ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 440

[FRL-3361-7]

Ore Mining and Dressing; Point Source Category; Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This regulation establishes effluent limitations guidelines and standards limiting the discharge of pollutants into navigable waters by existing and new sources that conduct gold placer mining operations. The Clean Water Act and a consent decree require EPA to issue this regulation.

This regulation establishes effluent limitations guidelines based on "best practicable technology" (BPT) and "best available technology" (BAT), and new source performance standards (NSPS) based on "best demonstrated technology".

DATES: In accordance with 40 CFR Part 23 (50 FR 7268, February 21, 1985), this regulation shall be considered issued for purposes of judicial review at 1:00 p.m. Eastern time on June 7, 1988. This regulation shall become effective July 7, 1988.

Under section 509(b)(1) of the Clean Water Act, judicial review of this regulation can be made only by filing a petition for review in the United States Court of Appeals within 120 days after the regulation is considered issued for purposes of judicial review. Under section 509(b)(2) of the Clean Water Act, the requirements in this regulation may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

The compliance date for new source performance standards (NSPS) is the date the new source begins operations.

ADDRESSES: Address questions on the final rule to: Mr. Willis Umholtz, Industrial Technology Division (WH-552), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, Attention: Gold Placer Mine Rules. The basis for this regulation is detailed in four major documents. See Supplementary Information (under "XV. Availability of Technical Information") for a description of each document. Copies of the technical and economic documents may be obtained from the National Technical Information Service, Springfield, Virginia 22161 (703/487-6000). Technical information may be obtained by writing Mr. Willis Umholtz, Industrial Technology Division (WH-552), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460 or by calling 202/382-7126. Additional economic information may be obtained by writing Mr. Mitchell Dubensky, Economic Analysis Branch (WH-586), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, or by calling 202/382-5388.

The record for the final rule will be available for public review not later than July 28, 1988, at the EPA Public Information Reference Unit, Room 2904 (Rear) (EPA Library).

FOR FURTHER INFORMATION CONTACT: Mr. Ernst P. Hall, 202/382-7126.

SUPPLEMENTARY INFORMATION:

Organization of This Notice

I. Legal Authority

This regulation is being promulgated under the authority of sections 301, 304 (b), (c) and (e), 306, 307, 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 and the Water Quality Act of 1987) (the Act), 33 U.S.C. 1311, 1314 (b), (c) and (e), 1315, 1317, and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567, Pub. L. 95-217; 101 Stat. 7, Pub. L. 100-4 ("the Act"). This regulation is also being promulgated in response to the Consent Decree in *Trustees For Alaska v. Thomas,* No. A85-440 (D. Alaska, May 7, 1986) as modified February 1, 1988.

II. Scope of this Rulemaking

This final regulation, which was proposed on November 20, 1985 (50 FR 47982), establishes effluent limitations guidelines and standards for existing and new source gold placer mine facilities.

This preamble describes the legal authority and background, the technical and economic bases, and other aspects of the final regulations. The abbreviations, acronyms, and other terms used in the Supplementary Information section are defined in Appendix A to this notice.

This final regulation is supported by four major documents, three of which are available from the National Technical Information Service. Analytical methods are discussed in "Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants." EPA's technical conclusions are detailed in the "Development Document for Effluent Limitations Guidelines and Standards for the Gold Placer Mine Subcategory of the Ore Mining and Dressing Point Source Category." The Agency's economic analysis is found in "Economic Impact Analysis of Effluent Limitations Guidelines and Standards for the Gold Placer Mine Subcategory."

A. Overview of the Subcategory

The gold placer mine subcategory is comprised of facilities that mine and process gold placer ores using gravity separation methods to recover the gold metal contained in the ore. A placer is a superficial gravel or alluvial deposit often deposited by flowing water. These deposits can be mined by open cut or dredge methods and the gold containing placer material processed to separate the gold from the remaining materials (gangue). Water is used as a hydraulic media to allow gravity separation of the metallic gold particles from the gangue using any of a variety of processing equipment such as sluices, jigs spirals, tables, etc. The water after use as a separation media carries large amounts of suspended soil materials including metals characteristics of the gangue being removed. A more complex discussion of gold placer mining is found in the preamble to the proposed regulation (50 FR 47982).

There were a total of 457 open cut gold placer mines operating in 1986 in the United States. Of this total 192 operated in Alaska and 265 operated in the 48 conterminous states (lower 48). In addition to the open cut placer mines there were five dredges operating on shore in Alaska and one in the lower 48. EPA estimates that nationwide 1,750 persons were employed in open cut mines and about 170 persons were employed in dredge operations. In Alaska 850 persons were employed in open cut mines and about 100 persons were employed in dredge operations. EPA also estimates that nationwide, the open cut mines processed 17.75 million cubic meters (23.22 million cubic yards) of ore to produce about 284,000 troy ounces of fine gold. In Alaska, mines processed an estimated 8.24 million cubic meters (10.78 million cubic yards) of ore to produce 172,300 troy ounces of fine gold. Nationwide, the raw wastes from open cut mines include 2,005,000 metric tons (kkg) (2,206,000 tons) total suspended solids (TSS) and 467,400 kilograms (kg) (1,208,300 lbs) toxic metals. In Alaska the raw wastes from these operations included 970,400 kkg (1,067,400 tons) TSS and 213,500 kg (469,700 lbs) toxic metals. All of the gold placer mines and dredges are direct discharges and there are no known indirect dischargers.

B. Prior EPA Regulations

EPA already has promulgated effluent limitations guidelines and standards for twelve subcategories in the Ore Mining and Dressing Point Source Category. This regulation for gold placer mines is an additional subcategory of the Ore Mining and Dressing Point Source Category. A more complete history of the EPA regulations of ore mining and dressing is contained in the preamble to the proposed regulation (50 FR 47982).

III. Summary of Legal Background

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). To implement the Act, EPA was to issue effluent limitations guidelines, pretreatment standards and new source performance standards for industrial dischargers.

The Act included a timetable for issuing these standards. However, EPA was unable to meet many of the deadlines and, as a result in 1976, it was sued by several environmental groups. In settling this lawsuit, EPA and the plaintiffs executed a "Settlement Agreement" which was approved by the District Court. This Agreement required EPA to develop a program and adhere to a schedule in promulgating effluent limitations guidelines, pretreatment standards, and new source performance standards for 65 "priority" pollutants and classes of pollutants for 21 major industries. 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 additional orders of October 26, 1982, August 2, 1983, January 6, 1984, July 5, 1984, January 7, 1985, April 24, 1986 and January 8, 1987. Promulgation of the Ore Mining and Dressing Point Source Category regulation 40 CFR Part 440 (49 FR 54598, December 3, 1982), satisfied the requirements of the 1976 Consent Decree with regard to the ore mining and dressing category. Therefore, today's regulation is not issued pursuant to that agreement.

Many of the basic elements of the Settlement Agreement were incorporated into the Clean Water Act of 1977. Like the agreement, the Act stressed control of toxic pollutants, including the 65 priority pollutants. In addition, 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.

On August 5, 1985, the Trustees for Alaska sued EPA in Federal District Court in the District of Alaska seeking an injunction requiring the Agency to complete this rulemaking. In a consent decree entered into by the parties and approved by the Court, EPA agreed to promulgate this regulation by October 30, 1987. *Trustees for Alaska v. EPA,* No. A85–440 Civ. (D. Alaska, May 7, 1986). In October of 1987, EPA filed with the Court a motion to modify the Consent Decree to provide the Agency until May 9, 1988, to complete the rulemaking on the grounds that the Agency needed more time to conduct additional data gathering and analysis activities that had not been contemplated in the previous schedule. The Court granted the Agency's motion on February 1, 1988.

Under the Act, the EPA is to establish a number of different kinds of effluent limitations guidelines and standards. These are discussed in detail in the preamble to the proposed regulations and in the Development Document. They are summarized briefly below. The Act directs EPA to promulgate Pretreatment Standards for Existing and New Sources (PSES and PSNS) to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of a publicly-owned treatment works (POTW). EPA is not promulgating pretreatment standards because there are no indirect discharging gold placer mines and, in light of the nature of this industry, none are anticipated.

A. Best Practicable Control Technology (BPT)

BPT limitations are generally based on the average of the best existing performance by plants of various sizes, ages, and unit processes within the category or subcategory.

In establishing BPT limitations, EPA considers the total cost in relation to the age of equipment and facilities involved, the processes employed, process changes required, engineering aspects of the control technologies, and nonwater

quality environmental impacts (including energy requirements). The total cost of applying the technology is balanced against the effluent reduction.

B. Best Available Technology (BAT)

BAT limitations, in general, represent the best existing performance in the industrial subcategory or category. The Act establishes BAT as the principal national means of controlling the direct discharge of toxic and nonconventional pollutants to navigable waters.

In arriving at BAT, the Agency considers the age of the equipment and facilities involved, the process employed, the engineering aspects of the control technologies, process changes, the costs and economic impact of achieving such effluent reduction, and nonwater quality environmental impacts. The Agency retains considerable discretion in assigning the weight to be accorded these factors.

C. Best Conventional Pollutant Control Technology (BCT)

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. Section 304(a)(4) designated the following as conventional pollutants: Biochemical oxygen demanding pollutants (BOD_5), total suspended solids (TSS), fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979 (44 FR 44501).

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 established 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 to achieve similar reduction 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 first published its methodology for carrying out the BCT analysis on August 19, 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 promulgated August 22, 1986 (51 FR 24974).

D. New Source Performance Standards (NSPS)

NSPS are based on the best available demonstrated technology (BDT). New plants have the opportunity to install the best and most efficient production processes and wastewater treatment technologies.

IV. Summary of Data Gathering, Analysis Methodology, Proposed Regulation and Notices of New Information

The data gathering efforts and data analysis methodology used in developing this regulation have been described in detail in the proposal for this regulation and the two notices of new data (See 50 FR 47982, 51 FR 5536 and 52 FR 9414). The following is a brief summary of those efforts.

The Agency's collection of data on gold placer mines began in 1974 when work was initiated on the regulation of ore mining. Gold placer mines were not regulated when the ore mining regulation was promulgated in 1977 due to an insufficient data base on gold placer mining. Data collection was accelerated through field expeditions until proposal of this regulation in 1985. The need for further information was demonstrated by the comments on that proposal and additional data was collected during the 1986 mining season. Data has been collected directly by the Agency personnel and contractors from state and other agency publications, from public and private statements by the industry and other groups, and from comments on the proposed regulation and notices of new information.

A. Notice of Proposed Rulemaking

1. Data Gathering Efforts Before Proposal

Prior to proposing this regulation in 1985, EPA collected technical and financial data during the 1983, 1984 and 1985 Alaska mining seasons. The 1983 data collection effort consisted of site visits to 60 gold placer mines where EPA conducted detailed sampling and engineering surveys. In 1984, personnel from EPA Region X studied seven gold placer mines (the Trend Study), and EPA headquarters staff and Agency contractors visited 20 additional mines in Alaska. Of these 20 gold placer mines, 10 were selected for detailed study. EPA contractor personnel also visited six gold placer mines in the lower 48 during the summer of 1984 to obtain operational, economic and water quality data. EPA conducted treatability (settling tube) tests at 11 Alaska gold placer mines in 1983 and at 10 mines in 1984. These tests evaluated simple settling and chemically-aided settling on gold placer mine wastewater. At 10 of the sites visited in 1984, the tests included the analyses of settleable solids ("SS"), total suspended solids ("TSS"), turbidity, and 124 toxic pollutants measured in the effluent from treatment.

EPA evaluated the capital and total annual costs for placer mines to install pollution control technologies based on engineering estimates of capital requirements and costs of constructing and operating the technologies. To assess the impact of these regulatory expenditures and the economic viability of placer gold operations, EPA developed a model mine analysis which considered the economic impacts of these compliance costs on various size operations.

2. Proposed Regulation

EPA evaluated three technologies for the proposed regulation: Settling ponds, recycle of process water, and chemically-assisted settling. EPA considered various configurations which combined the use of these technologies. (See 50 FR 47982).

EPA proposed not to establish effluent limitations guidelines and standards for open-cut mines processing less than 20 cu yd per day. The intermittent nature of these operations and the small size of these mines made it likely these mines were not a major source of pollution and made it more appropriate to develop limitations on a case by case basis.

For open-cut mines processing greater than 20 cu yd of ore (or pay dirt) per day, EPA proposed that BPT limitations be based upon the use of simple settling technology, since the use of ponds for settling was a demonstrated and familiar technology in the industry and all NPDES permits issued by EPA to placer mines contain limitations based on the use of settling pond technology. EPA rejected the use of chemical flocculants to assist settling on the grounds that flocculants had not been used under full-scale conditions and more study of this treatment technology was needed. EPA did not propose total recycle of process wastewater as the basis for BPT since recycle is an in-process as opposed to end-of-pipe technology. EPA proposed BPT

limitations of 0.2 ml/l of SS and 2,000 mg/l of TSS. The field data collected by the Agency and data from discharge monitoring reports submitted by placer miners to EPA indicated that properly designed settling ponds were capable of reducing SS levels in placer mine wastewater to below 0.2 ml/l. The Agency proposed a BPT limitation of 2,000 mg/l TSS on the basis of an analysis of settling data collected by the Agency.

For large dredges processing greater than 4,000 cu yd of pay dirt or ore per day, the proposed regulation would have required no discharge of process wastewater based on 100 percent recycle of process wastewater from the beneficiation process. The model technology used as the basis for the proposed standard was recycling of process water from the pond in which the dredge floats; information available to the Agency at that time indicated that at least 2 dredges recycled their process wastewater and discharged excess infiltration water from the dredge pond.

For open-cut mines processing between 20 and 500 cu yd of ore per day and for large dredges, EPA proposed BCT limitations based on the same technologies proposed as the basis for BPT for these subcategories. For open-cut mines processing greater than 500 cu yd of ore per day, EPA proposed BCT limitations more stringent than BPT by requiring no discharge of process wastewater. At the time of proposal, EPA had not yet finalized its BCT cost test methodology and the Agency planned to apply the final cost methodology in evaluating options for the final regulation.

For open-cut mines processing between 20 and 500 cu yd of ore per day, EPA proposed BAT limitations equal to BPT. The Agency declined to propose BAT limitations based on more stringent control technologies since the Agency's economic analysis indicated that recycling of process water was not economically achievable for these mine sizes. For open-cut mines processing greater than 500 cu yd of ore per day and large dredges, EPA proposed BAT limitations based on total recycle of process water.

In the proposal, EPA indicated that the Agency was not setting limitations for arsenic and mercury and other toxic pollutants since EPA data indicated that these pollutants are in particulate form and would be removed by the proposed limitations on solids.

EPA proposed NSPS equal to BAT and BCT. EPA was unable to identify any more stringent technologies that could control process wastewater pollutants from open-cut mines processing greater than 500 cu yd of ore per day, or from large dredges. For open-cut mines processing between 20 and 500 cu yd of ore per day EPA declined to propose NSPS more stringent than BPT and BAT because the Agency believed that more stringent limitations may have been a barrier to entry into the industry.

The 1985 proposal also contained specialized provisions relating to storm exemptions and combined waste streams. The proposed storm exemption would have provided an affirmative defense in an enforcement action for violations which occur during and immediately after any precipitation as long as the treatment system was designed, constructed and maintained to contain or treat the maximum volume which would be discharged or recycled (depending on the applicable limitations) by the beneficiation process during a 6-hour period plus the maximum volume of wastewater resulting from a 5-year, 6-hour precipitation event.

For those mines subject to effluent limitations prohibiting the discharge of process wastewater, the proposed definition of "combined waste streams" would have allowed the discharge of a volume of wastewater that was equal to the quantity of mine drainage or ground water which is commingled with process wastewater as long as the discharge met limitations of 0.2 ml/l SS and 2000 mg/l TSS. In effect, for mines required to meet limitations based on recycling of process wastewater, the proposed combined wastestreams provision would have allowed discharges of "excess water", due to ground water infiltration, or other non-process sources, so long as the discharge met limitations based on simple settling technology.

B. First Notice of New Information (First NOA)

During the 1985 mining season, EPA conducted data gathering and analysis activities the results of which were presented for public comment in a notice of availability of new information on February 14, 1986 (51 FR 5563) ("First NOA"). EPA conducted a study to determine the Method Detection Limit (MDL) for the measurement of settleable solids. The Agency determined that the MDL was 0.2 ml/l, based on tests performed at 10 mine sites. (See discussion in Section V of this notice). The Agency also presented additional technical and economic data collected during the 1985 mining season.

C. Second Notice of New Information (Second NOA)

On March 24, 1987 (52 FR 9414), EPA published a Second NOA which solicited public comment on data gathering activities conducted during the 1986 mining season, new methodologies being employed by the Agency to estimate the costs and economic impacts of the regulation, and new regulatory alternatives being considered by the Agency in light of this new information.

