations of 47 ml/l of SS and 27,000 mg/l of TSS are typical for commercial size operations.

Dredges represent a physically different means of mining placer deposits compared with the separate earth moving and sluicing equipment at other commercial mines. The dredges are large, self-contained barges which house all the ore mining equipment, ore processing equipment, and tailings separation equipment as a single machine. Dredges typically operate on electricity (but may be diesel-powered) and literally dig out an ore deposit over vast areas while floating on a "pond" of water created by digging out the streambed. In conjunction with the sheer size of these operations, dredges represent a fundamental process difference which the Agency believes should be recognized in subcategorization. EPA is unaware of any dredges which process less than 4,000 yd^3/day (except for small suction dredges).

Water use for processing ranges from about 1,000 gallons per cubic yard of ore processed up to about 8,000 gallons per yard. Extremes at the high end of this range are unusual and appear to result from using more water because it is available, rather than any inherent process requirement. Typical flows at commercial mines average 2,500 gallons per yard; dredges use about 4,000 gallons per yard for the self-contained systems. The Agency believes that within each segment it has created, the amount of water used is similar and that this factor supports the subcategorization scheme.

Similarly, sludge generation is also directly related to mine capacity since a fairly consistent volume of sludge per cubic yard of ore sluiced is generated at all types and sizes of placer mines. For a mine with 1200 yards per day sluicing capacity, some 150–200 yards of sludge would be contained in settling ponds. Approximately 1000 yards of the original ore are "heavy" tailings that generally never reach settling facilities. Thus, about 15 to 20 percent of a given cubic yard of ore will be discharged (ultimately) as sludge into containment structures. The Agency believes that sludge generation is similar for all mining segments and thus is not an appropriate basis for subcategorization.

A number of the other factors, such as climate, remote location, and age of the equipment, affect the cost of "doing business" and the degree of difficulty in operating the mine; but they have virtually no impact on the basic wastewater characteristics. As a factor in subcategorization, costs have been considered through the Agency's economic impact assessment. The Agency has subcategorized to reflect differential impacts for different sized mines. EPA's economic analysis indicates that a mine's potential for earning a profit increases as the size of the mine (amount of pay dirt processed per day) increases and that it is economically achievable for mines which process about 500 yd^3/day to install treatment in addition to simple settling. (See Economic Considerations, Section XIV of this preamble).

Similarly, the Agency has concluded that it is not necessary to subcategorize based on the geologic characteristics of the soil. For the settleable solids (SS) parameter, the data available to the Agency indicate achievable levels of SS from simple settling technology (proposed BPT model technology) are similar regardless of the type of soil being mined. However, geologic origins and soil characteristics have a direct bearing on effluent quality in terms of the physical nature and form of the particulate total suspended solids (TSS). The available data on TSS show similar wastewater treatability for placer mine discharges within a range of absolute (numerical) values for TSS. As shown in the Development Document, all settling pond treated effluent values for TSS are relatively high (one to several thousand mg/l). While there is no clear means to differentiate (subcategorize) mines when all values are so high and similar in magnitude, it appears there could be some differences for certain mines. If the placer deposit in question has high levels of colloidal or organic particulates in the fraction that becomes suspended (TSS), then this portion of the TSS would not be as amenable to control by simple settling (BPT) and thus could result in higher effluent values for this parameter. "Tyler" (or comparable) sieve analysis data on sludge "fines" in ponds, or on effluent TSS, is not now available to the Agency but could provide additional insight as to whether or not soil type (or geology) is a factor warranting further segments in the placer mining industry. EPA solicits any such available data.

Also, the Agency's subcategorization analysis reveals topography has little direct bearing on raw wastewater characteristics or general treatability of these wastewaters. Most operations successfully mine and provide effluent treatment in rugged terrain including steep upland valleys. However, there are a few situations where topography can dictate the availability of adequate space to provide treatment facilities. Operations in very narrow stream beds associated with narrow valley cross sections and steep gradient valley side slopes may not have sufficient space either to mine profitably or to install ponds or to adequately manage mine

drainage without substantially reconstructing (to expand) the site at considerable cost. However, EPA has no data indicating what differential costs would be incurred by these facilities to meet the proposed limitations and standards. Accordingly, the EPA analysis has not taken this very site-specific situation into account. EPA solicits comments on the number of facilities that may not have space to install ponds and alternative limitations that may be appropriate for these facilities. (See Solicitation of Comments, Section XXII below).

Based on available field and laboratory data, the Agency proposes to subdivide the gold placer mining subcategory into four segments, based on size of operation (yd^3/day of bank run processed) and type of operation (dredge and all others). (See Section IV of the Development Document.) Data show the same general distribution of commercial operations by size and mining process both in Alaska and in the contiguous United States.

The following subcategorization is proposed for this regulation:

1. Small mines (see description of mining methods above) with a production rate of <20 yd^3/day.
2. Large dredges with a production rate $>4{,}000$ yd^3/day, which operate in a self-contained pond.
3. All mines using all mining methods with production rates >20 yd^3/day and $<$; 500 yd^3/day of "bank run" ore.
4. All mines, all mining methods (except group 2, large dredges) with a production rate $<$; 500 yd^3/day of "bank run" ore.

VI. Scope of Proposed Regulation

EPA is proposing effluent limitations guidelines based on the application of best practicable technology (BPT), best conventional technology (BCT), and best available technology (BAT), and new source performance standards (NSPS).

The industry includes facilities listed under the U.S. Bureau of the Census Standard Industrial Classification (SIC), Gold Ores, SIC 1044. Over 600 active mining and processing operations are located in eight western states with approximately 70 percent of these located in Alaska. Most are situated in remote areas and are very difficult to reach.

The proposed effluent limitations guidelines and standards are applicable to facilities discharging wastewater from gold placer mining and milling operations that employ gravity separation methods for gold recovery. These regulations do not, however, apply to milling operations that employ chemicals or reagents for gold recovery. These more complex operations are covered under the Ore Mining and Dressing Point Source Category Effluent Limitations Guidelines and Standards, 40 CFR Part 440. See 47 FR 54598, December 3, 1982.

In addition, this proposal does not cover "recreational" mines that actually process less than 20 cubic yards of ore per day or dredges which operate in open water, e.g., open marine waters, bays, or major rivers.

At the present time, EPA does not believe that proposed effluent limitations guidelines and standards for recreational mines that actually process less than 20 cubic yards of ore per day are warranted. We have determined that because of the diversity among these operations and the limited nature of their discharge, the preferable approach is to develop effluent limitations for these facilities in the permit process based on the permit writer's best professional judgment. EPA invites comment on this approach. The dredges in open seas and flowing stream waters are not covered at this time because the Agency has no information as to number, location, or applicable technologies for these facilities. Similarly, permits for such facilities would be based on best professional judgement.

In many facilities, water from a number of different sources can be found commingled in the wastewater treatment facilities, i.e. normal process water, side stream flow, main stream excess flow, storm water runoff from the process area or other areas upstream, and subsurface or side bank seepage. This proposal deals directly with process wastewater (sluice water) as well as mine drainage and runoff within the ore processing area and certain drainage flows commingled with sluice water. Discharges from the mine site which are not commingled such as diverted runoff from the active mining area, offsite runoff entering the mine site, and certain other drainages are not covered by these regulations and would be handled by the permit authority on a site-specific basis. Design storm exemptions and combined waste stream clauses apply to all subcategories (see Definitions).

VII. Available Wastewater Control and Treatment Technologies

The control and treatment technologies available for this category include both in-process and end-of-pipe technologies. The ability of these technologies to control placer mining wastewater was evaluated; and this analysis formed the general basis of the regulatory options.

(A) Settling

Settling ponds are sometimes installed as a single, large pond but are frequently used in a multiple arrangement, in which one or more settling ponds are added in series to a primary settling pond. The purpose of the series scheme is to further reduce settleable solids (SS) and suspended solids (TSS), and thereby somewhat reduce turbidity associated with the solids in the sequential ponds. Toxic metals encountered (arsenic and mercury) are in the particulate form and are also substantially removed along with SS and TSS in this process.

Whether single ponds or ponds in series are used, the principle involved is to retain the wastewater long enough (detention time) to allow particulates to settle. The settling process will proceed efficiently as long as the velocity of the water flow is minimized (i.e., quiescent settling) and ponds contain storage volume for the sludge. Sludge storage volume is particularly critical because it assures that settled particles do not become remixed as the treated water moves through the pond to discharge or to uptake by recycle systems.

(B) Coagulation/Flocculation

In coagulation and flocculation, chemical coagulants act to destabilize colloidal solids, causing them to gather together in a large particle, or "floc," and settle. The primary purpose of chemical coagulation or flocculant addition to wastewater is to increase the size of settling particles by forming flocs of individual particles that act as a single larger particle, which settles faster than individual particles. These chemicals, which typically are added to the influent to sedimentation ponds, enhance overall solids removal and field tests reveal they can substantially reduce residuals of suspended solids in settling pond effluent. EPA views the use of chemicals with cautious optimism and the Agency will attempt to acquire additional data on the applicability of this technology, and the engineering and economic aspects for placer mines during the summer of 1986.

(C) Recycle

Raw wastewater discharged from a typical placer mine is usually routed through a "tail race" (open channel) to a primary settling pond for removal of settleable and suspended solids with associated toxic metals. If recycle (partial or total) is employed, the pump suction intake is positioned in the pond so as to obtain the "cleanest" water possible with the least amount of suspended solids. Care must also be taken to minimize excessive effects of

the water velocity in the pond so that "short circuiting" does not occur. The recycle facilities visited and evaluated are used principally to assure adequate water supplies to the sluice in water-short conditions (small streams or fairly arid areas). Recycle is also employed at mines because it allows somewhat smaller end-of-pipe treatment ponds, and recycle is fundamental to the operation of dredges which (conceptually) are literally floating in a pond serving both as water supply and effluent settling facility. A number of miners have stated that a high solids content in the recycle water inhibits the recovery of the fine gold particles. But no evidence has been submitted to the Agency thus far supporting this contention. As discussed in the Development Document, recent analyses did not reveal any significant loss in fine gold recovery due to increased solids levels in recycle water (see also Comment/Response, Section XX).

The use of recycle water reduces the total amount of pollutants discharged to the receiving stream (total recycle results in zero discharge of process wastewater). While capital and operating costs are slightly less for partial recycle (50 Percent to 80 percent recycle), the costs for complete recycle are similar and the mass of pollutants including toxic metals in the discharge is greatly reduced, if not mostly eliminated.

VIII. Best Practicable Technology (BPT) Effluent Limitations Guidelines

The factors considered in defining best practicable control technology currently available (BPT) include the total cost of application of the technology in relation to the effluent reduction benefits, the age of equipment and facilities involved, the process employed, nonwater quality environmental impacts (including energy requirements), and other factors the Administrator considers appropriate. In general, the BPT level represents the average of the best existing performance of plants of various ages, sizes, processes, or other common characteristics. Where existing performance is uniformly inadequate, BPT may be transferred from a different subcategory or category. Limitations based on transfer technology must be supported by a conclusion that the technology is, indeed, transferable and a reasonable prediction that it will be capable of achieving the prescribed effluent limitations guidelines. See, *Tanners' Council of America* v. *Train*, 540 F.2d 1188 (4th Cir. 1976). BPT focuses on end-of-pipe treatment rather than process changes or internal controls, except where such are common industry practice.

The cost/benefit inquiry for BPT is a limited balancing, committed to EPA's discretion, which does not require the Agency to quantify benefits in monetary terms. See, e.g. *American Iron and Steel Institute* v. *EPA*, 526 F.2d 1027 (3rd Cir. 1975). In balancing costs in relation to effluent reduction benefits, EPA considers the volume and nature of existing discharges, the volume and nature of discharges expected after application of BPT, the general environmental effects of the pollutants, and the cost and economic impacts of the required pollution control level. The Act does not require or permit consideration of water quality problems attributable to particular point sources or industries, or water quality improvements in particular water bodies, in setting technology-based effluent limitations guidelines. Accordingly, water quality considerations are not the basis for selecting the proposed BPT. See *Weyerhaeuser Company* v. *Costle*, 590 F.2d 1011 (D.C. Cir. 1976).

The BPT limitations for the ore mining industry, which were promulgated in 1978 and upheld by the 10th Circuit Court of Appeals [see *Kennecott Copper Corp.* v. *EPA*, 612 F.2d 1232 (1979)], reserved effluent limitations for the gold placer mine industry. While it is not long after the 1977 date to comply with BPT under the Clean Water Act, EPA is proposing BPT because treatment at most existing placer mines is inadequate to establish a baseline for additional limitations, including BCT and BAT.

The Agency considered four treatment options as the basis for the proposed BPT requirements. These options are discussed briefly below and in further detail in Section X of the Technical Development Document for this proposed regulation.

A. Control Technologies for Process Wastewaters

Option 1: Simple settling with a minimum six hours of detention time and discharge of treated wastewater to an effluent quality of 0.2 ml/l settleable solids; TSS of 2000 mg/l.

Option 2: Option 1 with the addition of recycle for 80 percent of the process wastewater and a discharge allowance for the remaining 20 percent as a blowdown. For this option, the Agency selected a configuration (from among several analyzed) of two ponds in series. The first pond is to the designed for at least one hour of detention time for the process wastewater—80 percent recycle is assumed using wastewater from the first pond. The second pond is designed for six hours of detention time for the 20 percent blowdown of process wastewater from the first pond. Settleable solids and total suspended solids are controlled in the discharge of the blowdown to the Option 1 levels, but the mass of pollutants discharged in reduced by 80 percent coincidentially with the discharge flow reduction.

Option 3: Option 2 with the addition of a chemical flocculant to further treat the 20 percent blowdown. The effluent limitations are based on pilot treatability studies to determine the type and amount of flocculant necessary to produce effluent with no settleable solids in the discharge and an effluent limitation on total suspended solids (TSS) of about 35 mg/l long-term average.

Option 4: Option 1 with 100 percent recycle of process wastewater. The design configuration is a six hour pond to assure solids reduction for the recycle stream and commingled flows.

B. Drainage Flows, Seepage, Runoff, and Storm Exemption

This proposal is applicable primarily to the discharge of "process wastewater" as defined in § 440.131, of the proposed rule. Moreover, these proposed limitations and standards generally are also applicable to all other wastewater which enters the treatment system, i.e., drainage or groundwater infiltration which commingles (or becomes "combined") with process wastewater. These "combined waste streams" to the treatment system are addressed in specialized provisions in Section 440.131 of the proposed rule. Certain other discharges from placer mines are not covered by this proposal, including impoundment seepage, offsite drainage diverted away from treatment facilities, and sanitary water. For these discharges, the permitting authority must apply its best professional judgment to set any applicable effluent limitations or standards for point sources.

The definitions and special provisions proposed in § 440.131 are applicable only to Subpart M—Gold Placer Mine Subpart and will supersede the definitions and provisions set forth in 40 CFR Part 401 and 40 CFR Part 440 Subpart L. In 40 CFR Part 401, the term *process wastewater* means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product. However, the Agency is proposing for placer mines a more specific definition which recognizes the

process wastewater streams specific to placer mining. *Process wastewater* in Subpart M is proposed to mean all water used in the beneficiation process, including but not limited to, the water used to move the pay dirt or ore to and through the beneficiation process, the water used to aid in classification, and the water used in the gravity separation method. In addition, process wastewater includes the rainfall runoff and drainage discharge from within the beneficiation area. "Beneficiation area" is defined to mean the area of land used to stockpile pay dirt or ore immediately before the beneficiation process, the area of land used to stockpile the tailings immediately after the beneficiation process, and the area of land from the stockpiled tailings to the treatment system, e.g. holding pond or settling pond, and the area of the treatment system.

These regulations include a proposed provision for combined waste streams. Where process wastewater is commingled with mine drainage or groundwater infiltration to the wastewater impoundment, settling pond, or holding pond, for mines and processing methods in the range of 20 yd^3/day to 500 yd^3/day, the combined waste stream may be discharged if the concentration of each pollutant or pollutant property does not exceed the BPT effluent limitations. For larger mines and dredges the volume of commingled wastewater that may be discharged under BCT cannot include the flow or volume of process wastewater where the effluent limitation for the beneficiation process is no discharge of process wastewater.

The provision Combined Waste Streams for the gold placer mine subcategory in effect supersedes the commingling provision of wastestreams in the NPDES regulation (40 CFR 125.3) as it applies to the defined "mine drainage" and "ground water infiltration" that is commingled with "process wastewater." In 40 CFR 125.3 the effluent limitations for commingled wastestreams must be applied and based on a flow-weighted average so that the mass loading of pollutants in the commingled discharge is not more than the mass of pollutants had each waste stream been treated separately to their respective effluent limitations. In the gold placer mine subcategory there are not separate effluent limitations for mine drainage and for ground-water infiltration because we have no data or information on treating these gold placer mine wastewaters separately. Site-specific BPJ's will govern these situations. Also, effluent limitations guidelines and standards for all of the mining point source categories, e.g. ore, coal, and mineral, are based on concentration limitations not mass limitations because correlating units of production and wastewater discharged by mines and beneficiation processes is not possible.

This proposed regulation also contains a "storm exemption" which provides relief from these effluent limitations guidelines & standards under certain conditions.

