ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 434

[FRL–6571–9]

RIN 2040–AD24

Coal Mining Point Source Category; Amendments to Effluent Limitations Guidelines and New Source Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: EPA proposes to amend the current regulations for the Coal Mining Point Source Category by adding two new subcategories to the existing regulation. First, EPA proposes to establish a new subcategory that will address pre-existing discharges at coal remining operations. EPA also proposes to establish a second new subcategory that will address drainage from coal mining reclamation areas in the arid and semiarid western United States. This proposal would not otherwise change the existing regulations.

The establishment of new subcategories has the potential to create significant environmental benefits at little or no additional cost to the industry. Establishing the Coal Remining Subcategory will encourage remining activities and will reduce hazards associated with abandoned mine lands. The new subcategory has the potential to significantly improve water quality by reducing the discharge of acidity, iron, manganese, and sulfate from abandoned mine lands. EPA projects total monetized annual benefits of $0.70 million to $1.2 million. Additionally, EPA expects that this regulation will result in significant ecological and public safety benefits that could not be quantified and/or monetized. EPA projects that the annual compliance cost for this new subcategory will be $0.33 million to $0.76 million.

EPA estimates that the proposed Western Alkaline Coal Mining Subcategory will result in a net cost savings to affected surface mine operators. The monetized and non-monetized benefits for this subcategory are a result of adopting alternative sediment control technologies for reclamation areas in the arid west. These technologies are projected to increase the volume of storm water drainage to arid watersheds and avoid the disturbance of 26,000 acres, thus reducing severe erosion, sedimentation, hydrologic imbalance, and water loss. EPA projects that the proposed subcategory will result in annualized monetized benefits of $43,000 to $769,000.

DATES: Comments on the proposed regulation must be received on or before July 10, 2000. Public meetings will be held during the comment period. Further details of the public meetings, including dates and specific locations, will be published in the **Federal Register** at a later date.

ADDRESSES: Send written comments on the proposed rule to Mr. Joseph Vitalis (4303); U.S. Environmental Protection Agency; 1200 Pennsylvania Ave, NW; Washington, DC 20460. Comments delivered by hand should be brought to Room 641, West Tower; 401 M Street, SW Washington, DC. Please submit any references cited in your comments. Submit an original and three copies of your written comments and enclosures. No facsimiles (faxes) will be accepted. For information on how to submit electronic comments see ''**SUPPLEMENTARY INFORMATION,** How to Submit Comments.''

A copy of the supporting documents cited in this proposal is available for review at EPA's Water Docket; Room EB57, 401 M Street, SW, Washington, DC 20460. A copy of the record supporting proposal of a Western Alkaline Coal Mining Subcategory is also available for review at the Office of Surface Mining Library, 1999 Broadway, 34th Floor, Denver, CO. The public record for this rulemaking has been established under docket number W–99–13, and includes supporting documentation, but does not include any information claimed as Confidential Business Information (CBI). For access to docket materials, please call (202) 260–3027 between 9:00 a.m. and 3:30 p.m., Monday through Friday, excluding Federal holidays, to schedule an appointment. For access to docket materials at the Office of Surface Mining Library, please call (303) 844–1436 between 8:00 a.m. and 4:00 p.m. to schedule an appointment.

See the **SUPPLEMENTARY INFORMATION** section for locations of the public meetings regarding this proposal.

FOR FURTHER INFORMATION CONTACT: For additional technical information contact John Tinger at (202) 260–4992 or *''Tinger.John@epa.gov'';* or Joseph Vitalis at (202) 260–7172. For additional economic information contact Kristen Strellec at (202) 260–6036 or *''Strellec.Kristen@epa.gov''.*

SUPPLEMENTARY INFORMATION:

Regulated Entities: Entities potentially regulated by this action include:

Category	Examples of regulated entities	SIC codes	NAICS codes
Industry	Operations engaged in the remining of abandoned surface and underground coal mines and coal refuse piles for remaining coal reserves in areas containing discharges defined as ''pre-existing'. Operations engaged in coal mine reclamation activities in the arid and semiarid western coal region.	1221 1222 1231	212111 212112 212113

The preceding table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware potentially could be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your facility is regulated by this action, you should carefully examine the applicability criteria in § 434.70 and 434.80 of today's rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed for technical information in the preceding **FOR FURTHER INFORMATION CONTACT** section.

Locations of Public Meetings

Public meetings regarding proposal of the Western Alkaline Coal Mining Subcategory will likely be held in Gillette, WY; Flagstaff, AZ; and Denver, CO during the public comment period. Public meetings regarding proposal of the Remining Subcategory also will likely be held near Charleston, WV; Lexington, KY; and Zanesville, OH during the public comment period. Further details of the public meetings, including dates and specific locations, will be published in the **Federal Register** at a later date. If you wish to present formal comments at the public meetings, you should have a written copy for submittal. No meeting materials will be distributed in advance

of the public meetings; all materials will be distributed at the meetings.

How to Submit Comments

Comments also may be submitted electronically to *vitalis.joseph@epa.gov.* Electronic comments must be submitted as a Word Perfect 5/6/7/8 or ASCII file. Please avoid using special characters, form and encryption. Electronic comments must be identified with the docket number (W–99–13). EPA also will accept comments and data on disks in WP 5/6/7/8 or ASCII file format. Electronic comments on this document may be filed online at some Federal Depository Libraries. No Confidential Business Information (CBI) should be sent via e-mail.

Supporting Documentation

The proposed regulations are supported by several key documents:

1. *''Coal Remining Best Management Practices Guidance Manual''* (EPA 821–R–00–007). This document describes abandoned mine land conditions and the performance of Best Management Practices (BMPs) that have been implemented at remining operations for over ten years. The BMP Guidance Manual is a technical reference document that presents research and data concerning the prediction and prevention of acid mine drainage to the waters of the United States.

2. *''Coal Remining Statistical Support Document''* (EPA 821–R–00–001). This document establishes the statistical methodology for establishing baseline conditions and setting discharge limits at remining sites.

3. *''Development Document for Proposed Effluent Limitations Guidelines and Standards for the Western Alkaline Coal Mining Subcategory''* (EPA 821–R–00–008): This document presents EPA's technical conclusions concerning the Western Alkaline Mining Subcategory proposal.

4. *''Economic and Environmental Impact Assessment of Proposed Effluent Limitations Guidelines and Standards for the Coal Mining Industry: Remining and Western Alkaline Subcategories''* (EPA–821–B–00–002): This document presents the methodology employed to assess economic and environmental impacts of the proposed rule and the results of the analysis.

Major supporting documents are available from the National Service Center for Environmental Publications (NSCEP), 11029 Kenwood Road, Cincinnati, OH 45242, (800) 490–9198, *http://www.epa.gov/ncepi.* You can obtain copies of this preamble and rule at http://www.epa.gov/OST/guide.

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I. Legal Authority

These regulations are proposed under the authority of sections 301, 304, 306, 308, 402, 501, and 502 of the Clean Water Act, 33 U.S.C. 1311, 1314, 1316, 1318, 1342, 1361, and 1363.

II. Background

A. Statutory Authorities

1. Clean Water Act

Congress adopted the Clean Water Act (CWA) to ''restore and maintain the chemical, physical, and biological integrity of the Nation's waters' (section 101(a), 33 U.S.C. 1251(a)). To achieve this goal, the CWA prohibits the discharge of pollutants into navigable waters except in compliance with the statute. The Clean Water Act confronts the problem of water pollution on a number of different fronts. Its primary reliance, however, is in establishing restrictions on the types and amounts of pollutants discharged from various industrial, commercial and public sources of wastewater.

Direct dischargers must comply with effluent limitations in National Pollutant Discharge Elimination System (''NPDES'') permits; indirect dischargers must comply with pretreatment standards. These limitations and standards are established by regulation for categories of industrial dischargers and are based on the degree of control that can be achieved using various levels of pollution control technology.

a. Best Practicable Control Technology Currently Available (BPT)—Section 304(b)(1) of the CWA. Effluent limitations guidelines based on BPT apply to discharges of conventional, toxic, and non-conventional pollutants from existing sources. BPT guidelines are generally based on the average of the best existing performance in terms of pollution control by plants in a particular industrial category or subcategory. In establishing BPT, EPA considers the cost of achieving pollution reductions in relation to the pollution reduction benefits, the age of equipment and facilities, the processes employed, process changes required, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and other factors the Administrator deems appropriate. CWA Section 304(b)(1)(B). Where the pollution control performance of existing sources for a category or subcategory is uniformly inadequate, EPA may set BPT by

transferring technology used in a different subcategory or category.

b. Best Available Technology Economically Achievable (BAT)—Section 304(b)(2) of the CWA. In general, BAT effluent limitations guidelines are based on the degree of pollution control achievable by applying the best available technology economically achievable for facilities in the industrial subcategory or category. The CWA requires BAT for controlling the direct discharge of toxic and non-conventional pollutants. The factors considered in determining BAT for a category or subcategory include the age of the equipment and facilities involved, the process employed, potential process changes, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and other factors the Administrator deems appropriate. EPA retains considerable discretion in assigning the weight to be accorded these factors. Generally, economic achievability is determined on the basis of total costs to the industrial subcategory and their effect on the overall industry's (or subcategory's) financial health. As with BPT, where existing performance is uniformly inadequate, BAT may be transferred from a different subcategory or category. BAT may be based upon process changes or internal controls, such as product substitution, even when these technologies are not common industry practice. The CWA does not require cost-benefit comparison in establishing BAT.

c. Best Conventional Pollutant Control Technology (BCT)—Section 304(b)(4) of the CWA.

The 1977 amendments to the CWA established BCT as an additional level of control for discharges of conventional pollutants from point sources other than publicly owned treatment works. In addition to other factors specified in section 304(b)(4)(B), the CWA requires that BCT limitations be established in light of a two part ''cost-reasonableness'' test. EPA published a methodology for the development of BCT limitations which became effective August 22, 1986 (51 FR 24974, July 9, 1986).

Section 304(a)(4) designates the following as conventional pollutants: biochemical oxygen demanding pollutants (measured as 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).

d. New Source Performance Standards (NSPS)—Section 306 of the CWA. NSPS reflect effluent reductions that are achievable based on the best available demonstrated control technology. New facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent controls attainable through the application of the best available control technology for all pollutants (i.e., conventional, nonconventional, and priority pollutants). In establishing NSPS, EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements.

e. Pretreatment Standards for Existing Sources (PSES)—Section 307(b) of the CWA—and Pretreatment Standards for New Sources (PSNS)—section 307(b) of the CWA. Pretreatment standards are designed to prevent the discharge of pollutants to a publicly-owned treatment works (POTW) which pass through, interfere, or are otherwise incompatible with the operation of the POTW. Since none of the facilities to which this rule applies discharge to a POTW, pretreatment standards are not being considered as part of this rulemaking.

f. CWA Section 304(m) Requirements. Section 304(m) of the CWA, added by the Water Quality Act of 1987, requires EPA to establish schedules for (1) reviewing and revising existing effluent limitations guidelines and standards and (2) promulgating new effluent guidelines. On January 2, 1990 (55 FR 80), EPA published an Effluent Guidelines Plan, which established schedules for developing new and revised effluent guidelines for several industry categories. The Natural Resources Defense Council, Inc., challenged the Effluent Guidelines Plan in a suit filed in the U.S. District Court for the District of Columbia (*NRDC* v. *Browner,* Civ. No. 89–2980). On January 31, 1992, the Court entered a consent decree (the ''304(m) Decree''), which established schedules for EPA's proposal and promulgation of effluent guidelines for a number of point source categories. The most recent Effluent Guidelines Plan was published in the **Federal Register** on September 4, 1998 (63 FR 47285). This plan required, among other things, that EPA propose the Coal Mining Guidelines by December 1999 and promulgate the Guidelines by December 2001. On November 19, 1999, the court modified the decree revising the deadline for proposal to March 31, 2000. The deadline of December 2001 for promulgation of these guidelines was not modified.

2. Pollution Prevention Act

The Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13101 *et seq.*, Pub. L. 101–508, November 5, 1990) ''declares it to be the national policy of the United States that pollution should be prevented or reduced whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or release into the environment should be employed only as a last resort * * *'' (Sec. 6602; 42 U.S.C. 13101(b)). In short, preventing pollution before it is created is preferable to trying to manage, treat or dispose of it after it is created.

The PPA directs EPA to, among other things, ''review regulations of the EPA prior and subsequent to their proposal to determine their effect on source reduction'' (Sec. 6604; 42 U.S.C. 13103(b)(2)). Source reduction reduces the generation and release of hazardous substances, pollutants, wastes, contaminants, or residuals at the source, usually within a process. The term source reduction ''includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training or inventory control. * * * The term ''source reduction'' does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a hazardous substance, pollutant, or contaminant through a process or activity which itself is not integral to or necessary for the production of a product or the providing of a service'' (42 U.S.C. 13102(5)). In effect, source reduction means reducing the amount of a pollutant that enters a waste stream or that is otherwise released into the environment prior to out-of-process recycling, treatment, or disposal.

In this proposed rule, EPA encourages pollution prevention by requiring the use of site-specific Best Management Practices (BMPs) that are integral to remining operations in abandoned mine lands and to reclamation activities in the arid and semiarid western coal regions. These BMPs, under each subcategory, are designed and implemented to improve existing conditions and to reduce pollutant discharges at the source, thereby reducing the need for treatment.

B. Current Requirements for the Coal Mining Point Source Category

1. EPA Regulations at 40 CFR Part 434

On October 9, 1985 (50 FR 41296), EPA promulgated effluent limitations guidelines and standards that are in effect today under 40 CFR part 434. Currently, there are four subcategories: Coal Preparation Plants and Coal Preparation Plant Associated Areas; Acid or Ferruginous Mine Drainage; Alkaline Mine Drainage; and Post-Mining Areas. Additionally, there is a subpart for Miscellaneous Provisions. The subcategories include BPT, BAT, and NSPS limitations for TSS, pH, iron, manganese, and/or settleable solids (SS).

2. Surface Mining Control and Reclamation Act

In 1977, Congress enacted the Surface Mining Control and Reclamation Act (SMCRA), 30 U.S.C. 1201 *et seq.,* to address the environmental problems associated with coal mining on a nationwide basis. SMCRA created the Office of Surface Mining Reclamation and Enforcement (OSM) within the Department of Interior, which is responsible for preparing regulations and assisting the States financially and technically to carry out regulatory activities.

Title V of the statute gives OSM broad authority to regulate specific management practices before, during, and after mining operations. OSM has promulgated comprehensive regulations to control both surface coal mining and the surface effects of underground coal mining (30 CFR parts 700 *et seq*). Implementation of these requirements has significantly improved mining practices, control of water pollution, and protection of other resources. Title IV of SMCRA addresses the problem of presently abandoned coal mines by authorizing and funding abandoned mine reclamation projects.

All mining operations subject to today's proposal must also comply with SMCRA requirements. EPA has worked extensively with OSM in the preparation of this proposal in order to ensure that the requirements proposed today are consistent with OSM requirements.

3. Rahall Amendment

As part of 1987 amendments to the CWA, Congress added section 301(p), often called the Rahall Amendment, to provide incentives for remining abandoned mine lands that pre-date the passage of SMCRA in 1977. Section 301(p) provides an exemption for remining operations from the BAT effluent limits for iron, manganese, and pH for pre-existing discharges from abandoned mine lands. Instead, a permit writer may set site-specific, numerical BAT limits for pre-existing discharges determined based on Best Professional Judgement (BPJ). The permit effluent limits may not allow discharges to exceed pre-existing ''baseline'' levels of iron, manganese, and pH. In addition, the permit applicant must demonstrate that the remining operation ''will result in the potential for improved water quality from the remining operation.'' The Rahall Amendment defines remining as ''a coal mining operation which began after February 4, 1987 at a site on which coal mining was conducted before August 3, 1977,'' which was the effective date of the Surface Mining Control and Reclamation Act. Thus, the Rahall Amendment attempted to encourage remining by allowing operators not to treat degraded pre-existing discharges to the levels set in EPA's current effluent limitations guidelines for coal mining.

Despite the statutory authority provided by the Rahall Amendment, coal mining companies and most States remain hesitant to pursue remining without formal EPA approval and guidelines. Today's Document proposes to establish requirements for determining baseline pollutant loadings in pre-existing discharges. It also proposes to specify how to determine site-specific BAT requirements for remining operations and how to demonstrate the potential for environmental improvement from a remining operation.

4. Clean Water Action Plan

On October 18, 1997, the 25th anniversary of the enactment of the Clean Water Act, Vice President Gore called for a renewed effort to restore and protect water quality. EPA and other Federal agencies were directed to develop a Clean Water Action Plan (CWAP) that would continue to provide clean water successes and would address three major goals: (1) Enhanced protection from public health threats caused by water pollution; (2) more effective control of polluted runoff; and (3) promotion of water quality protection on a watershed basis.

Based on the efforts of interagency work groups and comments from the public, EPA and other Federal agencies developed the final CWAP on February 14, 1998. One of several Key Actions specifically identified to implement the goals of the CWAP was EPA's project to re-examine 40 CFR part 434 to ''better address coal mining in arid western areas'' and ''to address coal remining operations.''

III. Scope of Proposal

Today, EPA is proposing effluent limitations and performance standards for the Coal Remining Subcategory and for the Western Alkaline Coal Mining Subcategory. The new subcategories will be added to the existing regulations for the Coal Mining Point Source Category found in 40 CFR part 434. The new subcategories will create a set of standards and requirements for the specific waste streams defined in today's proposal.

The existing provisions will continue to apply to discharges produced or generated in active mining areas, which include the active mining areas of remining operations. Section 434.11(b) defines active mining area as ''the area, on and beneath land, used or disturbed in activity related to the extraction, removal, or recovery of coal from its natural deposits. This term excludes coal preparation plants, coal preparation plant associated areas and post-mining areas.'' Wastewater discharges produced or generated by active coal mining operations will not be affected by this proposed regulation and will remain subject to the effluent limitations already established in part 434.

Additionally, in accordance with section 434.61, any waste stream subject to this proposed rule that is commingled with a waste stream subject to another subpart of part 434 will be required to meet the most stringent limitations applicable to any component of the combined waste stream. EPA's proposed regulatory text simply maintains the current regulatory approach on this issue.

A. Coal Remining Subcategory

The effluent limitations and standards proposed for the Coal Remining Subcategory apply to pre-existing discharges that are located within areas of a coal remining operation and that are not commingled with waste streams from active mining areas. Coal remining is the mining of surface mine lands, underground mine lands, and coal refuse piles that were abandoned prior to August 3, 1977.

EPA's rationale for the proposed Remining Subcategory is discussed in Section VI.

B. Western Alkaline Coal Mining Subcategory

The effluent limitations and performance standards for the Western Alkaline Coal Mining Subcategory apply to alkaline mine drainage from

reclamation areas associated with western coal mining operations.

''Alkaline mine drainage'' is defined in the existing regulations as ''mine drainage which, before any treatment, has a pH equal to or greater than 6.0 and total iron concentration of less than 10 mg/L.'' 40 CFR 434.11(c). ''Reclamation area'' is defined in the existing regulations as ''the surface area of a coal mine which has been returned to required contour and on which revegetation (specifically, seeding or planting) work has commenced.'' 40 CFR 434.11(l). EPA is not proposing to make any changes to these existing definitions.