1. Data Gathering Efforts in 1986

The studies conducted by the Agency during the 1986 mining season included the following: A field testing program conducted at eight mines in Alaska, studies on the performance of simple settling and chemically-aided settling to treat placer mine wastewater, analysis of the presence and removal by simple settling and chemically aided settling of 68 metals in mining effluent, and a study on the effect of high levels of TSS (simulated recycling conditions) on fine gold recovery.

2. New Regulatory Alternatives

In response to comments received regarding costs and impact methodologies presented in the November 1985 proposal, EPA made substantial revisions to its methodologies to better reflect actual conditions in the industry. Most of the changes were designed to make the impact analysis reflect the great variability among placer mining operations. The revised economic methodology applied variable cost factors which adjusted baseline operating costs according to site specific factors which are likely to affect the costs of operating at a particular site. The Agency also revised the economic impact models to reflect variability in parameters such as ore grade and fineness which vary from site to site and which have a significant impact on the revenues of mine operations. A complete discussion of the Agency's revised methodologies and impact analysis is contained in the Second NOA (See 52 FR 9426–9433).

In light of new data and revised methodologies, the Second NOA presented new regulatory alternatives being considered by the Agency. EPA stated that it was considering basing BCT and BAT limitations and NSPS for all sizes of open cut mines on total recycle of process wastewater. Furthermore, the Agency stated that it was considering adopting BCT and BAT limitations and NSPS for dredges, and medium and large open-cut mines based

on recycle of process wastewater and chemically aided settling of any excess wastewater that needed to be discharged.

The Agency also stated in the Second NOA that it was considering deleting the 2,000 mg/l TSS effluent limitation proposed for BPT, BCT and NSPS. After considering comments on the proposal, examining new data and reconsidering data available at proposal, the Agency determined that settling characteristics of solids as measured by TSS vary dramatically depending on the soil type at a particular site. Suspended particulate matter may settle qquickly, or conversely, remain suspended for extended periods depending on the soil characteristics of a specific mine site. The data collected by the Agency confirmed that simple settling did not consistently control TSS in placer mining effluent. Therefore, for those limitations based on simple settling, the Agency was considering adopting limitations on settleable solids only.

Furthermore, the data collected on metals in raw and treated effluent from gold placer mines indicated that metals in placer mining discharges are associated with solids and are removed along with the solids to varying degrees depending on site-specific soil characteristics. Because of this variability, the Agency found that it was not possible to set nationally applicable, uniform effluent limitations guidelines and standards for metals based on simple settling technology. Nonetheless, the Agency concluded that metals were adequately controlled by the proposed treatment technologies.

V. Control and Treatment Technology Options and Basis for Final Regulation

A. Control and Treatment Technologies

The BPT and BAT limitations and new source performance standards in this regulation were determined after an evaluation of several technologies that reduce solids and toxic metals found in gold placer mine wastewater. Those technologies are described in detail in the proposal, the two NOAs and the final development document.

1. Simple Settling Technology

Simple settling is allowing the suspended solids in gold placer mine wastewaters to fall out of suspension under the force of gravity in a quiescent environment. The Agency examined a variety of technical issues related to this technology, which are discussed below.

Method Detection Limit. The data base for determining the Method Detection Limit (MDL) of settleable solids was gathered by EPA using protocol sampling and analysis of inffluent and effluent wastewater samples at ten gold placer mines during the 1985 mining season. Standard EPA sampling and analysis procedures for determining an MDL were employed. These procedures require seven replicate measurements on each sample. For each replicate measurement, the mine owner, the EPA contractor and an EPA engineer read and recorded the settleable solids measurement. The samples thus analyzed in the field were sent to the EPA lab in Cincinnati for an additional analysis. These SS measurements were then compared statistically using an analysis of variance methodology. The results of the analysis comparing the three separate measurements provided additional support and validation for the settleable solids MDL of 0.2 ml/l. Notice of the MDL and the methodology used to obtain it was provided in the First NOA.

Raw Waste—Total Suspended Solids Content (TSS). The concentration of total suspended solids contained in raw or untreated wastewater from gold placer mines was determined based on data from 31 mines sampled in 1983, 1984, 1985, and 1986. A total of 153 samples were taken and analyzed during this period.

Some of the mines were sampled more than once during the four-year sampling period. The data from each individual mine were averaged into one data point for that mine so as to not give more weight in the analysis to mines with a large number of samples. Then the data from the 31 mines were statistically combined to determine the average raw waste. Using this data and analysis procedure, the average level of suspended solids in the untreated placer mine wastewater was determined to be 20,000 mg/l.

Treatment Effectiveness. The treatment effectiveness of simple settling has been evaluated by observing in-place treatment and performing settling tests on-site operating gold placer mines. During the mining seasons of 1983 through 1986, EPA sampled 52 gold placer mines. These data were analyzed and used to determine the Method Detection Limit for settleable solids (SS), the mean level of solids in raw wastewaters from gold placer mines, the solids levels in gold placer mine wastewaters after treatment, the metals levels before treatment and metals removals achieved in treatment of these wastewaters. The record of this rulemaking contains the complete reports of the studies and analysis referred to below.

The Agency conducted settling tests at 8 gold placer mines in 1986. However, only five of these mines were suitable for further analysis of the effect of treatment on TSS and metals (one mine was using thaw-field water in its gold recovery circuit and the process wastewater generated by this practice is not characteristic of process wastewater generated solely through the gold recovery process, one was not operating the gold recovery process and one was operating intermittently during the sampling period). The effluent from these five gold placer mines was placed in settling tubes and allowed to settle under quiescent conditions. The level of settleable solids for all five mines was reduced to the MDL within three hours of quiescent settling. One of the three mines sampled and found not suitable for further analysis in 1986 was a dredge operation. As noted above, because this dredge operation was allowing thaw-field wastewater to enter the treatment system and the resulting TSS and metals levels were not characteristic of the levels generated solely through the gold recovery process, EPA did not include the data from this dredge in calculating TSS and metals removals achieved with the modern technologies. However, EPA has relied on the data from this operation in assessing the removals of settleable solids that can be achieved with simnple settling applied to dredge operations. The data indicate that, even with the inclusion of thaw-field wastewater, settleable solids in the effluent were reduced to below 0.2 ml/l in less than 4 hours of quiescent settling. The additional time needed to reach this level may be attributable to the high organic solids levels usually encountered in the thaw-field effluent, which may have impeded settling.

The Agency is relying on the data from 1986 as a basis for the treatment effectiveness of simple settling. The results of the settling data collected durign 1984 confirm that 0.2 ml/l can be achieved with quiescent settling but these tests do not define the actual settling time required. The Agency has not relied on data collected in the 1983 tests since mosts measurements were taken after only 2 hours of settling.

During the 1983 through 1986 mining seasons, EPA collected 73 samples at 39 Alaska gold placer mines measuring the effectiveness of in-place settling ponds. These data indicate that properly designed and operated ponds reduce SS levels to below 0.2 ml/l prior to discharge. Ponds which did not achieve this level had discernable design or operating deficiencies. These in-place treatment data confirm that the level of settleable solids in gold placer mine wastewater can be reduced to below the

MDL of 0.2 ml/l with the use of settling ponds.

The data collected by EPA are supported by discharge monitoring reports (DMRs) submitted by placer miners operating during the 1984 season. In fully completed DMRs from 107 mines, 26 reported 0.2 ml/l or less of SS in over 2,600 individual samples. These data show that about 25 percent of the mines consistently achieve the MDL; however, there is no information relating these SS levels to retention time. Since data collected directly by EPA indicate that 0.2 ml/l settleable solids is achievable where ponds are designed and maintained to achieve the required settling time, EPA believes that those mines which reported 0.2 ml/l or less in their DMRs are representative of the average of the best treatment systems; i.e., those which are properly designed and operated.

Simple settling did not perform reliably in achieving a consistent removal of TSS. Data from the 15 mines sampled in 1985 and 1986 showed wide variations in the residual TSS (after simple settling) ranging from 20 mg/l to 2,400 mg/l. Even allowing the samples to settle for 24 hours did not achieve a consistent level of TSS. EPA believes this wide variations is related to the soil being processed at the various mines and the particle size of the fine suspended materials. A statistical analysis of data showing this wide range of values would not produce a meaningful performance standard for the technology. Because of this variability, TSS has not been used as a measure of the performance of simple settling for gold placer mines. (See discussion in Section V. C., below.)

EPA relied on the data gathered on the performance of simple settling in removing SS in order to estimate the costs of constructing settling ponds necessary for wastewater treatment and water recirculation. Since the technology has been show to remove all SS in open cut mine wastewater to the MDL in three hours or less, this becomes the apparent retention time required for the technology to function properly. However, since ponds are rarely perfect settling devices because of the tendency of water to channel in the entrance and exist areas of the ponds (called end effects), a pond volume equivalent to four hours of water flow has been used in the Agency's estimate of baseline costs. EPA believes the additional settling time will adequately compensate for any effects that may occur.

As noted above, the settling data for a dredge operation studied by the Agency indicated that 0.2 ml/l SS was achieved within four hours, and the slightly longer time may have been due to the influx of thawfield wastewater to the treatment facility. EPA believes that dredges not conducting thawfield operations generate wastewater that is similar to that generated by open-cut mines, since both dredges and open-cut mines use the same methods for gold recovery. Therefore, the costing analysis performed by the Agency has evaluated the costs for dredges, like open-cut mines, to build four-hour settling ponds. However, in recognition of the fact that wastewater from dredges conducting thawfield operations may require a slightly longer settling period, EPA has estimated the increased costs for dredges to build ponds capable of retaining wastewater for six hours. That analysis indicates that the cost of building six-hour ponds would only be less than one percent more than the cost of building four-hour ponds. This slight cost increase is not significant and would not alter the Agency's conclusions (described in Section V. C., below), regarding BPT and BAT technologies applicable to dredges.

Metals removal. In the 1986 mining season the Agency conducted extensive analysis of metals in raw untreated wastewater and treated wastewater discharged at eight gold placer mines in Alaska. As explained above, three of these mines were unsuited for metals analysis and data from those mines, therefore, were not included in the Agency's analysis. At the time of the analysis two of the remaining five mines were recycling some water while three were not recycling. Total suspended solids, settleable solids and metals were analyzed in the raw wastewater and after simple settling. These data were used to estimate the metals removal and treatment effectiveness for simple settling and recirculation followed by simple settling. As discussed below, these data also verify the indicator relationship between solids removal and metals removal achieved by simple settling.

The chemical analysis data and the mathematical analysis of that data are included in the administrative record of this rulemaking. They show that the average raw waste level for TSS was 20,000 mg/l; after simple settling, the average TSS level was 1,670 mg/l and the SS level was less than 0.2 ml/l. The sum of the average concentrations of the thirteen toxic metals present (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Nickel, Thallium, Silver and Zinc) in the raw waste was 7.494 mg/l. After simple settling the level of the sum of these toxic metal concentrations had been reduced to 1.283 mg/l. Many of the individual values of the toxic metals after settling were below the detection limit of the analytical method for the metals. For purposes of estimating the average removals, EPA assumed that levels below the detection limit were equal to one-half of the detection level. EPA made this assumption because the precise level of the pollutant below the detection limit could not be ascertained. Since the range of possible values is between zero and just below the detection limit, EPA believed it was reasonable to assume the residual levels were in the mid-point of this range, i.e., one-half of the MDL. As discussed further below, the metals removal is incidental to and is related to the removal of suspended solids.

Indicator Pollutants. In some cases, it may not be feasible to limit directly each toxic pollutant present in a wastewater stream. In such cases EPA may establish limitations on other pollutants which have a surrogate or indicator relationship to toxic pollutants. A surrogate relationship occurs between a toxic pollutant and a set of commonly regulated parameters when the concentration of the regulated parameter is used to predict the concentration of the toxic pollutant. When the concentration of the regulated parameter is used to predict whether or not the toxic pollutant level will be reduced, it is an indicator relationship. In the first instance the regulated parameter is called a surrogate and in the second, it is called an indicator.

A statistical analysis of the TSS and SS and metals concentration data collected during the 1986 mining season in Alaska indicates that the removal of solids, when measured either as SS or TSS, is associated with substantial reduction of the concentration of all of the toxic metals in the treated wastewater. However, the strong mathematical relationship between solids removal and metals removal necessary for prediction was not established. Therefore, the data indicate that both SS and TSS are indicators of, but are not surrogates for, toxic metals removal.

2. Wastewater Reduction

Reduction of the quantity of wastewater discharged from the gold recovery process represents one significant means of reducing the pollutants discharged to the waters of the United States. The model technology selected to achieve this reduction is recirculation of all process water used in the gold recovery process. Recirculation of process water is achieved by

withdrawing all of the process water from the settling ponds and returning the process water to the same settling ponds after use in the beneficiation process. The term recirculation is being used because it more correctly describes the in-process change necessary to reduce process water discharges than the term recycle used in previous notices. The water used for beneficiation is an integral part of the gold recovery process since the hydraulic flow is the means by which the gold is separated from other solid particles. Altering the source and solids content of the process water, therefore, entails a basic change in the gold recovery process itself.

Under most mine conditions, water incidentally enters a mine through rainfall, snow melt, surface runoff and subsurface incursion. While properly designed and constructed water diversion structures will reduce the amount of water which will accumulate in a mine, the incidental influx of water cannot be completely stopped. Since the gold recovery process is inherently a water consuming process due to the wetting of the soils in the ore, the incidental water which accumulates in a mine may be used as make up water for the gold recovery process. Water which incidentally enters the mine in excess of the amount of water needed for make up water must be collected and discharged. Because this excess incidental water usually mixes with the process water, this regulation allows the excess water from this mixture which is not used for gold recovery to be discharged after treatment. Under this regulation, the addition of new water is allowed only when the recirculated water is insufficient to operate the gold recovery process, and then only to the extent necessary to make up for any water deficit in the gold recovery process.

During the 1986 mining season, the Agency observed five gold placer mines in Alaska that were recirculating process water. Information provided by the state of Alaska indicates that about 30 percent of the gold placer mines in Alaska expected to operate in the recycle mode during at least some part of the 1984, 1985 or 1986 mining seasons; however, the data do not indicate whether these mines discharged (blowdown) water from their recirculation system. Another 30 percent of the gold placer mines indicated they expected to recycle some portion of their wastewater. In the lower 48 states, about one fourth of the gold placer mines for which EPA has data report that they have no discharge of gold recovery process wastewater.

During the 1985 and 1986 mining seasons the Agency studied the effect of high suspended solids in the sluice water on the recovery of gold. Comments had alleged that complete recirculation of gold recovery process water was not feasible because the high level of solids suspended in the recirculated water would have serious deleterious effects on the recovery of gold. This study demonstrated that the recovery of gold in a sluice operation is essentially unaffected by levels of suspended solids substantially higher than normally encountered in the process water that is recirculated through the gold recovery process.

3. Chemically Assisted Settling

The Agency conducted a study of the effectiveness of adding polymers to aid in the removal of suspended solids by settling. This procedure was tested using settling tubes and in field tests. The results were promising, indicating that chemically aided settling might achieve long term average TSS levels below 100 mg/l.

However, as discussed further in Section V. C., below, these tests were not sufficiently detailed and extensive to demonstrate the full applicability of this technology to the placer gold mines generally. Further testing and demonstration are necessary before this technology could reasonably be selected as the basis for BAT limitations.

A. Other Technologies Considered

The Agency also considered but rejected the establishment of mass-based production-related limitations for all gold placer mines based on water use control technology. EPA could not obtain adequate data on the quantity of water actually needed to process the gold ore through the gold separation device (usually a sluice box). The amount of water actually used seems to vary with the number of poorly defined conditions such as the amount and types of clay in the ore and the mining which previously may have been done at the present mine site (much of the present gold placer mining in Alaska is re-mining once or twice mined gold sands). In this regard, the Agency considered requiring greater water use efficiency by specifying water use rates which could only be achieved with specific types of gold recovery equipment. This option, which would have allowed a discharge of pollutants related to the quantity of ore mined, was rejected for lack of adequate data and because it was less stringent than the option of complete process water recirculation which in effect requires no discharge of pollutants except those resulting from the influx of excess water.

Filter dams were evaluated under the Alaska Department of Environmental Control (ADEC) grant program and found to reduce solids discharge from mine wastewaters but their applicability and effectiveness are site specific. Hence, they are not suitable as the basis for nationally applicable effluent limitations guidelines and standards.

Tundra filtration allows the filtering action of the vegetative cover of the tundra to strain out solids as a thin layer of mine wastewaters is allowed to flow over the surface vegetation. This technology raises serious and unresolved questions about the possible long term effect on the fragile tundra. This solids removal technology also appears to be highly site specific and therefore it is judged to be unsuitable as a basis for this regulation.

5. Innovative Technologies

EPA is encouraging the use of innovative technology through the application of the innovative technology provision of the CWA contained in section 301(k). Many comments pointed out the need for site-specific latitude to employ innovative technology and to promote development of new technologies. The CWA allows such latitude for development and application in section 301(k), which authorizes the Agency to grant an extension of up to two years for compliance with BAT if a facility uses an innovative technology which provides a significantly greater level of effluent reduction than that achieved at BAT, or equivalent reduction at lower cost, and which has the potential for industry-wide application.