The regulation includes this provision because the Agency believes that it is unreasonable to expect any mine operator with a properly designed, constructed, and maintained wastewater treatment facility to be responsible for treating or containing the wastewater that could result from a heavy precipitation event or a series of precipitation events that could statistically occur. The storm exemption provides a limited exception to the requirements applicable to gold placer mines under normal operating conditions. It grants relief from excess discharges which occur during and immediately after any precipitation or snowmelt—the intensity of the event is not specified. In the case of mines which are allowed to discharge process wastewater under this regulation, the storm exemption applies if the treatment system has been designed, constructed, and maintained to contain the maximum volume of untreated process wastewater which would be discharged by the beneficiation process during a 6-hour period (without an increase in volume from precipitation or groundwater infiltration) plus the maximum volume of water resulting from a 5-year, 6-hour precipitation event. In the case of mines which are not allowed to discharge process wastewater, the storm exemption applies if the treatment system is designed, constructed, and maintained to contain the maximum volume of process wastewater stored, contained, and used or recycled by the beneficiation process (without an increase in volume from precipitation or groundwater infiltration) plus the maximum volume of wastewater resulting from a 5-year, 6-hour precipitation event. In computing the maximum volume of waters which would result from a 5-year, 6-hour precipitation event, the operator must include the volume which would result from all areas contributing runoff to the individual treatment facility, i.e., all runoff that is not diverted from the active mining area and runoff which enters the treatment system. The storm exemption does not grant the operator the option of ceasing or reducing efforts to contain or treat the runoff resulting from a rainfall or snowmelt, regardless of the design and construction of the facility. The operator must, instead, take all reasonable steps during and after the precipitation event to treat or contain the wastewater discharge and to limit the amount of overflow or excess discharge.

EPA's general NPDES permit regulations have provisions for "bypass" (the intentional diversion of wastestreams from any portion of a treatment facility) and "upset" (an exceptional incident in which there is unintentional and temporary noncompliance with permit limitations based on this regulation because of factors beyond the reasonable control of the permittee). See 40 CFR 122.41 (m) and (n). In general, the storm exemption supersedes the general NPDES bypass and upset provisions with respect to precipitation events; that is, an operator wishing to obtain an excursion from the BPT, BAT, or NSPS requirements during precipitation events must comply with the prerequisites of the storm exemption. However, an operator also must comply with the notice provisions of the general upset and bypass provisions. The storm exemption, like the general upset and bypass provision, simply provides an affirmative defense to an enforcement action. Consequently, the burden of proving compliance with the conditions of the storm provision rests with the operator, just as in the case of the general upset and bypass exemptions.

This proposed storm exemption differs from the storm provisions for other ore mines and mills (see 40 CFR 440.131) because gold placer mines differ in many respects from the rest of the ore industry. First, the placer mine average daily production and production life generally is much less than "hard rock" mines. Also, placer mines generally operate fewer hours per day and only a few months per year. In addition, wastewater from placer mines contains only solids from the disturbed streambed; not the low or high pH found in effluent from "hard rock" mills. Furthermore, the typical settling pond at placer mines is not a large, permanent, stable earthen impoundment as is found at large "hard rock" ore mines. Lastly, the Agency has based limitations and standards on settling ponds with 6 hours of detention time, rather than days or weeks which is typical of large coal and ore mines for which a 10-year, 24-hour storm runoff benchmark has been established. Accordingly, the Agency is basing the proposed storm exemption on

a treatment system that is designed, constructed, and maintained to include the volume resulting from a 5-year, 6-hour precipitation event. The 6-hour duration of precipitation is tied to the 6-hour detention time upon which the settleable solids effluent limitations are based and upon which the economic model is based. The 5-year occurrence frequency reflects the shorter production life at placer mines and the seasonal operation at placer mines.

Based on observations of many settling ponds in 1983 and 1984, EPA had concluded that, while a few ponds would require only continuing maintenance to qualify for the storm exemption, the majority of mine operators wishing to qualify will have to improve the design, construction, and maintenance of the ponds. The Development Document supporting this proposed rule deals with the design, construction, and operation of settling ponds which are capable of removing settleable solids to trace levels and includes methods to design ponds to meet the criteria to qualify for the storm provision.

C. BPT Recommendations

The Agency is proposing that BPT for all placer mining methods and sizes other than small mines with a production rate <20 yd^3/day and large dredges with a production rate of >4000 yd^3/day be based upon Option 1, e.g. simple settling. Flocculant addition and 80 percent recycle were not included in the model BPT technology. Flocculants have not been used in full-scale application and, while showing promise in solids control, several technical questions remain to be resolved. Recycle at 80 percent was not selected because the technology is less efficient than 100 percent recycle at nearly the same cost, and is not economically practicable for the smaller mines. Total recycle was not selected as the model technology basis for BPT because, as an in-process (rather than end-of-pipe) technology it is more appropriately considered as a model BAT technology. EPA is proposing BPT effluent limitations for the following pollutants: Settleable Solids (SS) and Total Suspended Solids (TSS).

If the settling ponds are designed, constructed and maintained to provide a minimum of six hours of wastewater detention time in the pond with an additional volume for sludge sufficient to preclude reduction in this detention time, effluents with 0.2 ml/1 of settleable solids can be obtained. Field tests indicate that settleable solids in placer mine discharges can be reduced to less than 0.2 ml/1 or trace with 3 hours of settling under quiescent conditions. As a general engineering design premise, three hours quiescent settling can be accomplished under full-scale pond conditions by doubling the field test results to six hours of detention time. In addition, the Agency's engineering analysis and statistical analysis of existing facilities indicate that many existing ponds achieve 0.2 ml/1 settleable solids as their long-term performance.

The settleable solids effluent limitation is an "instantaneous maximum." This is a value which is not to be exceeded. This limitation was developed based on a combination of statistical analysis of pond performance, review of discharge monitoring data from miners, and engineering evaluations of sediment pond performance. The Agency believes it is appropriate to specify the instantaneous maximum because it is a more practical standard to apply and enforce, and is based upon the typical grab sample test. Statistical analysis of the performance at facilities the Agency sampled in 1984 showed some variation in instantaneous samples that could have a number of causes; the sample may reflect the technique used by the individual taking the sample, variation in treatment efficiency reflected by an undersized pond, or short circuiting in the pond. For additional discussion on this variability of sample results please note the Response to Comment No. 17. Many of the mines sampled by EPA in 1984 and in 1983 did not have ponds of sufficient size to provide a minimum of 6 hours of detention time if the sluice operated constantly during the work day. These mines generally did not operate constantly but rather on a cycle akin to a batch operation; there were periods when the raw wastewater was very high in solids followed by periods when the raw wastewater had low levels of solids (essentially the same level of solids as in the water supply). The effect of this batch type operation is to impact the settling facility with solids and then dilute the settling facility. Other mines, to provide process water to the sluice, diverted supply water to the settling facility with obvious dilution that reduced actual detention time. These mines nevertheless produced an effluent with settleable solids of trace to less than 0.2 ml/1.

EPA Region X issued 446 NPDES permits to the gold placer mining industry in Alaska for the 1984 season. In 1984, 338 of the placer miners holding NPDES permits submitted reports to the EPA at year's end. Of this total, 107 included a full Discharge Monitoring Report (DMR). Of the 107 DMR's, 26 (24.3 percent) reported 0.2 ml/1 or less of settleable solids (SS) both for individual monthly averages as well as for daily maximums the entire operating season. The effluent was sampled at some mines twice a day and at other mines only once per day. But, for these mines reporting SS of 0.2 ml/1 or less, over 2600 individual samples were reported which the Agency believes are representative of the better treatment found in the industry and which the Agency is using as the basis for BPT limitations. BPT also includes a limitation on TSS of 2000 mg/1 as a 30-day (long term) average. The statistical analysis and calculation of the arithmetic means of TSS data show averages of about 1900 mg/1 and 1700 mg/1 respectively. Because of analytical test variability (i.e., several dilutions required to determine actual TSS values in concentrated samples), the Agency believes it is appropriate to round off to the nearest whole 1000 units. A daily maximum is not specified in this instance because there is insufficient data to fully define variability between daily maximum and monthly averages, and simple settling performance is better defined by frequent settleable solids analyses.

The Agency is proposing that BPT for large dredges with production rates <4000 yd^3/day be based on total or 100 percent recycle of process wastewater from the beneficiation process used by the dredge. In § 440.141 of the proposed regulation, "process wastewater" and "beneficiation process" are defined. The technology basis for this proposal is recycle of the water from the pond in which the dredge floats as it mines and processes the paydirt. The very nature of the mining and processing methods used by dredges makes recycle of the water used to process gold placer ore necessary. All of the information available to the Agency at this time indicates that these large dredges with <4000 yd^3/day capacity are all presently recycling process wastewater at a very high rate, with at least 3 dredges recycling 100 percent of their process wastewater.

As discussed above and in the final rule promulgated for ore mining and dressing, the Agency recognizes that storm exemptions or relief are necessary for wastewater treatment facilities at ore mines and mills. As explained above, the proposed storm exemption or relief for gold placer mines in this rule differs somewhat from the relief in the 1982 rule for ore mining and dressing in that the intensity of the storm for which the treatment systems are designed is

the 5-year, 6-hour precipitation event. In all other respects the relief provided to gold placer mines in the storm exemption is the same as provided in the 1982 rule for ore mining and dressing. The storm exemption provides an affirmative defense to an enforcement action as a specified condition of upset resulting from precipitation for mines with treatment systems that are properly designed, constructed, and maintained to include the volume that would result from a 5-year, 6-hour precipitation event. Under the condition specified in § 440.141 of this proposed rule, relief is provided both for facilities permitted to discharge and for facilities not permitted to discharge.

In order for a placer mine operator to design, construct, and maintain the wastewater treatment facility at the mine, the effluent limitations for process wastewater and combined wastestreams must be considered in conjunction with the storm provisions. For mines allowed to discharge process wastewater and combined wastestreams, the mine operator would provide treatment for the total flow from the beneficiation process and the flow that would result from a 5-year 6-hour precipitation event on areas contributing to the combined wastestreams. For mines with a no discharge of process wastewater requirement, the mine operator would provide containment of the "process wastewater" and the volume resulting from a 5-year, 6-hour precipitation on the "benefication process area" and on the holding pond. The mine may discharge only the excess flow beyond that which results from a 5-year, 6-hour precipitation event on areas outside of the beneficiation process area contributing to the combined wastestream and any ground water infiltration. Thus, the relief from no discharge of process wastewater does not apply to the volume impounded from water used in the beneficiation process, or the volume that would result from a 5-year, 6-hour precipitation event on the beneficiation process area, or the volume that would result from a 5-year, 6-hour precipitation event on the surface of settling ponds.

The Agency's economic assessments indicate a number of mines that process <500 yd^3/day of ore could be unprofitable in the baseline (see Economic Considerations, Section XIV of the preamble). Nevertheless, the Agency believes that for these smaller mines it is appropriate to propose limitations on settleable solids and total suspended solids based on the best performance of simple settling, which is minimum treatment technology. Also, settling ponds are a demonstrated and familiar technology often used by the miners, and (in Alaska) all placer mining permits issued over the past decade have incorporated limits based upon settling pond technology. Current NPDES permits for 1985 incorporate effluent limitations based upon the use of settling ponds. These permit limitations (and BPT) apply at the end of pipe discharge and do not apply after any downstream dilution. In order to meet the proposed BPT effluent limitation, existing ponds may require an upgraded design and operation requirement.

The Agency estimates that the proposed BPT effluent limitations guidelines for this subcategory would remove approximately 95 percent of the solids produced in the untreated waste stream and 60 percent of the arsenic and mercury. The Agency estimates that the proposed BPT effluent limitations guidelines for this subcategory will result in the removal of approximately 8 million tons of solids per year, and ½ million pounds per year of arsenic and 1,800 pounds per year of mercury from the raw wastes. The estimated total annual cost in 1982 dollars for the proposed BPT effluent limitations guidelines is $7 million in investment costs. The Agency has determined that the effluent reduction benefits associated with compliance with BPT justify the costs.

IX. Best Conventional Technology (BCT) Effluent Limitations

The 1977 amendments to the Clean Water Act added Section 301(b)(2)(E) establishing "best conventional pollutant control technology" (BCT) for discharge of conventional pollutants from existing industrial point sources. Conventional pollutants are those defined in section 304(a)(4) (biochemical oxygen demanding pollutants (BOD_5), total suspended solids (TSS), fecal coliform, and pH), and any additional pollutants defined by the Administrator as "conventional." (To date, the Agency has added one such pollutant, oil and grease, 44 FR 44501, July 30, 1979.)

BCT is not an additional limitation but replaces BAT for the control of conventional pollutants. In addition to other factors specified in section 304(b)(4)(B), the Act requires that BCT limitations be assessed in light of a two-part "cost-reasonableness" test, *American Paper Institute* v. *EPA*, 660 F.2d 954 (4th Cir. 1981). The first test compares the cost for private industry to reduce its conventional pollutants with the costs to publicly owned treatment works for similar levels of reduction in their discharge of these pollutants. The second test examines the cost-effectiveness of additional industrial treatment beyond BPT. EPA must find that limitations are "reasonable" under both tests before establishing them as BCT. In no case may BCT be less stringent than BPT.

EPA published its methodology for carrying out the BCT analysis on August 29, 1979 (44 FR 50372). In the case mentioned above, the Court of Appeals ordered EPA to correct data errors underlying EPA's calculation of the first test, and to apply the second cost test. (EPA had argued that a second cost test was not required.)

The Agency proposed a revised BCT methodology on October 29, 1982 (47 FR 49176) and published a notice of data availability on September 20, 1984 (49 FR 37046).

For each of the alternate technologies, EPA estimated the incremental cost from BPT to BCT. This incremental cost is divided by the additional pounds of conventional pollutant removed by the BCT technology. The resulting cost per pound is then compared to a benchmark value, which is based on the cost per pound for Publicly Owned Treatment Works (POTWs) to upgrade from secondary treatment to advanced secondary treatment. This first test is passed if industry's cost per pound is lower than the POTW benchmark. For the second test, EPA calculates the following ratio for each of the alternate technologies: incremental cost per pound in going from BPT to BCT divided by the cost per pound to achieve BPT. This ratio is compared to an analagous ratio for POTWs: cost per pound to upgrade from secondary treatment to advanced secondary treatment divided by the cost per pound to reach secondary treatment. The second test is passed if industry's ratio is lower than the POTW ratio.

As discussed below in Section X, EPA determined that solids, primarily the solids put into suspension by the beneficiation process at placer mines, are the principal pollutants in the wastewater from placer mines and, that if the solids are controlled, other pollutants which are found in the solid form will be controlled as well. The Agency is setting BCT limitations equal to or more stringent than BPT for TSS, a conventional pollutant.

EPA considered the same four treatment options considered for BPT as the technology options for BCT. For large dredges, EPA is proposing BCT effluent limitations guidelines equal to the BPT effluent limitations guidelines based on total or 100 percent recycle of

process wastewater. EPA has identified no more stringent technologies to control process wastewaters from these types of facilities.

For all placer mining methods and sizes larger than 20 yd^3/day (except for large dredges), EPA determined the "cost reasonableness" of each option in terms of cost per pound of solid material (i.e., TSS) removed, utilizing the five model mines as structured to represent the industry both in Alaska and the lower 48 States. Model mine details and baseline economic parameters are delineated in the Economic Impact Analysis Document and in the Development Document, Section IX. The treatment technologies are considered to be "add-on" technologies to the basic BPT treatment scheme (simple settling), which EPA assumes (for BCT purposes) is already in place for these facilities. For each additional treatment option, EPA evaluated achievable effluent pollutant levels and the cost to implement the option. The pounds of solids removed annually by each treatment option were calculated for each model mine size group by extrapolation from data acquired through treatability tests performed by EPA at representative mines. Annual costs for total pounds removed for each of the four options for each model mine were then computed. The dollar cost per pound removed for BPT for all mines in the industry was $0.00062. For that segment of mines mining more than 500 yd^3/day, the cost per pound is $0.00058 for BPT and $0.002 for BCT. BCT costs for mines of less than 500 yd^3/day production were also in this range, but these more stringent BCT options to control solids are not economically achievable for this subcategory as discussed in Section XIV of this preamble. For purposes of applying the BCT methodology to this industry EPA is proposing to use a cost per pound of one cent. We are doing this because the costs are so low relative to removals and because one cent is the smallest real monetary unit. Thus, the requirements are "cost reasonable" and pass the test as previously proposed by EPA. Also, the Agency believes the costs are sufficiently low that they would pass any "cost reasonable" test that may be promulgated. (For further discussion of these findings see Sec. 3.6 of the cost-effectiveness document included in the record of this rulemaking). EPA specifically invites comment on the way it has applied its BCT methodology to the placer mining industry.

These larger mines will require additional equipment for wastewater treatment (i.e., recycle pumps, piping, etc.) in order to meet BCT limitations The four effluent control technologies considered for BPT were evaluated for applicability to the conventional pollutant of concern, appropriatess for the wastewater volume and pollutant concentrations found in this industry, and for economic achievability. The technologies that fullfilled these criteria are described below.

Pollutant levels or concentrations achievable by these technologies were determined using data from sampling and analysis at existing facilities, together with data from treatability studies performed by the Agency and data from other sources.

Based on the above consideration plus other available data the Agency proposes the following BCT effluent limitations guidelines:

1. For mines with a production rate from 20 to 500 yd^3/day, BCT limitations equal BPT limitations, and TSS is controlled at 2000 mg/1 (30–day average). Also, because BPT is no discharge of process wastewater for large dredges, BCT limitations equal BPT limitations for this subcategory.

2. For mines with an actual production rate greater than 500 yd^3/day, BCT based on Option 4, total recycle of process water is proposed.

The Agency is currently in the process of finalizing the BCT cost test methodology. In developing the final placer mining regulation, EPA will apply the final methodology in evaluating various technology options.

X. Best Available Technology (BAT) Effluent Limitations

The factors considered in assessing best available technology economically achievable (BAT) include the age of equipment and facilities involved, the process employed, process changes, nonwater quality environmental impacts (including energy requirements) and the costs of application of such technology (Section 304(b)(2)(B) of the Clean Water Act). In general, the BAT technology level represents, at a minimum, the best economically achievable performance of plants of various ages, sizes, processes, or other shared characteristics. BAT may include feasible process changes or internal controls, even when not in common industry practice.