EPA is proposing to define a ''western coal mining operation'' in arid or semiarid areas as a surface or underground coal mining operation located in the interior western United States, west of the 100th meridian west longitude, in an arid or semiarid environment with an average annual precipitation of 26.0 inches or less. This definition is consistent with the way OSM currently identifies and addresses western coal mining operations (see 30 CFR 701.5 and 30 CFR 816.116) and with SMCRA's provisions with respect to arid and semiarid lands (i.e., extended liability time frames for areas with less than 26 inches of annual precipitation, protection of the alluvial valley floors found in the western environments, and recognition of geological, hydrological and ecological differences found in arid and semiarid environments).

EPA discusses the rationale for the proposed Western Alkaline Coal Mining Subcategory in Section VI.

IV. Industry Profile

A. Coal Mining Industry

The United States is divided into three major coal producing regions termed the Appalachian, Interior, and Western regions. The States included in each are as follows:

- Western Coal Region—Alaska, Arizona, California, Colorado, Montana, New Mexico, North Dakota, Utah, Washington, and Wyoming;
- Appalachian Coal Region—Alabama, Georgia, Eastern Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia; and
- Interior Coal Region—Arkansas, Illinois, Iowa, Kansas, Western Kentucky, Louisiana, Missouri, Oklahoma, and Texas.

Historically, the Appalachian Region has been the Nation's most important source of coal, accounting for about three-fourths of the total annual production as recently as 1970. In 1970, most of the coal produced domestically was mined east of the Mississippi River (567.8 million tons east of the Mississippi River, compared to 44.9 million tons west of the Mississippi River). Appalachian coals are predominantly bituminous, with a high Btu content and a wide range of sulfur content. Coal in this Region generally occurs in beds that tend to be less than 15 feet thick.

There are two distinct coal-producing areas in the Interior Region. The Illinois Basin, which includes most of Illinois, parts of Indiana and western Kentucky, produces high Btu bituminous coal with medium to high sulfur content. The second major coal producing area in this Region consists of the lignite fields within the Coastal Plain along the Gulf of Mexico.

The Western Coal Region contains extensive deposits of sub-bituminous, low sulfur-content coal. This coal occurs in thick coal seams and shallow overburden conditions that enable the extraction of large volumes at relatively low cost. Consequently, these coal resources represent a highly competitive fuel in the power generation market based on chemical qualities and cost per kilowatt-hour.

Production from U.S. surface coal mines has increased by more than 90 percent since 1970, and there have been dramatic changes in the domestic production of coal due to environmental concerns and market demands. Environmental laws have increased government regulation of the industry. In addition, the Clean Air Act emission requirements to reduce acid rain have shifted market demand to lower sulfur content fuel sources. With this change in the coal market, coal production in the west has increased, and is now nearly equal to that in the Appalachian region (Energy Information Administration, Coal Industry Annual, 1997). In 1970, the Appalachian Region produced a total of 427.6 million tons. The Interior Region total production was 149.9 million tons. By comparison, in 1970, the Western Region produced only 35.1 million tons. By 1993, the market share of production from eastern coal mines had dropped to 55 percent (516.2 million tons), while western mine output had increased to 45 percent (429.2 million tons).

In 1997 the United States produced 1.09 billion short tons of coal, with the Appalachian Region producing approximately 468 million short tons, the Interior Region producing approximately 172 million short tons and the Western Region producing approximately 451 million short tons. While domestic coal production has increased since 1970, fewer operating mines exist today. In 1991, the number of mines producing coal was less than half the number in 1976 (e.g., 6,553 mines in 1976 compared to 3,022 mines in 1991). Coal-fired electric power generating plants are the largest single source of domestically produced primary energy.

B. Coal Remining Subcategory

Coal mining in the eastern United States has been an important industry for several centuries. The lack of adequate environmental controls, until recently, has produced hundreds of thousands of acres of abandoned mine land. Prior to passage of SMCRA in 1977, reclamation of coal mining sites was not a Federal requirement, and drainage from these abandoned mine lands has become the number one water quality problem in Appalachia.

Based on information supplied by the Interstate Mining Compact Commission (IMCC) and OSM's Abandoned Mine Land Inventory System (AMLIS), EPA estimates there currently are over 1.1 million acres of abandoned coal mine lands in the United States. These have produced over 9,709 miles of streams polluted by acid mine drainage. In addition, there are over 18,000 miles of abandoned highwalls, 16,326 acres of dangerous piles and embankments, and 874 dangerous impoundments. Of the land disturbed by coal mining between 1930 and 1971, only 30 percent has been reclaimed to acceptable levels. Several States have indicated that acid mine drainage from abandoned coal mine land is their most serious water pollution problem.

Streams that are impacted by acid mine drainage characteristically have low pH levels (less than 6.0 standard units) and contain high concentrations of sulfate, acidity, dissolved iron and other metals. These conditions commonly will not support fish or other aquatic life. The flows from abandoned mine lands can range from unmeasurable to huge torrents of thousands of gallons per minute. Ninety percent of acid mine drainage comes from coal mines (mostly underground mines) that were abandoned prior to the enactment of SMCRA. Many of the streams impacted by acid mine drainage could be resources for drinking water and the propagation and maintenance of aquatic life, and could support water-based recreation if they were remediated. Their restoration also would contribute to the enhancement of regional economies in areas that have been socio-economically disadvantaged for decades.

Development of modern surface-mining techniques has allowed for more efficient removal of coal deposits and more effective implementation of BMPs that provide pollution abatement and remediation. Consequently, mining is now feasible in areas where mining was previously uneconomical.

More than ten years of remining under the requirements of the Rahall Amendment have demonstrated success in improving abandoned mine land and acid mine drainage. IMCC member States have estimated that there are currently 150 mining companies in ten States involved in remining operations (under either Rahall-type permits or current 40 CFR part 434 limitations) or in operations affecting abandoned mine lands. These companies are producing at least 25 million tons of coal annually, and are employing approximately 3,000 people. To date, approximately 1,072 permits that include coal remining operations have been issued. Of these 1,072 permits, 330 (31 percent) are Rahall-type permits where the operator is required to meet a determined baseline limit for pre-existing discharges. Approximately 300 of these Rahall-type permits are in Pennsylvania alone. Of the 1,072 remining permits, 742 (69 percent) are non-Rahall permits where all discharges must meet current effluent limitations. These permits have tended to be issued at sites where the effects of acid mine drainage are not as significant. Remining operations are affecting approximately 270 abandoned coal refuse piles; 1,600 abandoned surface mines; and 1,100 abandoned underground mines. Information provided by IMCC indicates that there are approximately 2,100 coal refuse piles; 2,000 abandoned surface mines (plus 228,000 acres); and over 8,000 abandoned underground mines that have the potential for remining. Information provided by IMCC is discussed in the Coal Remining BMP Guidance Manual and is included in Section 7.0 of the Rulemaking Record.

Many States have not been able to establish the guidelines and procedures required to issue Rahall permits. However, IMCC member States have indicated that they would be able to establish formal remining programs under guidelines set forth under an EPA effluent limitation Coal Remining subcategory. With the establishment of State remining programs, mine operators would be more inclined to enter into remining projects as discussed in Section VI.

C. Western Alkaline Coal Mining Subcategory

EPA is proposing to address western alkaline mines which would be defined as mines that are (1) west of the 100th meridian, (2) have annual precipitation of 26 inches or less, (3) are in an arid or semiarid environment, and (4) produce alkaline mine drainage. Western coal producing States qualifying are: Arizona, Colorado, Utah, Montana, New Mexico, Wyoming, and all coal fields in North Dakota located west of the 100th meridian.

Coal mining operations in arid and semiarid western regions operate under environmental conditions that are significantly different from those in other regions of the United States. Western arid and semiarid areas are naturally unstable with highly eroded landscapes that are created by flash flood runoff transporting large volumes of sediment. Water resources are severely limited and highly valuable. Specific differences include:

- Precipitation—Annual precipitation averages 26 inches or less, with about one-half occurring as snowfall and one-half as rainfall. The average annual precipitation received by relevant western coal-producing States are: Arizona—13 inches; Colorado—16 inches; Montana—15 inches; New Mexico—13 inches; and Wyoming—13 inches. Rainfall is commonly received during localized, high-intensity, short-duration thunderstorms.
- Temperature—Temperatures fluctuate over wide daily ranges of 30° to 50°F and extreme seasonal ranges (−40° to 115°F). These temperature fluctuations contribute to the physical weathering of surface materials.
- Solar intensity—Solar energy is high and humidity is characteristically very low. As a result, evapotranspiration normally exceeds precipitation. Water infiltration and retention in soil is limited, which results in severe soil moisture deficits, extremely limited surface water resources, and poor vegetative growth.
- Erosion—Natural soils tend to be erosion prone and soil-forming materials frequently erode faster than they are formed. Soil that does form can be poorly developed with low organic matter and limited plant nutrient content. Soil moisture content is low and precipitation easily mobilizes sediment.
- Hydrology—Drainage systems are composed primarily of dry washes and arroyos. These drainage features provide an unlimited source of sediment that may be mobilized by flash flooding. For approximately eleven months per year, the washes and arroyos are dry, flowing only in response to precipitation runoff. Runoff is frequently characterized by high volume, high velocity, sediment laden, turbulent flows with tremendous kinetic energy. Flows can be expected to contain sediment concentrations ranging upwards to 500,000 mg/L during flash flood runoff events.
- Vegetation—Areas are characterized by discontinuous and sparsely distributed grasses, shrubs and trees. The major vegetation types are desert grass and brush, and open forests with pinyon-juniper and ponderosa pine.

EPA has identified 46 surface coal mines in the western region that potentially will be affected by this proposed rule (two percent of the total number of coal mines in the United States). These mines produce approximately one-third of the total annual U.S. coal production.

V. Summary of Data Collection Activities

A. Expedited Guidelines Approach

EPA is developing this regulation using an expedited rulemaking process. This process relies on stakeholder support to develop the initial technology and regulatory options. At various stages of information gathering, OSM, States, Tribes, industry, EPA and other stakeholders have presented and discussed their preferred options and identified differences in opinion. EPA developed this proposal more quickly than a typical effluent guidelines proposal, and the proposal contains less information than EPA usually provides for effluent guidelines. EPA expects to identify any gaps and gather additional information through the public comment process.

EPA encourages full public participation in developing the final Coal Remining and Western Alkaline Coal Mining Guidelines. This expedited rulemaking process relies more on open communication between EPA, the regulated community, and other stakeholders, and less on formal data and information gathering mechanisms. The expedited guidelines approach is suitable when EPA, States, industry, and other stakeholders have a common goal in regards to the purpose of the effluent guidelines. EPA believes this is the case with the Coal Remining and Western Alkaline Coal Mining rulemaking. EPA is proposing to allow site-specific effluent limits for pre-existing discharges at remining operations and alternative sediment control technologies at western alkaline mine reclamation operations. EPA believes that this rule will provide

better environmental results than the current requirements. EPA welcomes comment on all options and issues and encourages commenters to submit additional data during the comment period. EPA also is willing to meet with interested parties during the comment period to ensure that EPA considers the views of all stakeholders and the best possible data upon which to base a decision for the final regulation.

As part of the expedited approach to this rulemaking, EPA has chosen not to gather data using the time consuming approach of a Clean Water Act Section 308 questionnaire. Rather, EPA is using data voluntarily submitted by industry, permitting authorities, vendors, academia, and others, along with data EPA can develop in a limited period of time. Because all of the facilities affected by this proposal are direct dischargers, EPA did not conduct an outreach survey to POTWs.

Throughout regulatory development, EPA has worked with representatives from the U.S. Office of Surface Mining Reclamation and Enforcement, the Interstate Mining Compact Commission, State regulatory authorities, the Western Interstate Energy Board (WIEB), the National Mining Association (NMA), the coal mining industry, and research organizations to submit data and develop effluent limitations guidelines and standards that represent the appropriate level of technology (e.g., BAT, BCT, BPT, and NSPS).

EPA plans to continue its data gathering efforts for support of the final rule. EPA may publish a subsequent document of data availability for data either generated by EPA or submitted after this proposal and used by EPA to develop the final rule.

Databases and reports containing the information and data provided and used by EPA in support of this rule proposal are available in the Rulemaking Record. The following summarizes the data EPA has collected in support of this proposal.

B. Coal Remining Data Collection Activities

Following promulgation of the final effluent limitation guidelines for the Coal Mining industry in 1985, EPA began working with the Pennsylvania Department of Environmental Resources (now the Pennsylvania Department of Environmental Protection or ''PADEP''), the Office of Surface Mining (now the Office of Surface Mining Reclamation and Enforcement or ''OSM'') and various stakeholders to address the remining issue.

In 1988, EPA, PADEP, Pennsylvania State University, and Kohlmann Ruggiero Engineers developed a computer software package (Coal Remining Best Professional Judgement Analysis, Record Section 3.2.6) to enable best professional judgement (BPJ) analyses for remining operations. The software includes a Surface Mine Materials Handling and Cost Module, a Baseline Pollution Load Statistics Module, and a Water Treatment Cost Calculation Module. It has been used by the Commonwealths of Pennsylvania and Virginia to prepare NPDES Coal Remining Permits. The software is designed to:

- Input and revise pre-existing pollution discharge data;
- Calculate baseline pollution loads and perform additional statistical analyses on pre- and post-mining discharge data;
- Calculate capital and annual wastewater treatment cost;
- Input and revise mining plans;
- Simulate mining operations for a production rate and the associated mining costs;
- Compare mining plans and costs with and without abatement plans and evaluate abatement procedures; and
- Calculate relative mining costs with and without wastewater treatment costs added.

Pennsylvania DEP provided EPA with 41 remining permit application modules submitted by Pennsylvania remining operations. These modules are included in the Record at Section 3.2.4, and are titled Module 26: Remining of Areas with Pre-existing Pollutional Discharges. The modules follow the BPJ analyses provided in the EPA and PADEP Coal Remining—Best Professional Judgement Analysis (''REMINE'') User's Manual and Software Package. Eleven of these modules were submitted to EPA as part of data packages demonstrating BMP implementation at remining sites. The remaining 30 modules (ten modules from each of three Bureau Mining Offices) were submitted to EPA as representative of approximately 10 percent of Pennsylvania's Rahall permit operations to date. The modules include the following information:

- Abandoned mine land and mine drainage quantities and descriptions;
- Baseline pollution load summaries;
- Detailed descriptions of BMP abatement plans and descriptions of how they are expected to reduce baseline pollution loadings and improve environmental conditions;
- Detailed calculations including materials costs and handling costs for each step of the abatement plan;
- Detailed calculations of construction, operation, and maintenance costs for treatment of pre-existing discharges to current effluent limits; and
- Anticipated pollution reduction benefit resulting from implementation of the abatement plan, including impacts on discharge quality and quantity.

EPA reviewed information provided in these permit modules that compared the cost of treating pre-existing discharges to existing effluent limitations verses the implementation of site-specific BMP plans with the potential to improve baseline pollution loading. This cost comparison portion of Module 26 was completed in 40 of 41 respondents. In all 40 cases, remining was considered not economically feasible if treatment of pre-existing discharges to current effluent limits was required. In the same 40 cases, remining was economically feasible if the abatement plan was implemented as proposed.

In 1996, IMCC, EPA, and OSM formed a Remining Task Force and expanded investigations of opportunities to encourage remining of abandoned coal mines consistent with the requirements of SMCRA and the CWA. In February 1998, IMCC, EPA and OSM released a discussion paper entitled ''Water Quality Issues Related to Coal Remining'' that is included in the Rulemaking Record at Section 8.1. The paper provided an overview of current discussions between State and Federal agencies regarding water quality issues and concerns pertaining to coal remining operations. The paper focused on opportunities to encourage remining through adjustments to the current regulatory regime while assuring adequate protection of surface and ground water quality. The paper also presented several approaches for providing remining incentives, including the use of effluent limits set at baseline discharge levels for pre-existing discharges. IMCC collected written comments from environmental groups, industry, Federal agencies, and State agencies. The comments generally supported and recognized the value of remining, although commenters expressed some differences of opinion regarding regulatory approaches.

As discussed in Section VI, the discussion paper also presented an alternative BMP-based remining permit approach in which the permit focuses on implementation of BMPs, and does not include numerical limits for pre-existing discharges. Some commenters were concerned that reliance on the implementation of BMPs in lieu of numeric limitations could result in backsliding from existing requirements.

The Remining Task Force believes that BMPs can result in improved water quality and, in certain cases, can qualify as BAT for achieving standards required by the Clean Water Act.

To support this rulemaking, the IMCC submitted data and information specific to abandoned mine lands on pre-existing discharge water quality, BMP implementation, and remining activities in the eastern coal regions. IMCC member States and State regulatory authorities provided sixty-one data packages from Alabama, Kentucky, Pennsylvania, Tennessee, Virginia and West Virginia that include the following data and information:

- Remining permit applications and approved remining permits;
- Abandoned mine land reclamation project plans and results;
- Descriptions of abandoned mine conditions and extent of abandoned mine land;
- BMP implementation plans targeting pre-existing discharges and abandoned mine land;
- Site geology and overburden analysis data;
- Water quality data (surface water, ground water, and pre-existing discharges);
- Best professional judgement analysis of treatment and BMP implementation plans;
- Topographic maps indicating permit areas, active mining areas, pre-existing conditions, and water quality monitoring points;
- Mining operation plans; and
- Unit costs of best management practices.

EPA assessed portions of these data to determine the types and effectiveness of remining operations, abandoned mine land reclamation projects, and BMP implementation procedures that have occurred throughout the affected coal regions. EPA evaluated data packages from closed remining operations as case studies of the effectiveness of BMPs and of remining in terms of improving pre-existing water quality and non-water quality environmental conditions. Detailed case studies are provided in each section of the Coal Remining Best Management Practices Guidance Manual. Information and data provided in these data packages were compiled into a Coal Remining Database that is included in the Rulemaking Record at Section 3.5.1.

On September 3, 1998, IMCC distributed a Solicitation Sheet to States to collect information regarding the extent of existing abandoned mine land, characteristics of current remining operations, type and extent of BMP implementation, remining industry production and employment statistics, and potential for remining operations. Twenty States responded and IMCC submitted the responses to EPA. EPA used this information to develop a profile of the remining industry, estimate the potential for remining activity, and provide an indication of the types and efficiencies of BMPs currently being implemented during remining operations. State responses are included in the Rulemaking Record at Section 3.2.2. A detailed summary of these responses is provided in the Coal Remining BMP Guidance Manual, Appendix C.

In support of BMP implementation evaluation, PADEP provided EPA with a database containing summary pre- and post-mining water quality data and the associated BMPs for 112 closed remining sites throughout the bituminous coal regions of Pennsylvania (Record Section 3.2.3). EPA believes these are the most extensive data currently available for assessment of the water quality impacts of BMP implementation at remining operations. Data from 231 pre-existing discharges affected by BMPs at these closed sites were used to assess the efficiencies of remining BMPs in terms of water quality improvement. The data often demonstrate improvement in, or elimination of, the pollution loadings of acidity, iron, manganese, sulfate, and aluminum, and are presented in Appendix B of the Coal Remining BMP Guidance Manual. Detailed results of this assessment are presented in Section 6 of the Coal Remining BMP Guidance Manual.

C. Western Alkaline Coal Mining Data Collection Activities

In developing the portion of this proposal related to western mines, EPA has worked with a Western Coal Mining Work Group composed of representatives from OSM, the Western Interstate Energy Board (WIEB), State regulatory authorities, the National Mining Association (NMA), and other industry stakeholders to identify, compile and analyze existing information and data.