B. Subcategorization

In developing this regulation, it was necessary to determine whether different effluent limitations guidelines and standards were appropriate for different segments of the subcategory. The major factors considered in assessing the need for further segmentation and in identifying such segments included: Waste characteristics, types of water use, water pollution control technology, treatment costs, solid waste generation, size of mine, age of equipment, number of employees, total energy requirements, nonwater quality characteristics, and unique plant and site characteristics. These factors are discussed more fully in Section IV of the development document for this subcategory.

In the November 1985 proposal, EPA divided the placer mining industry into

several subcategories according to mine size and type for purposes of establishing effluent limitations guidelines and standards. First, EPA proposed distinguishing between dredges and other types of mining operations, since dredges represent a physically different means of mining placer deposits compared with separate earth-moving and sluicing equipment. (See 50 FR 47989.) The final regulation also addresses dredges and other types of mining operations separately, in light of the clear operational distinctions. However, the BPT, BAT limitations and NSPS are the same for dredges and other mine types.

In November 1985, EPA proposed not to regulate mines processing less than 20 cubic yards of ore per day under this regulation and dredges operating in open waters. As explained in Section IX. B., below, the final rule does not cover these operations. Furthermore, the final rule does not establish effluent limitations guidelines and standards for dredges processing less than 50,000 cubic yards of ore per year, for the reasons described in Section IX. B. EPA emphasizes, however, that the exclusion of these facilities from the coverage of this regulation does not alter their duty to obtain NPDES permits for their discharges.

The proposal divided the open-cut mines processing greater than 20 cubic yards of ore per day into two subcategories: those processing less than 500 cubic yards of ore per day and those processing more than this amount. Data available at that time indicated that mines processing less than 500 cubic yards of ore per day were not profitable in the baseline (i.e., prior to imposing costs of pollution control), whereas mines processing in excess of this amount were generally profitable. On the basis of this distinction, EPA proposed more stringent requirements at BCT, BAT, and NSPS for the larger size mines.

In the Second NOA, EPA stated that it was considering subcategorizing open-cut mines and dredges on the basis of yearly, as opposed to daily production volumes. The Agency also indicated it was considering dividing open-cut mines into 4 subcategories. With regard to BAT limitations and NSPS, the Agency stated that it was considering adopting limitations based on recycling as the model technology for all mines, regardless of size.

The final regulation contains identical limitations for all open-cut mines processing more than 1,500 cubic yards of ore per year which corresponds to approximately 20 cubic yards of ore per day. At BPT, all regulated mines are required to meet limitations based on simple settling. BAT limitations and NSPS require all regulated mines to meet limitations based on recirculation of process water and simple settling of excess water, since the Agency's economic data and analysis indicate that these model technologies are economically achievable for all regulated mine sizes. (See discussion in Section VI, below.)

In the proposal, EPA also discussed other factors which it considered but rejected as possible bases for subcategorization. These included factors affecting the cost of doing business such as climate, remote location, and age of equipment. The Agency declined to propose subcategories on these bases, since they do not affect wastewater characteristics. The Agency's economic analysis methodology expressly takes these factors into account in estimating placer mine baseline operating costs. EPA continues to believe that these would not be appropriate bases for subcategorization.

In the proposal, the Agency also mentioned geological characteristics as a possible basis for characterization. EPA believes that subcategorization on this basis is not necessary, since all mines can meet these regulations with properly designed and operated treatment facilities, regardless of soil type at a particular mine. As discussed below, because of soil-type variability, the Agency is not able to set effluent limitations guidelines and standards for TSS or metals based on settling technology. However, it would not be possible to subcategorize in order to account for this variability, since one mine can encounter many different soil types during the course of its normal operations. (See 52 FR 9422.)

In the proposal, EPA stated that it had not taken into account the possible costs to mines operating in steep canyons of constructing settling ponds where there is limited space. The Agency solicited comment on whether alternate limitations should be promulgated for these mines. Since proposal, EPA has incorporated into its cost methodology the possible increased costs to install ponds that may be incurred by mines in steep canyons by assuming that mines would only have sufficient space to install a small pond capable of treating wastewater from one quarter of the operating season. EPA therefore included in its cost estimates the expense of constructing four such small ponds per season. Because the Agency believes that all mines can install settling ponds of the size costed by the Agency, this regulation does not create a separate subcategory for mines operating in steep canyons.

C. Technology Basis and Rationale for Final Regulation

To determine the effluent limitations guidelines and standards promulgated with this notice, EPA evaluated the ability of the above treatment technologies to reduce the discharges of pollutants from placer mining wastewater, the costs to the industry of installing and maintaining pollution control equipment, and resulting economic impacts. The final development document for this subcategory presents a more complete discussion of the model technologies, and the economic impact analysis document discusses fully the economic aspects of this rule. Below is a description of the Agency's rationale for the BPT and BAT limitations and new source performance standards promulgated today.

BPT

EPA proposed BPT limitations, based on simple settling technology, of 0.2 ml/l SS and 2,000 mg/l TSS for all open-cut mines processing greater than 20 cubic yards of ore per day. For dredges processing greater than 4,000 cubic yards of ore per day, EPA proposed limitations prohibiting the discharge of process wastewater.

The BPT limitations for all gold placer mines and dredges in the final regulations are based on simple settling technology. This technology has been observed in widespread use by gold placer mines in all areas of the country. In Alaska, virtually all of the mines observed by the Agency staff and contractors in 1985 and 1986 had some level of simple settling technology installed and operating. As demonstrated in field studies, and discussed above in this preamble, simple settling technology achieves substantial removals of pollutants in gold placer mine wastewater.

EPA proposed BPT limitations for dredges processing greater than 4,000 cubic yards of ore per day based on 100 percent recycle of process wastewater from the dredge pond itself. The Agency proposed more stringent BPT requirements for dredges because available information indicated that all of these operations were recycling process water at a high rate, with two dredges recycling 100 percent of their process water. The Agency also believed that the very nature of the dredge operation made recycle necessary.

Since proposal, EPA has received additional information indicating that, while dredges withdraw water from the dredge pond for gold processing operations, they also discharge water from the dredge pond to control the suspended solids level of the pond. As a result, dredges usually have some discharge (blow down) of water and then introduce new water into the pond in order to maintain a proper level in the dredge pond.

On the basis of this new information, the Agency has modified the model technology from that described in the proposal. The technical support documents presented for public comment with the Second NOA evaluated settling technology for the dredges based on the use of a separate settling pond which treats wastewater to 0.2 ml/l prior to discharge. EPA data indicate that wastewater from dredges can achieve this level. BPT limitations for dredges, like other mines, are based upon this model technology. The final regulation does not require recirculation of process water at BPT, because dredges do not recirculate all process water, as originally believed. However, as discussed below, recirculation of process water is required at BAT, based on recirculation of water from the settling pond into the dredge pond.

As described above, EPA has collected data on the performance of simple settling technology which confirms that a settleable solids level of 0.2 ml/l can be reliably achieved with three hours of quiescent settling (four hours for dredges using thaw-field overflow water). The BPT limitation of 0.2 ml/l is that level which, based on data collected by EPA, is achievable with a settling pond that is properly designed and operated.

While the Agency proposed BPT limitations of 2,000 mg/l of TSS based on simple settling technology, the Agency stated in the Second NOA that is was considering deleting this limitation. The final rule does not contain a BPT limitation for TSS. As noted in Section V above, data collected from 15 mines in 1985 and 1986 show wide variations in residual TSS, even after 24 hours of settling. EPA believes that this wide variation is related to the characteristics of the soil being processed at the various mines and the particle size of the fine suspended solids. Because of this wide variation, the Agency does not believe analysis of the TSS data would yield a meaningful standard of performance for simple-setting technology. That is, there is not a particular level of TSS reduction that EPA believes is associated with the proper functioning of simple-settling technology. Rather, as its name suggests, settleable solids is a pollutant parameter which measures the effectiveness of simple-setting technology. Therefore, the final rule sets BPT limitations for settleable solids only.

As pointed out above, the removals of TSS achieved with simple settling technology vary depending on site-specific conditions such that EPA could not establish nationally applicable, uniform limitations for these pollutants based on simple settling technology. Nonetheless, the data indicate that the use of settling ponds does result in substantial reductions in the discharge of these pollutants, and EPA was able to analyze the data in order to determine the average removals achieved with settling ponds. On the basis of available data, EPA calculated the pollutant removal achieved at BPT. Implementation of the BPT limitations nationwide for mines will remove annually from estimated raw waste 387,600 kilograms (kg) (852,700 lbs) of toxic metals and 1,838,000 metric tons (kkg) (2,021,300 tons) of TSS; for the Alaska gold placer mines 177,000 kg (389,500 lbs) of toxic metals and 889,400 kkg (978,300 tons) of TSS will be removed. As discussed in Section VI of this preamble, EPA has calculated the costs of achieving these pollutant removals at BPT. The total annual cost of achieving BPT at gold placer mines nationwide is $2.42 million; for the Alaska gold placer mines the annual cost is $1.25 million. There is no projected capital cost for achieving BPT.

The Agency has determined that the pollutant reduction benefits associated with compliance justify the costs for this subcategory.

BAT

EPA has selected recirculation of process wastewater as the best available technology for all regulated mine sizes and types.

As discussed previously in this preamble, under most mine conditions, water incidentally enters a mine through precipitation, snow melt, surface runoff and subsurface incursion due to ground water infiltration and the melting of permafrost. While properly designed and constructed water diversion structures will reduce the amount of water which will accumulate in a mine, EPA field demonstrations, flow data, and comments from the industry indicate that in most cases, the incidental influx of water cannot be completely prevented. Because of this problem, the model BAT technology requires recirculation of process wastewater, but allows the discharge of commingled process and excess water after treatment in settling ponds. However, the discharge may not include the flow or volume of water that is used for the beneficiation process. Therefore the model BAT technology is actually a combination of two technologies: recirculation of process wastewater and simple settling of commingled water corresponding in volume to excess, non-process water. The effect of this limitation is to prohibit the discharge of any process wastewater during periods when new water is allowed to enter the plant site.

Water recirculation is a demonstrated and available technology in gold placer mines. As discussed earlier in this preamble it is common practice for some miners to recirculate process water during periods of water shortage. EPA has observed mines practicing recirculation, and data received from Alaska and states in the lower 48 indicate that recycling is practiced in the industry.

The addition of recirculation technology to simple settling technology requires substantial in-process changes. These changes constitute a change in the gold recovery process in that the water circuit is revised to return water containing substantial suspended solids to the gravity separation system instead of applying water that is relatively free of suspended solids to the gold recovery process. The Agency considered this to be a sufficiently significant process change to require confirmation that the change could be accomplished without serious consequences in the gold recovery rate. Also, comments had indicated that high levels of solids in recirculation water would have deleterious effects on gold recovery. Therefore, as described in Section V. A. above, EPA conducted a study during the 1985 and 1986 mining seasons on the effect of high suspended solids levels on the recovery of fine gold. The results of the study indicated that the recovery of gold in a sluice operation is essentially unaffected by levels of suspended solids substantially higher than those normally encountered in recirculated process water.

As stated in the Second NOA, the Agency considered adopting as BAT chemical treatment of wastewater, which involves the addition of polymers to aid in the removal of pollutants. The Agency has not adopted chemically aided settling in establishing BAT limitations because EPA believes that the technology is not a demonstrated, available technology at this time. At present, no placer mine is utilizing chemical treatment technology on a

season-long commercial basis. Furthermore, the tests conducted by EPA were not sufficiently detailed and extensive to demonstrate the full applicability of this technology to placer gold mines. As discussed in section VII of the development document, technical issues which have yet to be resolved include the effectiveness and cost of applying this treatment to the wide range of soils encountered in placer gold mines. Therefore, further testing and study are necessary before this technology could reasonably be selected as the basis for BAT effluent limitations guidelines.

Based on water recirculation and simple settling technologies, the BAT effluent limitations guidelines for all mines state that the volume of water which may be discharged from a plant site shall not exceed the volume that is due to commingling of infiltration and drainage water with process water which is in excess of the amount of make up water needed for operation of the beneficiation process. While the wording of the final rule is different from the proposed regulation, which stated that there shall be no discharge of process wastewater, the meaning of the proposed and the final regulation is identical. Both are based on the recirculation of all water that is needed for gold recovery. EPA believed that the language of the proposed rule could have been somewhat confusing, since the BAT limitations had to be read in conjunction with the specialized provisions defining "combined waste streams" in order to understand that excess, nonprocess water could be discharged after treatment. The final rule deletes the combined waste stream provision but inserts the substance of that provision into the language in the BAT section. The BAT limitations in the final rule are expressed in terms of the flow reduction that is achievable through the application of BAT to gold placer mine wastewater. Meeting this flow limitation will prevent the discharge of a significant portion of the process wastewater pollutants generated by the beneficiation of gold placer deposits. The BAT limitations also specify that the flow of commingled process and excess water which can be discharged must meet effluent limitations of 0.2 mg/l SS, derived on the basis of simple settling technology.

The final rule also contains several new terms that were not included in the proposed rule. These terms have been added for the sake of clarity, and do not alter the substance of the rule. These terms include "new water," "plant site," and "drainage water." Furthermore, the proposed rule would have applied the definitions for the ore mining and dressing category contained in Part 440, Subpart L, to the gold placer mine subcategory, except as superseded by definitions contained in the proposed rule. For the sake of clarity and simplicity, the final rule provides that Subpart L of Part 440 does not apply to this subcategory, and defines these terms from Subpart L which are relevant to gold placer mining. These terms are "mine," "mine area," and "mine drainage." The definitions are equivalent or similar to those contained in Subpart L. Where the definitions in this rule differ slightly from those contained in Subpart L, the changes were made for the sake of clarity and are not intended to reflect any substantive differences from the proposed rule.

Other minor definitional changes from proposal include the definition of "process wastewater," which at proposal only included water used and resulting from the beneficiation process. The definition of process wastewater in the final rule also includes mine drainage, drainage and infiltration water which commingle with water from the beneficiation process. This definition essentially inserts the substance of the combined waste streams into the process wastewater definition.

Also, the definition of "infiltration" in the final rule has simplified the definition of groundwater infiltration contained in the proposed rule. Finally, the definition of ore in the final rule combines the definitions of "gold placer deposit" and "ore pay dirt" contained in the proposed rule. The substance of the proposed rule have not been altered by any of these changes. Also, the term "opencut mine" is defined in the final rule to eliminate any possible confusion about the meaning of the term as used in this rule.

The final rule does not contain limitations for metals which have been found in placer mine wastewater. As stated in the preamble to the proposal, EPA's data indicate that metals which are discharged from placer mine operations appear to be associated with the solids. EPA reached this conclusion on the basis of a statistical analysis of the correlation between removals of TSS, arsenic and mercury. During the 1986 mining season, EPA conducted an extensive analysis of metals in treated and untreated wastewater. Settling tube tests conducted with polymer addition indicated that when TSS levels were reduced to low levels, the metals were, by and large, reduced to levels below their detection limits. These polymer settling tests demonstrated that metals in placer mines wastewater are in the particulate form and particulate metals are removed through treatment technologies that are designed to remove solids.

Even though there are no BAT limitations which control metals directly, the BAT limitations in this rule will adequately control the discharge of metals. By requiring recirculation of process water and thereby reducing significantly the volume of wastewater discharged, the BAT limitations will result in a corresponding substantial reduction of metals discharged to the receiving stream.

As described in the Second NOA, the actual levels of metals that are achieved at mines using settling ponds will vary depending upon the settling characteristics and metals content of the soil at a particular mine site. For this reason, it is not feasible to ascertain a precise level that is achievable with settling technology and which could thereby serve as a nationally applicable, uniform effluent limitation guideline. Settling ponds are designed to control solids and the Agency has not identified a treatment technology which has been demonstrated to control directly the metals content of placer mine wastewater. Nonetheless, because the metals have been demonstrated to be in particulate form and removed through solids removal, the BAT limitation of 0.2 ml/l of SS will result in substantial removals of metals in placer mine wastewater, in addition to the metals that are prevented from discharge through recirculation of process wastewater. EPA has not identified a more stringent demonstrated technology which could reduce metals levels below those achieved with the BAT limitations promulgated in this regulation.

Implementation of the BAT limitations nationwide for mines will remove annually from estimated raw waste 467,300 kilograms (kg) (1,028,000 lbs) of toxic metals and 1,977,000 metric tons (kkg) (2,174,800 tons) of TSS. From the Alaska gold placer mines 207,400 kg (456,300 lbs) of toxic metals and 956,900 kkg (1,052,600 tons) of TSS will be removed. As discussed in further detail in Section VI of this preamble, EPA has calculated the costs of achieving these pollutant removals. The total annual cost of achieving BAT nationwide at gold placer mines is $5.32 million and the projected capital costs for achieving BAT are $4.0 million. These costs are total and not incremental above BPT costs. For Alaska mines only, these costs are $2.77 million and $2.1 million respectively.