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

Despite this expanded consideration of costs, the primary determinant of BAT is effluent reduction capability.

EPA reconsidered the four treatment options previously considered for BPT and BCT as the technology options for BAT.

For large dredges and placer mines larger than 500 yd^3/day, EPA is proposing BAT effluent limitations guidelines based on total recycle of process wastewater pollutants. These effluent limitations guidelines are the same as the BCT effluent limitations guidelines. EPA is not proposing any more stringent limitations because we have not identified any more stringent technologies to control process wastewater pollutants.

For placer mines with a production rate from 20 to 500 yd^3/day, EPA is proposing BAT effluent limitations guidelines for settleable solids (SS) based on simple settling (i.e., BAT equals BPT and BCT). EPA is not proposing BAT effluent limitations for these smaller mines based on partial or total recycle (Option 3 or 4) because, as discussed in Section XIV, we do not believe such limitations would be economically archievable for this segment of the industry. EPA is not proposing limitations based on Option 2 because, as discussed above, serious technical questions remain to be resolved regarding the use of flocculants and the economic impact of this option on the smaller mines.

Sampling and analysis data indicate that wastewater from gold placer mining operations sometimes contains one or two toxic pollutants: arsenic and mercury. However, EPA is not proposing technology-based effluent limitations guidelines for these pollutants. Based on field and laboratory testing, EPA has determined that both pollutants are found in the particulate form and respond to the control of solids proposed for BPT and for BCT. They are also adequately controlled by the no discharge of process wastewater limitations in the BAT/BCT effluent limitations guidelines. Therefore, specific limitations at BAT are unnecessary. See response to Comments 4 and 19 in Section XX of this preamble.

XI. New Source Performance Standards

The basis for new source performance standards (NSPS) under section 306 of the Act is the application of the best

available demonstrated technology. New facilities have the opportunity to design and use the best and most efficient placer mining and milling processes and wastewater treatment technologies. Accordingly, Congress directed EPA to consider the best demonstrated process changes and end-of-pipe treatment technologies capable of reducing pollution to the maximum extent feasible.

Under EPA's general NPDES regulations, a "new source" means any building, structure, facility, or installation from which there is or may be a discharge of pollutants for which construction began after promulgation of new source performance standards under section 306 of the Clean Water Act 122.2 det. (b), if: (1) It is constructed at a site at which no other source is located, or (2) it totally replaces the process or production equipment that causes the discharge of pollutants at an existing source, or (3) its processes are substantially independent of an existing source. See 40 CFR 122.2, 122.29 (49 FR 38048, September 26, 1984).

EPA solicits comments on whether this general defintion is appropriate for the placer mining industry.

EPA is proposing that new sources in the gold placer mining and dressing industry achieve new source performance standards based on the same technology proposed for BAT/BCT (i.e. simple settling for mines that process <500 yd^3/day and total recycle of process wastewater for those mines that process >500 yd^3/day including large dredges). For the latter facilities, EPA was unable to identify any more stringent technologies that could control process wastewater pollutants at new mines. For the smaller mines (i.e., <500 yd^3/day) EPA is not establishing more stringent NSPS because we believe any more stringent standards may prevent new people from entering the placer mining industry, i.e., it may be a barrier to entry.

The general characteristics of wastewater, costs to treat this wastewater, and percentages of pollutant removals from new placer mining sources are expected to be similar to existing placer mining sources. Since the new source standards are equivalent to the existing source standards, these proposed NSPS will not pose a barrier to entry.

XII. Regulated Pollutants

The basis on which the controlled pollutants were selected is set out in Section VII of the development document.

Specific effluent limitations are being established for settleable solids (SS) and for total suspended solids (TSS). Control of these parameters will also achieve control of arsenic and mercury, the only two toxic pollutants controlled in placer mining discharges as discussed below in Section XIII, Pollutants Not Regulated.

XIII. Pollutants Not Regulated

Although this regulation is not being issued under a schedule established in the NRDC Settlement Agreement, EPA has decided to apply the criteria for regulating (or in the alternative excluding from regulation) individual toxic pollutants and classes of toxic pollutants established in Paragraph 8 of the Agreement. Data collected by EPA and individual facilities within the industry were used in deciding which specific toxic pollutants would be excluded from these national effluent limitations guidelines and standards.

Paragraph 8(a)(iii) of the Revised Settlement Agreement allows the Administrator to exclude from regulation toxic pollutants not detectable by section 304(h) analytical methods or other state-of-the-art methods. This provision includes pollutants below EPA's nominal detection limit. In addition, Paragraph 8(a)(iii) allows the exclusion of pollutants that were detected in amounts too small to be effectively reduced by technologies known to the Administrator. Pollutants excluded under these provisions are listed in Appendices C and D. One hundred and nine toxic organics, cyanide, and eleven toxic metals are proposed for exclusion from regulation under these provisions.

Paragraph 8(a)(iii) also allows the Administrator to exclude from regulation pollutants detected in the effluent of only a small number of sources within the category and which are uniquely related to those sources. The toxic organic pollutant methylene chloride was detected in the effluent at three mines during the screen sampling program and bis(2-ethylhexyl)phthalate was found at one mine. These two organics have been attributed to sample and laboratory contamination. Therefore, methylene chloride and bis(2-ethylhexyl)phthalate are excluded under this provision.

Paragraph 8(a)(iii) also allows the Administrator to exclude from regulation pollutants that are effectively controlled by the technology upon which other effluent limitations guidelines and standards are based. The Agency believes that arsenic and mercury found in discharges from placer mines are adequately controlled by the incidental removal associated with the control and removal of settleable solids and total suspended solids (TSS) found in the discharges from this industry at BPT, BCT, and BAT. If solids are controlled to the limitations specified, any arsenic and mercury in the raw discharge would be reduced to levels that would be proposed if arsenic and mercury were controlled directly (see Section VI of the Development Document).

The 1982 final effluent limitations guidelines and standards for ore mining and dressing excluded the toxic pollutant asbestos from direct effluent limitations and standards because effluent limitations and standards on solids (TSS) effectively controlled the discharge of asbestos (chrysotile). Asbestos was found in all raw waste discharges and all effluent from all ore mines and mills where an analysis was made for asbestos (88 samples representing 23 mine/mill facilities). The concentrations varied from 10^5 fibers/liter, the lower detection limit, to 10^{12} fibers/liter. EPA found a high degree of correlation between solids and chrysotile asbestos in the raw wastewater and treated wastewater; the Agency concluded that the success of settling technology to remove solids made an effluent limitation on asbestos inappropriate, considering the correlation with solids and the expense of monitoring specifically for asbestos. Based on the data and information available, the Agency believes that the proposed effluent limitations guidelines and standards for solids in the discharge from gold placer mines will also control the discharge of asbestos.

Turbidity is not directly limited by these regulations, though it is covered by effluent limitations in many existing NPDES permits and has been the subject of some controversy as to levels that can be obtained by various treatment technologies and what levels of turbidity are acceptable water quality for various uses. Turbidity is not a toxic pollutant nor a conventional pollutant subject to control under BCT. Turbidity is a nonconventional pollutant and as such, can be controlled by direct BAT limitations on the levels of turbidity that may be discharged or by indirect control through limitations on other pollutant parameters, i.e., solids, in the wastewater discharge. Turbidity is a measure of the light scattering properties of water which is measured by candle turbidimeters, Jackson Turbidity Units, (JTU) or nephelometers, (NTU). Turbidity is caused by the presence of suspended solids in water. The mass, size, shape, and refractive index of the solids in the water affects the measured turbidity. Effluent limitations guidelines and standards are proposed here controlling the discharge

of solids as measured by TSS and settleable solids based on simple settling technology and no discharge of process wastewater based on recycle technology of the process wastewater from the beneficiation process. The Agency has not identified any technology more stringent than those proposed here for BPT, BAT, BCT, and NSPS which are technically feasible and economically achievable within the meaning of the Act. However, effluent limitations or standards on turbidity will be included in NPDES permits if necessary to achieve water quality standards.

XIV. Economic Considerations

A. Introduction

EPA's economic assessment of the proposed regulation is presented in the "Economic Analysis of Proposed Effluent Limitations and Standards for the Gold Placer Mining Industry." This report estimates the required investment and annual costs for existing sources in the industry as a whole and for typical new sources covered by the proposed regulation. Compliance costs are based on engineering estimates of capital requirements and construction expenses implied by each option. These estimates include the full cost for settling ponds and/or recycle equipment already in place at mine sites, since accurate, mine-specific information on treatment-in-place is unavailable. The report also estimates the impacts of the costs of the regulation, price changes, production changes, profitability changes, mine shut-downs, employment changes, local community impacts, balance of trade effects, and industry structure changes. The Agency solicits comment on the methodological approach used to perform this analysis.

In addition, EPA has calculated the cost per pound of total solids material removed annually by each treatment option. Ordinarily, the Agency does not calculate the cost per pound or removal of settleable or suspended solids, but instead restricts its analysis to toxic pollutants. In the gold placer mining industry, however, solids are the major pollutant, and substantial amounts of solids are removed by each of the treatment options under consideration. This analysis is included in the record of this proposed rulemaking, and is entitled "Cost Effectiveness Analysis of Proposed Effluent Limitations and Standards for the Placer Mining Industry". EPA invites comments on the methodology used in this analysis.

B. Impacts

The Agency projects there will be approximately 568 mining operations throughout 11 states affected by this regulation. Such an estimate is extremely difficult to make for several reasons. First, state, federal, and local sources sometimes provide widely disparate estimate of the number of operations in a specific state or region. EPA therefore had to choose the most reliable and up-to-date source. Secondly, it is impossible to project at this time the effect the future price of gold will have on entrepreneurs who rely on this price as a barometer of the profitability of a mining venture. A sudden, upward swing in the market price of gold might significantly increase the number of mines which operate and thus incur costs as a result of this regulation, and vice versa if there were a downward plunge. Within this uncertainty, the Agency has developed what it feels to be the best estimate based on the sources available. All of these mines discharge their wastewater directly into navigable waters. Note also that the estimate of 568 mines does *not* include the large number of "recreational/assessment" mines, stated previously by EPA as mines processing 20 cubic yards per day or less, for which no effluent limitations guidelines and standards are proposed.

Based on EPA's estimate of 568 mines, total capital and construction costs to be incurred industry-wide during the 1985 season as a result of this regulation would be approximately $10.8 million. These costs are expressed in 1985 dollars. To assess the impact of these regulatory expenditures on the economic viability of placer gold operations, the Agency developed model mines of various sizes. The size of a mining venture, in terms of the average amount of sediment or gravel processed per hour per day, has a significant effect on the mines' potential to recover costs and earn a profit, especially during periods of declining gold prices. However, it is also true that two mines which process identical amounts of gravel in a season could vary significantly in terms of types and age of equipment used, amount of overburden to be stripped prior to mining, content and fineness of gold in the paydirt, water use, operating hours, etc. Equally important to the viability of a mine is the miners's skill at running an efficient operation, repairing equipment, and obtaining capital. Hence, it is accurate to say no two placer mines even in the same size range, are identical. EPA does believe, however, that enough similarities exist between operations to allow the development of reasonably representative model mines. Five such models were constructed; four models represent Alaskan mines and one represents operations in the lower 48 states. All five models were set up to process ore an average of 10 hours per day (see the development document for the average sluicing days per year for each model mine).

The Agency is aware that a single model is probably not an adequate representation of the spectrum of mining operations in the continental U.S. Lack of accurate and comprehensive data on the lower 48 states, however, limited EPA's ability to assess the industry in this region. The model presented (Model E) reflects the general observation that mines in the continental U.S. are smaller than those in Alaska. Most commercial operations are believed to process 75 cubic yards per hour or less. The Agency solicits comment on this observation and plans to actively pursue additional data on mines in the lower 48 states between proposal and promulgation of this regulation.

The size ranges chosen as the bases of the model mines are as follows:

Model	Size range (cubic yards per hour)	Value used in economic analysis
Alaska mines:		
A	20–35	25
B	36–75	50
C	76–150	100
D	151–>	180
Continental U.S. Mines:		
E	20–75	50

Each model was developed on the basis of EPA's estimates of equipment and labor requirements necessary for the operation of that size mine. Assumptions were then made for the values of many highly variable parameters such as gold content, leasing expenses, operating hours, opportunity costs, etc. The Agency invites comment on each of the assumptions employed in the development of the model mine profiles. They are identified and discussed in detail in the economic document. Several are mentioned below.

The Agency categorized mines into four segments for this regulation, but is only proposing limitations for 3 of them (i.e., mines processing less that 500 yd^3/day and mines processing more than 500 yd^3/day, including large dredges). The Very Large Dredge Segment (dredges processing more than 4000 yd^3/day) contains less than a dozen active operations nationwide and most are assumed to be at zero discharge. The mines that process less than 20 yd^3/day are not covered by these proposed regulations. The five models are

intended to portray mines in the remaining segments separated into two groups, mines processing between 20–500 yd^3/day (all mining methods) and mines processing more than 500 yd^3/day (all mining methods).

The methodology employed to estimate impacts on the all mining methods segment began with development of the models described above. The models are first constructed under "baseline" conditions; that is, prior to imposing any regulatory controls and related expenses. After the baseline performance of each mine is established, treatment costs for the various control options were imposed to determine the regulatory impact.

Revenue estimates developed for the models were based on the assumptions that: (1) All gold recovered and sold is 80 percent pure and thus commands 80 percent of the market price per ounce, (2) all gold recovered and sold is "fine" gold and is not in nugget form, (3) mines recover gold at a rate of .022 troy ounce per cubic yard of material processed, and (4) the price of gold is $360 per troy ounce, the average price through 1984. Sensitivity analyses were performed in which the price of gold was varied to reflect more current market values. The results of these tests are discussed in the economic analysis document. In addition, a series of gold recovery rates, both above and below the assumed value of .022 per cubic yard, were employed to analyze the sensitivity of the results to this parameter.

On the cost side, it is significant to note the model mine profiles assume miners lease and employ *new* earth-moving equipment for their operations. The operating cost estimates are thus in part derived from equipment dealers' quotations of lease costs and expected fuel/maintenance expenses associated with new machinery. This assumption was necessary since information on the age, depreciation, transportation costs, stock of spare parts, and status of equipment ownership at specific sites is scarce and/or unreliable. Furthermore, information concerning auxiliary expenses as well as the extent to which miners incur long-term debt to finance their operations is also difficult to obtain. The assumptions employed to estimate these cost items are as follows: auxiliary expenses (generators, supplemental piping, etc.) equal 25 percent of the model mine heavy equipment costs, and long-term debt obligations consume 10 percent of each model mine's gross revenues. The Agency solicits data which will help identify the auxiliary equipment items likely to be in use at representative operations, and characterize the availability and frequency of long-term financing arrangements within the industry.

The analysis indicates that Alaskan mines processing less than 50 yd^3/hr, 10 hours, per day, i.e., 500 yd^3/day (these operations are represented by model A and Model B) are generally not viable operations and are projected to be unprofitable in the baseline. EPA estimates there are approximately 110 mines in this size group. The Agency recognizes, however, that some mines of this size can and will be operated profitably, owing to the large variability among mine-sites and miners. Hence it is difficult to project what percentage of the estimated 110 mines of this size in Alaska would not operate profitably, if this regulation were imposed considering the economics for any given year. Furthermore, little is known about the size distribution of mines in the lower 48 states. Lack of comprehensive information on the mining industry in these states prevents EPA from accurately projecting how many mines will operate in any season. General observations indicate at least half of the estimated 264 mines in the continental U.S. are in the lower end (i.e., below 50 cubic yards per hour) of the size range portrayed by model E. Although projected to be unprofitable, the generally lower equipment expenses and longer operating season associated with the lower 48 states may allow a larger percentage of these mines to operate relative to those in Alaska.

In summary, EPA's analysis implies that small/medium scale operations are essentially unprofitable ventures under current economic conditions, even without regulatory controls. This conclusion is derived from the available data plus the assumptions and parameters employed in the "model mine" analysis and should not, as discussed above, be interpreted as a blanket projection of shut-down applicable to all operations this size. The Agency expects some mines that process less than 500 yd^3/day will operate profitably this season, and in accordance with this expectation, EPA is proposing that a minimum level of wastewater treatment (i.e., settling ponds) be required under BPT. However, (given the general implications of the analysis), EPA is recommending no more stringent technology for mines of this size or smaller under BAT/BCT.

Although no exact determination can be made, EPA's analysis indicates a miner's potential for earning a profit increases as the size of the operation approaches and exceeds 500 yds^3 processed per day. The Agency has therefore chosen this level of production as a boundary or cut-off. Most mines below this size level are projected to be unprofitable and most mines above this size level are projected to be financially healthy and capable of installing treatment beyond settling ponds. Therefore, mines processing more than 500 yds^3 per day are required under this proposal to attain 100 percent recycle of process wastewater. EPA solicits comment on this projection. Larger volume mines will incur reduced profitability under the proposed treatment options, but are not expected to shut down as a result. Employment and community effects are projected to be minimal, and no balance of trade impact is expected since U.S. placer gold production accounts for such a small percentage of total World gold production. These estimated impacts pertain to BPT and BCT/BAT levels of effluent control.

Note these results are contingent in part on the assumed revenue and cost parameters. In response to comments received on the draft economic analysis document, the Agency evaluated the performance of the mines at a gold recovery rate of .01 ounces per cubic yard of material processed. In this case, all five model mines were projected to be unprofitable in the baseline, especially after accounting for auxiliary expenses and long-term debt repayment. A significant number of miners claimed this recovery rate is standard for many operations. Others felt strongly that operating costs were understated in the models, and their suggestions led to the adjustments cited above. EPA questions the validity of these assertions, and requests data to justify them, since their inclusion in the models results in general unprofitability even without the imposition of wastewater controls. This is inconsistent with the fact that several hundred miners mined successfully last season and plan to do so again this year.