This work group has supplied EPA with data and information to support the development of new sediment control requirements relying on BMPs for surface reclamation activities in Western Alkaline coal mines. NMA supplied EPA with a number of reports supporting the need for, and feasibility of, establishing a separate Western Alkaline Coal Mining Subcategory. The reports include the following information and supporting data:

- Performance evaluation studies to determine the effectiveness of sediment control BMPs implemented at sites with environmental conditions similar to those of the arid and semiarid western coal region;
- In-stream monitoring programs evaluating background sediment;
- Site-specific sediment control plans targeting arid and semiarid western watersheds;
- Cost evaluations of BMP implementation and treatment requirements; and
- Case studies of mine sites in Arizona, New Mexico, and Wyoming.

The work group also supplied EPA with a mine modeling study sponsored by the National Mining Association and reviewed by OSM. The study compared the predicted performance, costs and benefits of current 40 CFR part 434 Guidelines to the requirements proposed for this rulemaking for a representative model mine in the arid western coal region. Characterization of background water quality, soil loss rates, and sediment yield were predicted using computer models for both pre-mining (undisturbed) and post-mining (reclamation) conditions. The study estimated that the cost of compliance with the proposed subcategory requirements for a typical western surface coal mine will be less than the cost of meeting the existing 40 CFR part 434 guidelines. Details of this study are included in Section 3.3 of the Rulemaking Record and are summarized in the Development Document for Proposed Effluent Limitations Guidelines and Standards for the Western Alkaline Coal Mining Subcategory.

EPA identified, compiled, and analyzed additional sources of existing information and data during the development of this proposed rule including:

- Final NPDES Storm Water Multi-Sector General Permit for Industrial Activities, 60 FR 50804, September 29, 1995. This document includes a section on storm water discharges from inactive coal mines and selected areas within active coal mines, and presents an overview and descriptions of applicable BMPs;
- Sediment control guidelines from State regulatory programs (Wyoming DEQ, Land Quality Division, Guideline No. 15; New Mexico's 19 NMAC 8.2 Subpart 20, Section 2009);
- Performance evaluations demonstrating effectiveness of BMPs (Water Engineering & Technology Studies); and
- Computer-based, predictive soil loss models developed by government,

academia, and industry to model and assess erosion, soil loss, and sediment yields from disturbed lands; capable of determining effectiveness of BMPs on erosion control and sediment production prior to field use (SEDCAD 4.0; Revised Universal Soil Loss Equation (RUSLE); Erosion and Sediment Impacts (EASI) Model).

This information is included in Section 4.3 of the rulemaking record, and is discussed in the Development Document for Proposed Effluent Limitations Guidelines and Standards for the Western Alkaline Coal Mining Subcategory.

VI. Development of Proposed Effluent Limitations Guidelines

A. Coal Remining Subcategory

The effluent limitations and standards proposed for the Coal Remining Subcategory would apply to pre-existing discharges located in areas of a coal remining operation that are not commingled with waste streams from active mining areas.

As noted previously in Section III, coal remining is the mining of surface mine lands, underground mine lands, and coal refuse piles that were abandoned prior to the enactment of the Surface Mining Control and Reclamation Act on August 3, 1977. Acid mine drainage from abandoned coal mines is damaging a significant number of waterways in the Appalachian and mid-continent Coal Regions of the Eastern United States. Information gathered from the Interstate Mining Compact Commission (IMCC) and OSM's Abandoned Mine Land Inventory System (AMLIS) indicates there are over 1.1 million acres of abandoned coal mine lands and over 9,709 miles of streams polluted by acid mine drainage in Appalachia alone.

Acid mine drainage can result from abandoned surface and underground coal mines and coal refuse piles. If acid-forming minerals are present in significant quantities, exposure to air and water can result in the formation of acid mine drainage. At abandoned underground mines, large reservoirs of acid mine drainage can continue to be replenished by ground water movement through the mineral-bearing rocks, creating more acid mine drainage. Water from these ''mine pools'' seeps through the hillsides or flows freely from abandoned mine entries, enters streams, and deposits metal-rich precipitates downstream.

In 1977, Congress included a provision in SMCRA to establish a fund (the Abandoned Mine Land Program) to address abandoned mine lands, with the highest priority given to cleaning up sites that pose a threat to the health, safety, and general welfare of people. Of the $3.6 billion of high priority (Priority 1 and 2) coal related abandoned mine land (AML) problems in the AML Program inventory, $2.5 billion, or 69 percent, have yet to be funded and reclaimed. Current estimates indicate that ninety percent of the $1.9 billion coal related environmental (Priority 3) problems in the AML inventory have not been funded and reclaimed (OSM Abandoned Mine Land Program, 1999). Although progress has been made in cleaning up abandoned sites, the funds released have not been sufficient to correct the majority of the environmental and safety problems associated with the large numbers of abandoned mine land sites.

EPA recognizes that one of the most successful means for improvement of abandoned mine land is for coal mining companies to remine abandoned areas and extract the coal reserves that remain. EPA also recognizes that if abandoned mine lands are ignored during coal mining of adjacent areas, a time-critical opportunity for reclaiming the abandoned mine land is lost. Once coal mining operations have ceased on the adjacent areas, there is little incentive for operators to return.

During remining operations, acid-forming materials are removed with the extraction of the coal, pollution abatement BMPs are implemented under applicable regulatory requirements, and the abandoned mine land is reclaimed. During remining, many of the problems associated with abandoned mine land, such as dangerous highwalls, vertical openings, and abandoned coal refuse piles can be corrected at no cost to OSM's Abandoned Mine Land Program. Furthermore, implementation of appropriate BMPs during remining operations can be effective at improving the water quality of pre-existing discharges. For example, implementation of appropriate BMPs during 112 remining operations in Pennsylvania was effective in improving or eliminating acidity loading in 45 percent of the pre-existing discharges, total iron loading in 44 percent of the discharges, and total manganese in 42 percent of the discharges. This improvement resulted in reduced annual pollutant loadings of up to 5.8 million pounds of acidity, 189,000 pounds of iron, 11,400 pounds of manganese, and 4.8 million pounds of sulfate. The environmental benefits associated with reclamation of abandoned mine lands are discussed further in Section IX of this document.

The current regulations at 40 CFR part 434 create a disincentive for remining because of their high compliance costs. Moreover, the potential of the statutory exemption contained in the Rahall Amendment to overcome this disincentive and derive the maximum environmental benefits from remining operations has not been fully realized in the absence of implementing regulations. If mining companies face substantial potential liability or economic loss from remining, they will continue to focus on mining virgin areas and ignore abandoned mine lands that may contain significant coal resources. Based on information collected in support of this proposal, EPA believes that remining operations are environmentally preferable to ignoring the coal resources in abandoned mine lands. EPA is soliciting comment on this conclusion, and on potential options that may be environmentally preferable to the new subcategory being proposed today.

As described in Section II of this document, Congress attempted to address the problems associated with acid mine drainage at abandoned mine lands by passing the Rahall Amendment to provide incentives to encourage coal remining. The Rahall Amendment (section 301(p)) allows permit writers to issue NPDES permits for remining sites with requirements less stringent than those in the existing regulations for some pollutant limits. Specifically, section 301(p) allows permit writers to use best professional judgement (BPJ) to set site-specific BAT limits determined for pre-existing discharges. These limits may not exceed baseline levels of iron, manganese, and pH. The operator must also demonstrate that the remining operation will result in the potential for improved water quality. The statute does not specify how to determine site-specific BAT, baseline pollutant discharge levels, or the potential for improved water quality and has left these up to each permitting authority to determine.

The statute does not allow site-specific limits for TSS. EPA also is not proposing alternative limitations for total suspended solids (TSS) or settleable solids (SS) in pre-existing discharges. EPA believes the current level of sediment control is necessary during surface disturbance operations to avoid sedimentation and erosion that can clog streams, increase the risk of flooding, impair land stability, and destroy aquatic habitats. Except for the alternate SS effluent limitations for 10-year, 24-hour precipitation events provided in 40 CFR 434.63, existing effluent limits for TSS and SS will

continue to apply to pre-existing discharges.

Since passage of the Rahall Amendment, seven States have established formal remining programs that have issued approximately 330 Rahall permits with numerical limits for pre-existing discharges that are less stringent than those in the existing regulations. Of these 330 Rahall Remining permits, approximately 300 were issued by the Commonwealth of Pennsylvania. Of the remaining thirty Rahall permits, ten were issued by Alabama, eight by West Virginia, four by Kentucky, three by Virginia, three by Ohio, and two by Maryland. Under these Rahall permits, remining operations must meet the alternate numeric limits specified in the permits and must implement site-specific BMPs. These BMPs include special handling of acid-producing materials, daylighting of abandoned underground mines, control of surface water and ground water, control of sediment, addition of alkaline material, and passive treatment. Remining operations currently underway have proven to be a viable means of remediating the environmental conditions associated with these abandoned mine lands without imposing a significant cost burden on industry (Skousen, Water Quality Changes and Costs of Remining in Pennsylvania and West Virginia, 1997).

A discussion paper released by IMCC, EPA and OSM in February 1998 (Discussion Paper on Water Quality Issues Related to Remining) and discussed further in Section V of this document, presented an alternative BMP-based remining permit approach where implementation of BMPs is the central focus of permitting. This alternative would not impose any numerical limits for pre-existing discharges, but only would require implementation of selected BMPs. The IMCC Remining Task Force believes that BMPs can result in improved water quality and, in certain cases, can qualify as BAT for achieving standards required by the Clean Water Act. EPA is considering conditions under which remining permits based solely on BMP implementation in lieu of numerical effluent limits may be appropriate. In addition, EPA recently accepted a Coal Remining and Reclamation Project XL proposal from the Pennsylvania Department of Environmental Protection. Once finalized, this pilot project is expected to provide a substantial amount of data about the feasibility of using the BMP-based remining permit approach in eight different watersheds throughout Pennsylvania. EPA does not currently have sufficient information on the environmental effectiveness and potential regulatory structure for such an approach, and is not including permits based solely on BMPs in today's proposal. EPA is soliciting additional comments and data supporting BMP-based remining permits and situations for which they may be appropriate.

Despite the statutory authority provided by the Rahall Amendment, coal mining companies and most States remain hesitant to pursue remining without formal EPA approval and guidelines. The Rahall Amendment requires application of the best available technology economically achievable on a case-by-case basis, using best professional judgment to set specific numerical effluent limitations in each permit. However, it does not provide guidelines for how to determine baseline pollutant loadings in pre-existing discharges. It also does not provide guidance on how to determine site-specific BAT requirements for a remining operation, or how to demonstrate the potential for environmental improvement from a remining operation. Without standardized procedures for developing effluent limits for pre-existing discharges, many States with extensive abandoned mine lands have not initiated formal remining programs.

EPA is today proposing a new remining subcategory with effluent limitation guidelines based on a combination of numeric limits and non-numeric BMP requirements. EPA is proposing a standardized procedure for determining pollutant loadings for baseline and compliance monitoring. This procedure is described in Appendix B of this proposed regulation. Example calculations using these procedures and further discussion of EPA's determination of these procedures are provied in the Coal Remining Statistical Support Document. EPA intends these proposed regulations to control pre-existing discharges at remining operations in a manner consistent with requirements under the Rahall Amendment. In effect, these proposed requirements are effluent limitation guidelines authorized under section 304(b) of the CWA, but are also implementing regulations for section 301(p), providing EPA's interpretation of unspecified aspects of that provision. Section 301(p) requires the permit to establish BAT on a case-by-case basis, using best professional judgment to set specific numerical effluent limitations for pH, iron, and manganese in each permit. The operator must demonstrate that the coal remining operation will result in the potential for improved water quality, and in no event may pH, iron, or manganese discharges exceed the levels discharged prior to the remining operation. No discharge from, or affected by, the remining operation may exceed State water quality standards. EPA solicits comments on the consistency of the proposal with the Rahall Amendment and existing State remining programs.

Under the proposed regulations, the permit would contain specific numeric and non-numeric requirements, constituting BPT and BAT. The numeric requirements would be established on a case-by-case basis in compliance with standardized requirements for statistical procedures and monitoring to establish baseline. The numeric effluent limitations set at baseline levels would ensure that in no event will the pollutant discharges exceed the discharges prior to remining, as required by section 301(p)(2). The stringency of the non-numeric permit provisions would be established using best professional judgement to evaluate the adequacy of the selected BMPs contained in a pollution abatement plan. The pollution abatement plan would demonstrate that the remining operation will result in the potential for improved water quality, as also required by section 301(p)(2). Together, the numeric and non-numeric requirements would constitute BPT and BAT.

EPA is proposing to require operators to use BMPs by proposing that remining operators must develop and implement a site-specific pollution abatement plan for each remining site. EPA is proposing that the pollution abatement plan must identify the characteristics of the remining area and the pre-existing discharges at the site; identify design specifications for selected best management practices; and include periodic inspection and maintenance schedules. The pollution abatement plan must demonstrate that there is a potential for water quality improvement, as required by the Rahall Amendment.

EPA is also proposing that this pollution abatement plan must be developed for the entire ''pollution abatement area.'' By applying the pollution abatement plan to the entire pollution abatement area, the proposed Remining Subcategory effluent limitations would cover all pre-existing discharges that are hydrologically connected to the active mining area, but that are not commingled with active mining discharges. EPA is proposing to define the ''pollution abatement area'' as the part of the permit area that is causing or contributing to the baseline pollution load, including areas that

would need to be affected to reduce the pollution load. This is similar to the definition used by Pennsylvania's remining program in Pennsylvania's Chapter 87, Subchapter F Surface Mining Regulations (Record Section 1.3). The success of the abatement plan is premised on a hydrological connection between the pollution abatement area and the baseline pollutant load. If there is no hydrologic connection between the pre-existing discharge and the operator's remining and reclamation efforts, there can be no water quality improvement. For further information on this rationale see The Preliminary Engineering Cost Manual for Development of BPJ Analysis, 1986, Kohlmann Ruggiero for PA DER and EPA. EPA is providing a supporting document, the Coal Remining Best Management Practices Guidance Manual to assist industry and permit writers in the development and implementation of the pollution abatement plan.

EPA is soliciting comment on the definition of pollution abatement area. EPA is also soliciting comment on any additional requirements for the pollution abatement plan that would ensure the proper use, design and implementation of BMPs.

In many cases, EPA believes that the requirements for the pollution abatement plan will be satisfied by an approved SMCRA plan. However, EPA or the State NPDES permitting authority will review the plan and will retain the authority to recommend additional or incremental BMPs as necessary to ensure that implementation of the identified BMPs is consistent with Clean Water Act requirements.

EPA is proposing regulatory text to make it clear that the requirements of this subcategory apply only to pre-existing discharges that are not commingled with waste streams from active mining areas. This will ensure that all mine drainage produced by the active mining operation is treated to meet existing part 434 guidelines. Any wastewater that is commingled with active mining wastewater would be subject to the most stringent limitations applicable to any component of the wastestream. This maintains the current regulatory approach expressed in section 434.61, that in cases where wastestreams subject to two different effluent limits are commingled, the combined discharge is subject to the more stringent limitation.

During remining, it may be necessary or even preferable for an operator to intercept and/or commingle a pre-existing discharge with active mining wastewater. This wastewater would then be required to meet the more stringent applicable limitations for active coal mining operations and would not be covered by the conditions of the proposed Coal Remining Subcategory. However, that pre-existing discharge may not be eliminated by the remining activity and may remain after remining in the area has been completed. In this instance the pre-existing discharge would no longer be commingled with active mining wastewater. EPA is proposing that a discharge that is no longer being commingled would become subject to the Coal Remining Subcategory requirements which bar an increase in pollutant loadings from baseline conditions.

EPA does not believe that a pre-existing discharge that has been intercepted or commingled should have to continue to meet the more stringent effluent limitations applicable to active mining operations after this activity has been completed. If EPA were to require that pre-existing discharges that are commingled with wastewater remain subject to effluent limitations designed for active mining operations once interception or commingling has ceased, EPA believes it would create a significant disincentive for remining activities. Based on anecdotal and historical evidence of current mining activities, mining companies may try to avoid intercepting pre-existing discharges because they do not want to assume the liability for future treatment of discharges that were not the result of their mining operations. This can result in a ''donut hole'' in the permitted area, to which BMPs are not applied and from which pre-existing acid mine drainage continues to be discharged. In many cases, EPA believes that the most environmentally beneficial approach would be for the coal operation to physically intercept this pre-existing discharge, treat the discharge to current standards during active mining and reclamation, implement BMPs, and then allow the pre-existing discharge to continue discharging at or below baseline pollutant levels. This approach is consistent with the way Pennsylvania has been implementing the Rahall provisions. Another option for a remining operator would be to divert the discharge stream away from the active mining area. In this case, the pre-existing discharge that has been diverted would be subject to the proposed subcategory effluent limitations, and the mine operator would have to implement BMPs and demonstrate that the pollutant loadings of the diverted discharge stream have not been increased.

These proposed limitations and standards would apply to coal remining operators under new remining permits. EPA is considering coverage of existing remining operations with Rahall-type permits and established BPJ limitations. EPA is also considering situations where coal remining operations seek reissuance of an existing remining permit. In both cases, EPA believes that it may not be feasible for a remining operator to re-establish baseline pollutant levels during active remining. Therefore, EPA is considering an alternative where pre-existing discharges at these operations would remain subject to baseline pollutant levels established during the original permit application. EPA is soliciting comment on the applicability of the proposed Coal Remining Subcategory in regard to both cases.

EPA expects this new subcategory to provide further incentives for industry to remine abandoned mine lands, which will result in reclamation of abandoned mine lands that would otherwise remain unreclaimed and hazardous. EPA solicits comment on the potential for improving hazardous conditions and improving acid mine drainage based on implementation of this subcategory. EPA also solicits comment on the proposed applicability of the remining subcategory as it relates to intercepted pre-existing discharges.

1. BPT for the Coal Remining Subcategory

EPA today proposes BPT effluent limitations for the Coal Remining Subcategory to control identified conventional, toxic, and non-conventional pollutants. For further information on the basis for the limitations and technologies selected, see the Coal Remining BMP Guidance Manual.

As previously described in Section II, section 304(b)(1)(A) of the CWA requires EPA to identify effluent reductions attainable through the application of ''best practicable control technology currently available for classes and categories of point sources.'' Generally, EPA determines BPT effluent levels based upon the average of the best existing performance by facilities of various sizes, ages, and unit processes within each industrial category or subcategory. In establishing BPT, EPA considers the cost of achieving pollution reductions in relation to the pollution reduction benefits, the age of equipment and facilities, the processes employed, process changes required, engineering aspects of the control technologies, non-

water quality environmental impacts, and other factors the Administrator deems appropriate.

EPA is proposing that BPT for the Coal Remining Subcategory be defined through a combination of numeric and non-numeric standards. Specifically, EPA is proposing that the best practicable control technology currently available for remining operations is implementation of a pollution abatement plan that incorporates BMPs designed to improve pH and reduce pollutant loadings of iron and manganese, and a requirement that such pollutant levels are not increased over baseline conditions. This is essentially the level of treatment currently required under permits issued in accordance with the Rahall Amendment, which has been demonstrated to be currently available by remining facilities included in EPA's Coal Remining database (Record Section 3.5.1) and in Pennsylvania's study of 112 closed remining sites (Record Section 3.5.3).

In order to evaluate available technologies to determine BPT, EPA relied on data from 41 remining operations in Pennsylvania. This data is contained in Section 3.2.4 of the regulatory record. All of these facilities used various combinations of BMPs as their pollutant control technology. EPA reviewed the expected performance, cost, and design of the BMPs used by these remining operations. EPA determined that the facilities were able to show potential for significant removals of loading as compared to pre-existing discharge conditions. EPA also determined that design and implementation of a BMP plan should, in most cases, achieve reductions below baseline discharge levels.