The Agency has determined that BAT limitations for this subcategory are technically feasible and economically achievable.

BCT

As stated in Section III above, BCT limitations control the discharge of conventional pollutants, including TSS. The Final rule, however, establishes limitations solely for settleable solids, a non-conventional pollutant. While solids in the form of TSS are present in placer mine wastewater, the Agency has determined that settling technology does not consistently control the levels of TSS such that the Agency can promulgate effluent limitations guideline and standards for this pollutant. Since the Agency has not established limitations for the control of any conventional pollutants, the final rule does not establish BCT limitations.

NSPS

EPA is promulgating NSPS for the gold placer mining subcategory based on the same wastewater treatment as BAT, which consists of simple settling plus recirculation of all process wastewater. There is no generally applicable, demonstrated technology which can be applied beyond BAT to further reduce the discharge of pollutants from gold placer mines. As discussed above, chemically aided settling is not at this time a demonstrated technology in gold placer mining. The other technologies examined by the Agency, including filter dams and tundra filters, are available only on a site-specific basis and therefore are not appropriate as the basis of nationally applicable, uniform effluent limitations guidelines and standards.

Since NSPS are equivalent to the BAT requirements, the Agency has determined that there will be no barrier to entry for new source gold placer mines. In fact, the new sources can design for efficient process water use and maximize wastewater reduction, thereby reducing the size (and in turn the cost) of pollution control facilities. Therefore, such facilities may actually be less costly to install and operate in comparison to existing mining operations.

EPA's NPDES regulations define a "new source" as a source which is constructed after the date of promulgation of applicable new source performance standards, unless those standards are promulgated within 120 days of their proposal, in which case a source is a new source if it is constructed after the date of proposal. 40 CFR 122.2. The new source performance standards contained in this rule were proposed in November 1985. Since more than 120 days have passed since proposal, NSPS will apply to those mines determined to be new sources by virtue of their activities occurring after promulgation of this rule. In the Second NOA, the Agency mentioned that the definition of new source in 40 CFR 122.2 was the subject of petitions for review in the U.S. Court of Appeals for the District of Columbia Circuit. The Court has since ruled upon this issue and upheld § 122.2 as being consistent with the Clean Water Act. *NRDC* v. *EPA*, 822 F2d 104, 113–114 (D.C. Cir., 1987).

As stated above, the NSPS promulgated by EPA for the gold placer mine subcategory are equal to BAT limitations, since BAT is based on the most stringent demonstrated technology that is available for treating gold placer mine wastewater. Therefore, those mines which are new sources will not be subject to controls any more stringent than those applicable to existing sources.

However, section 511(c) of the CWA provides that the issuance by EPA of NPDES permits to new sources is subject to the provisions of the National Environmental Policy Act (NEPA). Therefore, to the extent issuance of such permits might constitute major Federal actions significantly affecting the environment, NEPA requires the preparation of an environmental assessment and, if appropriate, an environmental impact statement prior to permit issuance. (see 40 CFR 122.29(c)).

In the preamble to the proposed regulation, EPA solicited comment on whether the new source criteria contained in EPA's NPDES regulations (40 CFR 122.2 and 122.29) would be appropriate for gold placer mining. In the Second NOA, EPA stated that it was considering adopting a list of factors for the Regional Administrator to use in determining, on a case-by-case basis, whether a gold placer mine is a new source under the Act. The Agency stated that case-by-case designation of new source placer mines on the basis of relevant factors was appropriate given the variety of possible events that may reasonably affect whether a gold placer mine is a new source.

After considering public comments on this issue, the Agency has concluded that the approach presented in the Second NOA is consistent with section 306 of the Act and provides the best approach to determining new source placer mines. EPA does not believe that the criteria contained in the NPDES regulations could reasonably be applied to determine new source placer mines, since they do not adequately address several unique features of gold placer mining, as discussed below. The adoption of industry-specific criteria for designation of new sources is consistent with the new source criteria contained in the NPDES regulations, since 40 CFR 122.29(b)(1) states that the NPDES provisions apply "except as otherwise provided in an applicable new source performance standard." Furthermore, EPA has adopted a similar approach to determining the existence of new source mining operations where the characteristics of the industry warranted specialized treatment. (See new source criteria for the coal mining category, 40 CFR 434.11(j)).

Under section 306 of the Act, whether a facility is considered a new source depends on the date construction of the facility was commenced. Section 306(a)(5) defines "construction" as "any placement, assembly, installation of facilities or equipment (including contractual obligations to purchase such facilities or equipment) at the premises where such equipment will be used, including site preparation work at such premises." Applying the term, "construction", to the placer mining industry, however, is problematic in light of several features of gold placer mines. First, gold placer mines, by their nature, are mobile operations. They continually move up or down a stream as they mine a pay streak, and they often relocate their mining activities within a claim or among different claims in search of pay dirt (i.e., ore containing recoverable gold). Second, due to climatic conditions, Alaskan placer mines can only operate during the summer months.

Applying the term, "construction," literally, it is arguable that a placer mine becomes a new source every time that it moves to a new location, since the mine is, in a sense, installing facilities and equipment at a different "premises". However, EPA believes that such an interpretation would not be consistent with the purposes of section 306. In placer mining, the continuous movement of mining operations represents the standard practice of an ongoing, existing operation. Designating all mines to be new sources by virtue of this movement would ignore that this is standard practice among existing placer mine operations.

The mobile nature of placer mines also demonstrates why the new source criteria contained in § 122.29(b) of the NPDES regulations are not appropriate for the determination of new source placer mines. If § 122.29(b)(1) were interpreted literally, any movement by a mine would make it a new source since,

arguably, a mine that moves to a new location is being "constructed at a site at which no other source is located." However, when EPA adopted the new source criteria, it acknowledged that they were not designed to address mobile operations. Commenters on the proposed NPDES criteria noted that they did not adequately address the question of whether relocated mobile oil and gas drilling rigs were new sources. In response, the Agency acknowledged that the regulation did not interpret section 306 of the Act for purposes of such mobile operations, and stated that this would be addressed when the Agency adopted new source performance standards for that industry. (44 FR 32871, June 9, 1979). Similarly, in this rulemaking, EPA is adopting criteria which address the unique aspects of gold placer mines.

EPA also considered whether gold placer mines should be defined as new sources when they recommence their operations every spring after being shut down for the winter season. Again, while this interpretation might be consistent with a literal reading of section 306, EPA believes that such an approach would ignore a unique aspect of gold placer mines operating in cold climates. Climatic conditions require gold placer mines to cease operations in Alaska during the colder months. It is an operating characteristic of such mines that some or all of their equipment is removed from the mining site each fall and replaced in the spring. This activity, however, is characteristic of all continuous, ongoing gold placer mine operations in such climates and therefore does not necessarily indicate the commencement of new mining activities. EPA therefore does not believe that it would be appropriate to consider the entire Alaskan gold placer mining industry to be new sources every spring. EPA does not believe that Congress intended in section 306 to designate large numbers of facilities in an entire subcategory as new sources every spring solely because climatic conditions dictated the routine yearly dismantling and installation of their operations.

Furthermore, defining all placer mines as new sources every spring would not advance the purposes of section 306. Congress adopted that provision in order to insure that new facilities which could institute production process changes met the most stringent pollution control requirements. (See Conf. Rep. 1236, 92nd Cong., 2d Sess. 127–129). However, the BAT limitations contained in this regulation already require existing sources to meet limitations based on the most stringent currently demonstrated pollution control technology that is available to gold placer mines, and NSPS are therefore equal to BAT limitations. Thus, designating every placer mine as a new source each season would not result in any more stringent levels of control than those already established for existing sources.

Instead of categorically classifying all mines as new sources because of the mobile and seasonal nature of their operations, the new source criteria in the regulation are to be considered by the Regional Administrator (RA) or Director of a state agency administering an NPDES program (Director) as the basis for determining when a mine has sufficiently altered location or discharges that the mine is to be treated as a new source. As described above, the designation of new source mines will not change the applicable effluent limitations, but may require the conduct of an environmental review by EPA in accordance with NEPA.

One of the criteria presented in the Second NOA is not included in the final rule. That criterion would have considered whether the mine moves to a vicinity which is not contiguous with the area in which the mine was previously operating. In light of comments stating that movement among claims along a stream is characteristic of on-going mining operations and pointing out the vagueness of the terms "contiguous" and "vicinity," EPA decided not to adopt this criterion in the final rule.

The criteria in § 440.144(c)(1), (3) and (4) relate to locational changes that the RA or Director is to consider which may be sufficiently significant to make a mine a new source. The criterion in § 440.144(c)(1) states that the RA or Director shall consider whether the mine will operate in a permit area which is outside of the permit area covered by a currently valid NPDES permit. This criterion is based on concern that mining activity in a new area that is not covered by a current NPDES permit may reflect significant new construction activities. Furthermore such a locational change could also have new and unknown deleterious effects on the environment. Commenters criticized the term, area, as being too vague. Section 440.141(a)(14) of the final rule therefore defines "permit area" as the area delineated in the NPDES permit, permit application, or other relevant documents. EPA believes this definition will minimize confusion as to the application of this criterion. EPA has slightly altered the language from that presented in the Second NOA by referring to whether the mine operates outside the permit area, instead of whether it operates in an area not covered by an NPDES permit. This change was made merely for the sake of clarity and no substantial change is intended.

Because the Agency has included the new term, "permit area," in this criterion, EPA believes it is more appropriate to tie this criterion to whether the mine operates outside an area covered by a currently valid NPDES permit. (The criterion in the Second NOA referred to whether the mine operates in an area which has previously been covered by a NPDES permit). The focus of this criterion on the area actually delineated in miners' NPDES permits (or other relevant documents such as the NPDES or state-Agency permit application) means that, in applying this criterion, the RA or Director will review the NPDES permits, applications and other documents that have been issued to or submitted by gold placer mining operations. Reviewing all the permits which have "previously" been covered by NPDES permits may well prove to be an administratively impossible task, since all the previous permits or applications may not be available. On the other hand, it will be administratively feasible to focus on the area delineated in the currently valid NPDES permit which is about to expire, since those permits and relevant permit applications should be readily accessible. Finally, the Agency also believes this modified criterion is appropriate because the operation of a mine outside an area currently covered by an NPDES permit can reflect significant new construction activities, even though the area may have been covered by a permit at some previous time.

The criterion in § 440.144(c)(4) refers to whether the mine will operate in a permit area that has not been mined during the term of the current permit, whereas the criterion presented in the Second NOA referred to whether mining has occurred within the past five years. Commenters questioned the Agency's basis for the five-year period. The final rule clarifies that the time period of concern should correspond to the term of the current permit. EPA believes that the term of the current permit, rather than some fixed period, is the appropriate time horizon, since the RA or Director will normally focus on the new source question, along with other permit issues, at the time of permit reissuance. Since the new source question may have last been addressed during the previous permit reissuance

proceeding, EPA believes that focusing on mining activity that has occurred since that time will provide an administratively workable means of applying this new source criterion.

The purpose of this criterion is to focus on those mines which wish to operate in areas that have not been mined for some period of time. EPA believes that the placement of facilities or conduct of mining operations in such an area is an appropriate criterion to be considered by the RA or Director in determining whether the mine is a new source, since such activities could reflect significant construction activities. Furthermore the effects of introducing pollutants in an area which has not recently been mined may be significant.

Section 440.144(c)(3) refers to whether the mine discharges into a stream into which it has not previously discharged. In the Second NOA, the Agency proposed that this criterion refer to whether the mine discharged into a new drainage basin. EPA has narrowed this criterion somewhat because the movement of a mine to a new stream can represent significant new construction activities. Furthermore, such a change could pose new environmental impacts.

The criterion contained in § 440.144(c)(2) refers to whether the mine significantly alters the nature or quantity of pollutants discharged. The reference to increasing gold recovery capacity that was included in the criterion presented in the Second NOA has been deleted. Commenters expressed confusion as to whether the criterion would apply to a mine that increased gold recovery capacity but did not alter the nature or quantity of pollutants discharged. EPA decided to delete the reference to gold recovery capacity in order to clarify that this criterion is intended to apply to changes in discharges, and not increases in gold recovery capacity per se.

Also, in light of the fact that BAT limitations and NSPS prohibit mines from discharging the volume of water used in the beneficiation process, increases in gold recovery processing capacity will not necessarily result in increased discharges to the receiving stream. Rather, under this regulation, the volume of discharges will depend upon the volume of excess drainage and infiltration water that enters into the treatment system and needs to be discharged. Therefore, the unique circumstance that may lead to significant changes in the nature and quantity of pollutants discharged would be where the plant site is significantly increased causing it to collect more drainage water than collected by the previously existing plant site. Since such excavation may involve significant construction activities, EPA believes that it is appropriate that the RA or Director consider whether the alteration in discharge resulting from such construction is sufficiently significant to designate the mine a new source. Taking into account the unique characteristics of this subcategory, as well as the particular limitations guidelines and standards promulgated in this rule, EPA believes that this criterion is an appropriate factor for the RA or Director to consider in designating new source gold placer mines.

The occurrence of any one of these events is not intended to be conclusive in making a new source determination. Rather, the criteria are to be considered and taken into account by the RA or Director in assessing all of the circumstances of a particular mine. EPA recognizes that the characteristics of placer mining operations may vary widely and EPA therefore may not have anticipated all the circumstances relevant to a new source determination. The rule therefore allows the RA or state Director to consider such other factors as he deems relevant in determining whether a placer mine is a new source. For example, the RA or Director may consider whether a mine has to rebuild completely the retaining berms or wastewater treatment ponds of the mine that have been destroyed by storms or snow melt.

VI. Economic Considerations

A. Costs and Economic Impacts

EPA's economic impact assessment is set forth in the report entitled "Economic Impact Analysis of Effluent Limitations Guidelines and Standards for the Placer Gold Mining Industry". This report presents the investment and annualized compliance costs for the plants covered by this regulation. The report also estimates the economic effect of compliance costs in terms of mine closures, employment losses, profitability impacts, and regulatory costs as a percent of sales and as a percent of operating costs. Except for a few large open cut and dredge operations included in the economic impact analysis, the report is a detailed analysis of small business impacts since most placer mines are owner-operated businesses with from one to three employees.

The number of active mines fluctuates from year to year, in response to changes in the price of gold and other factors. The EPA mine count of 457 active mines in 1986 is based largely on state supplied data. EPA estimates there are 192 mines covered by this regulation in Alaska and 265 mines in the lower 48 States. The costs of implementing the regulations are estimated on a model mine basis. Total capital costs for BPT and BAT are projected to be $4.0 million with annualized compliance costs (including capital and operating expenses) of $5.3 million (in 1986 dollars). These compliance costs are based on the assumption that mines rebuild settling ponds every year; however, the costs reflect the fact that some mines currently have other treatment equipment (primarily water recirculation equipment) in place.

The compliance costs calculated by EPA were based on engineering estimates of the capital requirements and operating expenses of each technology option for each open cut model mines sized at 18,000, 35,000, 150,000, and 340,000 cu yd of ore per year annual production and for dredges at 216,000 and 810,000 cu yd of ore per year annual production. Total compliance costs were derived by multiplying the cost for each option times the number of mines in each size category. As stated above, the Agency recognizes that the number of mines fluctuates based on many factors and thus total compliance costs for the industry would change as the number of mines fluctuates. However, EPA believes this will not alter or change the conclusions with respect to economic impacts at individual mines or for the industry as a whole. The purpose of the impact analysis is to characterize the impact of these regulations for the industry as a whole and analyze the impact on representative mining operations.

EPA believes that these model mines represent the range of various sized operations in the placer mining industry; that is, they indicate the impacts on very small, small, medium, and large open cut mining operations, and dredges processing greater than 50,000 cu yd of ore per year. Because placer mines vary in terms of the precise configuration of equipment, personnel, and value of ore processed, it is not possible for the Agency to develop models that represent the unique circumstances that may be found in every mining operation. Rather, the model mines developed by the Agency represent, to the maximum extent possible, the range of mining operations in the industry.

B. Economic Methodology

The Economic Impact Analysis (EIA) focuses on five primary impact measures: Closure, profitability, the ratio of compliance cost-to-sales,

percent increase in operating costs due to compliance, and job losses. The values are estimated for representative mines using a combination of survey data collected in the field, published literature, and other sources related to the placer gold mining industry.

The closure analysis compares cash flow to total operating costs (including expenses for mine operation and wastewater treatment) in a single year. A closure is projected if operating costs exceed revenues. The economic impact analysis indicates a number of baseline closures, with the number varying as the price of gold varies. That is, prior to imposing regulatory controls or compliance costs, these mines are expected to close due to total operating costs exceeding revenues. This situation is characteristic of an industry where prices are beyond the control of individual producers.