BPT—The technology chosen as the basis for proposed BPT limitations is the installation of simple settling ponds with six-hour detention of wastewater discharges for all facilities except large dredge facilities. For large dredges, EPA is proposing BPT effluent limitations guidelines based on zero discharge of process wastewater. Approximately 568 mines would incur costs as a result of the BPT requirements. Total annual costs at this level of control are estimated to be approximately $6.9 million. Commercial mines processing abour 500 cubic yards of material per day or more are not expected to incur any significant adverse effects. Smaller

mines, as discussed above, are likely to be unprofitable regardless of the imposition of wastewater controls. The Agency had determined that the effluent reduction benefits associated with compliance with the proposed BPT effluent limitations guidelines justify the costs.

BCT—BCT limitations more stringent than BPT are proposed only for mines processing more than 500 cubic yards of material per day. The technology basis for these limitations is 100 percent recycle of process wastewater. The estimated incremental cost above BPT requirements for these mines to attain this level of control in approximately $3.9 million. Added to the 6.9 million required for the entire industry to achieve BPT, the *total* cost of the proposed BPT/BCT requirement is an estimated $10.8 million. The projected economic and financial impact of this total recycle requirement on mines processing more than 500 cubic yards of material per day is expected to be minimal. For mines processing less than 500 cubic yards per day and for large dredge facilities, EPA is proposing the BCT=BPT. The Agency has determined that the BCT effluent limitations are economically achievable and, as discussed elsewhere in this preamble, satisfy the Agency's proposed "BCT cost test."

BAT—Since the Agency is proposing BAT effluent limitations guidelines equal to the proposed BPT/BCT effluent limitations guidelines, there are no additional costs or impacts associated with the proposed BAT effluent limitations guidelines.

NSPS—The technology basis for new source standards is the same as for BPT, BAT and BCT. Thus, new mines will not incur costs beyond those incurred by existing mines. Hence the regulations are not expected to present a barrier to entry into the industry.

C. Executive Order 12291

Executive Order 12291 requires EPA and other agencies to perform regulatory impact analyses of major regulations. Major rules are those which impose a cost on the economy of $100 million or more or meet other economic impact criteria. The proposed regulation for placer gold mining activities is not a major rule. The costs expected to be incurred by this industry will be significantly less than $100 million. Therefore a formal Regulatory Impact Analysis is not required. The Agency's regulatory strategy considered both the cost and economic impact of the regulation.

D. Regulatory Flexibility Analysis

Pub. L. 96-354 requires that EPA prepare a Regulatory Flexibility Analysis for regulations that have a significant impact on a substantial number of small entities. This analysis may be conducted in conjunction with or as part of other Agency analyses. A small business analysis is included in the economic impact assessment for this regulation.

After consultation with the U.S. Small Business Administration, EPA developed a definition of "small" as a basis for the small business analysis. EPA defines the small segment of the placer gold mining industry to include all small-scale "recreational/assessment" mines, plus all operations represented by model mines A, B, and E (see model mine description above). Recreational miners (i.e., miners processing 20 yd^3/day or less) would not be covered by this regulation or incur costs while model A, B and E operations (between 20 yd^3/day and 750 yd^3/day in Alaska and elsewhere), primarily those below 500 cubic yards or less per day, are projected to be unprofitable in the baseline (see "Section B. Impacts," above).

To evaluate the relative impact of the proposed regulation on this segment versus other size operations, the ratio of annual compliance costs to revenues was computed for "small" mines and compared to the same ratio computed for all other operations. For each treatment option, this was done by summing the estimated compliance costs incurred by the mines designated as small and comparing the total to the sum of the mines' projected revenues. The procedure was then repeated for the larger mines.

As noted earlier, this proposal does not cover small-scale, "recreational/assessment" mines. Furthermore, small commercial mines (those that process <500 yd^3/day), with the exception of those operated by the most capable and cost-efficient miners, are projected to be unprofitable under current economic conditions. Partly as a result of this conclusion, EPA has recommended no more stringent technology-based limitations beyond BPT for this segment of the industry. The compliance cost to revenue ratio for small mines calculated at Option 1, Simple Settling, is approximately the same as the ratio for large mines calculated at Option 4, Total Recycle. Thus, the projected impact on the two segments, as measured by the ratio of estimated compliance costs to projected revenues, is similar. Based on this analysis, EPA has determined that there will not be a significant impact on small entities within this category. Therefore, the Agency is not required to perform a formal Regulatory Flexibility Analysis.

E. SBA Loans

The Agency continues to encourage small plants to use Small Business Administration (SBA) financing as needed for pollution control equipment. The three basic programs are: (1) The Pollution Control Bond Program, (2) the Section 503 Program, and (3) the Regular Business Loan Program. Eligibility for SBA programs varies by industry.

For further information and specifics on the Pollution Control Bond Program, contact: U.S. Small Business Administrator, Office of Pollution Control Financing, 4040 North Fairfax Drive, Arlington, Virginia 22203, (703) 235-2902.

The Section 503 Program, as amended in July 1980, allows long-term loans to small and medium size businesses. These loans are made by SBA-approved local development companies. These companies are authorized to issue Government-based debentures that are bought by the Federal Financing Bank, and are an arm of the U.S. Treasury.

Through SBA's Regular Business Loan Program, loans made available by commercial banks are guaranteed by SBA. This program has interest rates equivalent to market rates.

For additional information on the Regular Business Loan and Section 503 Programs, contact your district or local SBA office. The coordinator at EPA Headquarters is Ms. Frances Desselle who may be reached at (202) 382-5373.

XV. Non-Water Quality Environmental Impacts

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

The following are the non-water-quality environmental impacts associated with the proposed regulation.

A. Air Pollution

Imposition of BPT, BCT, and BAT effluent limitations guidelines and NSPS will not create any additional air pollution emissions.

B. Solid Waste Generation

All of the solid wastes produced by the gold placer mining industry are the soil, sand, and rock residuals of the mining and processing operations. The vast majority (over 95%) of solid waste is from overburden removal, classification, and sluicing. These wastes, like other ore mining wastes, are not hazardous under the Resource Conservation and Recovery Act. It is estimated that more than 160 million tons of overburden and tailings result from placer operations each year. The settling pond treatment systems which are the basis of these regulations will contain some 8 million tons of sludge (sand, soil), which approximates the amount of sludge controlled by current practices. The recycle requirement for BCT will increase sludge generation by less than 0.5 million tons per year.

EPA estimates that a typical new source mine (of 1000 yd ^{3}day) will generate over 106,000 tons of tailings per year and control about 5,600 tons of sludge per year. Both new and existing mines manage solid waste by storage in ponds, reworking with tailings, or stacking on site.

C. Land Requirements

As a general rule, imposition of BPT, BAT/BCT, and NSPS standards are expected to create a moderate impact on land requirements. Land for the extra ponds will be required, but this land normally will be available on existing claims.

D. Energy Consumption

Achievement of BCT limitations and NSPS will result in a significant net increase in energy requirements for facilities. BCT and NSPS limitations for all facilities processing more than 500 yd ^{3} per day are based upon total recycle of the process water. This requires the addition of pumps, motors, controls, and piping. The power requirements are substantial and normally consist of a skid-mounted diesel motor with a mechanical drive for the pump. This additional fuel cost varies depending upon the remoteness of the mining site. Wherever feasible, gravity flow is used in treatment facilities for mine and mill process wastewater.

E. Consumptive Water Loss

Placer mining that occurs in areas that are normally short of water have historically resorted to recycling the available water in order to increase daily ore throughput to economic levels. These mines are usually close to the headwaters of the streams. The smaller mines normally establish a water balance with a pond discharge roughly equal in volume to existing stream flow with very little consumptive water loss and thus do not adversely impact downstream water rights. The mines processing more than 500 yd ^{3}day throughput impound the required volume of water, and, generally, except for makeup water, also achieve water balance resulting in no significant impact on downstream water rights.

In adequate and excess water areas the smaller mines (that discharge) do not affect water rights. Placer mines that employ recycle (or a portion of recycle) in areas of adequate or excess water, in the opinion of the Agency, do not adversely impact downstream water rights in that a water balance is usually attained via seepage through the impoundment structures.

XVI. Best Management Practices

Section 304(e) of the Clean Water Act authorizes the Administrator to prescribe "best management practices" ("BMP"), as described in the "Authority and Background" section of this preamble for toxic or hazardous pollutants.

Section 402(a)(1) of the Act allows the Administrator to prescribe conditions in a permit which are necessary to carry out the provisions of the Act. A BMP is such a condition. The discharges to be controlled by BMPs are plant site runoff, spillage or leaks, sludges, or waste disposal and drainage from raw material storage.

The gold placer ore mining and dressing industry has numerous problem areas, including storm water runoff, groundwater infiltration, and seepage. Section VIII of the Development Document addresses possible BMP's and can guide the permitting agency in developing case-by-case BMP requirements for NPDES permits. The following paragraphs contain a brief description of some possible BMP's.

Minimizing the volume of water contaminated at a mine is desirable because the volume of water and mass of pollutants to be treated is less. Diversion of water around a mine site to prevent its contact with possible pollution-forming materials is an effective and widely applied control technique. For example, settling ponds should be designed with adequate drainage and storm water diversion around the pond.

Regarding or recontouring of surface mines and surface waste piles can be used to modify surface runoff, decrease erosion, and prevent infiltration of water into the mine area.

A number of the mines examined in preparing this proposal practice some measure of mine drainage control, including bypasses, berms, and the use of mine drainage as intake process water. Use of the mine water as makeup water in sluice circuits is a desirable management practice and is widely implemented in this industry.

As the placer mining industry implements increased, proper application of technology-based standards, the industry must improve its use of bypasses to control stream flow away from the "process area" and the wastewater treatment area (i.e., ponds). In addition, best management practices in offstream disposal and containment of solid wastes becomes increasingly important.

XVII. Upset and Bypass Provisions

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

While an upset is an unintentional episode during which effluent limits are exceeded, a bypass is an act of intentional noncompliance during which

waste treatment facilities are circumvented in emergency situations. Bypass provisions have in the past been included in NPDES permits.

EPA has determined that both explicit upset and bypass provisions should be included in NPDES permits and has promulgated NPDES regulations that include upset and bypass permit provisions (see 40 CFR 122.41 (m) and (n)). The upset provision establishes an upset as an affirmative defense if an operation is prosecuted for violating a technology-based effluent limitation. The bypass provision authorizes bypassing to prevent loss of life, personal injury, or severe property damage.

The Agency has received several inquiries about the relationship between the upset and bypass provisions set forth in EPA's general NPDES permit regulations and the storm exemption contained in the 1982 final regulations for ore mining and dressing. The proposed storm exemption described above in Section VIII supersedes the general upset and bypass provisions with respect to precipitation events. In this proposed rule, an operator wishing to obtain relief from BPT, BAT, or BCT limitations, or NSPS during precipitation events must demonstrate that he has complied with the prerequisites of the rainfall exemption provision. However, the general upset and bypass provisions are available in all other applicable situations.

XVIII. Variances and Modifications

After the final regulations are promulgated, the appropriate effluent limitations must be incorporated in all Federal and State NPDES permits issued after that date to direct dischargers in this subpart.

For the BPT, BCT, and BAT effluent limitations, the one basis for an exception to the binding limitations is EPA's "fundamentally different factors" variance. See *E.I. duPont de Nemours and Co.* v. *Train,* 430 U.S. 1112 (1977); *Weyerhaeuser Co.* v. *Costle, supra.* This variance recognizes factors concerning a particular discharger that are fundamentally different from the factors considered in this rulemaking.

However, the economic ability of the individual operator to meet the compliance costs for BPT standards is not a consideration for granting a variance. See *National Crushed Stone Association* v. *EPA,* 449 U.S. 64 (1980). Although this variance clause was originally set forth in EPA's 1973–1976 industry regulations, it is now included in the general NPDES regulations and will be cross-referenced in the gold placer mining or other specific industry regulations. See the NPDES regulations for Fundamentally Different Factors Variances at 40 CFR Part 125, Subpart D.

New sources subject to NSPS are not eligible for any statutory or regulatory modifications. (See *E.I. DuPont de Nermours & Co.* vs. *Train, supra.)*

After reviewing Mine Safety & Health Administration and Army Corps of Engineers regulations and design guidelines, and holding discussions with representatives of other appropriate Federal regulatory agencies (Department of Labor, Department of the Interior, Department of Defense), EPA is confident that the impoundment facilities that provide the technological basis for compliance with the regulations proposed in this notice are reasonable, and that no additional danger will result from requirements for pollution control. Specifically, the Agency has concluded that the construction of impoundment facilities can be achieved without violation of State or Federal safety standards. However, if an owner or operator of a mining operation submits to the permitting authority evidence that he cannot achieve required effluent limitations or standards without violating safety standards, a variance from the national effluent limitations may be considered through the "fundamentally different factors" variance procedure. Under no circumstances will an owner or operator be required to violate applicable safety standards to meet these requirements. If more than isolated instances occur, EPA will consider amending this regulation. However, as noted above, the State and Federal authorities with whom EPA has consulted on this matter uniformly have concluded that safety issues should arise infrequently, if at all.

XIX. Relation to NPDES Permits

The BPT, BCT, and BAT limitations and NSPS in this regulation will be applied to individual gold placer mines through NPDES permits issued by EPA or approved State agencies, under section 402 of the Act after the limitations are promulgated in final form. As discussed in the preceding section of this preamble, these limitations must be incorporated in all Federal and State NPDES permits issued to gold placer mining operations.

One issue that warrants consideration is the effect of this regulation on the powers of NPDES permit-issuing authorities. The promulgation of this regulation does not restrict the power of any permitting authority to act in any manner consistent with law or these or any other EPA regulation. For example, even if this regulation does not control a particular pollutant, the permit issuer may still limit such a pollutant on a case-by-case basis when such limitations are necessary to carry out the purposes of the Act. In addition, to the extent that State water quality standards or other provisions of State or Federal law require the limitation of pollutants not covered by this regulation (or require more stringent limitations on covered pollutants), such limitations must be applied by the permit-issuing authority.

XX. Summary of Public Participation

The EPA has solicited comments from the industry for the past several years and most recently at the public workshop on the proposed rulemaking package held at Fairbanks, Alaska, on April 25, 1985. Specifically, the Agency requested written comments on the Draft Development Document on the Gold Placer Mining Segment of the Ore Mining and Dressing Point Source Category and the Draft Economic Impact Analysis of Proposed Effluent Limitations and Standards for Gold Placer Mining which were distributed as contractors' draft documents to interested Federal and State pollution control agencies, industry trade associations, environmental organizations, and interested individuals who requested copies. The Agency received nine written replies on the preliminary draft reports. The major comments and the Agency's responses are set forth below.

(1) *Comment:* One commenter expressed concern that the proposed rule may not regulate small or "recreational" mines and these mines will then be able to discharge unrestricted amounts of sediment into the streams.

Response: the Agency is proposing to exclude small mines (<20 yd^3/day) from these national effluent limitations guidelines and standards because we do not have adequate information on the number of mines, the cost of requiring treatment of these mines, or the pollutants discharged by these mines to establish national standards. This does not mean that these mines will be able to discharge unrestricted amounts of pollutants. Each such miner is required to obtain an NPDES permit which will include discharge limitations on a case-by-case basis. EPA also is considering issuing general NPDES permits for these sources with limitations based on its best professional judgment. Such permits when completed, would simplify the permit process.

(2) *Comment:* The comment was made that the draft Development Document

refers to "preliminary screening" and "selected mines" but does not document that the mines visited and sampled are representative of the industry as a whole (most of the mines are located in Alaska), that the mines represent the best performance or the "best operator," or the mines use the best available technology. Present data on the industry indicates that total recycle is practiced by many mines, zero discharge is attainable with total recycle, and therefore, total recycle represents the best available technology. The document should have proposed total recycle as BAT.

Response: The proposed Development Document summarizes the studies the Agency relied on to develop the proposed effluent limitations guidelines and standards for gold placer mines. Although EPA has historical data from gold placer mines from as early as 1976 and many subsequent years, the Agency primarily relied upon the studies performed in 1984 since these technical data on treatment performance were relatively current and fully documented. The majority of the available cost and economic data were also obtained in 1984. The Alaska mine sites in the 1984 studies used both for engineering site visits and sampling, were selected from available data from previous studies and through discussions with EPA Region X, Alaska Department of Environmental Conservation (ADEC), miners' trade associations, the Placer Miners Advisory Committee (PMAC), and individual miners. These mines were selected to be as representative as possible of placer mines considering such factors as: location, type of mining, size, amount and type of overburden, topography, and treatment employed. The majority of the data are for Alaska because the majority of placer mines in the U.S. are located in Alaska. However, data on facilities in the "lower 48" were also collected generally from state contacts and some site visits.

These data were also used in the analyses. All site visits included the collection of data on existing treatment, and the Alaska work provided data on pilot-scale treatment technology, high rate recycle, costs of operations and treatment, and the economic viability of mines.

All these data were used to help the Agency identify various alternative technologies to define the basis for standards for existing and new sources. The Agency agrees that several mines achieve what has been referred to as "zero discharge" at least to the extent of full containment of sluice water flows. However even under these conditions, there exist seepages from berms, overflows from drainage or runoff from these "best" facilities. As discussed elsewhere in this preamble, EPA is proposing no discharge of process wastewater (with drainage allowances) as the basis for BPT, BCT, BAT, and NSPS for large dredges with a production rate of more than 4,000 yd^3/day and BAT, BCT and NSPS for other mines processing more than 500 yd^3/day. The Agency is not proposing effluent limitations guidelines and standards based on no discharge of process wastewater for smaller placer mines for the reasons discussed elsewhere in this preamble.

(3) *Comment:* The comment was made that it is not clear how the costs of alternative treatment technology were determined in the draft development document.