This same data from Pennsylvania supports a conclusion that the proposed pollution abatement plan requiring use of BMPs also represents the best available technology economically achievable (BAT) levels of control. Section 301(p) allows permit writers to use best professional judgement (BPJ) to set site-specific BAT limits determined for pre-existing discharges. Pennsylvania completed this BAT determination for 40 of 41 respondents. Pennsylvania's remining permit modules indicated that the only more stringent technology available included chemical addition, precipitation, and settling. In all 40 cases, remining was considered not economically feasible if treatment of pre-existing discharges to current effluent limits was required. In the same 40 cases, remining was economically feasible if the abatement plan was implemented as proposed. Thus, the Pennsylvania remining permits issued under Rahall were issued as BAT permits. This conclusion is supported by the adoption of the Rahall Amendment by Congress in 1987. At that time, Congress recognized that remining was not being conducted on abandoned mine lands because of the cost and liability of requiring treatment to meet existing regulations and authorized less stringent requirements for remining operations.

Therefore, EPA is proposing that the implementation of a pollution abatement plan represents BAT level of control. Furthermore, EPA is aware that permits containing these BMPs are in place and are being implemented by a large number of operators. Thus, EPA is proposing that pollution abatement plans also represent the average of the best technology currently available.

The problem with setting numeric effluent limitations representing the reductions achieved through implementation of a pollution abatement plan is that it is difficult to project the results, in terms of measured improvements in pollutant discharges, that will be produced through the application of any given BMP or group of BMPs at a particular site. EPA believes that the Coal Remining BMP Guidance Manual compiles the best information available on appropriate application and projected performance of all currently identified BMPs applicable to coal remining operations. However, the Coal Remining BMP Guidance Manual provides only reasonable estimates of ranges of projected performance and efficiency. There are numerous variables associated with the design and application of a particular BMP at a particular site, let alone multiple BMPs at a site. Additionally, all of these estimates are subject to substantial uncertainties. In some cases, despite appropriate design and implementation of a BMP plan, there may be little or no improvement over baseline discharges. Thus, it is simply not practicable to project the expected numeric improvements that will occur for a specific pre-existing discharge through application of a particular BMP plan. As a consequence, EPA is proposing to establish a non-numeric requirement to implement a pollution abatement plan incorporating implementation of BMPs designed to reduce the pollutant levels of pH, iron and manganese in pre-existing discharges.

EPA interprets the CWA as authorizing the Agency to establish non-numeric effluent limitations where it is infeasible to establish numeric effluent limitations. Section 502 of the Act defines ''effluent limitation'' as ''*any* restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources.'' (Emphasis added.) This language does not restrict the form of effluent limitations to only numeric limits. The courts have held, in the context of permits, that the CWA does not require EPA to set numeric limits where such limits are infeasible. ''When numerical effluent limitations are infeasible, EPA may issue permits with conditions designed to reduce the level of effluent discharges to acceptable levels. This may well mean opting for a gross reduction in pollutant discharge rather than the fine-tuning suggested by numerical limitations. But this ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all.'' *Natural Resources Defense Council* v. *Costle,* 568 F.2d 1369, 1380 (D.C. Cir. 1977). EPA's NPDES permit regulations reflect this longstanding interpretation in 40 CFR 122.44(k), which provides that permits may include BMPs to supplement, or in lieu of, numeric effluent limitations when ''numeric effluent limitations are infeasible'' or ''the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of [the] CWA.'' Sections 402(a)(2) and 501 further authorize EPA to prescribe as wide a range of permit conditions as the Agency deems appropriate to assure compliance with applicable effluent limits. EPA believes that the same considerations underlying the court's statutory interpretation with respect to non-numeric effluent limitations in permits also support an interpretation that the Agency may establish non-numeric effluent limitation regulations where numeric limitations are infeasible. Because it is infeasible here to express the expected performance of the identified best practicable control technology in numeric terms, EPA believes that establishment of non-numeric effluent limitations is authorized under, and is necessary to carry out, the purposes and intent of the CWA.

Although it is not feasible to establish numeric limits predicting pollutant reductions, it is possible to calculate baseline pollutant levels in pre-existing discharges. Moreover, the record indicates that application of appropriately designed BMPs should be able to prevent any increase in pollutant loadings for pre-existing discharges. Accordingly, it is feasible to set a

minimum numeric requirement based on baseline pollutant levels. Therefore, EPA is today proposing to establish numeric effluent limitations that require that the pollutant levels for pH, iron and manganese do not increase over baseline levels. EPA is proposing a uniform methodology to use for this calculation. Baseline level determination and monitoring procedures are presented in the Coal Remining Statistical Support Document.

EPA requests comment on how to describe and structure the requirement to design and implement a pollution abatement plan to reduce pollutant loadings from pre-existing discharges. EPA has proposed a fairly general qualitative description of the requirement, which leaves it up to the permit writer to determine whether in a particular case BPT or BAT would require additional or more intensive BMPs than identified in an applicant's proposed plan. The proposed regulation would require that an operator identify the characteristics of the remining area and the pre-existing discharges at the site, identify design specifications for selected BMPs, and include periodic inspection and maintenance schedules. These requirements are intended to help the permit writer evaluate the likely cost and efficacy of the proposed plan in relation to the conditions existing at the site. EPA requests comment on whether there are additional criteria that EPA could establish to provide applicants and permit writers further guidance in determining whether a particular BMP plan meets the regulatory criteria. For example, the requirement to develop and implement a pollution abatement plan to maintain or reduce pollution in pre-existing discharges is a fairly general directive for what the plan should achieve. EPA requests comment on how the regulations could better define the type of plan that would constitute BPT and BAT.

The primary alternative control technology that EPA could determine to be BPT would be to require remining operations to treat pre-existing discharges to meet the effluent guideline limitations for active mining discharges. As discussed above, EPA does not believe that this is a practical option for remining operations, given cost and liability concerns. EPA is requesting comment and data for any other treatment technologies that would be economically feasible and available for control of pre-existing discharges to meet more stringent limitations.

EPA projects that the annual compliance cost for this new subcategory will be approximately $330,000 to $759,000.

2. BCT for the Coal Remining Subcategory

In July 1986, EPA promulgated a methodology for establishing BCT effluent limitations. EPA evaluates the reasonableness of BCT candidate technologies—those that are technologically feasible—by applying a two-part cost test: (1) a POTW test; and (2) an industry cost-effectiveness test.

EPA first calculates the cost per pound of conventional pollutant removed by industrial dischargers in upgrading from BPT to a BCT candidate technology and then compares this cost to the cost per pound of conventional pollutants removed in upgrading POTWs from secondary treatment. The upgrade cost to industry must be less than the POTW benchmark of $0.25 per pound (in 1976 dollars).

In the industry cost-effectiveness test, the ratio of the incremental BPT to BCT cost divided by the BCT cost for the industry must be less than 1.29 (i.e., the cost increase must be less than 29 percent).

In today's proposal, EPA is proposing to establish BCT effluent limitations guidelines equivalent to the BPT guidelines for the Coal Remining Subcategory. In developing BCT limits, EPA considered whether there are technologies that achieve greater removals of conventional pollutants than proposed for BPT, and whether those technologies are cost-reasonable according to the BCT Cost Test. EPA identified no technologies that can achieve greater removals of conventional pollutants than proposed for BPT that are also cost-reasonable under the BCT Cost Test, and accordingly EPA proposes BCT effluent limitations equal to the proposed BPT effluent limitations guidelines.

3. BAT for the Coal Remining Subcategory

As discussed above, EPA concluded that the requirement to design and implement a pollution abatement plan represents BAT and that there are no more stringent technologies that are economically achievable. The pollution abatement plan is required to be designed to control conventional, toxic and non-conventional pollutants, and the plan must reflect levels of control consistent with BAT for toxic and non-conventional pollutants. Of course, EPA expects that a facility will have a single plan to control all pollutants. In addition, EPA would expect that the permit writer would determine the adequacy of the plan based on the Coal Remining BMP Guidance Manual. As discussed above, EPA concluded that it is infeasible to express BAT as a numeric limit. EPA is proposing to set a combination of site-specific numeric and non-numeric effluent limitation guidelines for BAT identical to those for BPT for iron and manganese.

4. NSPS for the Coal Remining Subcategory

In today's proposal, EPA did not consider any regulatory options for new sources for the Coal Remining Subcategory. By definition, pre-existing discharges at abandoned mine lands covered by this proposal were in existence prior to passage of SMCRA in 1977. Therefore, EPA is designating pre-existing discharges existing sources. EPA is proposing that pre-existing discharges are subject to requirements proposed for BPT, BCT, and BAT. NSPS effluent limitations are not applicable to this subcategory. A new discharge from remining operations that is not designated as a pre-existing discharge must meet applicable effluent limitations at sections 434.35, 434.45, or 434.55, as appropriate.

B. Western Alkaline Coal Mining Subcategory

The effluent limitations and performance standards for the Western Alkaline Coal Mining Subcategory apply to alkaline mine drainage from reclamation areas associated with western coal mining operations.

Alkaline mine drainage is defined in the existing regulations as ''mine drainage which, before any treatment, has a pH equal to or greater than 6.0 and total iron concentration of less than 10 mg/L.'' Reclamation area is defined in the existing regulation as ''the surface area of a coal mine which has been returned to required contour and on which revegetation (specifically, seeding or planting) work has been commenced.'' EPA is not proposing to make any changes to these existing definitions.

EPA is proposing to define a western coal mining operation in arid or semiarid areas as a surface or underground coal mining operation located in the interior western United States, west of the 100th meridian west longitude, in an arid or semiarid environment with an average annual precipitation of 26.0 inches or less. This definition is consistent with the definition for western coal mining currently used by OSM (30 CFR 701.5 and 30 CFR 816.116).

The existing effluent guidelines for reclamation areas establish BPT, BAT, and NSPS numeric effluent limits based on the use of sedimentation pond technology. The discharge from

reclamation areas must meet effluent limitations for settleable solids and pH. The existing guidelines apply to all reclamation areas throughout the United States, regardless of climate, topography, or type of drainage (i.e., acid or alkaline). The existing guidelines do not take into consideration the dramatic differences in naturally occurring sedimentation that can result from the different environmental conditions in the arid and semiarid coal regions compared to the eastern United States.

The existing guidelines establish relatively stringent controls on the amount of sediment that can be discharged into waterways from post-mined areas. In the arid west, data have shown that the use of sedimentation ponds becomes necessary for compliance. Although sedimentation ponds are proven to be effective at reducing sediment discharge, EPA believes that there are numerous non-water quality impacts that may harm the environment when sedimentation ponds are necessary to meet discharge requirements for reclamation areas in the arid and semiarid west. Sedimentation ponds in reclamation areas are designed to capture and store water from a precipitation event and then slowly release the water in a continuous, low-velocity discharge. EPA believes that the slow release of water containing low amounts of sediment has caused negative environmental impacts in arid regions. The negative impacts caused by the predominant use of sedimentation ponds include disruption of the natural hydrologic and sediment balance, stream channel instability, and water loss due to evaporation.

EPA is proposing a new subcategory for reclamation areas of western alkaline coal mines primarily because of negative impacts caused by the predominant use of sedimentation ponds in arid regions as is necessary to meet the current guidelines.

In arid and semiarid western coal mine regions, climate, topography, soils, vegetation, and hydrologic components all combine to form a hydrologic balance that is naturally sediment rich. Sediment is defined as all undissolved organic and inorganic material transported or deposited by water. In arid regions, the natural vegetative cover is sparse and rainfall is commonly received during localized, high-intensity, short-duration thunderstorms. These conditions contribute to flash-floods and turbulent flows that readily transport large amounts of sediment. Runoff from natural, undisturbed arid lands may contain up to several hundred thousand milligrams per liter TSS.

Fluvial areas and receiving channels in the arid west have developed according to the natural conditions present in arid regions. The receiving channels are primarily ephemeral arroyos that transport large volumes of flow and sediment. The natural conditions of these channels may be affected by the alteration of sediment concentration and flow volume as a result of constructed sedimentation ponds. Discharge of sediment-free water from a sedimentation pond may actually accelerate channel erosion because the sediment-free water will entrain sediment from the channel immediately below the pond. Later, when the sedimentation pond is removed, drainage from the reclaimed area will flow uninterrupted into the downstream watershed. This return to natural flow volumes and sediment concentrations essentially ''shocks'' the drainage channel and may be extremely disruptive to the fluvial and hydrologic balance that has developed based on the sedimentation pond discharge. Severe channel reconfiguration can occur at this stage, making the area more susceptible to instability and erosion than the pre-mining undisturbed conditions. EPA is soliciting comment on the environmental impacts and benefits associated with the predominant use of sedimentation ponds in the arid west for control of sediment from post-mining areas.

For arid and semiarid western coal mines, EPA believes that the most environmentally responsible goal is to reclaim the land such that the natural sediment loadings and hydrologic balance of undisturbed conditions is maintained at post-mined lands. EPA solicits comment on this conclusion, and on the problems that are associated with disturbing the hydrologic balance in arid regions.

Following the 1985 promulgation of the current regulations, new and more accurate sediment control modeling, designs and plans have been developed and evaluated for use with drainage from reclamation areas at coal mines in the western United States. The States of Wyoming and New Mexico have developed regulations to allow the use of sediment control BMPs to prevent environmental problems associated with predominant use of sedimentation ponds. These State program BMP applications are considered to meet the sediment control provisions of SMCRA and are sanctioned by the delegated Clean Water Act regulatory authority in each State. These regulations include specific provisions to allow the use of BMPs and avoid the unique environmental problems that are associated with the predominant use of sedimentation ponds on coal mine reclamation areas. Provisions under SMCRA related to sediment control require coal mining operations to be conducted so as to prevent, to the extent possible, using the best technology currently available, additional contributions of suspended solids to streamflow, or run-off outside the permit area. Corresponding regulations are found at 30 CFR 816.45 which include the above language and also require the permittee to minimize erosion and meet the more stringent of applicable State and Federal effluent standards. The standards contained in this Western Alkaline Coal Mining Subcategory will be the framework for designing, installing, and maintaining sediment control measures that are expected to function as designed in a manner to meet the statutory and regulatory provisions for sediment control and modeling predictions.

Under Wyoming's Coal Rules and Regulations, Chapter IV, alternative sediment control measures may be used when it can be demonstrated that drainage will either meet effluent limitation standards or will not degrade receiving waters. Wyoming's regulations and accompanying guidance (Wyoming Department of Environmental Quality, Land Quality Division, Guideline No. 15, Alternative Sediment Control Measures) state that appropriate sediment control measures shall be designed, constructed, and maintained using best technology currently available to prevent additional contributions of sediment to streams or to runoff outside the affected area.

Under New Mexico's ''ASC Windows Program'' (19 NMAC 8.2 Subpart 20, Section 2009), SMCRA requirements to pass all disturbed area runoff through sedimentation ponds can be waived if the operator demonstrates that erosion is sufficiently controlled and that the quality of area runoff is as good as, or better than, that of water entering the permit area. The operator's plan for alternative sediment control must demonstrate that there will be no increase in the sediment load to receiving streams. Several mine operations in New Mexico have applied for and received reclamation liability bond releases for lands where sediment control BMP plans were implemented. These sites demonstrated that there was no additional annual contribution of suspended solids to the hydrologic regime of the area and that runoff from regraded areas had characteristics

similar to runoff from undisturbed areas.

In order to maintain natural conditions on reclamation areas, EPA is proposing that non-numeric effluent limits be based on the design, implementation, and maintenance of BMPs. Sediment control BMP technologies for the coal mining industry are well known and established. Common BMPs used at post-mining coal areas include regrading, revegetation, mulching, check dams, vegetated channels, and contour terracing as well as sedimentation ponds. The range and implementation of available BMPs are summarized in the Development Document for Proposed Effluent Limitations Guidelines and Standards for the Western Alkaline Coal Mining Subcategory. All of these BMPs are designed to stabilize the soil and control the amount of sediment released into the environment.

Erosion and sediment control plans and technology application have evolved since the passage of SMCRA and the promulgation of the current 40 CFR part 434 effluent limitations guidelines. Extensive monitoring and case studies have been performed on arid and semiarid lands to characterize the nature and extent of erosion occurring within these areas. Computer sediment modeling of arid and semiarid fluvial systems has advanced significantly, evolving into site-specific models that are able to account for local environmental factors found within the region. Under this proposed subcategory, prediction models will be used to design site-specific BMP plans that are effective in the arid and semiarid western coal regions. Sedimentation ponds may be used in conjunction with other BMPs to prevent additional contributions of sediment to streamflow or to runoff outside reclamation areas.

Specifically, EPA is proposing a requirement to develop and implement site-specific sediment control plans that would apply in lieu of numeric limits for pH and settleable solids applicable under current guidelines for reclamation areas. EPA is proposing that a mine operator must develop a site-specific sediment control plan for surface reclamation areas. The sediment control plan must identify BMPs and present design, construction, and maintenance specifications for the BMPs, and their expected effectiveness. The goal of the site-specific sediment control plan would be to specify BMPs sufficient to control sediment discharges from the reclamation area so that they do not exceed natural background levels. The proposed regulations would require the operator to demonstrate, using watershed models accepted by the regulatory authority, that implementation of the selected BMPs would meet this goal. The permit would then incorporate the site-specific sediment control plan and would require the operator to implement the plan.

EPA is proposing to establish requirements for site-specific sediment control plans based on computer modeling in lieu of nationally applicable numerical effluent limitations. As discussed above in Section VI.A.1, such requirements are authorized as non-numeric effluent limitations where it is infeasible to establish numeric effluent limitations.

EPA believes that determining compliance based on numerical standards for runoff from BMPs is infeasible due to the environmental conditions present in Western coal mine reclamation areas. As mentioned previously, precipitation events are often localized, high-intensity, short-duration thunderstorms. Rain may fall in one area of a watershed while other areas remain dry. This makes it extremely difficult to evaluate overall performance of the BMPs. Additionally, watersheds and reclaimed mine lands often cover vast and isolated areas. These factors combine to make it burdensome for a CWA permit authority to extract periodic, meaningful samples on a timely basis to determine if a facility is meeting effluent limitations for settleable solids. The difficulty of sample collection is described in the Phase I Report: Technical Information Package provided by the Western Coal Mining Work Group (Record Section 3.3.1).

Requirements based on BMP plans would ease the implementation burden of the rule and allow a permit authority to determine compliance on a regular basis. A permit authority would be able to visit the site and determine if BMPs have been implemented according to the site's sediment control plan. The permit authority would not have to wait for a significant precipitation event to determine compliance, and the facility would have the opportunity to improve BMP implementation prior to a precipitation event. EPA believes a key factor in using BMPs is the opportunity for continual inspection and maintenance by coal mine personnel to ensure that sediment control measures will continue to function as designed. Under SMCRA, inspections of the coal mining operations are conducted monthly. EPA is soliciting comments on the appropriateness of BMP inspection to determine compliance with the requirements of this subcategory and on recommended procedures for, and frequency of, such inspections. Because it is infeasible here to determine compliance and performance of the BMPs in numeric terms, EPA believes that establishment of non-numeric effluent limitations for this subcategory is authorized under and is necessary to carry out the purposes and intent of the CWA.

In addition, EPA believes that there are several advantages to establishing requirements for site-specific sediment control plans based on computer modeling in lieu of nationally applicable numerical effluent limitations. First, according to the applicability of the proposed subcategory, the discharge associated with this subcategory is alkaline, not acidic. Therefore, EPA does not believe that pH monitoring is necessary for reclamation areas associated with alkaline coal mines.