The profitability impact measure indicates the extent to which placer mining compliance costs reduce mine profitability. The cost-to-sales impact measure compares compliance costs to mine revenues. The fourth impact measure indicates the extent to which compliance costs increase total operating costs on a percentage basis, giving a sense of the relative magnitude of the cost of complying with this regulation. Job losses measure the extent to which mine closures caused by the regulation create unemployment.

C. Changes in the Economic Methodology

Major, substantive revisions to the economic analysis methodology and model mines were presented for public comment in the Second NOA. In response to information and data supplied by commenters regarding the revised methodology, EPA made certain changes which are described fully in the economic impact analysis and in the Comment and Response document contained in the public docket. Some of the comments and resulting changes are described below.

Commenters stated that EPA's model mines did not represent a large percentage of mines smaller than the mine utilized by EPA to determine impacts on small open cut mines (35,000 cu yd of ore per year). Commenters claimed that, since almost half of the gold placer mining industry consists of mines processing less than 35,000 cu yd of ore per year, EPA should model the costs and impacts for mines operating below this level. In response to these comments EPA developed a fourth open cut model mine to represent a very small mine processing 18,000 cu yd of ore per year, to better consider the impacts of this regulation on mines in this size range.

Another set of comments indicated that there are a few (3 to 4) very small dredges operating in Alaska, each processing approximately 25–50 thousand cu yd of ore per year. Since data and models utilized by EPA to examine impacts on dredges were based on much larger operations (i.e., 210,000 and 800,000 cu yd of ore per year), EPA does not believe that these models necessarily reflect the likely impacts on very small dredge operations. Since EPA has little data with which to measure these impacts, EPA has decided not to promulgate effluent limitations guidelines and standards applicable to dredges processing less than 50,000 cu yd of ore per year. These dredges will continue to be regulated under NPDES permits based on the best professional judgment of the permit writer.

Other commenters suggested incorporating data published by Alaska state agencies into EPA's economic analysis, including state figures on the number of mines, gold production, ore grades, and fineness. EPA reviewed all information and comments submitted by state and regional offices. EPA has adopted the State of Alaska figure on the number of active mines in each region in 1986. On the basis of the state's data, EPA has revised its estimate of total compliance costs and the amount of gold production in Alaska.

EPA has modified the assumptions regarding gold fineness that were presented in the Second NOA. Commenters correctly pointed out that the data relied upon by EPA were for "true fineness", the ratio of gold to the gold and silver content of the ore. However, the more relevant measure is the ratio of gold to the total ore. The Agency has therefore revised the fineness assumptions in the model mine analysis based on survey data collected by EPA from 50 commercial mines over a period of three years. EPA has decided to rely on the survey data collected directly by the Agency because the Agency is familiar with the data collection methodology and is confident that the information reflects conditions in the industry. Furthermore, EPA's fineness estimates are supported by the State of Alaska's figures of total gold production in 1986, since use of the Agency's fineness assumptions in its model mine analysis yields an estimate of total gold production that is consistent with the State's figures. (See response to comment No. 9, in Section X below).

EPA has not modified its assumptions about ore grade that were presented in the Second NOA. The Agency's ore grade estimates, which vary by region in Alaska from 0.013 to 0.029 ounces per cu yd, are based on a literature search of historic grades. The average of the values used by the Agency (.02 ounces per cubic yard of ore) is supported by survey data collected by the Agency and by the U.S. Bureau of Mines and Minerals Yearbook for 1985, which stated that the average ore grade in the United States was 0.02 ounches per cu yd of ore. Again, the Agency's ore grade assumptions are further corroborated by the fact that they yield an estimate of total gold production that is consistent with State of Alaska figures.

Additional comments received during the comment periods on the proposal and notices of new information suggested that EPA should investigate the frequency with which recycling technology is currently being practiced in the placer mining industry. The Alaska Department of Environmental Conservation submitted data on gold placer mining operations in Alaska for 1985, 1986 and 1987 containing information submitted by Alaskan placer miners in their applications for state-issued, Tri-agency permits. Included in the information submitted by permit applicants was whether they expected to practice recycling at their operation. The data indicate that approximately 30 percent of the mines in Alaska expected to recycle 100 percent of their water and another 30 percent indicated they would operate under partial recycle conditions. While these data do not demonstrate whether mines actually practiced recycling, EPA believes that they indicate the proportion of mines which already have recycling equipment on site. Since miners indicated in the permit applications that they would be practicing recycling, the Agency believes it is reasonable to conclude that the applicants had the equipment to carry out their stated intentions. The economic impact analysis contained in the record for this rulemaking describes the method by which the Agency incorporated these data into its analysis of baseline model mine operating costs and compliance costs.

D. Baseline Analysis

The baseline economic analysis establishes the economic health of gold placer mines prior to incurring costs to comply with this regulation. As discussed above, if a mine's pre-compliance total operating costs exceed its cash flow, the mine is projected to close and is considered a baseline closure. Baseline total operating costs consist of direct and indirect operating

expenses. The direct operating expenses include labor, labor support, energy, supplies, transportation, maintenance services and smelter and refining charges. The indirect operating expenses include debt service, depreciation, and amortization. The sum of these costs are the estimated total annual cost of a placer gold mining operation.

The economic impact analysis indicates a number of baseline closures. EPA estimates that there are 67 baseline closures when gold is valued at $377 per ounce (the average gold price during the 1986 mining season in Alaska) and two baseline closures when gold is valued at $455 per ounce (the average gold price during the 1987 mining season). Since these mines are projected to close even without the imposition of regulatory controls they are removed from the analysis determining the incremental impacts on the industry of complying with this regulation.

E. Economic Impacts

The following economic impacts are estimated given a gold price of $455 per ounce, which represents the season average reported price from May to September of 1987.

BPT: Simple Settling

The estimated 192 Alaskan mines covered by this rule will incur annualized compliance costs for BPT of $1.25 million; the estimated 265 mines in the lower 48 will incur annual BPT costs of $1.17 million. The total annual cost of BPT is $2.42 million. No capital expenditures are expected to be incurred in order to comply with BPT limitations. These total annual costs represent construction and maintenance of four settling ponds at each mine during the season using heavy machinery, equipment and labor already available at the mine site.

Compliance with BPT limitations results in no significant adverse impacts. Five Alaska and two lower 48 mine closures are projected in the very small (18,000 cu yd of ore per year) model group (out of 196 mines in the group) with an associated fourteen job losses. One Alaska mine closure and three job losses are expected in the small (35,000 cu yd of ore per year) model group (out of 189 mines in the group). For Alaska mines the ratio of compliance cost to sales for all groups ranges from 1 to 3.6 percent; the increase in operating costs due to compliance ranges from 1 to 5.1 percent for all groups. The impact values for cost-to-sales and increase in operating costs are virtually the same in the lower 48.

For dredges, the compliance cost to sales ratio is 1.9 to 2.3 percent and the increase in operating costs due to compliance is 2.6 to 3.1 percent.

In both Alaska and the lower 48, the decline in rate of return on investment for open cut mines and dredges ranges from zero to 2 percent for all mines under BPT.

EPA has concluded that these financial impacts represent an acceptable level of impact. The eight mine closures projected under BPT represent less than two percent of U.S. placer gold mines.

BAT: Water Recirculation with Simple Settling

The Alaskan mines will incur capital and annualized compliance costs for BPT and BAT of $2.1 million and $2.77 million; mines in the lower 48 will incur costs of $1.93 million and $2.55 million, respectively. The Total capital and total annual costs for BPT and BAT are $4.0 million and $5.32 million, respectively, after taking the treatment in place into account. The incremental capital and annual costs to go from BPT to BAT are $4.0 million and $2.91 million, respectively.

Eight Alaska mine closures (three incremental to BPT) are projected in the very small (18,000 cu yd of ore per year) mine group, with an associated sixteen job losses (six incremental to BPT). Five mine closures (four incremental to BPT) are projected in the small (35,000 cu yd of ore per year) mine group with an associated 15 job losses. For Alaska mines the ratio of compliance cost to sales under BAT ranges from 1.4 to 6.5 percent; the increase in operating costs due to compliance ranges from 2 to 9.4 percent.

For dredges, the compliance cost to sales ratio is 1.0 to 1.3 percent and the increase in operating costs due to compliance ranges from 1.0 to 1.3 percent under BAT. The return on investment for Alaska open cut and dredge mines drops in the range of from zero to 2.0 percent. These impact values are cumulative.

Four lower 48 mine closures (two incremental to BPT) are projected in the very small (18,000 cu yd of ore per year) mine group with an associated eight job losses (four incremental to BPT). One closure and an associated two job losses are projected in the small (35,000 cu yd of ore per year) mine group. Recirculation costs for mines in the lower 48 are projected to be about 27 percent less than in Alaska. Return on investment drops from between one and four percent at mines in the lower 48 under BAT.

On the basis of these projected economic impacts EPA has concluded that the BAT limitations are economically achievable for all mine sizes and types. The ten mine closures associated with BAT (incremental to BPT) represent only about three percent of active mines.

As previously mentioned, information submitted by Alaskan placer mines indicates that about 30 percent of the mines in Alaska expected to use full recycle and another 30 percent expected to operate under partial recycle conditions. Thus, for a large portion of mines, recirculation is currently an economically viable practice which may be undertaken to conserve water or for other reasons. In EPA's view, this fact supports the Agency's conclusion that BAT limitations based on recirculation of process water are economically achievable.

Impacts With Gold Price of $377 Per Ounce

EPA also examined the economic impacts of these technologies if the gold price were $377 per ounce. The price of gold and the grade of ore are the most significant and variable parameters in determining the profitability of a mining operation. The economic impact of meeting any option is obviously greater at $377 per ounce than at $455 per ounce. However, after analyzing and comparing the economic results under these two gold prices, the Agency has concluded that BAT is economically achievable even at the lower gold price. Though total mine closures increase from 12 to 19 in the very small mine size as the gold price drops from $455 to $377 per ounce, EPA has concluded that the impacts associated with BAT at the lower gold price are not significant.

F. Regulatory Flexibility Analysis

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.* Pub . L. 96–354) requires EPA to assess whether its regulations create a significant impact on a substantial number of small entities and to consider alternatives that minimize any such significant impacts. EPA previously defined "small" operations as those commercial gold placer mines processing more than 1,500 and less than 70,000 cu yd of ore per year (mines processing less than 1,500 cu yd per year are not covered by this regulation). These mines represent approximately 80 percent of the gold placer mines in Alaska and about 90 percent of the mines in the lower 48. In Alaska, these mines typically have revenues of approximately $300,000 (from mining several months each year)

and employ less than ten people. In the lower 48 states, these mines have annual revenues below $200,000 and also employ a small number of people per mine.

Gold placer mines are primarily small, independently owned operations. The economic analysis estimated the aggregate impacts which would occur if water recirculation was required for all mines (BAT). The Agency also considered a less stringent limitation for very small mines (i.e., those processing less than 18,000 cu yd of ore per season) by setting BAT equal to BPT (simple settling). The Agency rejected setting BAT equal to BPT for very small mines for several reasons. First, the incremental economic impacts of going from BPT to a more stringent BAT for very small mines were not significantly different from the incremental impacts for the other mine sizes. Second, the economic impacts do not include widespread significant adverse economic effects on small businesses.

Like actual mining operations, the Agency's economic model is sensitive to gold price. Although very small mine closures might increase in the long run at the lower gold price of $377 per ounce, EPA's economic analysis indicates that the majority of gold placer mines in Alaska and the lower 48 would continue to be productive and profitable entitles. Additionally, information submitted by the Alaska Department of Environmental Conservation supports the Agency's position that all mines, regardless of mine size, can afford to recirculate process water. These data indicate that very small mines operating in regions where water is scarce have instituted recirculation to conserve water. EPA concludes that there is no economic justification for not requiring small gold placer mining operations to achieve the BAT effluent limitations based on recirculation of process water.

EPA is promulgating this final rule based on currently available information. The Department of the Interior, as well as other commenters have expressed concerns about EPA's assumptions and resulting economic impacts that these regulations may impose on small placer mines (mines processing between 1,500 and 35,000 cubic yards per year). Based on all available information, EPA has determined that the limitations imposed by this rule are technically feasible and economically achievable. However, EPA is requesting comment for 60 days concerning the economic impacts imposed on small placer mines by this regulation. Should significant additional data be presented to the Agency on small placer mines during this comment period demonstrating that different effluent guidelines limitations and standards are warranted on a national basis, the Agency will modify the rule.

G. Cost-Effectiveness

EPA has conducted an analysis of the incremental cost per pound equivalent for removal of the pollutants controlled by the placer gold mining regulation. A pound equivalent is calculated by multiplying the number of pounds of a pollutant by the toxic weighting factor for that pollutant. The weighting factors give relatively more weight to more highly toxic pollutants. Thus, for a given expenditure and pounds of pollutants removed, the cost per pound-equivalent removed would be lower when more highly toxic pollutants are removed than if less toxic polllutants are removed.

The cost effectiveness values for BPT is less than $1 per pound and the incremental cost effectiveness of BAT is $3 per pound equivalent. The cost effectiveness report is included in the public record of this rulemaking.

H. Executive Order 12291

Executive Order 12291 requires EPA and other agencies to perform regulatory impact analyses (RIA's) for major regulations. Major regulations are those that impose an annual cost to the economy of $100 million or more, or meet other criteria. This regulation is not considered a major regulation. The costs expected to be incurred by this industry ($5.3 million annually) are significantly less than $100 million. Therefore, a formal Regulatory Impact Analysis is not required. The Agency's regulation for this industry considered both the cost and economic impact of the regulation.

I. SBA Loans

The Agency continues to encourage small concerns to use Small Business Administration (SBA) financing as needed for pollution control equipment. The three basic programs are: (1) The Pollution Control Finance Guarantee Program, (2) the section 503 Program and (3) the Regular Business Loan Program (section 7(a)). Eligibility for SBA programs varies by industry.

For further information and specifics on the Pollution Control Finance Guarantee Program, contact the U.S. Small Business Administration, Office of Pollution Control Financing, 1441 L Street, NW., Washington, DC, 20416, (202) 653-2540.

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.

Through SBA's Regular Business Loan Program (section 7(a)), 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 (Section 7(a)) and Section 503 Programs, contact the appropriate district or local SBA office. The coordinator at EPA Headquarters is Ms. Karen V. Brown, Small Business Ombudsman (A-149C), Environmental Protection Agency; 401 M Street, SW., Washington, DC, 20460; (703) 557-7015.

VII. Nonwater Quality Aspects of Pollution Control

The elimination or reduction of one form of pollution may cause other environmental problems. Therefore, sections 304(b) and 306 of the Act require EPA to consider the nonwater quality environmental impacts (including energy requirements) of certain regulations. In compliance with these provisions, EPA has considered the effect of this regulation on air pollution, solid waste generation, water scarcity, and energy consumption. While it is difficult to balance pollution problems against each other and against energy utilization, EPA is promulgating regulations which it believes best serve often competing national goals.

The following nonwater quality environmental impacts (including energy requirements) are associated with the final regulation. The impacts identified below are justified by the benefits associated with compliance with the limitations and standards.

A. Air Pollution

Imposition of BPT may cause a minor increase in the emissions of dust from the movement of earth to build the settling ponds recommended for the gold placer mining subcategory. These emissions are not expected to create a substantial air pollution problem. BAT and NSPS will not result in any increase in air pollution above BPT. The Agency does not consider this to be a significant impact.

B. Solid Waste

EPA estimates that the promulgated BPT limitation for gold placer mines nationwide will generate 1,838,000 kkg (2,021,300 tons) per year of solid wastes (sludge) (wet basis—1986 production levels) as a result of wastewater treatment; BAT will generate 1,977,000 kkg (2,174,800 tons) per year solid waste from raw waste. These sludges will be comprised of soil solids containing very

small concentrations of toxic metals, including arsenic, antimony, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, thallium, and zinc. Because these sludges are characteristic of the soils indigenous to the particular mine and contain no additives, it is the Agency's view that solid wastes generated as a result of these guidelines will not be considered as hazardous under RCRA. Furthermore an analysis was made of the toxic metals data collected for raw and treated wastewaters at five mines in 1986. This analysis showed that even if all of the toxic metals taken out of the water in the sludge were extracted by the RCRA EP test, the sludge would not be classified as a hazardous (toxic) waste under RCRA.

C. Energy Requirements

EPA estimates that the achievement of BPT effluent limitations will result in the consumption of approximately 155,800 gallons of additional diesel fuel per year. The BAT technology should increase the energy requirements above BPT by 485,200 gallons per year. NSPS will not add any additional energy requirements. To achieve the BAT effluent limitations, a typical direct discharger will increase total energy consumption by 14.2 percent of the energy consumed for production purposes. This increase in energy consumption is not considered to be of national significance.