Response: The cost estimates in Section IX of the draft development document were explained in some detail for various components (e.g. ponds, pumps) of the treatment options. The cost of a treatment component for a mine is determined from various figures in the section. The cost of a given treatment option is based on wastewater flow rate (hydraulic loading) and is the sum of the cost of the components making up the option. The proposed development document now includes an example of how to determine the costs of an option.

(4) *Comment:* One comment expressed concern that limitations for arsenic and mercury are necessary because these pollutants are not controlled by the limitations on solids, and in view of the decision of the Ninth Circuit (*Trustees for Alaska* v. *EPA*), EPA must place specific limitations on arsenic and mercury.

Response: As is discussed elsewhere in this preamble, EPA has determined that its proposed effluent limitations guidelines and standards on settleable solids (SS) and total suspended solids (TSS) will adequately control the discharge of arsenic and mercury.

EPA's proposed effluent limitations guidelines and standards for dredges and large mines (mines processing more than 500 yd^3/day) are based on zero discharge of process wastewater with only drainage and storm event allowances. Application of this technology will eliminate discharges of arsenic and mercury from the process wastewaters. The drainage and storm event allowances for these facilities contain effluent limitations on settleable solids (BPT/BAT/NSPS) and total suspended solids (BPT/BCT-NSPS). As discussed previously in this preamble and in response to Comment 19, EPA believes these limitations will ensure optimal removal of arsenic and mercury using the model treatment technology.

EPA's effluent limitations guidelines and standards for other mines that process between 20 yd^3/day and 500 yd^3/day are based on simple settling and likewise contain effluent limitations on SS and TSS. This technology removes approximately 70 percent of the arsenic and 90 percent of the mercury in the process wastewater. EPA has identified no economically achievable technology which could remove the remaining arsenic and mercury. EPA believes that the limitations and standards on SS and TSS will ensure optimal removal of arsenic and mercury using the model treatment technology. Accordingly, EPA is not proposing effluent limitations guidelines and standards for arsenic and mercury because we have determined that the *technology-based* requirements of the Clean Water Act for toxic pollutants (i.e., BAT, NSPS) will be satisfied by the BCT, BAT, NSPS limitations and standards on settleable solids and total suspended solids.

This position is not inconsistent with the Court's holding in *Trustees for Alaska* v. *EPA*. The Court had before it the question of how to implement Alaska's water quality standards for arsenic and mercury in NPDES permits. The Court held that Section 301(b)(1)(C) of the Act requires EPA to include effluent limitations for arsenic and mercury in placer mining permits if EPA determines such limitations are necessary to achieve the state water quality standards.

These national regulations are not issued to satisfy state water quality standards, but rather the technology-based requirements in Sections 301(b)(1)(A) and 301(b)(2) of the Clean Water Act. The effluent limitations necessary to achieve state water quality standards will be determined during the NPDES permit proceeding. As part of that proceeding, limitations and standards for arsenic and mercury will be added to the permit if necessary to meet state water quality standards.

(5) *Comment:* Commenters suggested that EPA should consider alternative regulatory measures to lessen the economic impact on small business. They suggest that all of the provisions of P. L. 96-354 (The Regulatory Flexibility Act) apply to the gold placer mining industry in Alaska because the U.S. Small Business Administration's definition of small business applies to *all* Alaska placer operations. They

therefore argued that EPA must consider alternative regulatory approaches to mitigate or eliminate economic impacts on the industry.

Response: EPA has considerable discretion in defining "small entities" within an industry for purposes of compliance with Pub. L. 96-354 (the Regulatory Flexibility Act). The Agency's guidelines for implementing the requirements of this Act clearly describe this discretion. The guidelines state that ". . . EPA programs will often need to start out with a clear definition of "small entity" (unless it is clear that the regulation will have insignificant impacts on any affected entities, whether large or small). For this purpose, the lead office may either: (1) Use the definitions of "small entity" provided in the Act or (2) develop its own definitions."

"Lead offices should always seriously consider using the definitions in the Act before deciding to develop an alternative. To establish its own definition, the lead office must consult with the Office of Advocacy of the Small Business Administration (SBA) and provide the public an opportunity for comment."

As noted in a memorandum included in the record of this proposed rulemaking, EPA consulted with a representative of SBA's Size Standard Staff within the Office of Advocacy on January 11, 1985. The SBA official was informed of EPA's plans to develop a definition of "small entity" and offer it for public comment. Accordingly, EPA is in full compliance with its obligations.

As discussed in Section XIV of this preamble, the Agency conducted a detailed economic assessment of placer mines including small facilities. EPA has defined "small mines" to include all very small recreational/assessment mines as well as all small commercial operations represented by model mines A, B and E in the economic impact analysis. Consistent with the Regulatory Flexibility Act, the Agency has considered regulatory alternatives for small mines, and taken actions to minimize the impact of this regulation on this segment of the industry. EPA is proposing to exclude recreational/assessment mines (i.e., mines processing no more than 20 cubic yards of paydirt material per day) from these national regulations. Furthermore, our analysis indicates model A, B and E operations (between 20 and 500 cubic yards processed per day) are likely to be unprofitable under current economic conditions. Partly as a result of this finding, EPA is proposing technology-based limitations based on settling pond technology *only* for mines processing less than 500 yards per day, with no requirement for recycle of process water. Not only are settling ponds a familiar and demonstrated technology within the industry, but also ponds have long served as the basis for most state permit requirements to maintain water quality. Moreover, many miners employ such ponds as a best management practice aimed at conserving process water. Hence, EPA believes settling ponds are a reasonable requirement for any small-scale miner who is able to operate successfully in the coming season. Large mines would be required under the proposed regulation to attain 100 percent recycle of process wastewater. The Agency's analysis has shown that the ratio of compliance cost to projected revenues, calculated for the recommended treatment option is the same for small mines (at settling ponds only) as it is for large operations (at 100 percent recycle). Thus EPA concludes the regulation does not impose an inordinate burden on the small segment of the industry.

(6) *Comment:* Several comments were made that grab samples should not be used as a basis for providing analytical data to develop regulations for the gold placer mine industry.

Response: Grab samples were used rather than composite samples which were used for other subcategories of the ore industry because performance of simple settling to control settleable and suspended solids is better described with fairly frequent samples. Alternative composite samples (over say a 24-hour period) would reflect *average* daily conditions but would fail to reveal fluctuations in pond performance, for example during periods of sluicing versus periods of shutdown. Frequency of sampling is most important whether composite or grab samples are taken. Either sample scheme should be as frequent as possible to define long-term performance. However, the Agency used statistical methodology to define variability based on grab samples because the settling ponds associated with existing placer mines are comparatively small when compared to settling facilities found at mines and mills in other subcategories of the ore industry that provide settling time of 24 hours to 30 hours and more. These large settling facilities in general do not show as great short-term fluctuations in effluent quality as the smaller facilities at placer mines. Placer miners tend to operate the beneficiation process intermittently; the process operates a few hours up to as many as 12 hours per day and at many mines the process is akin to batch processes in which the process (sluice) is loaded, run, and then stopped while another load of paydirt is moved into process. On the other hand, most beneficiation processes (mills) in other subcategories of the ore industry are continuous processes, running almost 24 hours a day. The smaller size of settling facilities and intermittent nature of the operation cause impacts on the settling facilities at most placer mines. These impacts are a function of the settling detention time for the facility, the point in time after the facility is sampled relative to the sluice operating time and the volume of paydirt loaded for sluicing. Grab samples best represent these variables by providing data that can be used to establish the average and long-term performance of existing settling facilities at placer mines reflecting the treatment of the wastewater during the actual operation of the beneficiation process, even though operations may be intermittent and vary in loadings during the working day.

The use of grab samples as a basis to establish treatment performance and solids removal also has an advantage over the use of composite samples in that the Imhoff cone can be used as the sample container, thereby reducing solids agglomeration (and causing artificially high SS readings) in the sample container, and even more in the composite sample. Finally, all data reported by miners and the monitoring requirements in the previously issued NPDES permits are based on grab samples. Therefore, these monitoring data could be compared to EPA's sampling data.

(7) *Comment:* The comment was made that polymer (flocculant) addition should not be considered as a technology for placer mines because of the cost and their possible "chemical pollution."

Response: Chemical aids (e.g., polyelectrolytes) are in common usage to remove residuals of solids in a wide variety of municipal and industrial wastewater discharges. Polyelectrolytes (sometimes called "polymers" or "organic flocculants") have not been used at full scale at placer mines, but are successfully used rather widely in the ore mining industry to further remove residuals of solids and metals in treated effluent. These treatment chemicals literally bridge two or more suspended particles, causing them to agglomerate and settle. The chemicals themselves have not been shown to present an environmental problem in previous applications, and do not appear to present any implications of "chemical pollution." Thus, the Agency undertook an investigation to determine

if the application of polyelectrolytes to placer mine wastewater would be similarly successful to enhance settling in ponds. While they were not conducted on full scale treatment systems, the field tests conducted by the Agency showed highly effective removal of solids and turbidity in the wastewater from several placer mines. Based on these test results and other engineering data available, the Agency decided that polyelectrolytes may be feasible and that it would be appropriate to assess the costs associated with their use. The total annual cost of polymer use to reduce solids in an overflow (blowdown) equivalent to 20 percent of sluice process wastewater was determined and is presented in the development document. Based on the economic assessment for the larger mines, (mines processing more than 500 yd^3/day), the costs appear reasonable. Notwithstanding the generally favorable findings to date, the Agency recognizes that work remains to resolve questions about full scale operations (including the feasibility of chemical metering systems and sludge handling and disposal requirements) to reasonably assure this technology is "available" for use by placer mines. Accordingly, while the use of polyelectrolytes is not the basis for these proposed effluent limitations guidelines and standards, the Agency will continue to consider this technology in developing these regulations.

(8) *Comment:* Several comments noted that mine revenues estimated by EPA were based on the assumption that gold is 100 percent pure as mined. It was pointed out, however, that no more than 80 percent purity (one comment suggested 82 percent) should be applied to gold as mined. Price fluctuation in the price of gold should also be considered in determining revenues for mines.

Response: Revenue estimates in the economic impact analysis supporting the proposed rule have been revised to reflect gold purity of 80 percent with coincidental effect on prices paid to the miner. The market price for gold was assumed to be $360 per troy ounce (1984 average price), but sensitivity analyses were performed using the economic impact on model mines and varying the market gold price between $300 and $400 per ounce. Thus, applying the 80 percent factor, the price actually received by mines used in EPA's analysis ranges between $240 and $320 per ounce. The results of these analyses are discussed in Section XIV of this preamble and in detail in the economic document supporting the proposed rule.

(9) *Comment:* EPA has overstated the availability of heavy equipment in use at Alaskan gold placer mines. Routine maintenance and repair, often performed by the equipment operators themselves, in addition to breakdowns reduce the availability of heavy equipment over the course of the season. The availability should not exceed 67 percent.

Response: EPA has not assumed 100 percent availability of heavy equipment in the model mine analysis used to assess economic impacts. EPA's model mine estimates of the costs of owning and operating heavy equipment reflect an assumption of 200 operating hours per month, or 800 hours over the course of a 3½-4 month season. This figure (200 hours) was cited by heavy equipment dealers as the standard number of operating hours per month guaranteed against extraordinary repair. However, a miner is assumed to work 10 hours per day which, in a 30-day month, totals 300 working hours. If only 200 equipment hours are available per month, this implies an equipment availability ratio of 200/300 or 67 percent. Furthermore, the assumption of a 10-hour work day is believed to be conservative since data indicate miners often work substantially longer days. As the length of the work day expands, the implied equipment availability ratio declines even further. As additional site-specific data becomes available to the Agency, steps will be taken to assure that cost items, cost methodology, and model mine profiles are reviewed and revised as necessary.

(10) *Comment:* One commenter claims the model mine profiles in the draft economic analysis do not totally address the time needed for stripping land prior to sluicing. This is due primarily to EPA's overstatement of heavy equipment earth-moving capability. Therefore, some mines will be unable to sluice the amount of material, and thus recover the volume of gold, implied by the Agency model. The commenter applied the conditions existing at his own mine site to EPA's model mine C to justify his assertions. The commenter's site is characterized by requiring the commenter to move a yard of overburden for every yard of material sluiced. By employing his site's "job condition factors," the commenter calculated the production capability of the bulldozer and then estimated the number of hours needed to remove 50,000 cubic yards of overburden in preparation for sluicing (250 hours would be required). The commenter concludes by determining the amount of material which can be processed (50,000 cubic yards) using the 500 machine hours left of the 750 hours assumed for the model. The 50,000 cubic yards of paydirt is below the range of production model mine C is intended to represent. Therefore, the total amount of gold recovered and revenues earned are substantially lower than model mine C, thus rendering the model far less profitable than EPA claims.

Response: EPA does not dispute the commenter's calculation of the earth-moving capacity of his bulldozer and the bulldozer in the model. However, the commenter fails to employ this stated capacity to determine the amount of material which can be sluiced. The capacity of the bulldozer is 280 loose cubic yards per hour (LCY/hr.) but the miner assumes gravel will be processed at a rate of only 100 LCY/hr. While it is true EPA's model mine C is described as an operation processing 100 yards per hour, this figure is not intended to serve as a constraint, but is the season-long *average* implied by the assumptions of the model (75 days sluicing 1,000 cubic yards during a 10-hour "sluice-day"). Given the capability of the bulldozer, it appears the miner could sluice substantially more than 100 yards per hour and increase his total yardage for the season well above the 75,000 yd^3/year used for the model. The front-end loader also costed for this model, which the commenter states cannot be used very much for stripping, could assist in loading paydirt while the dozer is stripping and add to the production by loading and clearing tailings from the sluice. Thus, it appears the commenter's claim that he is able to process no more than 50,000 cubic yards is somewhat conservative. If the miner is somehow constrained by operational or site-specific conditions such that he is unable to sluice more than this amount, then his operation fits more properly into the framework of model mine B. The Agency is aware of the variety of site-specific characteristics which affect the production and dictate the expense of operating a placer mine. We welcome comments such as the above which discuss these conditions in the framework of the model mine profiles.

(11) *Comment:* One commenter suggested that the use of the word "pollutant" throughout the text of the draft technical document is ill-advised because placer mining adds no unnatural substances to the waters.

Response: Pollutant is defined in the Act and in 40 CFR 401.11 General definitions. As defined: "The term 'pollutant' means dredged spoil, solid waste, incenerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, *rock, sand,* cellar

dirt and *industrial,* municipal, and agricultural *waste* discharged into water [emphasis added]. This term does not mean (A) 'sewage from vessels' within the meaning of section 312 of this Act; or (B) water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil or gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if such State determines that such injection or disposal will not result in the degradation of ground or surface water resources." This definition clearly includes the constituents (rock, sand, industrial waste) discharged by gold placer mine point sources.

In addition, the Act stresses the control of the 65 classes of pollutants that Congress declared toxic under section 307(a) of the Act. Arsenic and mercury are found in the wastewater discharges from placer mines and are included in the list of toxic pollutants as defined by the Act.

(12) *Comment:* One commenter questioned how the draft development document can suggest for BAT the use of process controls and changes in operations that may not be in common use by placer operations.

Response: The Act specifically requires EPA to consider process changes and control techniques in defining the basis for BAT limitations. Section 304(b)(2)(B) states: "Factors relating to the assessment of best available technology shall take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate" (emphasis added). For placer mining BAT, EPA assessed the availability of in-process controls as well as control and treatment techniques at the end of the recovery process. In-process controls and treatment techniques considered as part of this rulemaking include: water conservation through the use of classification (screening) before the separation process (sluice), wastestream segregation so that process wastewater from the beneficiation process is not allowed to commingle with mine drainage, the use of flocculants in wastewater treatment to reduce the solids in the wastewater discharge, and other control and treatment techniques discussed in the Development Document. In order to be considered BAT, a process control need not be in common use in the industry. It need only be demonstrated by some member of the industry or, if the industry's pollution control is found to be uniformly inadequate, technology can be transferred from another industry. Limitations based on transfer technology must be supported by a conclusion that the technology is transferable and a reasonable prediction that it will achieve the effluent limitations guidelines. *See, Tanners' Council of America* v. *Train.* 540 F.2d 1188 [4th Cir. 1976].

While some process controls considered for BAT are not included as the basis for BAT in this proposed regulation, some miners may choose to implement such controls to achieve BAT. The Agency encourages the use of such process controls. For example, classification or screening the run of mine paydirt before sluicing will reduce the water use at many mines that presently require large volumes of water to push oversize material through the sluice. Reduced process water use reduces the size of a settling pond necessary to provide any given retention time and therefore reduces the cost of wastewater treatment. Similarly, segregating mine drainage, mine run-off, and run-off from the area surrounding the active mine by the use of ditches and berms reduces the commingled wastewater to be treated and the cost of treatment, and allows this relatively clean water to be discharged without being contaminated by process water used in the beneficiation process.

(13) *Comment:* One commenter said that water monitoring (sampling and analyses) costs at a mine should be the responsibility of EPA.

Response: Water monitoring of a point source discharge (sampling and analyses) is clearly the responsibility of the owner or operator of the point source facility. Section 308(a)(A) of the Act states that when carrying out section 402 of the Act: "the Administrator shall require the owner or operator of any point source to (i) establish and maintain such records, (ii) make such reports, (iii) install, use, and maintain such monitoring equipment or methods (including where appropriate, biological monitoring methods), (iv) sample such effluents (in accordance with such methods, at such locations, at such intervals, and in such manner as the Administrator shall prescribe), and (v) provide such other information as he may reasonably require."

Section 402 establishes the National Pollutant Discharge Elimination System (NPDES) and the conditions under which the Administrator may issue an NPDES permit. Also, 40 CFR Part 122, National Pollutant Discharge Elimination System, contains provisions for the NPDES program. Subpart C—Permit Conditions, at § 122.41(h) states: "*Duty to provide information.* The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Director upon request, copies of records required to be kept by this permit." "Director" is defined as the EPA Regional Administrator or the chief administrative officer of any State agency operating an approved NPDES program.