Also, existing regulations (40 CFR part 434.63) allow for alternative limitations during precipitation events of the specified magnitudes, which may generate a significant amount of sediment, especially in the arid West. Under the proposed subcategory, the BMP plan requirement would not allow for alternative (i.e., less stringent) limits because computer models are able to account for precipitation events that typically occur in the arid west. The BMP plan requirement would be based on a demonstration that the average yearly sediment yield will not increase over undisturbed conditions, and would consider precipitation events. NMA's model mine study Draft Western Alkaline Mining Subcategory—Mine Modeling and Performance Cost-Benefit Analysis (Record Section 3.3.6) conducted in support of this proposal predicted sediment yield and BMP effectiveness based on a 24-hour, 10-year storm event. Under the proposed requirements, the coal mine operator would have to design and construct sediment controls that are adequate for high precipitation events rather than meeting the existing alternative limitations during these events. Sediment control measures under BMP plans would be designed to control annual sediment yield, not only the 10-year, 24-hour storm. This would result in retaining more soil on the slopes, rather than collecting it in a sedimentation pond. At the same time, sediment control measures under BMP plans would no longer allow the exemptions provided during high intensity flows exceeding a 10-year, 24-hour storm event in which only pH

limits apply under the current regulations (434.63(a)(2)).

The Western Coal Mining Work Group has suggested that EPA consider applying the new subcategory to all non-process water. Non-process water would include runoff from pre-stripping areas (i.e., development areas where brushing, topsoil salvage, and other types of general construction earthwork are being conducted). EPA has considered including non-process water from other areas, but does not believe there is sufficient data to expand the applicability of the proposed Western Alkaline Coal Mining Subcategory at this time. EPA solicits comment on the appropriateness of expanding the applicability of this proposed subcategory to include the control of non-process water from other coal mining related areas.

EPA expects that, in general, the sediment control plan will largely consist of materials generated as part of the SMCRA permit application. The SMCRA permit application process requires a coal mining operator to submit an extensive reclamation plan, documentation, and analysis to OSM or the permitting authority for approval. The requirements of the reclamation plan are specified in 30 CFR 780.18 *Reclamation plan: General requirements.*

In brief summary, some of the OSM requirements that also directly relate to this proposal include requirements for coal mining operators to provide: A description of coal mining operations; a plan for regrading mined lands; a plan for revegetating mined lands; a description of baseline ground water and surface water characteristics; and an analysis of the hydrologic and geologic impacts caused by the reclamation activity.

Specifically, the plan requires a ''probable hydrologic consequences (PHC) determination.'' 30 CFR 780.21 (f) (3) states:

> The PHC determination shall include findings on: (i) Whether adverse impacts may occur to the hydrologic balance; (ii) Whether acid-forming or toxic-forming materials are present that could result in the contamination of surface or ground water supplies; (iii) Whether the proposed operation may proximately result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit or adjacent areas which is used for domestic, agricultural, industrial or other legitimate purpose; and (iv) What impact the proposed operation will have on: (A) Sediment yields from the disturbed area; (B) acidity, total suspended and dissolved solids, and other important water quality parameters of local impact; (C) flooding or streamflow alteration; (D) ground water and surface water availability; and (E) other characteristics as required by the regulatory authority.

Additional OSM requirements relevant to the proposed sediment control plan are given in Section 780.2 (h) ''Hydrologic reclamation plan.''

> The application shall include a plan, with maps and descriptions, indicating how the relevant requirements of part 816, including Secs. 816.41 to 816.43, will be met. The plan shall be specific to the local hydrologic conditions. It shall contain the steps to be taken during mining and reclamation through bond release to minimize disturbances to the hydrologic balance within the permit and adjacent areas; to prevent material damage outside the permit area; to meet applicable Federal and State water quality laws and regulations; and to protect the rights of present water users. The plan shall include the measures to be taken to: Avoid acid or toxic drainage; prevent, to the extent possible using the best technology currently available, additional contributions of suspended solids to streamflow; provide water-treatment facilities when needed; control drainage; restore approximate premining recharge capacity and protect or replace rights of present water users. The plan shall specifically address any potential adverse hydrologic consequences identified in the PHC determination prepared under paragraph (f) of this section and shall include preventive and remedial measures.

Based on these requirements, EPA believes that plans developed to comply with SMCRA requirements will usually fulfill the requirements proposed by EPA for sediment control plans. The requirement to use modeling techniques also is consistent with OSM reclamation plans, and mining facilities already submit a watershed model as part of their SMCRA reclamation plan. EPA believes modeling is particularly valuable in arid and semiarid areas where the infrequency of precipitation makes it difficult to gather data. While EPA is not proposing to require that operators use a specific model, the operator would have to use the same model as was, or will be, used to acquire the SMCRA permit. This would ensure that the model used will be consistent with OSM requirements and reclamation plans. While EPA is proposing that an appropriate sediment control plan will depend on the sediment yield calculation, these models also typically calculate additional parameters for undisturbed areas and reclamation areas for expected storm events including: total runoff volume, peak sediment yield, peak sediment concentration, average annual sediment yield and average annual peak water discharge. A guidance manual entitled ''Guidelines for the Use of the Revised Universal Soil Loss Equation (RUSLE) Version 1.06 on Mined Lands, Construction Sites, and Reclaimed Lands'' published in August, 1998 describes the use of RUSLE for watershed modeling. Additionally, SEDCAD™ 4.0 is a widely accepted model for predicting BMP performance and is currently being used by many mine sites. NMA describes use of RUSLE 1.06 and SEDCAD 4.0 models in the Mine Modeling and Performance Cost-Benefit Analysis (Record Section 3.3.6) to determine the costs and loadings for a representative model mine associated with this proposed subcategory.

EPA is proposing to define the term ''sediment yield'' to mean the sum of the soil losses from a surface minus deposition in macro-topographic depressions, at the toe of the hillslope, along field boundaries, or in terraces and channels sculpted into the hillslope. This definition is consistent with the definition established for the RUSLE modeling program. EPA solicits comment on this definition of sediment yield and on the appropriateness of using this parameter as the basis for determining sediment loadings.

EPA is soliciting comment on establishing non-numeric effluent limits in the form of a requirement to develop and implement a BMP-based sediment control plan rather than setting numeric effluent limitations.

1. BPT for the Western Alkaline Coal Mining Subcategory

EPA today proposes BPT effluent limitations for the Western Alkaline Coal Mining Subcategory to control sediment discharge from reclamation areas. For further information on the basis for the limitations and technologies selected see the Development Document for Proposed Effluent Limitations Guidelines and Standards for the Western Alkaline Coal Mining Subcategory.

As previously described in Section II, section 304(b)(1)(A) of the CWA requires EPA to identify effluent reductions attainable through the application of ''best practicable control technology currently available for classes and categories of point sources.'' Generally, EPA determines BPT effluent levels based upon the average of the best existing performance by facilities of various sizes, ages, and unit processes within each industrial category or subcategory. In establishing BPT, EPA considers the cost of achieving pollution reductions in relation to the pollution reduction benefits, the age of equipment and facilities, the processes employed, process changes required, engineering aspects of the control technologies, non-water quality environmental impacts,

and other factors the Administrator deems appropriate.

EPA is proposing that BPT for the Western Coal Mining Subcategory consist of designing and implementing BMPs to maintain the average annual sediment yield equal to or below pre-mined, undisturbed conditions. EPA is proposing this new subcategory primarily because of the negative non-water quality environmental impacts created by the current requirements.

Current requirements for reclamation areas (40 CFR part 434, subpart E) establish BPT, BAT, and NSPS based on the use of sedimentation pond technology, and set effluent limitations for settleable solids and pH. The existing guidelines apply to all reclamation areas throughout the United States, regardless of climate, topography, or type of mine drainage (i.e., acid or alkaline).

Existing effluent limitation guidelines establish relatively stringent controls on the amount of settleable solids that can be discharged into waterways from reclamation areas. Although sedimentation ponds are proven to be effective at reducing sediment discharge, EPA believes that there are numerous non-water quality impacts that may harm the environment when sedimentation ponds are required to meet current effluent limits. The negative non-water quality impacts associated with existing regulations include: disturbing the natural hydrologic balance of arid western drainage areas; accelerating erosion; reducing groundwater recharge; reducing water availability; and impacting large areas of land for pond construction. A further discussion of these impacts can be found in Sections IV and IX of this document.

EPA believes that the current requirements are not appropriate for arid and semiarid western reclamation areas because of the negative non-water quality impacts associated with the predominant use of sedimentation ponds, as discussed above. The appropriate goal for reclamation and discharges from post-mined lands should be to mimic the natural conditions of the area that were present prior to mining activities. In order to do this, it is necessary to maintain the hydrologic balance and sediment loadings of natural, undisturbed conditions on post-mined lands. EPA believes that use of BMPs to control sediment discharges is the only effective alternative control technology to sedimentation ponds. Therefore, EPA is proposing that BPT consist of designing and implementing BMPs projected to maintain the average annual sediment yield equal to or below pre-mined, undisturbed conditions. This would ensure that natural conditions are maintained. In order to achieve these results, EPA would require that the coal mining operator develop a sediment control plan and run models. Requirements are further described in the proposed regulatory text.

As discussed in Section X of this document, EPA estimates that today's proposal will result in a net cost savings to all affected surface mine operators, and will be at worst cost-neutral for affected underground operators (although EPA believes that most will also incur cost savings). Therefore, implementing these standards will result in no facility closures or negative economic impact to the industry. EPA projects that the proposed subcategory will result in annualized monetized benefits of $43,000 to $769,000.

2. BCT for the Western Alkaline Coal Mining Subcategory

In today's proposal, EPA is not proposing effluent limitations for any conventional pollutant and hence need not propose to establish BCT limitations for this subcategory at this time.

3. BAT for the Western Alkaline Coal Mining Subcategory

EPA is proposing that BAT be equivalent to BPT for this subcategory to control sediment discharge for reclamation areas. Existing effluent limitations guidelines established BAT based upon sedimentation pond technology. However, as previously noted, non-water quality impacts can occur that may harm the environment when sedimentation ponds are required to comply with current effluent limits for settleable solids. EPA is proposing that BAT consist of designing and implementing BMPs projected to maintain the average annual sediment yield equal to or below pre-mined, undisturbed conditions, which is equivalent to proposed BPT.

EPA has not identified any more stringent treatment technology that could represent BAT level of control for maintaining discharge levels of settleable solids consistent with natural, undisturbed conditions on post-mined land in the arid west. EPA is therefore proposing that BAT standards be established equivalent to BPT. Further, as discussed in Section X of this document, EPA estimates that today's proposal will result in a net cost savings to all affected surface mine operators, and will be at worst cost-neutral for affected underground operators. Therefore, implementing BAT standards will result in no facility closures or negative economic impact to the industry.

4. NSPS for the Western Alkaline Coal Mining Subcategory

As discussed for BAT, EPA has not identified any more stringent treatment technology option that it considers to represent NSPS level of control for discharges from post-mined land. Further, EPA estimates that today's proposal will result in a net cost savings to all affected surface mine operators, and will be at worst cost-neutral to affected underground operators. Therefore, implementing of NSPS standards will result in no barrier to entry based upon the establishment of this level of control for new sources. EPA is therefore proposing that NSPS standards be established equivalent to BAT.

VII. Statistical and Monitoring Procedures for the Coal Remining Subcategory

A. Statistical Procedures for the Coal Remining Subcategory

EPA's proposed statistical procedures are presented in Appendix B of the proposed regulation and described in detail in the Coal Remining Statistical Support Document. These procedures apply to the Coal Remining Subcategory.

The objective of these statistical procedures is to provide a method for deciding when the pollutant levels of a discharge exceed baseline pollutant levels. These procedures are intended to provide a good chance of detecting a substantial, continuing state of exceedance, while reducing the likelihood of a ''false alarm.'' To do this, it is essential to a have an adequate duration and frequency of sample collection to determine baseline and to determine compliance.

In developing these procedures, EPA considered the statistical distribution and characteristics of discharge loadings from pre-existing discharges, the suitability of parametric and non-parametric statistical procedures for such data, the number of samples required for these procedures to perform adequately and reliably, and the balance between false positive and false negative decision error rates. EPA also considered the cost involved with sample collection as well as delays in permit approval during the establishment of baseline, and is concerned that increased sampling could potentially discourage remining. In order to sufficiently characterize pollutant levels during baseline determination and during each annual

monitoring period, EPA is requiring that at least one sample result be obtained per month for a period of 12 months.

It is possible that one year of sampling may not accurately characterize baseline levels, because discharge flows can vary among years in response to inter-year variations in rainfall and ground water flow. There is some risk that the particular year chosen to characterize baseline flows and loadings will be a year of atypically high or low flow or loadings. There may be a need to evaluate differences among baseline years in loadings and flows, based on further analysis of data. Using such information, EPA may provide optional statistical procedures in a final rulemaking and in the final version of the Coal Remining Statistical Support Document that could be used to account for the uncertainty in characterizing baseline from a one-year sample duration, or that could be used to account for the unrepresentative character of a baseline sampling year. Such procedures could employ modifications of the proposed statistical procedures that use estimates of the variance among baseline years in loadings, developed from long-term datasets. Such procedures could employ adjustments to the baseline sample statistics to account for a baseline sampling year that was atypical in rainfall or discharge flow; such an adjustment could be a factor (multiplier) or a statistical equation estimated by regression.

The proposed statistical procedures are intended to provide environmental protection and to ensure compliance with the effluent limitation guidelines for BPT, BAT, and BCT. EPA has not yet evaluated quantitatively the error rates of these decision procedures. EPA intends to evaluate the decision error rates of each procedure by computer simulations. EPA solicits comments on the proposed statistical procedures presented in Appendix B of the proposed regulation for calculating limits and warning levels using baseline and post-baseline data: Baseline Determination and Compliance Monitoring for Pre-existing Discharges at Remining Operations. Development of these procedures is described in the Coal Remining Statistical Support Document. In particular, EPA solicits comments on (1) the details of the proposed statistical methodologies, (2) the relative merits of Procedures A and B, (3) the merits of other statistical procedures that commenters may propose, (4) the advantages and disadvantages of the use of accelerated monitoring and decision rules based upon accelerated monitoring, and (5) the effectiveness of the proposed statistical procedures in correctly indicating when baseline conditions have been exceeded and in providing reasonable protection from incorrectly deciding that baseline conditions have been exceeded. Depending upon comments and associated evidence, and depending upon EPA's further evaluations, EPA may modify or reject these procedures, or may change the recommended sample amount, to provide suitable decision error rates.

B. Monitoring To Establish Baseline Conditions and To Demonstrate Compliance for the Coal Remining Subcategory

EPA evaluated the duration and frequency of sampling necessary to apply the proposed statistical procedures. Those procedures are used to compare the levels of baseline loadings to the levels of loadings during remining or the period when the discharge is permitted. Without an adequate duration and frequency of sampling, the statistical procedures would often fail to detect genuine exceedance of baseline conditions.

Based on the considerations described below, EPA is proposing that the smallest acceptable number and frequency of samples is 12 monthly samples, taken consecutively over the course of one year. EPA believes this number represents the absolute minimum.

EPA considered an adequate number of samples per year to be that number that would allow an appropriate statistical procedure to detect a difference, between a baseline year and a remining year, in the mean or median loading, of one standard deviation (determined for the baseline loadings), with a probability (power) of at least 0.75.

The t-test is an appropriate statistical procedure for a yearly comparison because loadings from mine discharges appear to be approximately distributed log-normally, and thus logarithms of loadings are expected to be approximately distributed normally. The (non-parametric) Wilcoxon-Mann-Whitney test is also appropriate for yearly comparisons and has a power nearly equal to that of the t-test when applied to normally distributed data. EPA determined that annual comparisons of baseline to remining years based upon 12 samples in each year were expected to have a power 0.75 to detect a difference of one standard deviation.

An increase of one standard deviation can represent a large increase in loading, given the large variability of flows and loadings observed in mine discharges. The coefficient of variation (CV) is the ratio of standard deviation to mean. Sample CVs for iron loadings range approximately from 0.25 to 4.00, and commonly exceed 1.00. Sample CVs for manganese loadings range approximately from 0.24 to 5.00. When the CV equals 1.00, an increase of the average loading by one standard deviation above baseline implies a doubling of the loading.

The duration, frequency, and seasonal distribution of sampling are important aspects of a sampling plan, and can affect the precision and accuracy of statistical estimates as much as can the number of samples. To avoid systematic bias, sampling, during and after baseline determination, should systematically cover all periods of the year during which substantial discharge flows can be expected.

Unequal sampling of months could bias the baseline mean or median toward high or low loadings by over-sampling of high-flow or low-flow months. However, unequal sampling of different time periods can be accounted for using statistical estimation procedures appropriate to stratified sampling. Stratified seasonal sampling, possibly with unequal sampling of different time periods, is a suitable alternative to regular monthly sampling, provided that correct statistical estimation procedures for stratified sampling are applied to estimate the mean, median, variance, interquartile range, and other quantities used in the proposed statistical procedures.

There may be acceptable alternatives to the proposed minimum duration and frequency of one sample per month for twelve months. EPA has not thoroughly evaluated the merits of alternative sampling plans. Alternative plans could be based upon subdivision of the year into distinct time periods that might be sampled with different intensities, or could be based on other types of stratified sampling plans that attempt to account for seasonal variations. Seasonal stratification has the potential to provide a basis for more precise estimates of baseline characteristics, if the sampling plan is designed and executed correctly and if results are calculated using appropriate statistical estimators.

EPA solicits comments on the requirements for the number of samples to determine and monitor baseline, the sampling duration and frequency, and the plan of sampling over time. In particular, EPA solicits comments on (1) the adequacy of a sampling plan consisting of twelve monthly observations of concentration and flow

to calculate a monthly loading, (2) the advantages and disadvantages of seasonally-stratified sampling or other plans for sampling over time, (3) the adequacy of a baseline characterization based upon one year of sampling and the likelihood and consequences of the baseline year being atypical of long-term baseline conditions, and (4) the effectiveness of the proposed sampling requirements in correctly indicating when baseline conditions have been exceeded and in providing reasonable protection from incorrectly deciding that baseline conditions have been exceeded.

C. Additional Pollutant Parameters in Pre-existing Discharges

Although EPA is proposing to regulate iron, manganese, and pH, which is a subset of the parameters regulated under the current guidelines and which are the parameters addressed by the Rahall Amendment, EPA is considering establishing limitations or monitoring requirements for additional parameters that may also be indicators that a discharge is the result of coal mine operations. Acidity has been selected in Pennsylvania preferentially to pH because a baseline load can be calculated for acidity, whereas pH does not readily lend itself to calculation of load. In addition, pH is a measurement of effective hydrogen ion concentration and does not measure potential hydrogen ions that are generated during neutralization by the hydrolysis of metals such as iron, manganese and aluminum. Typically, the (passive) treatment systems and chemical addition used for acid mine drainage are designed with regards to acidity or net alkalinity (i.e., alkalinity minus acidity) and not pH. EPA is soliciting comments and data regarding the merits of acidity, net alkalinity, and pH as regulated parameters, or as parameters required to be monitored but not regulated.

Many mining operations also routinely monitor sulfate, which, in the temperate climate of the Appalachian Basin, is considered the most stable and reliable indicator of coal mine drainage (Lovell, 1985, The Chemistry of Mine Drainage, and McCurry, 1986, Characterization of Ground Water Contamination Associated with Coal Mines in West Virginia). Under most conditions associated with mining and mine drainage in the Appalachian Region and the Interior Basin, sulfate does not easily leave solution and is a direct indicator of pyrite oxidation (acid mine drainage production). EPA is soliciting comments and data regarding the merits of using sulfate as a parameter for assessment of pollution loading from pre-existing discharges as an unregulated requirement for monitoring.