D. Consumptive Water Loss

Treatment and control technologies that require extensive recirculation and reuse of water often result in the substantial consumption of water because the water is used as a cooling mechanism. Because the gold recovery processes do not generate heat or require cooling the water, loss through evaporative cooling is negligible. The Agency concludes that the consumptive water loss is negligible and that the pollution reduction benefits or recirculation outweigh the impact on consumptive water loss.

VIII. Permits for Dredged or Fill Material

Section 404 of the CWA requires that permits be obtained from the Army Corps of Engineers for most discharges of dredged or fill materials into navigable waters. To the extent individual placer mines conduct activities regulated under this provision, they must obtain individual permits or general permits, if applicable, under section 404 of the CWA.

IX. Pollutants and Facilities Not Regulated

A. Pollutants Not Regulated

In the preamble to the proposed regulation, EPA stated that it intended to apply criteria contained in paragraph 8 of the NRDC settlement agreement for excluding individual toxic pollutants from regulation. One commenter objected to reliance on those criteria since this regulation, as EPA has stated, is not being issued pursuant to that agreement. These criteria have been a consideration in the issuance of effluent limitations guidelines and standards for many industry categories, including ore mining and dressing. Since gold placer mining is a subcategory of ore mining and dressing and does not appear to have unique conditions which would justify a different approach from that used in ore mining and dressing EPA believes that it is appropriate to apply the concepts of these criteria to this subcategory.

As indicated in the preamble to the proposed regulation, the Agency examined effluent waters from gold placer mining for the presence of toxic pollutants. Only two toxic organic pollutants were identified in these wastewaters and neither of these two could be associated with placer gold mining but rather appear to be contaminants from the handling or analysis of samples. Therefore the toxic organic pollutants are excluded from regulation because they were not found to be present in the wastewaters of this subcategory.

Thirteen toxic metals were found to be present at varying levels in different mines sampled. These metals are present in the solid (undissolved) state and are removed at the same time that other solids are removed from the wastewaters. Similarly, asbestos is a solid material which when present will be removed along with other solids from the wastewaters. Therefore these thirteen toxic metals and asbestos are believed to be adequately controlled by the regulation of settleable solids in the wastewaters which are treated and discharged.

B. Facilities Not Regulated

This regulation applies to all open cut and mechanical dredge gold placer mines except those open cut mines that mine less than 1,500 cubic yards of placer ore per mining season, dredges that remove less than 50,000 cubic yards of placer ore per mining season and dredges operating in open waters.

The exclusion of small open cut gold placer mines was proposed (50 FR 47982) and comments received on the exclusion. Generally, these comments supported the exclusion of these extremely small or exploratory mines from this regulation. For the reasons stated in the preamble to the proposal, the Agency continues to believe that these extremely small mines are below the level of production that can be effectively regulated by this national regulation and are more appropriately regulated under BPJ permits. Therefore this regulation establishes limitations only for open cut mines with production levels greater than 1,500 cubic yards of ore per year. Operations processing less than this amount must meet effluent limits contained in NPDES permits based on the best professional judgment of the permit writer.

The Agency proposed to regulate mechanical dredges processing greater than 4,000 cubic yards of ore per day. As presented in the Second NOA, EPA thereafter developed economic models based on production rates of 810,000 cubic yards of ore per year and 216,000 cubic yards per year. Based on these models, EPA considered applying this regulation to dredges of all sizes. Comments on the Second NOA described extremely small dredges which had production rates at or below 50,000 cubic yards of ore per year. The Agency examined all of the available data for these dredges and determined that there was not sufficient data with which to promulgate effluent limitations guidelines and standards for these operations. Therefore, this regulation only applies to dredges which mine more than 50,000 cubic yards of ore per year. However all dredges not covered by this regulation remain subject to regulation by the NPDES permit issuing authority under section 402 of the CWA. The Agency believes that there are only three or four of the extremely small dredges and that they can be effectively regulated in this manner.

EPA proposed to exclude from coverage of this regulation dredges operating in open waters because the Agency had no information as to the number, location, or applicable technologies for these facilities. One commenter suggested we clarify what is intended by the term open waters. For the purpose of this regulation open waters are the open gays, marine waters and major rivers in which a dredge can operate freely and without the use of artificial water impoundments. The final rule maintains this exclusion for these facilities for the reasons stated in the proposal. These facilities will continue to be regulated based on the best professional judgment of the permit writer.

X. Public Participation and Response to Major Comments

Industry, government, individual citizens, and environmental groups have participated during the development of these effluent limitations guidelines and standards. Before proposal (November 20, 1983), EPA released a draft development document and a draft economic impact document, and held a public workshop (April 25, 1984). Public comments from this workshop were discussed when this regulation was proposed on November 20, 1985, (50 FR 47982). The comment period was scheduled to end on March 20, 1986. However a notice of new data was published February 14, 1986, (51 FR 5563) and the comment period on the proposal was extended to close on April 10, 1986. Additionally, EPA published a second notice of new data and request for comments on March 24, 1987, (52 FR 9414). Following a public workshop held March 26, 1987, in Fairbanks, Alaska, the comment period closed June 26, 1987.

Since proposal, the following 112 commenters have made 130 submissions containing approximately 1300 individual comments on the proposed regulation and notices of new data: Northwest Exploration, Inc.; Earl H. Beistline; Howard Bayless; Stephen G. Olson; Warren E. Magnuson; Lloyd Magnuson; Edward O. Strandberg, Jr.; Nelson N. Angapak, Calista Corporation; L. A. Peterson & Associates, Inc.; Little Creek Mine; Consolidated Placer Dredging, Inc.; Kako Mine; Douglas B. Tweet, N. B. Tweet & Sons; G. M. Zemansky; Innoko Area Miners, Neece, Cator & Associates, Inc.; Spruce Creek Mining Company; Bureau of Water Quality, Department of Health and Welfare, Division of Environment, State of Idaho; Robert L. Magnuson, Mayor, City of McGrath, Alaska; Alaska Gold Company; J. Moore Laboratory; Office of the Governor, State of Alaska; Flat Creek Placers; Eric Smith, Trustees for Alaska and Randy Rogers, Northern Alaska Environmental Center; Howard F. McWilliams; Keith Tryck, Alaska Miners Association; Nyac Mining Company; Tanana Chiefs Conference, Inc; Fish and Wildlife Service, U.S. Department of the Interior; Office of the Secretary, U.S. Department of the Interior; Robert Aumiller; Jacqueline D. LaPerriere, University of Alaska; Department of Fish and Game, State of Alaska; Jack La Cross; St. Joe Minerals Corporation; Roger C. Burggraf, Alaska Miners Association, Inc.; Tulkisarmute IRA Council; Donald Stein, Alaska Miners Association; Rural Alaska Resources Assoc.; Curt McVee, Alaska Miners Association; Flat Creek Placers; Richard L. Wright; Leo Mark Anthony, University of Alaska; Mike R. Mark Anthony; Office of Management and Budget, State of Alaska; Department of Natural Resources, State of Alaska; Calista Corporation; C & R Enterprises; Hawley Resource Group, Inc.; Engstrom Dredging Co.; Howard F. McWilliams; Mark B. Ringstad; Western Alaska Tribal Council; Stanley C. Rybachek and Rosalie A. Rybachek; Ralph and Irene Anderson; Rosander Mining; Donald E. Mullikin; Spruce Creek Mining Company; Birch Creek Village Council; Harold Gillam; On-Line Exploration Services, Inc.; Cenaliulriit; Martinson Gravel & Crane Inc.; Roy E. Traxler; Richard B. Stough; Lyman Resources in Alaska; L. E. Wyrick; Eagle Creek Mining; Department of Natural Resources, Division of Mining, State of Alaska; Division of Geological & Geophysical Surveys, Department of Natural Resources, State of Alaska; Lyman Resources in Alaska; Frank Demantle, Mayor, City of Akiak, Alaska; Mark Ringstad; John W. Harding; Rural Alaska Community Action Program, Inc., Bering Sea Fishermen's Association and Tanana Chiefs Conference; Trinity Mining; Muriel A. Tweet; Richard A. Hughes; Granite Investment Inc.; Tom Van Ostrand; Jim Frey, Sr.; Paul Manuel; Bruce W. Campbell; Clyde B. McMahon; Al Hopen; Fred D. Wilkinson; GHD Resources Partners, Ltd.; Miners Rights Action Group; Placer Mining Advisory Group for the State of Alaska; John B. Goghill, Senator, Alaska State Legislature; Russell Roberts; Richard A. Hughes; Tim Roberts; S & H Enterprises; Campbell Enterprises; Director, Office of the Governor, State of Alaska; Brooke Cacy; P. J. Cacy, Jr.; Patti J. Saunders, Trustees for Alaska and Randy Rogers, N. Alaska Environmental Center; J. S. Masterman; Karl Hanneman; Chief, Department of Lands, Bureau of Minerals, State of Idaho; John Korobko, Placer Miners of Alaska; Citizens' Advisory Commission on Federal Areas; Kevin P. Adler; Jerry Birch and Kevin Greenfield, Nyac Mining Company; Campbell Enterprises; Tulkisarmute IRA Council; Frank Demantle, Sr., Mayor, City of Akiak; Leslie F. Simmons, Alaska Dept. of Environmental Conservation; Ted Stevens, U.S. Senator, and James H. Cole.

The comments from these commenters have been responded to in a document entitled "Response to Comments for the Gold Placer Mining Subcategory" which is available in the public record for this rulemaking. The following is the Agency's response to selected significant comments.

1. Adequacy of the Data Base

Comment: Many commenters questioned the adequacy of the data base collected by the Agency, and the reliability of the methods used to collect and obtain the economic and technical data supporting the proposed effluent limitations guidelines and standards. Some commenters stated the data base is not representative of the industry.

Response: The Agency believes it has an adequate data base supporting this regulation and that this data base is representative of mines in the industry.

The development document lists nineteen data gathering efforts conducted by the Agency, the Agency's contractor, a state environmental agency, and the Canadian Department of Environmental Resources. These reports contain data and information collected since 1975 for over 175 individual gold placer mines located in 15 mining districts in Alaska, in six other states, and in Canada where gold placer mines are operated. However, in developing the effluent limitations guidelines and standards, the Agency has relied primarily upon the information and data gathered from 1983 through 1986, since these data reflect current practices in the industry. During this period, wastewater samples were obtained and analyzed from over 120 mine sites (some mines in this group sampled several times and no samples were obtained if the mine was not operating or sluicing). Profile and fact sheets were completed at over 80 mines and treatability studies were conducted at 21 mine sites. (Two mine sites were studied twice during different years.) These data were supplemented by NPDES permit files from EPA Regional Offices, contacts with state pollution control offices, and demonstration projects sponsored by EPA.

The ten mines visited and sampled in detail in 1984 represented seven mining districts where two-thirds of the existing mines in Alaska were located. Mines were selected after requesting recommendations from EPA Region X, ADEC, the Alaska Miners Association, and the Placer Mining Advisory Group (an ad hoc group composed of representatives from government, industry, and academic and environmental groups) regarding mines representing a cross-section of the industry in the following respects: geographical locations, type of mining, size, rate of recycle (0 to 100 percent), depth and type of overburden and method of removal, type of ore (amount of clay and whether it was semi-frozen), topography, age, processing method

(including classification), climate (rainfall and period of breakup or freeze up), and treatment technology. Furthermore, the eight mines visited and sampled in 1986 were selected in four mining districts not previously represented by technical and economic data collected by EPA or EPA contractors. In light of EPA's efforts to collect data from operations representing the variety of practices and conditions in the industry, the Agency believes that its data base is representative of the industry.

Sampling and analysis data were collected according to established EPA procedures. The data and fact sheets were completed by either EPA personnel or EPA contractors. In both cases, the fact sheets were completed by professionals who were experienced at collecting data and information in support of effluent limitations guidelines and standards. Information was collected from the industry through direct industry submissions, and submissions of data from Federal and state agencies. With the placer mining industry, as with any industry which EPA has studied to develop effluent limitations guidelines and standards, the Agency considers fully the information submitted by private individuals and representatives of the industry.

Some commenters claimed that the cost and economic data collected by EPA from the industry were not verified by the Agency and therefore provided a questionable basis for evaluating the economic impact of this regulation. EPA disagrees with this comment and believes that the data collected from the industry are reliable. First, the information submitted by different miners was generally corroborative; that is, the reported values for parameters such as average ore grade fell within a reasonably narrow range. In addition, whenever possible, the Agency attempted to substantiate industry-submitted data by reviewing other published sources of data and inquiring with relevant state or federal agencies. The Agency considered to totality of all available information in evaluating the technical and economic aspects of this rule.

2. Subcategorization Based on Mine Size

Comment: Many commenters indicated that BAT more stringent than BPT should only be established for large mines while other commenters stated that there was no basis to subdivide the subcategory by mine size.

Response: In this regulation, the gold placer mine subcategory is subdivided according to the mining method employed, i.e., open cut mines and bucket line dredges. EPA has divided the industry in this manner because of basic difference in these two mining methods. Furthermore, as discussed in the development document, open-cut mines and dredges will employ slightly different methods in order to implement recirculation model technologies. As discussed in Section IX of this preamble, all mines processing less than 1500 cu yd of ore per year and bucket line dredges producing less than 50,000 cu yd of ore per year are not subject to this regulation and will receive NPDES permits based on the permit writer's best professional judgment. BPT and BAT effluent limitations and NSPS are the same for all mines and dredges of all sizes covered by this regulation.

The proposed rule would have subdivided the subcategory by mine size, establishing BCT, BAT limitations and NSPS equal to BPT for mines processing less than 500 cu yd of ore per day because the Agency's economic impact analysis indicated that more stringent controls were not achievable for these small mines. However, based upon comments received and data and information obtained after the proposal, the Second NOA announced that the Agency was considering water recirculation as a requirement for all mines covered by this rule.

On the basis of the methodologies and impacts presented in the Second NOA, as well as modifications made in light of public comments, the Agency finds no justification based on technical or economic bases to further subdivide the gold placer mine subcategory. The technology selected at BAT and NSPS, recirculation of process water and simple settling of excess water, is technically feasible for all open-cut mines and dredges. Furthermore, the Agency's economic impact analysis indicates that recirculation of process water is economically achievable for existing and new sources, regardless of mine size, as discussed in Sections V and VI of this preamble and in greater detail in the Development Document and Economic Analysis Document.

3. Small Dredges

Comment: Commenters pointed out that some operating dredges are much smaller than the dredges discussed in the Second NOA.

Response: The Second NOA stated that the Agency was considering regulating mechanical dredges of all sizes with the same effluent limitations based on the assessment of costs and impacts with two dredge models of 216,000 cu yd of ore per year and 810,000 cu yd of ore per year. From comments and the little technical information the Agency was able to obtain following the notice, EPA has identified three dredges smaller than 50,000 cu yd of ore per year. Due to an insufficient data base on these operations, EPA did not develop an economic model to evaluate the economic impact of this rule on these dredges. The Agency has therefore excluded bucket line dredges processing less than 50,000 cu yd of ore per year from the regulation. These operations will receive NPDES permits establishing appropriate effluent limitations based on the best professional judgment of the permit writer.

4. Settleable Solids Measurement and Limitation

Comment: Some commenters questioned the Agency's derivation of the method detection limit for settleable solids (SS) while others questioned the achievability of 0.2 ml/l SS with simple settling technology.

Response: The method detection limit for settleable solids is discussed in some detail in the First NOA. The method detection limit determined for placer mine wastewater is the lowest level of settleable solids that can be read accurately. The MDL determination described in Section V of this preamble resulted in a MDL for settleable solids in wastewaters from gold placer mines of 0.2 ml/l. This determination of the MDL was done in accordance with published Agency procedures for establishing MDL's. In addition, statistical analysis of multiple measurements of replicate settleable solids samples provided additional support and validation of the settleable solids MDL.

The available data indicate that the effluent limitation for settleable solids is achievable with a properly designed, constructed, and maintained pond which, when filled with its designed capacity of settled sludge and wastewater, the pond will provide a minimum of four hours retention of the wastewater entering the pond. Four (or more) hours of simple settling in this model treatment system will reduce settleable solids in the wastewater to a level at or below the MDL of 0.2 ml/l. As described in Section V of this preamble, EPA determined this limitation based on data from settling tests conducted with gold placer mine wastewater from 5 mines sampled in 1986. The limitation was verified by sampling and analysis of existing treatment at 17 miles, and by discharge monitoring reports (DMR) submitted by placer mines reporting individual samples of 0.2 ml/l or less (See discussion in section V, above).

5. Solids removal as an indicator of toxic metals removal.

Comment: Commenters questioned EPA's conclusions about the relationship between solids removal and metals removal, and some stated that direct numerical control of the metals is required by the Clean Water Act.