(14) *Comment:* Geographic considerations have been eliminated as a basis for subcategorization; however, remote sites in Alaska have economic and mechanical difficulties not present in the "Lower 48." Also, climate and rainfall differ between Alaska and the Lower 48.

Response: As discussed in the Development Document, geographic location was considered as a possible basis for subcategorization, but upon examination and analysis of mines in seven mining districts in Alaska (representing ⅔ of the total mines in Alaska) and comparing these mines in Alaska with mines in the Lower 48 for which we have information and data, the Agency found many similarities. Regardless of geographic location within Alaska or whether the mine was located in the western states or in Alaska, the mines used similar mining methods and benefication methods and worked with similar types of equipment, and the wastewater characteristics, in-place treatment, and wastewater treatability were all similar. Likewise climate and rainfall do not justify separate subcategories. EPA has found that geographic location does effect the cost of doing business. For example, the sheer logistics of mines without road access leads to higher costs of operation. Also location, by way of climate, affects the duration of the mining season and the opportunity to mine and process. In the Agency's analyses, these effects have been accommodated in defining income and profitability of mines. For instance, the financial profile for the mines in Alaska and the western states reflects

differences in operating days per season due to variable thaw-freeze between these locations.

Rainfall, as a basis for subcategorization, was considered as a component of climate. In addition, rainfall intensity was considered in the storm exemptions provided in §§ 440.131(a) (2) and (3). The storm exemption and the size of the treatment system required to qualify for the exemption are based on the 5-year, 6-hour precipitation event at the specific mine location. Therefore, the larger the 5 year, 6 hour precipitation event, the larger the pond must be required to qualify for the relief. However, the 5-year, 6-hour precipitation event in Alaska is about 0.75 to 1.5 inches, depending upon the mine site, and in the western states, is about 0.5 to 1.25 inches. These ranges of intensity do not support a separate subcategorization based on rainfall.

(15) *Comment:* Topography is dismissed as a basis for subcategorization but the EPA analysis details the economic and physical impacts of topography on placer mining.

Response: Topography is a further, specific aspect of geography (location) and the Agency did consider topography as a possible basis for subcategorization. The Agency can find no justification to subcategorize based on the topography at a mine.

Topography differs from mine site to mine site and sometimes varies considerably even within a mine operator's claim area. But the Agency has found that production practices, wastewater characteristics, and treatability are similar for all types of topography. Generally, mines in Alaska and the lower 48 states can be characterized as operating in valleys, either instream or on the flood plains of a stream, and as generally having sufficient land area to mine and build wastewater treatment facilities. However, a few mines for which EPA has data (3 of the 33 site visits in 1984) are located in rugged, narrow, and steeply sloping valleys which constrain the land available for both mining and building wastewater treatment facilities (ponds). At least partially because of these constraints, these mines are smaller mines, i.e., they process less than 500 yd^3/day, which as a group are already identified by the Agency as not requiring additional controls beyond BPT. Therefore, EPA has indirectly accounted for varying topography.

The Agency believes the number of mines located in this type of topography is small and that these mines already approach base line closure, i.e., are marginal operations because of their small size. However, the Agency is aware of the space availability issue and specifically requests information and data from owners and operators of mines which believe they have constraints on their mine caused by the topography of the mine or area adjacent to the mine. If this data supports a conclusion that different limitations and standards should be established for mines on the basis of topography, EPA will subcategorize the industry accordingly.

(16) *Comment:* The comment was made that in Table V–2 of the draft development document, the sample population of mines in Alaska is too small and is biased towards easily accessible mines (reached by road) which are not representative of the Alaska industry.

Response: The table referenced lists by mine code approximately 100 mines that were sampled by EPA or EPA contractors from 1982 to 1984. These mines represent both remote and readily accessible sites, and all types of practices and mine site situations. The Agency believes the data are representative. The majority of the data is for mines located in Alaska because most placer mines are in Alaska. As discussed elsewhere in this section (See Comment 2), the Agency relied substantially upon the results from the 1984 studies in Alaska to develop this proposed guideline. The mine sites were selected to be typical and representative of mines found across Alaska. The sites are located across 7 mining districts (as detailed by the United States Department of the Interior's Geological Survey) where over ⅔ of the total mines in Alaska are located. Some emphasis was on the Circle District and Fairbanks District where about 40 percent of the total mines in Alaska are located. It is true that the mines in these two districts are comparatively accessible and can be reached by road. Indeed, available data show a substantial percentage of all mines in Alaska are located at accessible sites. However, mine site visits were also made to mines in the Yentna District, Kantishna District, and Koyokuk District which are not easily accessible and are reached by "winter roads and trails" or by air.

(17) *Comment:* Commenters requested that EPA clarify sampling techniques to acquire grab samples and show that they maintained consistency between and among sample sites. They stated that if sampling techniques are not "identical" at all sites, you cannot compare the results in any meaningful way. Also, sampling during periods when there was no sluicing activity would lead to artifically low results.

Response: In the studies conducted by EPA in 1984, grab samples were taken at prescribed intervals for 2–6 days per mine. Measurements were made in the field for pH, temperature, turbidity, and settleable solids. Samples were also provided for laboratory measurements of total suspended solids (TSS). For each site, the sample location, date, and time were noted and a sketch of the mine site and sample locations was prepared. At every mine, samples were taken from the following: supply, sluice discharge, and final effluent (except for those mines recycling 100 percent). Depending on the mine layout and water use, additional samples were obtained for the same measurements on recycle water, intermediate pond effluent (where more than one pond was in use), ground water, mine drainage, and runoff from boiling (washing ore with high pressure water). Water samples were taken during periods when the mine was actively operating and sluicing ore. Samples were collected, preserved, and transported in accordance with the procedures in Appendix III of "Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants" (EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio, March 1977).

"Identical" samples are pragmatically unlikely and statistically remote for any water discharge. This is especially so in the placer mining industry where process controls (e.g., automation) are not present and pollutant loads are high. Moreover, there is certain inherent variation in sampling due to many influences, one important aspect of which is "sampling error." This is a statistical term that generally refers to any error from "true" value or "exact" samples occasioned by action of the person taking the sample, changes in the discharge being tested, differences in accessibility of sample points and other factors. The Agency is fully aware of these factors and therefore follows a very consistent procedure at each mine and for each individual sample to minimize both sample variation and measurement variability. The Agency then applies statistical analyses to the actual data to obtain a measure of the overall variability in effluent characteristic when defining technology performance. This variability is reflected in daily maxima and monthly averages presented in the proposed Development Document. These averages reflect the performance of all mines tested that had treatment ponds in place, not just the best mines. In assessing performance of the best mines as well as engineering evaluation of properly designed and

operated ponds (6 hour detention time), the Agency believes that 0.2 ml/l SS is achievable at all times. That is, the variability in effluent performance for settleable solids occurs below this level. Well designed and operated ponds will simply contain wastewater long enough to assure settling of these large particles and solids substantially diminish the influence of variability of this parameter. The available data supports this conclusion. (See Section VIII C. BPT Recommendations). For total suspended solids, however, the Agency is proposing only a 30-day (long-term) average because EPA believes that even well designed and operated ponds will experience day-to-day variability for this parameter, while this long-term average can be met. The Agency is very interested in receiving additional data on raw waste and effluent characteristics for settleable solids and total suspended solids to assess these variability factors (See Solicitation of Comments, Section XXII).

(18) *Comment:* Two commenters questioned the statistical methods employed by the Agency. In particular, they asserted that the sampling scheme and sample sizes were inadequate and the distributional model (the delta-lognormal distribution) and the methods used to estimate the mean and 99th percentile of the delta-lognormal were not appropriate. One of the commenters also questioned the difference between the daily and monthly limitations.

Response: The sample was designed to obtain information from mines of various sizes and mines with a broad range of sluice water treatment or controls (e.g., simple settling, recycle). The composition of the final sample reflected a compromise between the competing requirements of economic and effluent data gathering. In order to assure that the sze (i.e., sluicing capacity) distribution of the industry was properly represented in the sample, the industry was stratified by size. The sample was then designed so that each stratum was properly represented in the sample.

As discussed in response to Comment 17 and Comment 6 above, the sampling technique and procedure in the studies conducted by EPA used grab samples at the same sample point at each mine, e.g., final effluent, so that consistency was maintained in sampling at a mine and between mines. Frequent grab samples of a mine's effluent were used to account for fluctuations in treatment performance caused by the intermittent nature of the sluice process during the time a mine is operating. The samples are representative of the treated discharge from an operating sluice. Samples from "down days" and the normal periods when a mine is not operating (most mines sampled were operated 10 to 12 hours per day, not 24 hours) were not included in the data base used for statistical analyses.

The Agency used statistical techniques to define the pattern of treatment performance for solids control. For analysis of effluent settleable solids, EPA employed the "delta-lognormal" statistical model to predict mean and 99th percentile level effluent characteristics for the mines sampled by the Agency. The delta-lognormal is a probability distribution which is a general form of the lognormal distribution used extensively in the determination of treatment performance limitations in effluent guidelines regulations, including ore mining. The basic approach is to use statistical methods to model observed effluent data. This is done by fitting the data to mathematical formulae known as probability distributions. Estimates of the 99th percentiles of distributions fit to effluent data are used as the basis of limitations. A probability distribution describes the variation in a set of data and provides a mechanism for estimating the percentiles and variability of a population based on small samples. A well-known example of a probability distribution is the familiar bell-shaped curve of the normal distribution. The lognormal is closely related to the normal distribution in that the logarithms of lognormally distributed data follow the bell-shaped curve of the normal distribution. The primary factor in determining the adequacy of the fit of a distribution to a set of data is the relationship between the general shape displayed by a graphical plot of the data and the shape of the curve determined by the mathematical formula for the distribution. While no set of observed data will fit a mathematical model precisely, the data will usually display a shape that is reasonably close to a particular distribution. Usually, larger data sets will display a more distinct shape than smaller data sets. However, the Agency has found, in extensive work with data sets of various sizes, that the lognormal distribution provides a reasonable tool to analyze effluent data.

(19) *Comment:* Two commenters took issue with the Agency's interpretation of the relationships of arsenic and mercury to total suspended solids (TSS), claiming that the results of the correlations are indistinct, not supported by a consideration of the chemical makeup (form) of the arsenic and mercury, and based upon too few samples for arsenic and mercury.

Response: EPA used statistical techniques to examine whether the data support the premise that removal of arsenic and mercury is associated with the removal of SS and TSS. This premise is based on the notion that arsenic (As) and mercury (Hg) in particulate or solid form should be removed with the other solids. The Agency believes the statistical analysis, supported by engineering judgment and information from many miners, confirms this basic premise. The Agency conducted pilot tests of simple settling on samples of mine wastewater. The results of the pilot tests show that as solids were removed from samples of untreated mine wastewater, the concentrations of As and Hg were also reduced. These results were confirmed by statistical analysis of the pilot test data.

(20) *Comment:* One commenter observed that the draft Development Document "admits" that quiescent settling does not exist in settling ponds, suspended solids in placer effluents are often (predominately) colloidal suspensions, and in no case did turbidity levels ever reach 5 NTU at existing facilities or in pilot testing. Therefore, it is unreasonable to expect a placer mine to achieve 5 NTU at end-of-pipe.

Response: The issue raised by the commenter on the achievability of a turbidity limitation of 5 NTU is related to individual NPDES permit conditions. This proposed regulation does not impose effluent limitations on turbidity. Effluent limitations and standards are being proposed based on two technologies, simple settling and recycle. The BPT effluent limitations based on simple settling require control of solids in the wastewater discharge, e.g., settleable solids and TSS. The BCT, BAT, and NSPS effluent limitations guidelines and standards for larger mines, as-well as the BPT effluent limitations guidelines for dredges require no discharge of process wastewater from the sluicing process based upon recycle.

The comment is correct that effluent turbidity levels of 5 NTU have not been observed in discharges from any technology at mines (i.e., discharges from pond systems with or without recycle) nor was this level attained in flocculant-aided settling tests. However, for placer mines, turbidity reduction can be achieved by solids control and recycle of process (sluice) water is believed to be the most technically and economically feasible means to control solids.

Turbidity effluent limitations will be included in NPDES permits if necessary to meet state water quality standards. Questions pertaining to the achievability of any such effluent limitation should be raised with the State when it establishes or reviews its water quality standards.

(2) *Comment:* A number of comments were received regarding the validity of a conclusion in the draft Development Document that it appears that gold loss, due to recycle of process water with high solids concentrations, is minimal. The conclusion was based primarily upon two pilot scale studies of gold recovery in a sluice when the TSS in the process water is varied from 0 to about 200,000 mg/l. Commenters stated the conclusion is not valid because: a known quantity of gold was salted into paydirt with an unknown quantity of gold and the percent recovery is then meaningless; the tests were based on "only 2" tests; "fine gold" was defined as −30 to +60 mesh and the fine gold that is lost due to recycle (high TSS) is −100 mesh according to one commenter and −200 mesh according to a second commenter. They claim recycle (with high TSS) causes reduced gold recovery in a sluice in direct proportion to the solids concentration.

Response: A concern often repeated by miners is that recycle washwater containing high TSS reduces gold recovery in a sluice. However, no conclusive data were offered to quantify the loss or, if there is a loss, what TSS concentration starts to effect a loss. Information submitted or referenced to confirm gold loss due to recycle or buildup of solids consists of anecdotal data that is either not measurable or, if measured, lacked control data that would indicate the conclusion (i.e., that there is gold loss with recycle water) was in fact a loss of recoverable product and not an extraneous or circumstantial difference in recovered gold. More ounces of gold per cubic yard of paydirt from one area of a mine sluiced with clean water *vs* fewer ounces of gold per cubic yard of paydirt from a second area of a mine sluiced with recycle water does not necessarily mean there was a loss of recovery due to recycle, i.e., the assay of the paydirt could be quite higher in the first area. A literature search of mining texts, handbooks, and articles offered narrative data but not quantifying information. (Primarily because the assumption is sufficient water is available for mining and washing of paydirt and water is recycled only in water short areas). Therefore, EPA and ADEC funded projects to start to provide reasonably hard data and information that addresses the issue. While the two studies are not all inclusive, the results of the studies of two separate paydirts with only small variation in the study methods are the same, i.e. over 99 percent of the gold was recovered in the pilot test sluice regardless of the concentrations of TSS.

In the pilot test conducted for ADEC, a fixed amount of paydirt was washed to recover the unknown gold in the paydirt. This "barren paydirt" was then salted with a known amount of gold. The same barren paydirt and salted gold was washed, recovered, reblended, washed and recovered using washwater with varied amounts of TSS. Gold recovery for all concentrations of TSS was over 99 percent.

The pilot test recycle study conducted for EPA used paydirt from a different mine and a larger sample of paydirt to provide a fresh sample of paydirt for each test run. Part of the pilot test included coning and dividing the ore sample to provide an ore sample split for each test run which is a standard method used in an ore dressing laboratory for large bulk samples. Theoretically, the same amount of "unknown" gold was in each sample split. As with the other pilot test, a known quantity of gold was added to a split before a test run to be certain there was gold to measure as recovered gold. From the results of the tests, it appears the paydirt was essentially barren because 99.5 percent of the known gold added was recovered in the test runs. Gold recovery of the known gold was consistant in each run and there was over 99 percent recovery regardless of the TSS concentrations.

There is no single recognized standard of what mesh gold is "fine gold." Authors of mining texts and mining articles define fine gold, depending upon the author, from −10 mesh to −100 mesh when discussing both loss of gold (percent recovery of recoverable gold) and recoverable gold (what size gold can be recovered in a sluice). The Agency is not defining what size constitutes fine gold. Placer gold (for the EPA sponsored test) was obtained from a mine in an as recovered condition from mine's sluice and was size −30+60 mesh. However, apparently from abrasion during the repeated use of the gold in the pilot test runs, the −30+60 mesh gold was broken down so that after the final test run, about 11 percent of the recovered gold was −60+100 mesh. Including the −100 mesh gold, after 5 test runs using wash water with varying TSS concentrations, the loss of the original known gold was less than 0.3 percent. This indicates that in the pilot sluice some recoverable gold is −60 mesh.

Based on the data available to the Agency at this time, there appears to be no gold loss attributable to high TSS even in the 200,000 mg/l range. Furthermore, simple settling even for an hour will reduce TSS to less than 5000 mg/l. Therefore, if as alleged there is some direct relationship between TSS and gold loss, the Agency believes the loss would be insignificant if the recycle water is allowed to settle for a few hours.

(22) *Comment:* Turbidity should not be used to regulate the placer industry because there is no documented cause and effect between turbidity and environmental damage.

Response: As discussed above, the national regulation for gold placer mines being proposed does not establish effluent limitations guidelines or standards for turbidity. Some states have water quality standards for turbidity. If a state has such water quality standards, effluent limitations and standards for turbidity will be included in any NPDES permit as necessary to meet the state water quality standards.

As discussed in the Development Document supporting this proposed regulation, turbidity is a nonconventional pollutant that was considered for regulation of gold placer mines discharges. Turbidity is defined by the American Public Health Association (APHA, 1980) as "an expression of the optical property of a sample that causes light to be scattered and absorbed rather than transmitted in straight lines through the sample." Turbidity in water is caused by suspended matter (including clay, silt, finely divided organic and inorganic matter, plankton, and other microscopic organisms). Solids and turbidity are measured differently. The terms solids and turbidity are analogous, but they are not synonomous measures of water quality. Turbidity is a measure of the light scattering properties of the sample. Turbidity is measured by Jackson candle turbidimeters or nephelometers, in Jackson turbidity units (JTU) and nephelometric turbidity units (NTU), respectively. Solids are generally reported on a concentration (milligrams per liter) basis. The size, shape, and refractive index of suspended particulate matter are not directly related to the concentration and specific gravity of the suspended matter. Therefore, measurements of suspended solids and turbidity are not interchangeable.