VIII. Non-Water Quality Environmental Impacts of Proposed Regulations

The elimination or reduction of pollution has the potential to aggravate other environmental problems. Under sections 304(b) and 306 of the CWA, EPA is required to consider these non-water quality environmental impacts (including energy requirements) in developing effluent limitations guidelines and NSPS. In compliance with these provisions, EPA has evaluated the effect of this proposed regulation on air pollution, solid waste, energy requirements, and safety.

Today's proposed rule does not require the implementation of treatment technologies that result in any increase in air emissions, in solid waste generation or in energy consumption over present industry activities.

Non-water quality environmental impacts are a major consideration for this rule because the rule is intended to improve or eliminate a number of existing non-water quality environmental and safety problems. Remining operations have improved or eliminated adverse non-water quality environmental conditions such as abandoned and dangerous highwalls, dangerous spoil piles and embankments, dangerous impoundments, subsidence, mine openings, and clogged streams that pose a threat to health, safety, and the general welfare of people. EPA expects this proposed rule to improve or eliminate these hazardous conditions at abandoned mine sites and believes that remining has the potential to eliminate nearly three million feet of dangerous highwall in the Appalachian and mid-Continent coal regions.

EPA also does not expect this proposed rule to have an adverse impact on health, safety, and the general welfare of people in the arid and semiarid western coal region. The intent of the rule is to allow runoff to flow naturally from disturbed and reclaimed areas. EPA believes this is preferable to retention in sedimentation ponds that is accompanied by periodic releases of runoff containing sediment imbalances potentially disruptive to land stability. Alternate sediment control technologies in these regions address and alleviate adverse non-water quality environmental conditions such as: quickly eroding stream banks, water loss through evaporation, soil and slope instability, and lack of vegetation.

Based on this evaluation, EPA prefers the options proposed under these new subcategories over existing AML conditions in the eastern United States and over the hydrologic imbalances produced by application of current regulations in the western arid United States.

IX. Environmental Benefits Analysis

This section presents EPA's estimates of the environmental benefits that would occur under the proposed regulatory options. EPA's complete benefits assessment can be found in Benefits Assessment of Proposed Effluent Limitations Guidelines and Standards for the Coal Mining Industry: Remining and Western Alkaline Subcategories (hereafter referred to as the ''Benefits Assessment''; Record Section 5.0). A detailed summary is also contained in Economic and Environmental Impact Analysis of Proposed Effluent Limitations Guidelines and Standards for the Coal Mining Industry: Remining and Western Alkaline Subcategories (hereafter referred to as the ''EA'').

A. Coal Remining Subcategory

The water quality improvements associated with the proposed rule for remining depend on (1) changes in annual permitting rates for remining; (2) characteristics of sites selected for remining; and (3) the type and magnitude of the environmental improvements expected from remining. The subcategory is designed to standardize and facilitate the remining permitting process to increase future permitting rates. Remining permits in Pennsylvania increased by an estimated factor of three to eight following State implementation of a regulation that is similar to today's proposed remining rule. EPA believes that implementing today's proposed rule is likely to have a similar effect on other States with remineable coal reserves and similar acid mine drainage problems. The type and magnitude of site-specific water quality improvements under the proposed rule are not expected to be dramatically different than those that have occurred under existing requirements in Pennsylvania.

Of approximately 9,500 miles of acid mine drainage impacted streams in States where coal mining has previously occurred (Record Section 3.2.2), EPA estimates that 2,900 to 4,800 miles may be improved by remining, with a predicted 1,100 to 2,100 miles improved significantly. Based on the range of expected stream mile improvements per 1,000 acres of Abandoned Mine Land (AML) reclaimed (one to six) and an average of 38 acres of AML reclamation per permit, EPA estimates

approximately 0.04 to 0.2 miles of stream improvement per remining project. EPA estimates that AML sites affected by the proposed rule have an average of 70 highwall feet per acre. EPA also estimates that an additional 216,000 to 307,000 feet of highwall (41 to 58 miles) will be targeted for removal each year as a result of the proposed rule. EPA solicits comments on additional or alternative sources of data for estimating the extent of AML affected by the proposed rule.

EPA assessed the potential impacts of remining BMPs on water quality using pollutant loadings data from pre-existing discharges at 13 mines included in EPA's Coal Remining Database (Record Section 3.5.1). Approximately 58 percent of the post-baseline observations showed a decrease in mean pollutant loadings. Approximately half of these sites (27 percent of the post-baseline observations) showed a statistically significant decrease in loadings. The 13 mines examined by EPA are active remining operations; decreases in pollutant loads are expected to become more significant with time. In comparison, Pennsylvania's Remining Site Study of 112 closed remining sites (Record Section 3.5.3) found significant decreases or elimination of loadings for acidity, total iron and total manganese in 44 percent, 42 percent, and 41 percent respectively, of the pre-existing discharges monitored. The Pennsylvania Remining Site Study focused on sites reclaimed to at least Stage II bond release standards, so that the mitigating impacts of BMPs had ample time to take effect. EPA solicits comments on alternative or additional data sources for assessing the impacts of remining BMPs.

Remining generates human health benefits by reducing the risk of injury at AML sites and reducing discharge of acid mine drainage to waterways that are drinking water sources. However, the human health benefits associated with consumption of water and organisms are not likely to be significant because (1) acid mine drainage constituents are not bioaccumulative, and adverse health effects associated with fish consumption are therefore not expected; and (2) public drinking water sources are treated for most acid mine drainage constituents associated with adverse health effects. Eliminating safety hazards by closing abandoned mine openings, regrading highwalls, stabilizing unstable spoils, and removing hazardous waterbodies potentially prevents injuries and saves lives.

EPA evaluated the potential impacts to human and aquatic life by comparing the number of water quality criteria exceedances in receiving water bodies in the baseline (pre-remining) and post-baseline sampling periods for 11 remining sites in the Coal Remining Database for which relevant data exist. Exceedances of the human health criterion for pH (water plus organism consumption, field pH) were eliminated at two sites while exceedances of chronic aquatic life criteria were eliminated for pH (field pH) at two sites and iron at two sites. Exceedances of the acute aquatic life criterion for manganese were eliminated at two sites. Although surface water quality data examined indicate changes in the number of water quality exceedances due to remining, nine of the 11 sites consist of active remining operations where the full environmental impacts of BMPs have yet to be realized. Correlations between pre-existing discharge loads and pollutant concentrations in receiving water can be used to determine the extent to which remining BMPs are responsible for changes in surface water quality. However, the lack of sufficient data on relevant sources of acid mine drainage upstream from pre-existing discharges at the selected mine sites made it difficult to estimate these correlations.

Remining and the associated reclamation of AML is expected to generate ecological and recreational benefits by (1) improving terrestrial wildlife habitat, (2) reducing pollutant concentrations below levels that adversely affect aquatic biota, and (3) improving the aesthetic quality of land and water resources. EPA was able to quantify and monetize some of the benefits expected from increased remining using a benefits transfer approach. The benefits transfer approach relies on information from existing benefit studies applicable to assessing the benefits of improved environmental conditions at remining sites. Benefits are estimated by multiplying relevant values from the literature by the additional acreage reclaimed under the remining subcategory.

EPA used the following assumptions to estimate annual benefit values for ecological improvements: (1) 3,100 to 4,400 acres will be permitted for reclamation under the proposed subcategory; (2) 57 percent of the acres permitted will actually be reclaimed (1,800 to 2,500 acres) ; (3) 38 percent to 44 percent of acres reclaimed per year are expected to be associated with significant decreases in AMD pollutant loads to surface water bodies; and (4) annualized benefits from remining begin to occur five years after permit issuance and are calculated for a five year period. EPA assumed that 57 percent of the acres permitted would actually be reclaimed based on a study of 105 remining permits in Pennsylvania (Hawkins, 1995, Characterization and Effectiveness of Remining Abandoned Coal Mines in Pennsylvania). The study found that on average, a remining site had 67 AML acres, of which 38 acres (or 57 percent), were actually reclaimed. The assumption that 38 to 44 percent of acres reclaimed would be associated with significant decreases in AMD pollutant loads was based on the results of Pennsylvania's study of 112 closed remining sites, which showed significant decreases in loads of acidity (44 percent), manganese (41 percent), iron (42 percent), and aluminum (38 percent) of the associated pre-existing discharges. A detailed explanation of all assumptions is provided in the Benefits Assessment document.

EPA estimated water-related ecological benefits using the benefits transfer approach with values taken from a benefit-cost study of surface mine reclamation in central Appalachia by Randall et al. (1978, Reclaiming Coal Surface Mines in Central Appalachia: A Case Study of the Benefits and Costs). EPA's analysis is based on two values from the study: (1) Degradation of life-support systems for aquatic and terrestrial wildlife and recreation resources, valued at $37 per acre per year (1998$); and (2) aesthetic damages, valued at $140 per acre per year (1998$). EPA estimated nonuse benefits using a widely accepted approach developed by Fisher and Raucher (1984, Intrinsic Benefits of Improved Water Quality: Conceptual and Empirical Perspectives), where nonuse benefits are estimated as one-half of the estimated water-related recreational use benefits. The estimated water-related benefits range from $0.53 to $0.89 million per year.

Reclaiming the surface area at AML sites will enhance the sites' appearance and improve wildlife habitats, positively affecting populations of various wildlife species, including game birds. This is likely to have a positive effect on wildlife-oriented recreation, including hunting and wildlife viewing. EPA estimated land-related ecological benefits using the benefits transfer approach with values taken from a study of improved opportunities for hunting and wildlife viewing resulting from open space preservation by Feather et al. (1999, Economic Valuation of Environmental Benefits and the Targeting Conservation Programs). EPA's analysis is based on two values from the study: (1) The average wildlife viewing value, $21 per acre per year;

and (2) the improved pheasant hunting value, $7 per acre per year. Based on an aggregate value of $28 per acre per year, EPA estimates land-related benefits of $0.20 to $0.29 million per year.

The sum of the estimated monetary values of the different benefit categories results in total annual benefits of $0.73 to $1.17 million from implementing the proposed remining subcategory. This estimate does not include benefit categories that EPA was unable to quantify and/or monetize, which include human health and safety impacts. A more detailed discussion of the benefits analysis is contained in both the EA and the Benefits Assessment.

B. Western Alkaline Coal Mining Subcategory

Only a small percentage of potentially affected western coal mines discharge to permanent or perennial water bodies. Information about receiving waters is available for 39 of the existing western surface coal mines, and 30 of these discharge to intermittent or ephemeral creeks, washes, or arroyos. Only two of the mines list a permanent water drainage feature as the primary receiving water. It is therefore difficult to describe the benefits of the Western subcategory in terms of the use designations referenced in the section 101(a) goals of the Clean Water Act.

The environmental conditions and naturally high sediment yields in arid and semiarid coal regions are discussed in Section IV. The potential impacts of the predominant use of sedimentation ponds to control settleable solids in these regions include reduced sediment loads to natural drainage features, reduced downstream flood peaks and runoff volumes, and downstream channel bed and bank changes. The environmental and water quality effects of these hydrologic impacts include: (1) Reducing ground water recharge, (2) shrinking biological communities consisting of and reliant upon riparian and hydrophytic vegetation, (3) degrading downstream channel beds from ''clean'' water releases, and (4) accelerating erosion.

Site-specific alternative sediment control plans incorporating BMPs designed and implemented to control sediment and erosion have the potential to provide both land and water-related benefits. Land-related benefits include decreased surface area disturbance, increased soil conservation, and improved vegetation. Surface disturbance is estimated to decrease by approximately 1,700 acres per year across all existing potentially affected surface mine sites in the western region. Vegetative cover may increase by five percent when BMPs are used.

EPA was only able to monetize land-related benefits associated with decreased surface area disturbance. Hunting benefits from increased availability of undisturbed open space were estimated to be between $0.37 and $2.46 per acre per year based on Feather et al. (1999) and Scott et al. (1998). Annual land-related benefits of the proposed subcategory range from $5,500 to $36,500 per year, based on the value of enhanced hunting opportunities. However, this estimate does not account for a number of benefit categories, including nonuse ecological benefits that may account for the major portion of land-related benefits in relatively unpopulated areas such as those affected by the proposed rule.

Water-related benefits include improved hydrologic and fluvial stability in the watersheds affected by western mining operations. These benefits will be site-specific and depend upon the nature of environmental quality changes; the current in-stream water uses, if any, and; the population expected to benefit from increased water quantity. EPA estimated water-related benefits using the estimated mean ''willingness to pay'' (WTP) values for preservation of perennial stream flows adequate to support abundant stream side plants, animals and fish from Crandall et al. (1992, Valuing Riparian Areas: A Southwestern Case Study). The WTP value is applied to water-based recreation consumers residing in counties affected by western mining operations discharging to, or affecting, water bodies with perennial flow. EPA identified seven perennial streams located in six counties that are likely to be affected by the proposed rule. The estimated monetary value of recreational water-related benefits for these streams ranges from $25,000 to $488,000. As noted above, EPA estimates that nonuse benefits are equal to one-half of the water-related recreational benefits, or $12,500 to $244,000 per year.

Total estimated annualized benefits from implementing the proposed subcategory range from $43,000 to $768,500. This estimate does not include benefit categories that EPA was unable to quantify and/or monetize, which include increased vegetative cover and some additional recreational and non-use benefits associated with western alkaline coal mine reclamation areas. A more detailed discussion of the benefits analysis is contained in both the EA and the Benefits Assessment.

X. Economic Analysis

A. Introduction, Overview, and Sources of Data

This section presents EPA's estimates of the economic impacts that would occur under the proposed regulatory options. The economic impacts are evaluated for each subcategory for BPT, BCT, BAT, and NSPS as applicable. The description of each proposed option and the rationale for selection are given in Section VI of today's document. EPA's detailed economic impact assessment can be found in Economic and Environmental Impact Analysis of Proposed Effluent Limitations Guidelines and Standards for the Coal Mining Industry: Remining and Western Alkaline Subcategories (referred to as the ''EA''). EPA also prepared the Coal Remining and Western Alkaline Mining: Economic and Environmental Profile (Record Section 5.0) in support of today's proposal.

This section of today's document describes the segment of the coal industry that would be impacted by the rule (i.e., the number of firms and number of mines that would incur costs or realize savings under the proposed rule), the financial condition of the potentially affected firms, the aggregate cost or cost savings to that segment, and economic impacts attributed to the proposed rule. The section also discusses impacts on small entities and presents a cost-benefit analysis. This discussion will form the basis for EPA's findings on regulatory flexibility, presented in Section XI.B. All costs are reported in 1998 dollars unless otherwise noted. As described in Section V of this document, EPA developed this proposal using an expedited rulemaking procedure. Therefore, EPA's economic analysis relied on industry profile information voluntarily provided by stakeholders, on data compiled from individual mining permits, and on data from publicly available sources. For the Coal Remining Subcategory, EPA obtained information on abandoned mine lands from the Abandoned Mine Lands Information System (AMLIS) maintained by the Office of Surface Mining (Record Section 3.5.2), the National Abandoned Lands Inventory System (NALIS) database maintained by the Pennsylvania Department of Environmental Protection (Record Section 3.5.5), and a survey of states conducted by the Interstate Mining Compact Commission (Record Section 3.2.2). For Western Alkaline mines, EPA relied on industry profile data developed and submitted to EPA by the Western Coal Mining Work Group as

described in Section V. Specifically, the work group provided data on: coal mine operator, mine location, annual production, reclamation permit numbers, acres of land reclaimed, and reclamation bond amounts. This information is included in Section 3.3 of the Record.

Data on the coal industry as a whole, including coal production, employment, and prices, as well as information on individual western alkaline underground mines, were obtained from various Energy Information Administration (EIA) sources, including the 1997 Coal Industry Annual, the 1998 Annual Energy Outlook, and the 1992 Census of Mineral Industries. EPA used the Security and Exchange Commission's (SEC's) Edgar database, which provides access to various filings by publicly held firms, such as 8Ks and 10Ks, for financial data and information on corporate structures. EPA also used a database maintained by Dun & Bradstreet, which provides estimates of employment and revenue for many privately held firms, and obtained industry financial performance data from Leo Troy's Almanac of Business and Industrial Financial Ratios.

B. Method for Estimating Compliance Costs

The costs and savings of today's proposal are associated with modeling requirements, BMP implementation, baseline monitoring, and performance monitoring. For each option and geographic area, EPA estimated economic baseline conditions based on existing State and Federal regulations and current industry practices. For remining, EPA assumed as economic baseline conditions remining under a Rahall permit, pursuant to section 301(p), rather than comparing to compliance with current Part 434 regulations. Following this, EPA estimated the incremental compliance costs for each option proposed.

1. Coal Remining Subcategory

EPA projected costs for each remining site by calculating the cost of increased monitoring requirements for determining baseline, the cost of potential increases in compliance monitoring requirements, and the potential costs associated with implementing the required pollution abatement plan. To assess the increased monitoring requirements of the proposal, EPA evaluated current State requirements for operations permitted under the Rahall provision and calculated the proposed monitoring costs that exceed the current State requirements. Current State sample collection requirements for determining and monitoring baseline are included in the Record at Section 3.4.

Although EPA estimated that the Remining Subcategory would be applicable to 64 to 91 remining sites and 3,810 to 5,400 acres annually, EPA projects that fewer sites would realize costs or benefits from this proposal. As noted throughout this proposal, the Commonwealth of Pennsylvania has an advanced remining program and EPA does not believe that the proposal will have a measurable impact on Pennsylvania's remining activities. Therefore, EPA did not include Pennsylvania's remining sites in the estimation of costs or benefits. EPA's cost and benefit analysis were calculated for a total of 43 to 61 sites representing 3,100 to 4,400 permitted acres each year. EPA estimates that approximately 1,800 to 2,500 of these acres would actually be reclaimed each year. Table X. B.1 shows the various estimates EPA used in the estimation of costs and benefits.

TABLE X. B.1.—ANNUAL ESTIMATES OF AFFECTED REMINING SITES USED IN THE ECONOMIC ANALYSES

Additional sites permitted	Number of sites	Acres	Used in analysis of:
All types, all states (initial estimate)	64–91	3,812–5,401	
All types, excluding PA	43–61	3,111–4,407	Monitoring costs for selected states; NPDES permitting authority costs.
10% of surface & under-ground sites only (no coal refuse piles), excluding PA.	3.9–5.6	309–438	Costs of additional BMPs.
Additional acres reclaimed: (57% of acres permitted, all types excluding PA).	.....	1,773–2,512	Benefits from recreational use of reclaimed land.
Additional acres reclaimed expected to have significant decreases in AMD pollutant loads (37.6–44.4% of additional reclaimed acres).	.....	667–1,115	Benefits from recreational use of improved water bodies; Aesthetic improvements in water bodies; Non-use benefits.

2. Western Alkaline Coal Mining Subcategory

The proposed subcategory will include alkaline drainage from reclamation areas at surface and underground coal mines located west of the 100th meridian in arid or semiarid environments with average annual precipitation of 26 inches or less. EPA's Coal Remining and Western Alkaline Mining: Economic and Environmental Profile provides profile information on the 47 surface coal mines and 24 underground coal mines EPA initially believed to be in the scope of the proposed subcategory. However, EPA determined that one of the surface mines profiled was already in the final reclamation stage and would not be affected by today's proposal; hence only the remaining 46 surface mines were included in the analyses of costs and benefits.