Response: The Agency takes the position that it may control pollutants either directly through specific limitations on the pollutants itself or indirectly through limitations on other pollutants. As described in Section III of this preamble, the NRDC Settlement Agreement which has applied to the issuance of effluent limitations guidelines and standards for many industry categories provides that pollutants may be excluded from regulation at BAT and NSPS if they are effectively controlled by the technologies upon which other effluent limitations guidelines and standards are based. While this regulation is not issued pursuant to that Settlement Agreement, EPA believes it is consistent with the Clean Water Act to apply the principles of the settlement agreement. EPA has determined that toxic metals are effectively controlled by the removals of solids that are achieved by the limitations established in this regulation. Simple settling specifically removes settleable solids from the wastewater, including metals and metallic minerals that are in the solid form. All data available to the Agency indicate that metals detected in the raw wastewater from gold placer mines are predominantly in the solid form and are removed along with other solids when settleable solids are removed from the raw wastewater.

Furthermore, as described previously in this preamble, the Agency's data indicate that it is not feasible to establish effluent limitations guidelines and standards for the metals in placer mine wastewater. While settling data inducate that metals are removed through the removal of solids, the data also indicate that those metals are not consistently removed to levels that could serve as appropriate effluent limitations guidelines. Rather, the metals are removed to varying degrees at different sites. This result is not surprising since settling technology is specifically designed to remove solids, not metals. Nonetheless, the Agency's data indicate that metals in placer mine wastewater are by and large removed through solids removal. Thus, even though metals removals through simple settling are not sufficiently consistent that the Agency could establish effluent limitations guidelines and standards for these pollutants, the available data also indicate that removal of metals achieved through the control of solids will be substantial.

In addition, the BAT limitations and NSPS are based on recirculation of process water and the treatment of excess water to 0.2 ml/l settleable solids before discharge. The Agency estimates that over 90 percent of the toxic metals in the raw wastewater will be removed by BAT and NSPS, including 90 percent of the arsenic and 95 percent of the mercury. The data collected by the Agency indicate that the total concentration of toxic metals found in wastewater treated to 0.2 ml/l settleable solids is below the limitations promulgated for the metals in other subcategories of ore mining based on treatment specifically designed for metals removal. Similarly the metal concentrations found in treated effluent from good placer mines are below the concentrations achievable with model technologies (pH adjustment, settling, and filters) used as the basis for metals limitations in many other industrial categories. The Agency concludes that the concentrations of metals in treated effluent discharged from gold placer mines are at concentrations below those to which metals are required to be treated by available technologies applied in other industrial situations.

6. Water Reuse and Recirculation

Comment: Some comments claimed that the Agency should establish limitations based on recycling which prohibit the discharge of any water, since infiltration and runoff can be completely eliminated. Other commenters contended that water recirculation was not feasible because it interferes with the recovery of fine gold.

Response: The Agency disagrees with the comments. Public comments, substantiated by Agency observations, demonstrate that excess water cannot always be eliminated from settling or wastewater holding facilities whether the water is in the form of subsurface infiltration or mine drainage to the settling facility. In this regulation, the Agency requires mines to use certain Best Management Practices (BMP) in locating and constructing settling facilities, controlling mine drainage, and controlling run-off from outside of the mine area. These BMPs will result in the reduction of the volume of excess wastewater to the lowest feasible level. However, these practices will not eliminate excess water at some mines.

The Agency investigated the volume of excess water at a number of mines and was able to obtain limited data on flow and the pollutant loads of incidental excess water. Incidental excess water, after commingling with process water, is used as makeup water in a water recirculation system to run the gold recovery process. To the extent the volume of excess water exceeds the amount required for gold recovery, that volume may be discharged after treatment.

Comments also stated and the Agency observed that some dredge operations have excess incidental water due to a water inflow to the dredge pond itself. This excess water in a dredge pond must be treated and discharged in order for the dredge pond to be maintained at its proper level to enable the dredge's buckets to reach to the bottom of the ore being mined. In light of these comments from the industry and EPA field observations, EPA concludes that incidental and infiltration water can not always be eliminated and this rule provides for that contingency.

Gold placer mine operators qualify their demonstrated practice of recirculating wastewater by stating that high suspended solids caused by recirculating water reduces gold recovery in a sluice. However, no conclusive data have ever been offered by the industry to establish or quantify the loss or, if there is a loss, indicate what concentration level of solids initiates such a loss. The Agency, the Alaska Department of Environmental Conservation, and the University of Alaska have conducted pilot studies to determine if total recirculation of water (buildup of total suspended solids in the recycle water) affects the recovery of gold. All of the studies conducted indicate that there is no appreciable loss of gold due to suspended solids in the process water. Test runs have included wash water with TSS levels approaching 200,000 mg/l levels which far exceed those encountered under full-scale recirculation conditions. The Agency has no reason to believe that a scale-up in size would alter the conclusions obtained from the pilot field studies.

7. Chemically Assisted Settling

Comment: Commenters stated that the use of chemically assisted settling was not sufficiently proven to form a proper basis for BAT.

Response: The Agency agrees with this comment. Chemically assisted settling is documented as a proven and effective technology in other subcategories of the ore mining category as well as in other industrial categories, for the control and removal of TSS in wastewater. The Agency conducted pilot field tests over three mining

seasons in Alaska that indicated polymers used in chemically aided settling would effectively control TSS to low levels. However, upon further examination by the Agency following numerous comments from the public, EPA has concluded that this technology has not been adequately examined in gold placer mining under full scale mine conditions nor have seasonal effects or variations in geology or mineralogy been examined sufficiently for the Agency to regulate TSS based on chemically assisted settling as a model technology.

Chemically assisted settling can however be used at the discretion of a permittee to meet effluent limitations for SS in a NPDES permit based on this regulation or other more stringent limitations, i.e., based on state water quality standards. Also, section 301(k) of the Clean Water Act, as implemented in 40 CFR 125.20–125.27, provides that facilities may obtain a 2-year extension for compliance with BAT if the facility can demonstrate that it will use an innovative technology that achieves a significantly greater effluent reduction than that required by BAT limitations or an equivalent effluent reduction at significantly less cost than BAT if the technology can be applied at two or more facilities in the industry. While the NPDES regulations provide that the Administrator may grant such extensions to no later than July 1, 1987, that language was based upon language in section 301(k) of the Act prior to its amendment in 1987. That amendment deleted reference to July 1, 1987 and provides that extensions may be granted for up to two years from the date of compliance with BAT. Until such time as EPA amends its regulations to conform to the 1987 amendments, the Act's language on this point is controlling Chemically aided settling, alone or in conjunction with other technologies such as those demonstrated through the Alaska Grants Project, could under certain circumstances provide a significantly greater level of effluent reduction than that provided at BAT by recirculation of process water and simple settling of the excess water to achieve 0.2 ml/l settleable solids. Recycle of any portion of the process wastewater would reduce even further the solids discharged to the environment. The mine operator (permittee) could under section 301(k) apply to the Regional Administrator for a 2-year extension for compliance with BAT, at which time the permittee would have to meet alternative BAT effluent limitations reflecting significantly greater pollutant removals than those achieved by BAT limitations.

As noted above, 40 CFR 125.20–125.27 also applies to an innovative technology that results in the same effluent reduction as BAT at significantly lower costs than BAT systems. Section VIII of the Development Document contains a more complete discussion of the implementation of section 301(k) and 40 CFR 125.20–125.27.

8. Baseline Model Mines

Comment: Commenters indicated that placer gold mining operations are affected by many factors including soil condition, mine location, weather conditions and other site specific characteristics which the models did not take into account.

Response: EPA could not model every existing or new placer gold mining operation. However, in light of comments received on the proposal, EPA revised its economic methodology to reflect site-specific conditions such as transportation costs, water availability, weather, topography, geology, geography, etc. The Agency derived numerical cost factors to modify or adjust baseline cost estimates according to those conditions prevalent in six regions in Alaska and in the lower 48 states. The Agency differentiated the models to reflect conditions such as climate, geology, and water availability according to the region in Alaska where mines are located. EPA then assigned cost factors which reflected the different costs associated with these conditions. The application of these variable cost factors resulted in the development of "representative" mines for each region. In this way, the Agency developed a systematic method of comparing mining costs under the variety of site-specific conditions found in gold placer mines.

9. Gold Production in Alaska

Comment: Several commenters pointed out that EPA's estimate of total Alaska gold production in 1986 presented in the second NOA was higher than figures published by the State of Alaska. Commenters contended that this discrepancy indicated that the Agency's assumptions about ore grade values were inflated, and that EPA estimates of mine revenue were therefore too high.

Response: In response to these comments the Agency revised its estimate of 1986 total cumulative gold production by summing all gold produced from the estimated 192 active placer mining operations. EPA's revised estimate of 1986 Alaska gold production is 172,200 ounces (compared with state figures of 160,000). This revised estimate was derived by adjusting the Agency's assumptions about the number of mines located in each region of Alaska to be consistent with the geographic distribution reported in *Alaska's Mineral Industry 1986 Special Report 40.* However, EPA has maintained in its economic methodology the same assumptions about ore grades that were reported in the March 1987 notice. As described in that notice, EPA has assumed that ore grade varies in different regions in Alaska. Adjusting the location of mines consistent with the State's information resulted in more mines being located in regions with lower ore grades. EPA's estimate of total gold production was thereby reduced to a value comparable to the State's figure, even though the Agency did not make any changes about ore grade contained in the economic analysis. The EPA estimate is approximately 8 percent greater than the State of Alaska figures. There could be several reasons for this discrepancy, including unreported gold production by miners retained for price speculation purposes or for trading or bartering purposes, or gold transported and smelted out of the state of Alaska and thus not reported in state figures. In any case the difference between EPA's estimate and State's figures is small, which confirms the accuracy of the Agency's assumptions about parameters such as ore grade and fineness which were utilized in calculating EPA's estimate of mine revenues.

10. Small Businesses

Comment: Commenters stated almost all mines in Alaska should be classified as small businesses, and contended that EPA should examine the small business impacts of this regulation.

Response: As described in Section VI. F., above, the Agency has focused on the impacts of this regulation on small business. The Agency considers all placer gold mining operations processing between 1,500 and 70,000 cu yd of ore per year to be a small business (operations smaller than 1,500 cu yd of ore per year are not covered by this rule). Mines of this size generally employ one to four people full time during the mining season. The economic impact analysis presents a detailed study of the estimated effects compliance costs will have on these operations. The Agency has developed two model open cut mines, with processing rates of 18,000 and 35,000 cu yd of ore per year, to reflect the impact on small mining operations. These model mines have equipment schedules and operating characteristics that incorporate the data reported by small miners. EPA developed the model representing a very small mine (18,000

cu yd of ore per year) in response to comments from the industry requesting more analysis of the impacts on small operations. Thus, EPA has focused specifically on the impacts of this regulation on very small mining operations.

11. General Assumptions Used to Derive Mine Revenue

Comment: Commenters questioned the values used to determine mine revenue including ore grade, fineness, nugget bonus and gold price.

Response: Ore grades for the revised model open cut mines range from 0.013 to 0.029 ounces per cu yd of ore. These grades are based upon a literature search of historic grades which is documented in the public record of this rulemaking. Questionnaires (also included in the record) returned by active placer mines in Alaska show a current average recovered ore grade of 0.022 ounces per cu yd of ore. The average ore grade used by EPA is 0.02 ounces per cu yd of ore. This figure is thus supported by values reported to EPA by placer mines and available literature.

Commenters questioned the validity of using MIRL Report 45, Mining Industry Research Laboratory, University of Alaska, to derive assumptions about gold fineness because it reports "true fineness" which exclusively compares the ratio of gold and silver in the bullion and does not take other impurities into account. EPA agrees with these comments. As a result, EPA reviewed all surveys submitted by mine operators in 1984, 1985 and 1986. Those mines surveyed reported an average fineness of 858, and this figure was applied to all regions in the final economic impact analysis report.

Commenters also objected to the Agency's assumptions about the percentage of gold recovered in nugget form and the premium obtained for nuggets above the spot price. Other commenters supported the Agency's position. EPA reviewed this issue and concludes premiums are paid to miners for a portion of their gold production. EPA bases this conclusion on information obtained from gold buyers in both the lower 48 and Alaska about the premium paid for gold of certain mesh sizes.

This information indicates that varying premiums are paid for those portions of gold production that exceed certain size classifications. On the basis of available data, a premium of 23 percent over the spot gold price was assigned to that portion of production that exceeds 14 mesh. No premium was assigned to gold less than 14 mesh.

The percentage of production that qualified for the premium was determined from data developed by the State of Alaska Innovative Grants Program. These percentages are 19 percent for the very small and small open cut mines, 15 percent for medium and 5 percent for the large open cut mines. No premium was assigned to the dredge model.

XI. Best Management Practices (BMP)

Section 304(e) of the Clean Water Act authorizes the Administrator to prescribe "best management practices" to prevent the release of toxic and hazardous pollutants from plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw materials storage associated with or ancillary to the manufacturing or treatment process. In gold placer mines, infiltration, surface drainage and mine drainage are associated with mining and beneficiation operations and may contribute significant amounts of pollutants to navigable waters. The November 1985 proposal solicited comments on possible BMP being considered by the Agency. The five BMP explained below and included in the regulation are necessary for control and treatment of the drainage and infiltration water at gold placer mines and to prevent solids and toxic metals from being released to the receiving streams under various types of climatic and seasonal conditions. These BMP represent good mining practices which are commonly practiced in well operated mining operations. This rule requires the inclusion of BMP in gold placer mine permits, unless it can be demonstrated to the satisfaction of the RA or Director that one or more of the BMP are not applicable for a particular operation.

(a) Surface Water Diversion

The free flow of surface waters into the plant site shall be interrupted and these waters diverted around and away from incursion into the plant site.

Such diversion may be accomplished by appropriate means such as the construction of dikes, berms or ditches to convey the water away from or around the plant site. For the purpose of this requirement, the plant site is defined in § 440.14(a)(15) as the area occupied by the mine, necessary haulage ways from the mine to the ore processing equipment, the area occupied by the ore processing equipment, the areas occupied by the wastewater treatment facilities and the storage areas for waste materials and solids removed from the wastewaters during treatment.

This BMP requirement applies both during the active mining season and at all other times. It applies for the plant site in active use and to plant site areas no longer in active use after active operations have ceased.

(b) Berm Construction

Berms, including any pond walls, dikes, low dams and similar water retention structures shall be constructed in a manner such that they are reasonably expected to reject the passage of water.

This may be achieved by utilizing on-site materials in a manner that the fine sealing materials such as clays are mixed in the berms with coarser materials. Berms should be toed into the underlying earth, constructed in layers or lifts, and each layer thoroughly compacted to ensure mechanical and water tight integrity of the berms. Other impermeable materials such as plastic sheets or membranes may be used inside the berms when sealing fines are unavailable or in short supply. The side slope of berms should be not greater than the natural angle of repose of the materials used in the berms or a slope of 2:1 whichever is lower.

(c) Pollutant Materials Storage

Measures shall be taken to assure that pollutant materials removed from the process water and wastewater streams will be retained in storage areas and not discharged or released to the waters of the United States.

These measures may include location of the storage ponds and storage areas to assure that they will not be washed out by predictable flooding or by the return of a relocated stream to its original stream bed. The overflows from ponds and storage areas should be protected from erosion by rip rap or rock plating. Submerged discharges or constant level discharge pipes through retention dikes should be used where practicable.

This requirement applies both during the active mining season and at all other times as well as after active mining operations have moved to new locations.

(d) New Water Control

The amount of new water allowed to enter the plant site for use in ore processing shall be limited to the minimum amount required as make-up water for processing operations.

New water is defined in § 440.141(a)(11) as water from any discrete source such as a river, creek, lake or well which is deliberately allowed or brought into the plant site.

Control mechanisms should limit the flow of new water to the minimum amount needed to supplement other waters for gold ore processing make-up requirements and should shut off the flow or exclude new water when the ore processing segment of the facility is not being operated.

(e) Maintenance of Water Control and Solids Retention Devices

All water control devices such as diversion structures and berms and all solids retention structures such as berms, dikes, pond structures and dams shall be maintained to continue their effectiveness and to protect from unexpected and catastrophic failure.

The structures should be inspected on a regular basis for any signs of structural weakness or incipient failure. Whenever such weakness or incipient failure becomes evident, repair or augmentation of the structure to reasonably assure against catastrophic failure shall be made immediately.

This BMP requirement shall apply both during the active mining season and at all other times as well as after active mining operations have moved to new locations.

XII. Upset and Bypass Provisions

A recurring issue of 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 beyond the reasonable control of the permittee. It has been argued that an upset provision in EPA's effluent limitations is necessary because such upsets will inevitably occur even in properly operated control equipment. Because technology-based limitations require only what technology can achieve, many claim that liability for upsets is improper. When confronted with this issue, courts have been divided on whether an explicit upset or excursion exemption is necessary, or whether upset or excusion incidents may be handled through exercise of EPA's enforcement discretion. Compare *Marathon Oil Co.* v. *EPA*, 564 F.2d 1253 (9th Cir. 1977) with *Weyerhaeuser* v. *Costle, supra*, and *Corn Refiners Association, et. al.* v. *Costle*, No. 78–1069 (8th Cir., April 2, 1979). See also *American Petroleum Institute* v. *EPA*, 540 F.2d 1023 (10th Cir. 1976); *CPC International, Inc.* v. *Train*, 540 F.2d 1320 (8th Cir. 1976); *FMC Corp.* v. *Train*, 539 F.2d 973 (4th Cir. 1976).