Criteria for solids (suspended and settleable) and turbidity are included as a part of the EPA Red Book, *Quality Criteria for Water* (U.S. Environmental Protection Agency, 1976). The EPA Red Book incorporates both solids (suspended and settleable) and turbidity in a single criterion (U.S. EPA, 1976). The criterion is written as follows:

Freshwater fish and other aquatic life: Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life.

Turbidity restricts the depth to which light will penetrate in water. Decreases in light penetration cause reductions in photosynthesis, and thus in primary production. Animals dependent upon vision for feeding are also adversely affected by the decreased light since the ability to see their prey is impaired. Both lethal and sublethal sediment effects of high turbidity have been demonstrated, along with habitat changes that render an area unsuitable for particular species. Suspended clays may be detrimental to zooplankton as their feeding efficiency decreases and particles that have a little or no nutritional value are ingested.

(23) *Comment:* The Comment was made that EPA's prediction in the draft economic analysis that every single model A size mine in Alaska is going to close is not credible. The closure prediction is based on unprofitability created largely on paper by the inclusion of "opportunity cost of capital." This is an accounting cost only and does not affect the cash flow in a negative manner as do labor expense and fuel costs. It is unrealistic to assume all 110 (est.) mines represented by model A will close. Miners will often continue to operate through bad seasons in the hope of encountering better paydirt, to build equity through exploration, and/or for a variety of other reasons. It is also absurd for EPA to assume that no mines in the continental United States are going to close.

Response: The conclusions drawn from EPA's model mine analysis concerning the profitability of various size operations are general in nature and are not specifically applicable to every existing placer operation. The very nature of a "model" analysis precludes any such narrow determinations. Hence, EPA does *not* conclude that each and every placer mine of model A or B dimensions will be unprofitable in the coming season and therefore will not operate. Instead, EPA believes mines of this size will require very capable and cost-efficient operators to earn a profit during the 1985 season, laregly due to currently depressed gold prices. Furthermore, EPA recognizes that many factors affect the decision to operate in a given year, and that expected profit is not the sole motive. As explained elsewhere in the preamble to the proposed regulation and the supporting economic impact assessment, the projection that all model A or B mines will shut down is a worst case assumption only. The Agency fully realizes that, due primarily to the inherent hetererogenity of the placer mining industry, some percentage of these mines will operate in the coming season. The implication of the analysis (based largely on the assumptions therein) is that current economic conditions will make it difficult for many mines of this size to operate profitably.

Placer operations in the lower 48 states are profiled in the economic analysis by model E, intended to represent continental placer mines processing 75 cubic yards of paydirt per hour or less. As currently constructed, this model appears unprofitable in the baseline as well under current economic conditions. Thus it is projected that many such operations in the lower 48 states will not operate (at least not profitably) in the coming seasons. Again, EPA does not mean to suggest that all 264 (est.) mines of this size will shut down, but instead that only the most cost-efficient and capable operators of such mines will earn a profit. Thus, the commenters claim that only Alaska mines are projected to close is incorrect.

(24) *Comment:* One commenter observed that EPA based their revenue estimates on a gold recovery rate of .022 troy ounces per cubit yard, the average of the values reported by the 20 miners interviewed in 1984. This commenter stated this figure is 100 percent higher than a nationwide average based on hundreds of mines sampled over a period of 9 years.

Response: Early drafts of the economic impact document showed only .022 troy ounces/yd^3 as a basis for revenue estimates. This value was used because it represents an average of actual, recently reported values given directly to EPA representatives. Revisions have been made and the economic analysis supporting the proposed rule includes a *range* of gold recovery rates in the models to assess the impact of various "ground" values on the performance of the models. Also, as discussed in Section XV, Solicitation of Comments, the Agency is seeking additional specific data on mine revenues.

(25) *Comment:* A number of comments contended that EPA's estimates of operating costs for Alaska mines are understated (and "skeletal") and do not take into account differentials due to the Arctic environment.

Response: EPA's model mine costs for owning and operating heavy equipment, obtaining fuel, and hiring labor do reflect differences for Alaska mines from those estimated for the continental U.S. mine. The Agency recognizes that the cost differentials may need to be better defined for certain parameters particularly heavy equipment maintenance cost. The Agency plans to identify and incorporate necessary additional changes into the models between proposal and promulgation. (See Section XV, Solicitation of Comments).

In addition, an "auxiliary expense" line item calculated as 40 percent of the model mine heavy equipment costs has been incorporated into the model mine profile in the economic analysis for the proposed rule. This item is intended to cover miscellaneous costs that are not itemized. The Agency also plans to obtain further information on auxiliary expenses to enumerate the various components of these outlays.

(26) *Comment:* One comment noted that in the economic draft report, the sluicing time of mines is given as 650, 750 or 850 hours per year, depending on the size of the mine. This implies the model D mine would feed itself for 50 hours, since the equipment costs are only estimated for 800 hours.

Response: Model D placer operations are assumed to employ three separate pieces of heavy equipment; one D-8K and one D-9L bulldozer in addition to a 966D front-end loader. The operating cost profile developed for this model includes the estimated cost of securing, operating, and maintaining *each* of these for 800 working hours, or 2400 heavy equipment hours in total. This easily accommodates the 850 hours designed for feeding the sluice and processing paydirt. The balance of the hours are intended to represent the time needed for clearing land, removing overburden, maintaining ponds, and other "non production" use of equipment.

(27) *Comment:* One comment observed that in the draft economic document, if one divides the number of mines in any state into the total compliance cost by option, one will get the cost per mine by option and by each state. The results of doing this reveal almost no variation between the states, except for Alaska. EPA is "cooking the books" to arrive at pre-set ratios of

compliance costs in Alaska relative to the lower 48 states.

Response: EPA has made no attempt whatsoever to construct the costs according to preconceived cost-per-mine ratios. EPA developed compliance cost estimates for each of the five model mines. Four of the models represent Alaska operations, so cost estimates depended primarily on the relevant Alaska data on pond size necessitated by the amount of gravel processed and the volume of water used per yard. Compliance cost estimates for the continental U.S. model were also derived using these factors, but an allowance was also made for the lower equipment and maintenance costs incurred by "lower 48" mines. Site specific data obtained thus far justify this differential. State-specific differentials were not included due to lack of sufficient information. Once the compliance cost estimates for the model mines were determined, the aggregate compliance cost per state was calculated by multiplying the cost for each model by the number of mines represented by that model estimated to be in the state. In other words, if a state is estimated to contain 50 model A mines and the Option 1 compliance cost for model A is estimated to be $8,000, then the Option 1 compliance cost for that state is reported as $50 \times \$8,000 = \$400,000$. This procedure is clearly explained in Chapter VI, *Cost of Compliance,* of the economic document. This analysis is made necessary by the use of model mine analysis, which is in turn made necessary by the lack of mine-specific operating data.

(28) *Comment:* Several commenters have raised the issue that mines have legally defined water rights for certain amounts of water and "end of pipe" limitations do not take into account instream mixing on the miner's property before the wastewater is discharged from the miner's property.

Response: Under the Clean Water Act, effluent limitations guidelines and standards apply at the point where a "point source" "discharges" pollutants to the "navigable waters." Each of these terms is defined in the Act and in 40 CFR Part 401. The commenters seem to believe that a pollutant should not be deemed to be "discharged" to the "navigable waters" until it leaves the miner's property. Such an interpretation is not consistent with the Clean Water Act. A pollutant is "discharged" when it is added to the navigable waters from any point source. See e.g., *United States* v. *Earth Sciences, Inc.,* 599 F.2d 368 (10th Cir. 1979). "Navigable waters" under the Clean Water Act is a very broad term. *United States* v. Earth Sciences, Inc. supra; *Quivira Mining Company* v. United States Environmental Protection Agency, Nos. 83-2338, 83-2339, 83-2356 (10th Cir. June 10, 1985); *State of Utah* v. *Marsh,* 740 F2d 799 (10th Cir. 1984); *Avoyelles Sportsmens League* v. *Marsh,* 715 F.2d 897 (5th Cir. 1983). It includes all the waters of the United States. Thus navigable waters include the portions of a stream that runs through a miner's property. The effluent limitations apply where the discharge from the point source enters the stream, even though the stream might continue for some distance exiting the miner's property.

EPA recognizes that under state law miners have water rights for certain amounts of water. EPA's effluent limitations guidelines and standards do not in any way deny the miner's use of their claimed water rights. On the contrary, EPA's proposed regulations are economically and technologically feasible and EPA has considered any consumptive water loss non-water quality environmental impacts of the proposed limitations and standards. Accordingly, EPA's regulations are being properly developed and apply at the point where the pollutants are discharged to the navigable waters.

(29) *Comment:* One Commenter noted that the analyses for turbidity, settleable solids, and TSS in the draft development document and in a separate study by another consulting engineering company should be assessed in light of apparent differences in values taken from the same discharge point and sampled at approximately the same time.

Response: EPA believes that the results of the settleable solids analyses are in close agreement. The analyses for TSS and turbidity show differences in absolute values between the two studies, particularly the analyses for turbidity, although the Agency notes that the average values, especially for TSS, are comparable and indicate very similar pond performance over the 3-day sampling period. The differences can have a number of explanations including the sampling method and handling of the sample before analysis, a change in the effluent quality or treatment efficiency, and the variability of the analytical method. The turbidity results are particularly sensitive to variation at very high values (thousands of turbidity units, NTU). This is because the test requires dilution of highly turbid raw sample by factors of 100 to 1000 or more to run the test. Any small error or difference in analyses of the dilute sample is greatly magnified in calculating the projected actual sample result.

(30) *Comment:* The comment was made that placer mining should not be included in the ore mining and dressing point source category because placer gold is not an ore but is raw gold which was liberated from ore rock by natural forces. Crushing is not required and treatment with toxic chemicals is not required to separate the mineral as in other parts of the ore mining and dressing category.

Response: Gold placer mining is specifically included in the ore mining and dressing point source category in SIC 1041 Gold Ores. For the purpose of the regulation, ore and "paydirt" are synonymous and the recovered or concentrated mineral (metal) is placer gold. The Agency realizes that there are significant differences between the facilities, mines, and mills in the ore mining and dressing category and therefore subcategorized the industry. In particular, a separate Gold Placer Mine Subcategory is being established by this proposed rule to take account of the unique factors presented by gold placer mining.

XXI. Solicitation of Comments

Copies of the draft "Development Document" and the draft "Economic Impact Analysis" document were circulated to all interested parties the first week of March, 1985. A public workshop to present and discuss the proposal was held in Fairbanks, Alaska, on April 25, 1985. The Agency is accepting comments at this time. The formal comment period will extend for 120 days after the proposal is published. This extended period will allow sufficient time for the miners to review and respond to the proposal after the 1985 operating season ends. In addition, the Agency will continue to gather data during the 1986 operating season.

There exists an ongoing question on the Method Detection Limit (MDL) for settleable solids (SS) and the SS limitations for gold placer mining. The current mean MDL for settleable solids is 0.3 ml/l, which is a direct result of EPA Headquarters work in conjunction with the Cincinnati EPA laboratory in the early 1980's relative to establishing effluent limitations and and standards for the coal mining industry. Due to the lack of a definitive data base that is directly related to the gold placer mining industry for settleable solids, the Agency conducted a sampling program in Alaska during the summer of 1985. This involved mines in several different areas of the state. The sampling procedure used for the determination of the Method Detection Limit involved seven replicates of an effluent sample at

each mine using the methods outlined in Appendix B to 40 CFR Part 136 with a representative sample from each mine forwarded to the EPA Cincinnati Laboratory for correlation. The results of this program plus any additional data obtained in response to this proposal will be made available for public comment prior to the development of final regulations.

EPA encourages and solicits public participation in this rulemaking effort. The Agency requests that any comments relating to errors, deficiencies or omissions in this proposal or in the supporting documents be specific as to item and location in the record and be supported with facts and information that will correct or otherwise supplement the existing data base. The information in this data base, which profiles the gold placer mining industry, was used to develop this proposed regulation.

Any comments or data submittals to the Agency should include pertinent mailing and mine location addresses, so this information can be entered into EPA's record. In addition it would be helpful if the number of years of operation at the current location or other sites could also be provided. This type of information is essential not only for the Agency to assure reasonable accuracy, but also for compiling aggregate profile statistics, assessing subcategorization, and completing meaningful analyses of facilities.

(1) *Operating Cost, Revenue and Other Data.* Many people who commented on the preliminary draft of the proposed Development Document were also at the technical workshop on the proposed effluent limitations guidelines and standards held in Fairbanks, Alaska on April 25, 1985. They were critical of the data EPA used to estimate revenue and costs, which in turn were used to conduct an economic assessment of the impact of the proposed regulation on the gold placer mining industry. However, virtually no specific data or detailed information on existing mines were supplied to EPA either at the meeting or submitted later. Thus, the Agency continues to seek site-specific data and other information from mines to augment the present data base. The cost, revenue information, and data are essential to determining which technologies are "economically achievable."

Specifically, the Agency requests data from individual mines in both Alaska and the lower 48 States covering the following areas: revenue; operating and maintenance costs, including overhead expenses, mine lease costs, and equipment costs; operating data relating to daily and seasonal operating hours, water quality and quantity, mining and process methods employed, ore throughput, personnel and equipment utilized; mine site data such as the stream and mining district names, geology, topography, location; and climate; and operating details for stripping overburden, prospecting, mining and processing (i.e., sluicing) ore.

(1) The revenue data should delineate assay value of ore ("pay dirt") in place and gold recovered as a result of processing (sluicing) on the basis of ounces of gold per cubic yard of material. Gold fineness (percent pure gold) and particle size distribution including percentage of nuggets is also requested, if possible.

Aggregate costs have been defined to cover a number of major cost items. To better define and further document these estimates, the Agency is seeking additional site specific data from the industry on item costs such as the following: delivered fuel costs, cost of spare parts and parts inventories carried, cost of outside maintenance service, cost of prospecting (dollar value and labor and equipment hours), cost of season start-up and shutdown, camp costs, labor costs per hour or per day (including methods of payment) and list of personnel by job category, equipment costs (including lease or rental arrangements), mining site lease costs and methods of payment, costs to recycle process water, professional service charges (engineering, legal, or accounting), reclamation costs, costs to construct and maintain wastewater treatment facilities (in both equipment and labor hours), costs involved for disposal of solid wastes (including equipment and labor hours), costs pertaining to thawing and removal of overburden, transportation costs, and any other costs of doing business.

(2) *Processing Methods.* EPA seeks specific information pertaining to the various mining and ore processing methods employed in the industry including all relevant equipment data such as type, size (capability in yd^3/hour), cost, operating and maintenance costs, and type and cost of power used for all aspects of the work.

This information is necessary to properly structure the "model mines" so as to reflect the actual gold placer mining industry as accurately as possible. This information, in turn, will provide the best available data necessary to assess the economic impact of the proposed regulations on individual mines as well as the industry as a whole.

(3) *Water Use.* The Agency would appreciate information on water sources and uses and wastewater treatment. Updated information on mines which have already provided information for the data base, would also be useful.

The following information regarding water supply would be especially useful: average stream flow (gal/min or cfs), and if there is a low flow problem, the location of the stream as it relates to the mine; the method of supplying water (gravity or pump); data on the pump (if used) including type of power (electric, diesel, gas), horsepower and capacity; and the total amount of water used by the mine. The amount of water used should be broken down as to the amount used for hydraulic mining (i.e., overburden removal, thawing, "boiling'), the amount used for classification (screening), the amount used in the separation process (i.e., sluice, jigs, spirals), and the volume that is recycled.

The Agency also requests specific information on recycle of wastewater, if practiced by the mine, as well as data on the pump used for recycle, including type of power (electric, diesel, gas), horsepower and capacity, and length of pipe, diameter of pipe, and pipe material (steel, aluminum, plastic).

(4) *Settling Ponds.* The wastewater treatment system at most mines includes settling or holding ponds. The Agency requests data on existing ponds, the dimensions of the ponds (width, length, depth), the method of construction, the cost of construction (dollar value or machine hours and labor hours), the annual maintenance cost of the ponds (dollar value or machine hours and labor hours), the method and cost of handling solid waste (build new ponds as ponds fill or how often ponds are cleaned out and by what method), and whether the ponds are leveled or reclaimed at the end of the season. The Agency would also like to know if the mine has adequate land available within the existing claims for new pond construction.

In the event information is not supplied in response to this request the Agency has the legal authority under section 308 of the Clean Water Act to obtain all desired information. EPA regulations provide that a business may, if it desires, assert a business confidentiality claim covering part or all of the information it furnishes to EPA. A mine submitting information may assert a confidentiality claim covering the information by attaching a cover sheet or notice labelled "company confidential" or with a similar notation. In the event that the Agency receives a request for release of information covered by a claim of confidentiality, or the Agency otherwise decides to make a

determination as to whether or not specific information submitted is entitled to confidential treatment, notice will be first provided to the business which furnished the information. Effluent data cannot be claimed confidential. In addition, any information may be disclosed to officers, employees, or authorized representatives of the United States concerned with carrying out provisions of the Act or when relevant in any proceeding under the Act. The complete details of confidential treatment afforded by EPA appear in 40 CFR Part 2, Subpart B. The manner of asserting claims of confidentiality is specified in 40 CFR 2.203(b). Copies of the Code of Federal Regulations, Title 40 contains the regulation and can be found in the libraries of most Federal and State offices. If individual miners or mining companies wishing to supply data cannot obtain access to the Code of Federal Regulations, they can request copies of 40 CFR Part 2, Subpart B at the address listed in this preamble for technical information.