The only incremental cost attributed to the proposed subcategory is associated with the watershed modeling requirements discussed in Section VI. Information provided by OSM (Record Section 7.2) indicates that most coal mine operators already perform modeling (to support their SMCRA permit applications) that is sufficient to meet today's proposed requirements. The information also indicates that a typical underground operator would not incur any additional modeling costs as a result of today's proposed rule due to the small acreage and lack of complexity associated with surface reclamation areas at underground mines.

Although EPA believes that compliance with the proposed rule would result in operational savings for both surface mine operators and many underground producers, EPA did not estimate the savings for underground producers due to data limitations. The industry profile submitted by the Western Coal Mining Work Group did not provide information on disturbance acreage, mine life, or bond amounts for the underground mines, and the model mine analysis addressed conditions typical of surface mines rather than underground mines. It was therefore not possible to estimate cost savings associated with the proposed

subcategory for reclamation of surface areas at underground mines. However, any savings are likely to be small given the limited acreage and lack of complexity associated with these reclamation areas. Hence, EPA assumes that today's proposal would be cost-neutral for underground operators. EPA solicits any data or comments regarding these assumptions. The remainder of this section considers only the 46 active existing surface mines in its discussion.

C. Costs and Cost Savings of the Regulatory Options

1. Coal Remining Subcategory

Under the proposed rule, EPA is requiring that operators conduct one year of monthly sampling to characterize the baseline pollutant levels for pH, iron (total), and manganese (total). Although most states with remining activities have similar requirements, remining sites in Alabama and Kentucky will be required to add six samples annually. EPA did not have data for Illinois, Indiana, or Tennessee because the remining operations that occur in these States do not incorporate Rahall provisions for pre-existing discharges. EPA has conservatively assumed monitoring costs for 12 additional samples annually for these states. Information representing current State sampling requirements is included in the Record at Section 5.

Although EPA is not requiring a specific monitoring frequency to demonstrate compliance, EPA has assumed monthly compliance monitoring for costing purposes. Most states already have similar requirements, with the exception of Ohio, which currently requires quarterly modeling. Again, EPA did not have data for Illinois, Indiana, or Tennessee because these states do not incorporate Rahall provisions in their remining permits. For these states, EPA has conservatively assumed that an additional 12 compliance monitoring samples per year would be required for five years.

Because each remining site will typically have more than one pre-existing discharge, EPA reviewed Pennsylvania remining sites to estimate the average number of pre-existing discharges per site. EPA used this calculated average of four pre-existing discharges per site for estimating baseline determination and compliance monitoring costs (Record Section 3.3.1). Additionally, EPA assumed that remining operators would have to purchase and install flow weirs to comply with the baseline monitoring requirements in the States that do not incorporate Rahall provisions in their remining permits. These assumptions result in an upper bound estimate of additional monitoring costs for the 43 to 61 potentially affected sites per year.

EPA estimates the total annual incremental monitoring costs to be in the range of $133,500 to $193,500. Of this, between $83,000 and $120,000 is associated with incremental baseline monitoring requirements and between $50,500 and $73,500 results from incremental compliance monitoring during the five year mining period. Detailed assumptions and calculations are presented in the EA.

In addition to monitoring, remining operators must develop and implement a site-specific pollution abatement plan for each remining site. In many cases, EPA believes that the requirements for the pollution abatement plan will be satisfied by an approved SMCRA plan. However, EPA recognizes that some operators may be required to implement additional or more intensive BMPs under the proposed rule beyond what is included in a SMCRA-approved pollution abatement plan.

EPA developed a general estimate of the potential costs of additional BMPs based on review of the existing remining permits contained in the Coal Remining Database (Record Section 3.5.1), and on information provided in the Coal Remining BMP Guidance Manual. EPA determined that the most likely additional BMP that NPDES permit writers might require would be a one-time increase in the amount of alkaline material used as a soil amendment to prevent the formation of acid mine drainage. EPA assumed that an average mine facility requiring additional BMPs would need to increase its alkaline addition by a rate of 50 to 100 tons per acre to meet the additional NPDES permit review requirements. EPA estimated an average cost for alkaline addition of $12.90/ton, and assumed that 10 percent of surface and underground remining sites would be required to incur these additional BMP costs. Because the typical BMP for coal refuse piles is simply removal of the pile, no incremental BMP costs would be incurred for these sites. Based on EPA's estimate that between 309 and 438 acres could be required to implement additional or more intensive BMPs each year, the estimated annual cost of additional BMP requirements would range from $199,500 to $565,000.

Based on the above assumptions, the total estimated incremental costs associated with the proposed rule range from $333,000 to $758,500 per year. These costs are based on EPA's estimates of what is likely to happen in the future, and they would be incurred by new remining operations. Table X. C.1 summarizes the incremental costs associated with the proposed subcategory.

TABLE X. C.1.—ANNUAL COSTS FOR THE REMINING SUBCATEGORY

Monitoring Costs	$133,500–$193,500
Additional BMPs	$199,500–565,000
Total Compliance Costs	$333,000–758,500

2. Western Alkaline Coal Mining Subcategory

The cost impacts of the proposed subcategory will vary, depending on site-specific conditions at each eligible coal mine. However, based on data and information gathered to date, EPA believes that the costs of reclamation under today's proposal will be less than or equal to reclamation costs under the existing effluent guidelines for each individual operator, and thus to the subcategory as a whole.

EPA expects that, in general, the sediment control plan will largely consist of materials generated as part of the SMCRA permit application. The SMCRA permit application process requires that a coal mining operator submit an extensive reclamation plan, documentation and analysis to OSM or the permitting authority for approval. Based on these requirements, EPA believes that plans developed to comply with SMCRA requirements will usually fulfill the requirements proposed by EPA for sediment control plans.

EPA believes that the only incremental cost attributed to the proposed subcategory is associated with the watershed modeling requirements discussed in Section VI of today's document. The requirement to use modeling techniques is also consistent with OSM reclamation plans. While

OSM does not specifically require modeling, most coal mine operators already perform watershed modeling to support their SMCRA permit applications that is sufficient to meet today's proposed requirements. However, some incremental costs may occur in cases where the rule increases model complexity. Information provided by OSM indicates that a typical surface mine operator may incur a one-time additional cost of zero to $50,000 to meet the modeling requirements in today's proposal. These figures represent the additional modeling effort attributed to today's proposed requirements; they do not represent the total cost associated with watershed modeling. Although most sites would not incur additional modeling costs, EPA conservatively assumes that all 46 existing surface operators would incur additional modeling costs of $50,000. This assumption results in a total cost estimate of $327,500 on an annualized basis. These costs would be offset by cost savings discussed below.

EPA projects that cost savings for this subcategory would result from lower capital and operating costs associated with implementing the proposed BMP plans, and from an expected reduction in the reclamation bonding period. The cost savings for controls based on BMPs were calculated for a representative model mine and were submitted by the Western Coal Mining Work Group. The cost model is discussed in detail in the Development Document for Proposed Effluent Limitations Guidelines and Standards for the Western Alkaline Coal Mining Subcategory and is included in the Record at Section 3.3.2. The cost estimates of the model mine relied on data taken from case study mine permit applications, mine records, technical resources and industry experience. The study estimated capital costs (design, construction and removal of ponds and BMPs) and operating costs (inspection, maintenance, and operation) over the anticipated bonding period.

Cost savings for reclamation at existing surface mines were calculated by extrapolating the cost savings from the model mine. The present value of savings over a 10-year period for the model mine was calculated to be $672,000 (annualized at seven percent) or $1,764 saving per acre. EPA used the projected disturbance acreage divided by the remaining mine life to estimate the annual acres reclaimed at each existing mine site. This information was available for 26 mines and totaled 9,880 acres per year, or an average of 380 annual acres per mine. EPA assumed that the remaining 20 mines with incomplete data would each reclaim the average 380 acres per year, resulting in a total of 17,480 acres. Based on an average savings of $1,764 per acre, EPA projects that the proposed subcategory will result in annual savings of $30.8 million. EPA solicits comment on this approach for estimating reclamation cost savings.

EPA has also calculated cost savings that may result from earlier Phase II bond release. The OSM hydrology requirements to release performance bonds at Phase II at 30 CFR part 800.40(c)(1), requires compliance with the existing 0.5 ml/L effluent standard. The Western Coal Mining Work Group, in its draft Mine Modeling and Performance Cost Report (Record Section 3.3.2) estimates that the typical post-mining Phase II bonding period can be ten years or more under the current effluent guidelines. Reclamation areas must achieve considerable maturity before they are capable of meeting the existing standard. The BMP-based approach in today's proposal uses the inspection of BMP design, construction, operation and maintenance to demonstrate compliance instead of the current sampling and analysis of surface water drainage for reclamation success evaluations. The report estimates that the BMP-based approach would reduce the time it takes reclaimed lands to qualify for Phase II bond release to about five years.

EPA used the following assumptions to estimate cost savings due to earlier Phase II bond release: (1) a Post-mining Phase II bonding period of ten years under the current effluent guidelines and five years under the proposed subcategory; (2) twenty-five percent of the reported bond amount would be released at the end of Phase II; and (3) surety bonds were used, with annual fees between $3.75 and $5.50 per thousand. Twenty-six mines provided information necessary to calculate associated bond savings. The total estimated savings for these mines range from $197,000 to $289,000 when annualized at seven percent over the five year permit period. EPA assumes that the remaining 20 mines for which savings could not be calculated would achieve the average savings per mine ($7,600 to $11,100) resulting in total annualized savings between $349,000 and $511,500. Detailed assumptions and calculations are contained in the EA.

The estimated net savings in compliance costs associated with the proposed subcategory, considering additional modeling costs and the savings to mining operations in sediment control and bonding costs, is estimated to be approximately $31 million, as shown in Table X. C.2.

TABLE X. C.2.—ANNUAL COSTS AND COST SAVINGS FOR THE WESTERN ALKALINE SUBCATEGORY

[Discounted at 7%]

Incremental Modeling Costs	$327,500
Sediment Control Costs (Savings)	($30,835,000)
Earlier Phase 2 Bond Release (Savings)	($349,000–$511,500)
Total Compliance Costs (Savings)	($30,857,000–$31,019,000)

D. Economic Impacts of Proposed Options

1. Economic Impacts of Proposed Coal Remining Subcategory

As discussed in Section VI, EPA is proposing BPT, BCT, and BAT that have an equivalent technical basis and is not proposing NSPS limitations for the Remining Subcategory. EPA believes that the proposed option will not impact existing remining permits. For new permits, remining operators will have the ability to choose among potential remining sites, and will only select sites that they believe are economically achievable to remine. Furthermore, any additional BMPs required by the NPDES authority under the proposed rule will be site-specific, with economic achievability considered in making a BPJ determination. The proposed requirements will not create any barriers to entry in coal remining, but instead are specifically designed to encourage new remining operations. Hence, the Agency finds no significant negative impacts to the industry associated with the proposed subcategory.

The implementation of a pollution abatement plan containing BMPs may impose additional costs beyond what is included in a SMCRA-approved

pollution abatement plan. At the same time, the proposed subcategory may increase profits at remining sites by providing an incentive to mine coal from abandoned mine land areas that may have been avoided in the absence of implementing regulations. The proposed subcategory will also affect the relative profitability of remining different types of sites, with the potential to encourage remining of the sites with the worst environmental impacts. An analysis by the Department of Energy (DOE) of potential remining sites estimated an average coal recovery of between 2,300 and 3,300 tons per acre of remined land (1993, Coal Remining: Overview and Analysis). At these coal recovery rates, the estimated steady state annual increase in acres being remined would produce between 7.1 and 14.5 million tons of coal per year. This represents only 1.5 to 3.1 percent of total 1997 Appalachian coal production of 468 million tons. The same DOE report noted that, given the general excess capacity in the coal market, it is likely that coal produced from new remining sites will simply displace coal produced elsewhere, with no net increase in production overall. The proposed remining subcategory is therefore not expected to have a significant impact on overall coal production or prices.

2. Economic Impacts of Proposed Western Alkaline Coal Mining Subcategory

As discussed in Section VI, EPA is proposing BPT, BAT, and NSPS limitations that have an equivalent technical basis for the Western Alkaline Coal Mining Subcategory. EPA concludes that nearly all economic impacts are positive for the proposed option and finds the preferred option to be a cost savings to the industry and thus, economically achievable. Because reclamation costs under today's proposal will be less than or equal to those under the existing effluent guidelines for all individual operators, and thus, to the subcategory as a whole, no facility closures or direct job losses associated with post-compliance closure are expected. However, EPA estimated changes in labor requirements attributed to the proposed subcategory by extrapolating from the model mine results, which calculated changes in labor hours associated with those erosion and sediment control structures that were used, or no longer used, under either the existing guidelines or the proposed subcategory for the model mine. The results indicated that the proposed subcategory would reduce annual labor requirements by approximately 0.2 work years for the model mine. EPA assumed that each of the 46 western alkaline surface mines would experience the same employment impact as predicted by the model mine study (Record Section 3.3.6), resulting in the loss of 9.2 full-time employees (FTEs) per year. This represents 0.1 percent of the total 1997 coal mine employment (6,862 FTEs) in the western alkaline region States.

The cost savings associated with the proposed subcategory are not expected to have a substantial impact on the industry average cost of mining per ton of coal, and therefore are not expected to have major impacts on coal prices. While the savings are substantial in the aggregate and for some individual mine operators, on average they represent a small portion of the total value of coal produced from the affected mines. As described in the EA, the estimated savings from the proposed subcategory are equivalent to only 0.6 percent of the value of production at 25 mines for which enough information was available to make site-specific estimates of savings. As with the Coal Remining Subcategory, the proposed Western Alkaline Coal Mining Subcategory is not expected to result in significant industry-level changes in coal production or prices.

EPA is proposing NSPS limitations equivalent to the limitations that are proposed for BPT and BAT for the Western Alkaline Coal Mining Subcategory. In general, EPA believes that new sources will be able to comply at costs that are similar to or less than the costs for existing sources, because new sources can apply control technologies more efficiently than sources that need to retrofit for those technologies. Specifically, here, to the extent that existing sources have already incurred costs associated with installing sedimentation ponds, new sources would be able to avoid such costs. There is nothing about today's proposal that would give existing operators a cost advantage over new mine operators; therefore, NSPS limitations will not present a barrier to entry for new facilities.

E. Additional Impacts

1. Costs to the NPDES Permitting Authority

Additional costs will be incurred by the NPDES permitting authority to review new permit applications and issue revised permits based on the proposed rule. Under the proposed rule, NPDES permitting authorities will review baseline pollutant levels and proposed pollution abatement plans for the Coal Remining Subcategory and watershed modeling results and sediment control plans for the Western Alkaline Coal Mining Subcategory.

EPA estimates that permit review will require an average of 35 hours of a permit writer's time per site and that permit writers receive an hourly wage of $31.68. Based on these assumptions, total annual costs to the NPDES permitting authorities range from $47,500 to $67,500 for the 43 to 61 additional sites that can be expected to be permitted under the proposed subcategory. An upper bound estimate of costs associated with implementing the proposed western subcategory assumes that all 46 existing surface mine permits are renewed. The total incremental annual cost would be $12,500 per year when annualized over the 5-year permit life (using a seven percent discount rate). Total additional permit review costs for the proposed rule are therefore estimated to be between $60,000 and $80,000 per year. A detailed analysis is contained in the EA.

2. Community Impacts

The proposed rule could have community-level and regional impacts if it significantly altered the competitive position of coal produced in different regions of the country, or led to growth or reductions in employment in different regions and communities. As described in the EA, the proposed rule is not likely to have significant impacts on relative coal production in the West versus the East. The proposed Remining Subcategory is likely to shift the location of production and employment toward eligible abandoned mine lands, but not to increase national coal production and employment or affect coal prices significantly overall.

EPA projects that impacts of the proposed Western Alkaline Coal Mine Subcategory on mine employment will also be minor. As discussed above, EPA estimated a reduction in labor requirements of 9.2 FTEs per year by extrapolating from the model mine results. This represents 0.1 percent of the total 1997 coal mine employment in the western alkaline region States. Regional multipliers relating total direct and indirect employment to coal industry employment range from 2.6 to 3.2 for the western alkaline region states (U.S. Bureau of Economic Analysis, Regional Input-Output Modeling Systems, ''RIMSII''). Therefore, the total impact on employment, direct and indirect, that may result from the proposed western alkaline subcategory is a reduction of between 24 and 29 FTEs per year. This reduction in

employment might be offset if lower costs under the proposed subcategory encourage growth in coal mining in the western alkaline region.

3. Foreign Trade Impacts

EPA does not project any foreign trade impacts as a result of the proposed effluent limitations guidelines and standards. U.S. coal exports consist primarily of Appalachian bituminous coal, especially from West Virginia, Virginia and Kentucky (U.S. DOE/EIA, Coal Data: A Reference; U.S. DOE/EIA Coal Industry Annual 1997). Coal imports to the U.S. are insignificant. Impacts are difficult to predict, since coal exports are determined by economic conditions in foreign markets and changes in the international exchange rate for the U.S. dollar. However, no foreign trade impacts are expected given the relatively small projected increase in production and projected lack of impact on costs of production or prices.

F. Cost-effectiveness Analysis

Cost-effectiveness calculations are used during the development of effluent limitations guidelines and standards to compare the efficiency of regulatory options in removing toxic and non-conventional pollutants. Cost-effectiveness is calculated as the incremental annual cost of a pollution control option per incremental pollutant removal. The increments are considered relative to another option or to a benchmark, such as existing treatment. In cost-effectiveness analysis, pollutant removals are measured in toxicity normalized units called ''pounds-equivalent.'' The cost-effectiveness value, therefore, represents the unit cost of removing an additional pound-equivalent of pollutants. In general, the lower the cost-effectiveness value, the more cost-efficient the regulation will be in removing pollutants, taking into account their toxicity. While not required by the Clean Water Act, cost-effectiveness analysis is a useful tool for evaluating regulatory options for the removal of toxic pollutants.

While cost-effectiveness results are usually reported in the Notice of Proposed Rulemaking for effluent guidelines, such results are not presented in today's document because of the nature of the two subcategories. For the Coal Remining Subcategory, EPA is unable to predict pollutant reductions that would be achieved at future remining operations. As described in Section VI, it is difficult to project the results, in terms of measured improvements in pollutant discharges, that will be produced through the application of any given BMP or group of BMPs at a particular site. EPA is therefore unable to calculate cost-effectiveness. For the Western Alkaline Coal Mining Subcategory, cost-effectiveness was not calculated because there are no incremental costs attributed to the proposed option.

G. Cost Benefit Analysis

EPA estimated and compared the costs and benefits for each of the proposed subcategories. EPA concludes that both subcategories have the potential to create significant environmental benefits at little or no additional cost to the industry. The cost and benefit categories that the Agency was able to quantify and monetize for the proposed Coal Remining Subcategory are shown in Table X. G.1. The monetized annual benefit estimates ($734,000 to $1,175,500) substantially outweigh the projected annual costs ($380,500 to $825,500).

TABLE X. G.1.—ANNUALIZED SOCIAL COSTS AND BENEFITS OF PROPOSED REMINING SUBCATEGORY

Social Costs (Discounted at 7%):	
Industry Compliance Costs	$330,000–$758,500
NPDES Permitting Costs	$47,500–$67,500
Total Social Costs	$380,500–$865,000
Monetized Social Benefits (Discounted at 3%):	
Recreational use of improved water bodies	$100,500–$168,000
Aesthetic improvements to water bodies	$380,000–$635,500
Non-use (related to improved water bodies)	$51,500–$86,000
Total Water-Related Benefits	$532,000–$889,500
Recreational use of reclaimed land	$202,000–$286,000
Total Monetized Benefits	$734,000–$1,175,500

In addition to the monetized benefits shown in Table X. G.1, the increase in remining is projected to result in the removal of some 216,000 to 307,000 feet of highwall each year, with benefits in increased public safety. The increased remining also has the potential to recover an estimated 7.1 to 14.5 million tons of coal per year that might otherwise remain unrecovered, with a value of approximately $188.5 to $ 385.0 million (based on an average 1997 value per ton of coal in Appalachia of $26.55).