An upset is an unintentional episode during which effluent limits are exceeded; a bypass, however, is an act of international noncompliance during which waste treatment facilities are circumvented in emergency situations. The Agency has, in the past, included bypass provisions in NPDES permits.

EPA has determined that both upset and bypass provisions should be included in NPDES permits and has promulgated permit regulations that include upset and bypass permit provisions (see 40 CFR 122.41 (m) and (n), 48 FR 14146 (April 1, 1983)). The upset provision establishes an upset as an affirmative defense to prosecution for violation of technology-based effluent limitations. The bypass provision authorizes bypassing to prevent loss of life, personal injury, or severe property damage.

Although permittees in the gold placer mine subcategory will be entitled to upset and bypass provisions specified in NPDES permits, this regulation establishes the specific conditions which must be met in order to be eligible for the storm exemption established as part of the technology-based requirements of this regulation. As discussed in the preamble to the proposed regulation and in the development document for this regulation, the Agency recognizes that mines, in particular surface mines, should not be required to construct treatment for the maximum precipitation event, or series of precipitation events, that could occur with resulting effects on wastewater and mine drainage discharge flows. The storm exemption provides a limited exception to the requirements applicable under normal operating conditions. If the operator complies with this provision, the operator has an affirmative defense against an enforcement action for any violation that occurs as a result of precipitation if he complies with the notification requirements of § 122.41 (m) and (n) of the general permit regulation. The final rule therefore, establishes for gold placer mines criteria to be used in designing, constructing and maintaining wastewater treatment facilities, in order to be eligible for the storm exemption i.e., the facilities must be able to contain and treat the maximum volume of wastewater resulting from processing ore during a 4-hour period plus the volume that would be discharged from a five-year, six-hour precipitation event § 440.141(b). The proposed storm exemption would have required that ponds be designed to retain the volume of wastewater generated during a 6-hour processing period. The final rule is based on the retention of process water that would be generated during a four hour period, since, as discussed in Section V above, the Agency bases the limitations in this regulation on a four hour retention period. Furthermore, the final rule also provides that in order to be eligible for the storm exemption, the permittee must be in compliance with the BMP contained in this rule. The storm exemption supersedes the general upset and bypass provisions of the general NPDES permit regulations only with respect to precipitation events. The upset and bypass provisions in the general permit regulations are available in all other applicable situations. The storm exemption and its application are discussed further in the Development Document.

XIII. Variances and Modifications

Upon promulgation of this final regulation, the appropriate effluent limitations must be applied in all Federal and State NPDES permits thereafter issued to direct dischargers in the gold placer mine subcategory.

For BPT effluent limitations, the only exception to the binding limitations is EPA's "fundamentally different factors" variance. See *E.I. duPont deNemours Co.* v. *Train*, 430 U.S. 112 (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 cost 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 to 1976 industry regulations, it is now included in the general NPDES regulations and is cross-referenced in this regulation as well as other specific industry regulations. See the general NPDES regulations at 40 CFR Part 125, Subpart D.

The BAT limitations in this regulation also are subject to EPA's "fundamentally different factors" variance. However, section 306 of the Water Quality Act of 1987 added a new section 301(n) to the Act which somewhat limits the availability of FDF variance from BAT effluent limitations guidelines. An FDF application must be based solely on information and supporting data submitted to EPA during the rulemaking establishing the limitations that discussed the fundamentally different factors, or on information and supporting data that the applicant did not have a reasonable opportunity to submit during the rulemaking. The alternative requirement must be no less stringent than justified by the fundamental difference and must

not result in markedly more adverse non-water quality environmental impacts than those considered by EPA in establishing these BAT limitations.

Readers should note that EPA has not yet amended its FDF variance regulation to conform to the provisions of the Water Quality Act of 1987. However, EPA recognizes that the new section 301(n) of the Act overrides the existing FDF regulation to the extent of any inconsistency, and EPA does intend to modify the FDF regulation to conform to the new statutory requirements.

In addition, BAT limitations for nonconventional pollutants are subject to modifications under section 301(c) and 301(g) of the Act. These statutory modifications do not apply to toxic or conventional pollutants. Since BAT limitations on the discharge of settleable solids serve as indicators for the discharge of toxic pollutants, gold placer mine operators will not be able to obtain variances under these provisions of the Act.

New sources subject to NSPS are not eligible for any statutory or regulatory modifications. See, *E.I. duPont deNemours & Co.* v. *Train supra.*

XIV. Implementation of Limitations and Standards

A. Relationship to NPDES Permits

The BPT and BAT limitations, NSPS and BMP 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. These requirements do not apply to individual dischargers until incorporated into NPDES permits. As discussed in the preceding section of this preamble, these limitations must be applied in all Federal and State NPDES permits except to the extent that variances and modifications are expressly authorized. Other aspects of the interaction between these limitations and NPDES permits are discussed below.

One issue that warrants consideration is the effect of this regulation on the powers of NPDES permit issuing authorities. EPA has developed the limitations, standards and BMP in this regulation to cover the typical facilities in each subcategory of this point source category. However the promulgation of this regulation will not restrict the power of any permitting authority to act in any manner consistent with law or these or any other EPA regulations, guidelines, or policy. For example, even if this regulation does not control a particular pollutant, such as total suspended solids (TSS), the permit issuer may still limit the pollutant on a case-by-case basis when such actions are necessary to carry out the purposes of the Act. In addition, to the extent that State water quality standards, e.g., for turbidity, or other provisions of State or Federal law require limitation of pollutants not covered by this regulation (or require more stringent limitations on covered pollutants), the permit issuing authority must apply those limitations.

These guidelines will not assure compliance with receiving water quality standards in all cases. As stated above, the permit issuing authority may have to impose additional controls (such as turbidity limits) to ensure compliance with the water quality standards. However, because of the BAT limitations based on recirculation of process water, application of the guidelines will result in compliance with water quality standards at a large percentage of the mines. At other sites, discharges will be greatly reduced, with the result that the costs of any additional treatment needed to meet water quality standards will be reduced accordingly.

A second topic that warrants discussion is the operation of EPA's NPDES enforcement program, many aspects of which were considered in developing this regulation. The Agency emphasizes that although the Clean Water Act is a strict liability statute, the Agency may elect to use any of the enforcement responses available under the CWA. *Sierra Club v. Train,* 557 F.2d 485 (5th Cir. 1977).

XV. Availability of Technical Information

The basis for this regulation is detailed in four major documents. Analytical methods are discussed in "Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants." EPA's technical conclusions are detailed in the "Development Document for Effluent Limitations Guidelines, and New Source Performance Standards for the Ore Mining and Dressing Category, Gold Placer Mine Subcategory". The Agency's economic analysis is presented in "Economic Impact Analysis of Effluent Limitations Guidelines and Standards for the Gold Placer Mine Subcategory". A detailed response to the public comments received on the proposed regulation is presented in a report "Responses to Public Comments on the Effluent Limitations Guidelines and Standards for the Proposed Gold Placer Mine Subcategory", which is a part of the public record for this regulation. Copies of the technical and economic documents may be obtained from the National Technical Information Service, Springfield, Virginia 22161, (703) 487-4600. Additional information concerning the economic impact analysis may be obtained from Mr. Mitchell Dubensky, Economic Analysis Staff (WH-586), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460 or by calling (202) 382-5388. Technical information may be obtained from Mr. Willis Umholtz, Industrial Technology Division (WH-552), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460 or by calling (202) 382-7126.

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 OMB review under the Paperwork Reduction Act of 1980. 44 U.S.C. 3501 *et seq.*

XVI. List of Subjects in 40 CFR Part 440

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

Dated: May 9, 1988.

Lee M. Thomas,

Administrator.

XVII. Appendices

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

Act—The Clean Water Act.

ADEC—Alaska Department of Environmental Conservation.

Agency—The U.S. Environmental Protection Agency.

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

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

BDT—Best available demonstrated technology under section 306(b)(1) of the Act.

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

BPJ—Best Professional Judgment.

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

CWA—Clean Water Act—The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 *et seq.*), as subsequently amended.

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

NEPA—National Environmental Policy Act of 1969.

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.

OMB—Office of Management and Budget.

POTW—Publicly owned treatment works.

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

SBA—Small Business Administration.

SS—Settleable Solids.

TSS—Total Suspended Solids.

For the reasons discussed above, 40 CFR Part 440 is amended as follows:

PART 440—[AMENDED]

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

Authority: Secs. 301, 304(b), (c) and (e), 306, 307, 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 and the Water Quality Act of 1987), (the Act), 33 U.S.C. 1311, 1314(b), (c) and (e), 1316, 1317, and 1361; 86 Stat. 816, Pub. L. 92–500; 91 Stat. 1567, Pub. L. 95–217; 101 Stat. 7, Pub. L. 100–4.

2. In § 440.100 paragraph (a) is revised to read as follows, paragraph (b) is redesignated as paragraph (d), and new paragraphs (b) and (c) are added 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 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.

(b) 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.

(c) Discharge from mines (including placer or dredge mining, and hydraulic mining operations) or mines and mills that use gravity separation methods to extract silver from placer ores are not covered under this part.

* * * * *

§ 440.102 [Amended]

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

§ 440.103 [Amended]

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

§ 440.104 [Amended]

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

6. Part 440 is amended to add a new Subpart M, consisting of §§ 440.140 through 440.148, 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 and dredges that produce gold or gold bearing ores from placer deposits; and

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

(b) The provisions of this Subpart M are not applicable to any mines or beneficiation processes which process less than 1500 cubic yards (cu yd) of ore per year, or to dredges which process less than 50,000 cu yd of ore per year, or to dredges located in open waters (i.e., open bays, marine waters, or major rivers).

§ 440.141 Specialized definitions and provisions.

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 except as superseded by those below. The general provisions and definitions set forth in 40 CFR Part 440 Subpart L, shall not apply to this subpart.

(a) *Specialized Definitions.* The following specialized definitions apply to this subpart only.

(1) "Beneficiation area" means the area of land used to stockpile ore immediately before the beneficiation process, the area of land used for 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).

(2) "Beneficiation process" means the dressing or processing of gold bearing ores for the purpose of—

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

(ii) Removing unwanted constituents from the ore, and

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

(3) "Drainage water" means incidental surface waters from diverse sources such as rainfall, snow melt or permafrost melt.

(4) "Dredge" means a self-contained combination of an elevating excavator (e.g., bucket line dredge), the beneficiation or gold-concentrating plant, and a tailings disposal plant, all mounted on a floating barge.

(5) "Five (5) year, 6-hour precipitation event" 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.

(6) "Gravity separation methods" 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.

(7) "Infiltration water" means that water which permeates through the earth into the plant site.

(8) "Mine" means a place where work or other activity related to the extraction or recovery of ore is performed.

(9) "Mine area" means the land area from which overburden is stripped and ore is removed prior to moving the ore to the beneficiation area.

(10) "Mine drainage" means any water drained, pumped or siphoned from a mine.

(11) "New water" means water from any discrete source such as a river, creek, lake or well which is deliberately allowed or brought into the plant site.

(12) "Open cut mine" means any form of recovery of ore from the earth except by a dredge.

(13) "Ore" means gold placer deposit 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. Ore is the raw "bank run" material measured in place, before being moved by mechanical or hydraulic means to a beneficiation process.

(14) "Permit Area" means the area of land specified or referred to in an NPDES permit in which active mining and related activities may occur that result in the discharge regulated under the terms of the permit. Usually this is specifically delineated in an NPDES permit or permit application, but in other cases may be ascertainable from an Alaska Tri-agency permit application or similar document specifying the mine location, mining plan and similar data.

(15) "Plant site" means the area occupied by the mine, necessary haulage ways from the mine to the beneficiation process, the beneficiation area, the area occupied by the wastewater treatment facilities and the storage areas for waste materials and solids removed from the wastewaters during treatment.

(16) "Process wastewater" means all water used in and resulting from the beneficiation process, including but not limited to the water used to move the ore to and through the beneficiation process, the water used to aid in classification, and the water used in gravity separation, mine drainage, and infiltration and drainage waters which commingle with mine drainage or waters resulting from the beneficiation process.

(17) "Settleable solids" means the particulate material (both organic or inorganic) which will settle in one hour expressed in milliliters per liter (ml/l) as determined using an Imhoff cone and the method described for Residue—Settleable in 40 CFR Part 136.

(b) *Specialized Provisions—Storm Exemption.* This specialized provision applies to this Subpart M only. If, as a result of precipitation (rainfall or snowmelt), a source subject to 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:

(1) The treatment system is designed, constructed, and maintained to contain the maximum volume of untreated process wastewater which would be discharged, stored, contained and used or recycled by the beneficiation process into the treatment system during a 4-hour operating period without an increase in volume from precipitation or 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 the plant site contributing runoff to the individual treatment facility.

(2) The operator takes all reasonable steps to maintain treatment of the wastewater and minimize the amount of overflow.

(3) The source is in compliance with the BMP in § 140.148 and related provisions of its NPDES permit.

(4) The operator complies with the notification requirements of § 122.41 (m) and (n) of this title. 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.

§ 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 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 in process wastewater from an open-cut mine plant site shall not exceed:

Effluent limitations	
Effluent characteristics	Instantaneous maximum
Settleable solids	0.2 ml/l

(b) The concentration of pollutants discharged in process wastewater from a dredge plant site shall not exceed:

Effluent characteristics	Effluent limitations—Instantaneous maximum
Settleable solids	0.2 ml/l

§ 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 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 volume of process wastewater which may be discharged from an open-cut mine plant site shall not exceed the volume of infiltration, drainage and mine drainage waters which is in excess of the make up water required for operation of the beneficiation process. The concentration of pollutants in process wastewaters discharged from an open-cut mine plant site shall not exceed:

Effluent characteristics	Effluent limitations—Instantaneous maximum
Settleable solids	0.2 ml/l

(b) The volume of process wastewater which may be discharged from a dredge plant site shall not exceed the volume of infiltration, drainage and mine drainage waters which is in excess of the make up water required for operation of the beneficiation process. The concentration of pollutants in process wastewater discharged from a dredge plant site shall not exceed:

Effluent characteristics	Effluent limitations—Instantaneous maximum
Settleable solids	0.2 ml/l

§ 440.144 New Source Performance Standards (NSPS).

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:

(a) The volume of process wastewater which may be discharged from an open-cut mine plant site shall not exceed the volume of infiltration, drainage and mine drainage waters which is in excess of the make up water required for operation of the beneficiation process. The concentration of pollutants in process wastewaters discharged from an open-cut mine plant site shall not exceed:

Effluent characteristics	Effluent limitations—Instantaneous maximum
Settleable solids	0.2 ml/l

(b) The volume of process wastewater which may be discharged from a dredge plant site shall not exceed the volume of infiltration, drainage and mine drainage waters which is in excess of the make up water required for operation of the beneficiation process. The concentration of pollutants in process wastewater discharged from a dredge plant site shall not exceed:

Effluent characteristics	Effluent limitations—Instantaneous maximum
Settleable solids	0.2 ml/l

(c) Notwithstanding any other provision of this chapter, the Regional Administrator or Director of a State agency with authority to administer the NPDES program shall in designating new source gold placer mines, take into account and base the decision on whether one or more of the following factors has occurred after May 24, 1988.

(1) The mine will operate outside of the permit area which is covered by a currently valid NPDES Permit.

(2) The mine significantly alters the nature or quantity of pollutants discharged.

(3) The mine discharges into a stream into which it has not discharged under its currently valid NPDES permit.

(4) The mine will operate in a permit area that has not been mined during the term of the currently valid NPDES permit.

(5) Such other factors as the Regional Administrator or state Director deems relevant.

§§ 440.145—440.147 [Reserved]

§ 440.148 Best Management Practices (BMP).

The following best management practices are specific requirements which shall be included in each NPDES permit for all mining operations regulated under this subpart to the greatest extent applicable in each such mining operation.

(a) *Surface Water Diversion:* The flow of surface waters into the plant site shall be interrupted and these waters diverted around and away from incursion into the plant site.

(b) *Berm Construction:* Berms, including any pond walls, dikes, low dams and similar water retention structures shall be constructed in a manner such that they are reasonably expected to reject the passage of water.

(c) *Pollutant materials storage:* Measures shall be taken to assure that pollutant materials removed from the process water and wastewater streams will be retained in storge areas and not discharged or released to the waters of the United States.

(d) *New Water Control:* The amount of new water allowed to enter the plant site for use in ore processing shall be limited to the minimum amount required as make-up water for processing operations.

(e) *Maintenance of water control and solids retention devices:* All water control devices such as diversion structures and berms and all solids retention structures such as berms, dikes, pond structures and dams shall be maintained to continue their effectiveness and to protect from unexpected and catastrophic failure.

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