This regulation was submitted to the Office of Management and Budget for review as required by Executive Order 12291. This rule does not contain any information collection requirements subject to the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*

List of Subjects in 40 CFR Part 440

Metal, Mines, Water pollution control, Waste treatment and disposal.

Dated: November 6, 1985.

Lee M. Thomas,

Administrator.

XXIII. Appendices

Appendix A—Abbreviations, Acronyms and Other Terms Used in This Notice

Act—The Clean Water Act.

Agency—The U.S. Environmental Protection Agency.

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

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

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

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

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

MSHA—The Mine Safety and Health Administration, U.S. Department of Labor.

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

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

POTW—Publicly owned treatment works.

RCRA—Resource Conservation and Recovery Act (Pub. L. 94-580) of 1976, Amendments to Solid Waste Disposal Act.

SBA—Small Business Administration.

OMB—Office of Management and Budget.

Appendix B—Pollutants Selected for Regulation

1. Settleable Solids (SS).
2. Total Suspended Solids (TSS).

Appendix C—Toxic Pollutants Not Detected During Sampling

1. Acenaphthene
2. Acrolein
3. Acrylonitrite
4. Benzidene
5. Carbon Tetrachloride
6. 1,2,4-Trichlorobenzene
7. Hexachlorobenzene
8. 1,2-Dichloroethane
9. Hexachloroethane
10. 1,1-Dichloroethane
11. 1,1,2-Trichloroethane
12. 1,1,2,2-Tetrachloroethane
13. Chloroethane
14. Bis(2-Chloroethyl) Ether
15. 2-Chloroethyl Vinyl Ether
16. 2-Chloronaphthalene
17. 2,4,6-Trichlorophenol
18. Parachlorometa Cresol
19. 2-Chlorophenol
20. 1,2-Dichlorobenzene
21. 1,3-Dichlorobenzene
22. 1,4-Dichlorobenzene
23. 3,3-Dichlorobenzidene
24. 1,1-Dichloroethylene
25. 2,4-Dichlorophenol
26. 1,2-Dichloropropane
27. 1,3-Dichloropropylene
28. 2,4-Dinitrotoluene
29. 2,6-Dinitrotoluene
30. 1,2-Diphenylhydrazine
31. Fluoranthene
32. 4-Chlorophenyl Phenyl Ether
33. 4-Bromophenyl Phenyl Ether
34. Bis(2-Chloroisopropyl) Ether
35. Bis(2-Chloroethoxy) Methane
36. Methyl Chloride
37. Methyl Bromide
38. Bromoform
40. Dichlorodifluoromethane
39. Chlorodibromomethane
40. Hexachlorobutadiene
41. Hexachlorocyclopentadiene
42. Isophorone
43. Naphthalene
44. Nitrobenzene
45. 2-Nitrophenol
46. 4-Nitrophenol
47. 2,4-Dinitrophenol
48. 4,6-Dinitro-O-Cresol
49. N-Nitrosodimethylamine
50. N-Nitrosodiphenylamine
51. N-Nitrosodi-N-Propylamine
52. Pentachlorophenol
53. Benzo(A) Anthracene
54. Benzo(A) Pyrene
55. 3,4-Benzofluoranthene
56. Benzo(K) Fluoranthene
57. Chrysene
58. Acenaphthylene
59. Anthracene
60. Benzo(G, H, I) Perylene
61. Phenathrene
62. Dibenzo(A, H) Anthracene
63. Indeno(1, 2, 3-C, D) Pyrene
64. Pyrene
65. Trichloroethylene
66. Vinyl Chloride
67. Chloradane
68. 4,4-DDT
69. 4,4-DDE
70. 4,4-DDD
71. Endosulfan-Alpha
72. Endosulfan-Beta
73. Endosulfan Sulfate
74. Endrin Aldehyde
75. Heptachlor Epoxide
76. g BHC (Lindane)—Gamma
77. PCB-1242 (AROCHLOR 1242)
78. PCB-1254 (AROCHLOR 1254)
79. PCB-1221 (AROCHLOR 1221)
80. PCB-1232 (AROCHLOR 1232)
81. PCB-1248 (AROCHLOR 1248)
82. PCB-1260 (AROCHLOR 1260)
83. PCB-1016 (arochlor 1016)
84. Toxaphene
85. 2,3,7,8-Tetrachlorodibenzo-p-Dioxin
86. 2,4-dimethylphenol
87. Chlorobenzene
88. Dichlorobromomethane
89. Fluorene
90. Aldrin
91. Dieldrin
92. Endrin
93. Heptachlor
94. 1,1,1-Trichloroethane
95. Chloroform
96. Ethylbenzene
97. Diethyl Phthalate
98. Tetrachloroethylene
99. Toluene
100. BHC-Alpha
101. BHC-Beta
102. BHC-Delta
103. Benzene
104. 1,2-Trans-Dichloroethylene
105. Phenol
106. Butyl Benzyl Phthalate
107. Di-N-Butyl Phthalate
108. Di-n-Octyl Phthalate
109. Dimethyl Phthalate
110. Cyanide
111. Antimony
112. Beryllium
113. Silver
114. Thallium
115. Selenium

Appendix D—Toxic Pollutants Detected in Amounts Too Small To Be Effectively Reduced by Technologies Considered in Preparing this Guideline

1. Cadmium
2. Chromium
3. Copper
4. Nickel
5. Lead
6. Zinc

Appendix E—Toxic Pollutants Detected From a Small Number of Sources and Uniquely Related to These Sources

1. Bis(2-Ethylhexyl)Phthalate
2. Methylene chloride

Appendix F—Pollutants Effectively Controlled by the Technology Upon which Other Effluent Limitations and Guidelines are Based

1. Arsenic
2. Mercury
3. Asbestos

Technical amendments to the Subpart J—Copper, Lead, Zinc, Gold, Silver, and Molybdenum Ores Subcategory are being proposed as part of today's document to clarify the applicability of Subpart M—Gold Placer Mine Subcategory which is being proposed today. However, the limitations and requirements of Subpart J remain unaffected by today's proposal; they are not being reproposed today, and are not subject to review.

PART 440—ORE MINING AND DRESSING POINT SOURCE CATEGORY

For the reasons discussed above, EPA proposes to amend portions of Part 440 as follows:

1. The authority citation for Part 440 continues to read as follows:

Authority: Sections 301, 304 (b) and (c), 306, and 501 of the Clean Water Act (The Federal Water Pollution Control Act Amendments of 1972, as amended by the Clean Water Act of 1977), (the Act), as amended, 33 U.S.C. 1311, 1314 (b) and (c), 1316, and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567, Pub. L. 95-217.

2. § 440.100 is amended by revising paragraph (a) to read as follows:

§ 440.100 Applicability: description of the copper, lead, zinc, gold, silver, and molybdenum ores subcategory.

(a) The provisions of this Subpart J are applicable to discharges from—

(1) Mines that produce copper, lead, zinc, gold, silver, or molybdenum bearing ores, or any combination of these ores from open-pit or underground operations other than gold placer deposits;

(2) Mills that use the froth-flotation process alone or in conjunction with other processes, for the beneficiation of copper, lead, zinc, gold, silver, or molybdenum ores, or any combination of these ores;

(3) Mines and mills that use dump, heap, in-situ leach, or vat-leach processes to extract copper from ores or ore waste materials; and

(4) Mills that use the cyanidation process to extract gold or silver.

Discharge from mines or mines and mills that use gravity separation methods (including placer or dredge mining or concentrating operations, and hydraulic mining operations) to extract gold ores are regulated under Subpart M. Discharge from mines or mines and mills that use gravity separation methods (including placer or dredge mining or concentrating operations, and hydraulic mining operations) to extract silver ores are not covered by this Part.

* * * * *

§ 440.102 [Amended]

3. § 440.102 is amended by removing paragraph (e) and redesignating paragraphs (f) through (i) as (e) through (h).

§ 440.103 [Amended]

4. § 440.103 is amended by removing paragraph (e).

§ 440.104 [Amended]

5. § 440.104 is amended by removing paragraph (e).

6. Part 440 is amended to add a new Subpart M to read as follows:

Subpart M—Gold Placer Mine Subcategory

Sec.

Subpart M—Gold Placer Mine Subcategory

§ 440.140 Applicability: description of the gold placer mine subcategory.

(a) The provisions of this Subpart M are applicable to discharges from—

(1) Mines that produce gold or gold bearing ores from gold placer deposits; and

(2) The beneficiation processes for gold placer deposits which use gravity separation methods.

(b) The provisions of this Subpart M are not applicable to any mines or beneficiating processes which process less than 20 cubic yards (yd^3) of paydirt or ore per day, or to dredges located in open waters, i.e., open bays, marine waters, or major rivers.

§ 440.141 Specialized provisions and definitions.

For the purpose of this Subpart M, the general definitions, abbreviations, methods of analysis, and general provisions set forth in 40 CFR Part 401 shall apply, as well as the general provisions and definitions set forth in 40 CFR Part 440 Subpart L, except as provided below.

(a) *Specialized Provisions.* (1) *Combined Waste Streams.* Where process wastewater from the beneficiation processes, including, but not limited to, the discharges from classification equipment, sluices, jigs, shaking tables, and spiral separators, is commingled with mine drainage or groundwater infiltration to the wastewater impoundment, settling pond, or holding pond, this combined waste stream may be discharged if the concentration of each pollutant or pollutant property does not exceed the effluent limitations applicable to mines processing paydirt or ore in the range of 20 yd^3/day to 500 yd^3/day. However, the volume of commingled wastewater that may be discharged does not include the flow or volume of process wastewater for the beneficiation process where the effluent limitation for the beneficiation process is no discharge of process wastewater.

(2) *Storm Exemption for Facilities Not Subject to Effluent Limitations Guidelines and Standards Requiring No Discharge of Process Wastewater.* If, as a result of precipitation (rainfall or snowmelt), a source with an allowable discharge under this subpart has an overflow or discharge of effluent which does not meet the limitations or standards of this subpart, the source may qualify for an exemption from such limitations and standards with respect to such discharge if the following conditions are met:

(i) The treatment system is designed, constructed, and maintained to contain or treat the maximum volume of untreated process wastewater which would be discharged by the beneficiation process during a 6-hour operating period without an increase in volume from precipitation or groundwater infiltration, plus the maximum volume of water runoff resulting from a 5-year, 6-hour precipitation event. In computing the maximum volume of water which would result from a 5-year, 6-hour precipitation event, the operator must include the volume which would result from all areas contributing runoff to the individual treatment facility, i.e., all runoff that is not diverted from the active mining area and runoff which is allowed to commingle with the influent to enter the treatment system.

(ii) The operator takes all reasonable steps to maintain treatment of the

wastewater and minimize the amount of overflow.

(iii) The operator complies with the notification requirements of § 122.41 (m) and (n) of this Part. The storm exemption is designed to provide an affirmative defense to an enforcement action. Therefore, the operator has the burden of demonstrating to the appropriate authority that the above conditions have been met.

(3) *Storm Exemption for Facilities Subject to Effluent Limitations and Guidelines Requiring No Discharge of Process Wastewater.* If, as a result of precipitation (rainfall or snowmelt), a source which is subject to effluent limitations guidelines or standards requiring no discharge of process wastewater under this subpart, has an overflow or discharge which violates the limitations or standards of this subpart, the source may qualify for an exemption from such limitations or standards with respect to such discharge if the following conditions are met:

(i) The treatment system is designed, constructed, and maintained to contain the maximum volume of process wastewater stored, contained, and used or recycled by the beneficiation process during normal operating conditions without an increase in volume from precipitation or groundwater infiltration plus the maximum volume of wastewater resulting from a 5-year, 6-hour precipitation event. In computing the maximum volume of wastewater which would result from a 5-year, 6-hour precipitation event, the operator must include the volume which would result from all areas contributing runoff from the beneficiation process area, i.e., all runoff that is not diverted from the active mining area and runoff which is allowed to commingle with the influent to the treatment system.

(ii) The operator takes all reasonable steps to minimize the overflow or excess discharge.

(iii) The operator complies with the notification requirements of § 122.41 (m) and (n). The storm exemption is designed to provide an affirmative defense to an enforcement action. Therefore, the operator has the burden of demonstrating to the appropriate authority that the above conditions have been met.

(b) *Specialized Definitions.* (1) "Groundwater infiltration" in this subpart means that water which enters the treatment facility as a result of the interception of natural springs, aquifers, and other seepage or run-off which percolates into the ground and seeps into the treatment facility's pond or wastewater holding facility.

(2) "Five (5)-year, 6-hour precipitation event" in this subpart means the maximum 6-hour precipitation event with a probable recurrence interval of once in 5 years as established by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, or equivalent regional or rainfall probability information.

(3) "Gold placer deposit" in this subpart means an ore consisting of metallic gold-bearing gravels, which may be: residual, from weathering of rocks in-situ; river gravels in active streams; river gravels in abandoned and often buried channels; alluvial fans; sea-beaches; and sea-beaches now elevated and inland.

(4) "Beneficiation process" in this subpart means the dressing or processing (sluicing) of gold bearing ores for the purpose of—

(i) Regulating the size of, or recovering, of the ore or product,

(ii) Removing unwanted constituents from the ore, and

(iii) Improving the quality, purity, or assay grade of a desired product.

(5) "Gravity separation methods" in this subpart means the treatment of mineral particles which exploits differences between their specific gravities. The separation is usually performed by means of sluices, jigs, classifiers, spirals, hydrocyclones, or shaking tables.

(6) "Dredge" in this subpart means a self-contained combination of an elevating excavator, the beneficiation or gold-concentrating plant, and a tailing disposal plant, all mounted on a barge.

(7) "Process wastewater" in this subpart means all water used in and resulting from the beneficiation process, including but not limited to, the water used to move the pay dirt or ore to and through the beneficiation process, the water used to aid in classification, the water used in the gravity separation method, and the water and runoff from the beneficiation process area.

(8) "Ore pay dirt or" in this subpart means the raw "bank run" measured in place, before extraction cubic yards of raw material which is moved by mechanical or hydraulic means to a mine's beneficiation process.

(9) "Beneficiation area" in this subpart means the area of land used to stockpile pay dirt or ore immediately before the beneficiation process, the area of land used to stockpile the tailings immediately after the beneficiation process, and the area of land from the stockpiled tailings to the treatment system e.g., holding pond or settling pond and the area of the treatment system.

(10) "Settleable solids" in this subpart means the organic or inorganic particulate material which will settle in one hour, expressed in milliliters per liter (ml/l) as determined using an Imhoff cone and the method described for Settleable Solids—209E in *Standard Methods for Examination of Water and Wastewater,* 16th edition.

(11) "Total Suspended Solids" (TSS) in this subpart means the residue retained on a standard glass-fiber filter after filtration of a well-mixed water sample expressed in milligrams per liter (mg/l) using the method described for Total Suspended Solids Dried at 103–105C—209C in *Standard Methods for Examination of Water and Wastewater,* 16th Edition.

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

Except as provided in § 440.131 and 40 CFR 125.30–125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

(a) The concentration of pollutants discharged from a mine's beneficiation process that processes 20 to 500 yd^3 of pay dirt or ore per day shall not exceed:

Effluent characteristic	Effluent limitations	
	Instantaneous maximum	Average of daily values for 30 consecutive days
Settleable solids	0.2ml/l	
TSS		2,000 mg/l.

(b) The concentration of pollutants discharged from a mine's beneficiation process that processes more than 500 yd^3 of pay dirt or ore per day (except dredges with capacities of more than 4000 yd^3 per day) shall not exceed:

Effluent characteristic	Effluent limitations	
	Instantaneous maximum	Average of daily values for 30 consecutive days
Settleable solids	0.2 ml/l	
TSS		2,000 mg/l.

(c) There shall be no discharge of process wastewater from the beneficiation process used by any dredge which mines and processes more than 4000 yd^3 of ore or pay dirt per day.

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

Except as provided in § 440.141 and 40 CFR 125.30–125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) The concentration of pollutants discharged from a mine's beneficiation process which processes 20 to 500 yd^3 of ore or pay dirt shall not exceed:

Effluent characteristic	Effluent limitations—instantaneous maximum
Settleable solids	0.2 ml/l.

(b) There shall be no discharge of process wastewater from the beneficiation process used by any mine which processes more than 500 yd^3 of pay dirt or ore per day.

(c) There shall be no discharge of process wastewater from the beneficiation process used by any dredge which mines and processes more than 4000 yd^3 of ore or pay dirt per day.

§ 440.144 New Source Performance Standards (NSPS).

Except as provided in § 440.141 any new source subject to this subpart must achieve the following NSPS representing the degree of effluent reduction attainable by the application of the best available demonstrated technology (BADT):

(a) The concentration of pollutants discharged from a mine's beneficiation process which processes 20 to 500 yd^3 of pay dirt or ore per day shall not exceed:

Effluent characteristic	Effluent limitations	
	Instantaneous maximum	Average of daily values for 30 consecutive days
Settleable Solids	0.2 ml/l	
TSS		2,000 mg/l.

(b) There shall be no discharge of process wastewater from the beneficiation process used by any mine which processes more than 500 yd^3 of pay dirt or ore per day.

(c) There shall be no discharge of process wastewater from the beneficiation process used by any dredge which mines and processes more than 4000 yd^3 of ore or pay dirt per day.

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

Except as provided in § 440.141 and 40 CFR 125.30–125.32, any existing source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

(a) The concentration of pollutants discharged from a mine's beneficiation process which processes 20 to 500 yd^3 of pay dirt or ore per day shall not exceed:

Effluent characteristic	Effluent limitations—Average of daily values for 30 consecutive days
TSS	2,000 mg/l.

(b) There shall be no discharge of process wastewater from the beneficiation process used by any mine which processes more than 500 yd^3 of pay dirt or ore per day.

(c) There shall be no discharge of process wastewater from the beneficiation process used by any dredge which mines and processes more than 4000 yd^3 of ore or pay dirt per day.

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