The proposed Western Alkaline Coal Mining Subcategory is projected to result in net cost savings to society while increasing environmental benefits to society. The industry compliance costs consist of watershed modeling costs and are offset by cost savings associated with the proposal, specifically reduced costs for sediment control and earlier Phase II bond release. Total annual cost savings to society are expected to be approximately $31 million. The proposed subcategory is also expected to result in annual environmental benefits valued between $43,000 and $768,500—with the majority of benefits resulting from recreational use of waters with improved water flow. Table X. G.2 summarizes the social costs and benefits of the proposed Western Alkaline Coal Mining Subcategory.

TABLE X. G.2.—ANNUAL SOCIAL COSTS/SAVINGS AND BENEFITS OF THE PROPOSED WESTERN SUBCATEGORY

Social Costs and Cost Savings (Discounted at 7%):	
Associated Industry Cost Savings	($31,183,000–$31,346,000)
Industry Compliance Costs	$327,500
NPDES Permitting Costs	$12,500
Total Social Cost Savings	($30,845,000–$31,007,000)
Monetized Benefits (Discounted at 3%):	
Avoided surface disturbance	$5,500–$36,500
Recreational benefits from improved water flow	$25,000–$488,000
Non-use benefits	$12,500–$244,000
Total Monetized Benefits	$43,000–$768,500

XI. Administrative Requirements

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether the regulatory action is ''significant'' and therefore subject to OMB review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

It has been determined that this proposed rule is not a ''significant regulatory action'' under the terms of Executive Order 12866 and is therefore not subject to OMB review.

B. Regulatory Flexibility Act as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 U.S.C. 601 et seq.

The Regulatory Flexibility Act generally requires an agency to prepare a regulatory flexibility analysis for any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) A small business that has 500 or fewer employees (based on SBA size standards); (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impact of today's proposed rule on small entities, I certify that this action will not have significant economic impact on a substantial number of small entities. In determining whether a rule has significant economic impact on a substantial number of small entities, the impact of concern is any significant *adverse* economic impact on small entities, since the primary purpose of the regulatory flexibility analysis is to identify and address regulatory alternatives ''which minimize any significant economic impact of the proposed rule on small entities.'' 5 U.S.C. 603 and 604. Thus, an agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, or otherwise has a positive economic effect on all of the small entities subject to the rule. EPA projects that the proposed subcategory for Western alkaline mines results in cost savings for all small surface mine operators. For all small underground mine operators, EPA projects no incremental costs, and the Agency believes that many are likely to experience some cost savings. Section X of this document discusses the likely cost savings associated with the subcategory in more detail. As described in Section III of this document, the current regulations at 40 CFR part 434 create a disincentive for remining by imposing limitations on pre-existing discharges for which compliance is cost prohibitive. Despite the statutory authority for exemptions from these limitations provided by the Rahall Amendment, coal mining companies and States remain hesitant to pursue remining without formal EPA guidelines. The proposed remining subcategory provides standardized procedures for developing effluent limits for pre-existing discharges, thereby eliminating the uncertainty involved in interpreting and implementing current Rahall requirements. The proposed subcategory for remining is intended to remove barriers to the permitting of remining sites with pre-existing discharges, and is therefore expected to encourage remining activities by small entities. Thus, we have concluded that today's proposed rule will relieve regulatory burden for all small entities. We continue to be interested in the potential impacts of the proposed rule on small entities and welcome comments on issues related to such impacts.

C. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-

effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that the proposed rule, if promulgated, would not contain a Federal mandate that will result in expenditures of $100 million or more for State, local and tribal governments, in the aggregate, or the private sector in any one year. Although the proposed rule will impose some permit review and approval requirements on regulatory authorities, EPA has determined that this cost burden will be less than $80,000 annually. Accordingly, today's proposal is not subject to the requirements of sections 202 and 205 of UMRA. EPA has determined that this proposal contains no regulatory requirements that might significantly or uniquely affect small governments. Thus, is not subject to the requirements of section 203 of the UMRA. The proposal, if promulgated, would not establish requirements that would apply to small governments.

D. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the *Paperwork Reduction Act,* 44 U.S.C. 3501 *et seq.* An Information Collection Request (ICR) document has been prepared by EPA (ICR No.1944.01) and a copy may be obtained from Sandy Farmer by mail at Collection Strategies Division; U.S. Environmental Protection Agency (2822); 1200 Pennsylvania Ave., NW, Washington, DC 20460, by email at farmer.sandy@epamail.epa.gov, or by calling (202) 260–2740. A copy may also be downloaded off the internet at http://www.epa.gov/icr.

Today's proposed rule requires an applicant to submit baseline monitoring and a pollution abatement plan for coal mining operations involved in remediation of abandoned mine lands and the associated acid mine drainage during extraction of remaining coal resources. In addition, today's proposed rule requires an applicant involved in reclamation of coal mining areas in arid regions to submit a sediment control plan for sediment control activities. Information collection is needed to determine whether these plans will achieve the reclamation and environmental protection pursuant to the Surface Mining Control and Reclamation Act and the Clean Water Act. Without this information, Federal and State regulatory authorities cannot review and approve permit application requests. Data collection and reporting requirements associated with these activities are substantively covered by the ''Surface Mining Permit Applications—Minimum Requirements for Reclamation and Operation Plan—30 CFR part 780'' ICR, OMB Control Number 1029–0036. Data collection and reporting requirements from today's proposed rule that may not be included in the 30 CFR part 780 ICR are: some incremental baseline and annual monitoring and some sediment yield modeling.

The initial burden for coal mining and remining sites under the proposed rule is estimated at 74,478 hours and $2,614,538 for baseline determination monitoring at remining sites and additional sediment yield modeling at Western Alkaline mining sites. The initial burden associated with preparation of a site's pollution abatement plan or sediment control plan is already covered by an applicable SMCRA ICR. For the Western Alkaline Subcategory, EPA estimates that 46 sites per year will experience an initial reporting burden of 72,588 hours; or an average of 1,578 hours and $50,000 per facility. For the Remining Subcategory, EPA estimated that 78 sites per year will experience an initial reporting burden of 1,890 hours; or an average of 24 hours and $4,033 per facility. The annual burden for coal mining and remining sites under the proposed rule is estimated at 3,024 hours and $189,302 for annual monitoring at coal remining sites. There is no annual burden associated with the Western Alkaline Subcategory. For the Remining Subcategory, the duration of the ICR is three years. EPA estimated that 234 sites (78 sites $\times$ 3 years) will each experience an annual burden of 13 hours and $809. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR Part 9 and 48 CFR Chapter 15.

Comments are requested on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques. Send comments on the ICR to the Director, Collection Strategies Division; U.S. Environmental Protection Agency (2822); 1200 Pennsylvania Ave., NW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th St., NW, Washington, DC 20503, marked ''Attention: Desk Officer for EPA.'' Include the ICR number in any correspondence. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after April 11, 2000, a comment to OMB is best assured of having its full effect if OMB receives it by May 11, 2000. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

E. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) of 1995, Pub L. No. 104–113 Sec. 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.,* materials specifications, test methods, sampling procedures, business

practices, etc.) that are developed or adopted by voluntary consensus standard bodies. The NTTAA directs EPA to provide Congress, through the Office of Management and Budget (OMB), explanations when the Agency decides not to use available and applicable voluntary consensus standards.

Today's proposed rule requires dischargers to monitor for TSS, magnesium, iron, and pH. All of these analytes are required to be measured using consensus standards that are specified in the tables at 40 CFR part 136.3.

EPA welcomes comments on this aspect of the proposed rulemaking and, specifically, invites the public to identify potentially-applicable voluntary consensus standards and to explain why such standards should be used in this regulation.

F. Executive Order 13132: Federalism

Executive Order 13132, entitled ''Federalism'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

Under Section 6 of Executive Order 13132, EPA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or EPA consults with State and local officials early in the process of developing the proposed regulation. EPA also may not issue a regulation that has federalism implications and that preempts State law, unless the Agency consults with State and local officials early in the process of developing the proposed regulation.

This proposed rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. The rule will not impose substantial costs on States and localities. The rule establishes effluent limitations imposing requirements that apply to coal mining facilities when they discharge wastewater. The rule does not apply directly to States and localities and will only affect State and local governments when they are administering CWA permitting programs. The proposed rule, at most, imposes minimal administrative costs on States that have an authorized NPDES program. (These States must incorporate the new limitations and standards in new and reissued NPDES permits). Thus, the requirements of section 6 of the Executive Order do not apply to this rule. Although section 6 of Executive Order 13132 does not apply to this rule, EPA did consult extensively with State officials in developing this proposal, as discussed in Section V of this document.

In addition, in the spirit of this Executive Order and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicits comment on this proposed rule from State and local officials.

G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks

The Executive Order ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that: (1) is determined to be ''economically significant'' as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children; and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency. This rule is not subject to E.O. 13045 because it is neither ''economically significant'' as defined under Executive Order 12866, nor does it concern an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children.

H. Executive Order 13084: Consultation and Coordination With Indian Tribal Governments

Under Executive Order 13084, EPA may not issue a regulation that is not required by statute, that significantly or uniquely affects the communities of Indian Tribal governments, and that imposes substantial direct compliance costs on those communities, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 13084 requires EPA to provide to the Office of Management and Budget, in a separately identified section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 requires EPA to develop an effective process permitting elected officials and other representatives of Indian tribal governments ''to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities.''

Today's rule does not significantly or uniquely affect the communities of Indian tribal governments. Although EPA has identified sites in the western United States with existing coal mining operations that are located on Tribal lands, EPA projects that this proposal will generate a net cost savings for these mine sites. Accordingly, the requirements of section 3(b) of Executive Order 13084 do not apply to this rule.

Nevertheless, EPA consulted with representatives of tribal governments. EPA has identified sites in the western United States with existing coal mining operations that are located on Tribal lands. With assistance from its American Indian Environmental Office, EPA has identified five Tribes as having lands in the western U.S. with, or having an interest in, coal mining activities. The Tribes are the Navajo Nation, the Hopi Tribe, the Crow Tribe, the Southern Ute Indian Tribe, and the Northern Cheyenne Tribe. EPA representatives met with Tribal officials from the Navajo Nation during coal mine site visits in New Mexico and Arizona in August 1998 to review environmental conditions and the applicability of the proposed regulation. In December 1999, EPA sent meeting invitations to Tribal Chairmen, Directors of Tribal Environmental Departments, and other representatives of the five Tribes with existing or potential interest in coal mining, and met with Tribal representatives from the Navajo Nation and Hopi Tribes in Albuquerque, NM on December 16, 1999 to consult on the proposed amendments to the existing effluent limitations guidelines, and to discuss plans for involvement at public

meetings in western locations. As a result of this consultation, EPA has agreed to a comment period on this Document of 90 days and has agreed to provide a copy of the relevant portions of the Rulemaking Record at the western location identified in the **ADDRESSES** section of this document. EPA has also agreed to hold public meetings in three locations that are convenient for attendance by Tribal representatives.

I. Plain Language Directive

Executive Order 12866 and the President's memorandum of June 1, 1998, require each agency to write all rules in plain language. We invite your comments on how to make this proposed rule easier to understand. For example, have we organized the material to suit your needs? Are the requirements in the rule clearly stated? Does the rule contain technical language or jargon that isn't clear? Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule easier to understand? Would more (but shorter) sections be better? Could we improve clarity by adding tables, lists, or diagrams? What else could we do to make the rule easier to understand?

XII. Solicitation of Data and Comments

A. Specific Data and Comment Solicitation

EPA has solicited comments and data on many individual topics throughout this preamble. EPA incorporates each and every such solicitation here, and reiterates its interest in receiving data and comments on the issues addressed by those solicitations. In addition, EPA particularly requests comments and data on the following issues:

1. Regulatory Proposal

a. EPA solicits comments on the data and methods used to determine the benefit and cost impact values supporting this proposed regulation. (Refer to Section IX and Section X)

b. EPA solicits comment on the belief that this proposed rule will provide better environmental results than the current requirements. (Refer to Section III, Section IV, and Section VI)

c. EPA is soliciting comments on the potential impact of the proposed rule on small entities and on issues related to such impacts. (Refer to Section XI.B)

2. Coal Remining Subcategory Proposal

a. EPA believes that encouraging remining operations through the proposed subcategory has the potential for improving hazardous conditions and improving acid mine drainage from abandoned mine lands. EPA is soliciting comment on this conclusion and on potential options that may be environmentally preferable to the proposed Remining subcategory. EPA is also soliciting comments and additional data on the extent of abandoned mine land that may be affected by the proposed rule. (Refer to Section VI.A and Section IX.A)

b. EPA is soliciting comments on the proposed statistical procedures presented in Appendix B of the proposed regulation for calculating baseline limits and determining compliance with baseline limits and on the requirements for the number of samples, the sampling duration and frequency, and the plan of sampling over time. EPA is also soliciting comments and data on the feasibility of using acidity, net alkalinity, pH, and sulfate as parameters for assessment of pollution loading from pre-existing discharges. (Refer to Section VII.B and Section VII.C)

c. EPA is soliciting comments on the consistency of the proposed Remining subcategory with the Rahall Amendment and with existing State remining programs. (Refer to Section VI.A)

d. EPA is soliciting comments on the definition for pollution abatement area and on any additional requirements of pollution abatement plans that would ensure the proper use, design and implementation of BMPs for compliance with the proposed regulations. EPA also is soliciting comments on how the proposed regulations could better define a pollution abatement plan that would constitute BPT and on other treatment technologies that would be economically feasible and available for control of pre-existing discharges. (Section VI.A)

e. EPA is soliciting comments on the proposed applicability of the coal remining subcategory as it relates to commingling pre-existing discharges with active mining wastewater. (Refer to Section VI.A)

f. EPA is soliciting comments on the legal basis and technical support for alternative permits incorporating only BMP-based requirements with no numeric limits and for information on conditions to determine a site's eligibility. (Refer to Section VI.A)

g. EPA requests comment on how to describe and structure the requirement to design and implement a pollution abatement plan to reduce pollutant loadings from pre-existing discharges. (Refer to Section VI.A)

h. EPA requests comment on how the regulations could better define the type of plan that would constitute BPT and BAT. (Refer to Section VI.A)

i. EPA is soliciting comment on the applicability of the proposed Coal Remining Subcategory in regard to permit reissuance and Rahall-type permits. (Refer to Section VI.A)

3. Western Alkaline Coal Mining Subcategory Proposal

a. EPA is soliciting comments and data on the appropriateness of expanding the applicability of this proposed subcategory to include the control of non-process water drainage from active mining areas in the arid and semiarid region. (Refer to Section VI.B)

b. EPA is soliciting comments on the environmental impacts and benefits associated with operating sedimentation ponds in the arid and semiarid west and on the problems that are associated with disturbing the hydrologic balance in arid regions. (Refer to Section VI.B)

c. EPA also is soliciting comment on the appropriateness of establishing effluent limitations requiring only BMP plans rather than setting numeric limitations based on treatment technologies for drainage from reclamation areas in these regions. (Refer to Section VI.B)

d. EPA is soliciting comment on the appropriateness of BMP inspection to determine compliance with requirements of this subcategory. EPA also is soliciting comment on recommended procedures for and frequency of such inspections. (Refer to Section VI.B)

e. As applies to the Western Alkaline Coal Mining Subcategory, EPA defines ''sediment yield'' to mean the sum of the soil losses from a surface minus deposition in macro-topographic depressions, at the toe of the hillslope, along field boundaries, or in terraces and channels sculpted into the hillslope. EPA is soliciting comments on the definition of sediment yield and on the appropriateness of using this parameter as the basis for determining sediment loadings. (Refer to Section VI.B)

f. EPA is soliciting comments on the approach used to estimate reclamation cost savings that EPA expects will result from the proposed Western Alkaline Subcategory and on EPA's assumption that today's proposed subcategory would be cost neutral for underground operators. (Refer to Section X)

B. General Solicitation

EPA encourages public participation in this rulemaking. EPA asks that comments address any perceived deficiencies in the record supporting this proposal and that suggested revisions or corrections be supported by data. In addition, EPA requests

comments on the various methods of handling supporting data and information and on the applicability of these proposed guidelines, as they relate to the definitions for coal remining and western alkaline coal mining.

EPA invites all parties to coordinate their data collection activities with EPA to facilitate mutually beneficial and cost-effective data submissions. Please refer to the **FOR FURTHER INFORMATION** section at the beginning of this preamble for technical contacts at EPA.

To ensure that EPA can properly respond to comments, EPA prefers that commenters cite, where possible, the paragraph(s) or sections in the document or supporting documents to which each comment refers. Please submit an original and two copies of your comments and enclosures (including references).

Appendix A to the Preamble: Definitions, Acronyms, and Abbreviations Used in This Document

Act—Clean Water Act
Agency—U.S. Environmental Protection Agency
Alkaline mine drainage—mine drainage which, before any treatment, has a pH equal to or greater than 6.0 and total iron concentration of less than 10 mg/L
AML—Abandoned mine land
AMLIS—Abandoned Mine Land Inventory System
ASTM—American Society of Testing and Materials
BADCT—The best available demonstrated control technology, for new sources under section 306 of the Clean Water Act
Baseline—Pre-existing pollution loading. Baseline will be determined according to the protocol set forth by EPA in promulgation of this proposed rule
BAT—The best available technology economically achievable, under section 304(b)(2)(B) of the Clean Water Act
BCT—Best conventional pollutant control technology under section 304(b)(4)(B) of the Clean Water Act
BMP—Best management practices
BOD—Biochemical oxygen demand
BPJ—Best professional judgement
BPT—Best practicable control technology currently available, under section 304(b)(1) of the Clean Water Act
CBI—Confidential Business Information
CFR—Code of Federal Regulations
Clean Water Act—Federal Water Pollution Control Act Amendments (33 U.S.C. 1251 *et seq.*)
Conventional pollutants—Constituents of wastewater as determined by section 304(a)(4) of the Clean Water Act, including, but not limited to, pollutants classified as biochemical oxygen demanding, suspended solids, oil and grease, fecal coliform, and pH
CV—Coefficient of variation
CWA—Clean Water Act
CWAP—Clean Water Action Plan
Direct discharger—A facility that discharges or may discharge pollutants to waters of the United States
EPA—U.S. Environmental Protection Agency
FDF—Fundamentally different factors—Variance
FR—Federal Register
FTE—Full-time employees
ICR—Information Collection Request
IMCC—Interstate Mining Compact Commission
Indirect discharger—A facility that introduces wastewater into a publicly owned treatment works
IRFA—Initial Regulatory Flexibility Analysis
NAICS—North American Industry Classification System
NCA—National Coal Association
NMA—National Mining Association
NPDES—National Pollutant Discharge Elimination System
NRDC—Natural Resources Defense Council, Incorporated
NSPS—New source performance standards under section 306 of the Clean Water Act
NTTAA—National Technology Transfer and Advancement Act
OMB—Office of Management and Budget
OSM/OSMRE—Office of Surface Mining, Reclamation and Enforcement
PADEP—Pennsylvania Department of Environmental Protection
PRA—Paperwork Reduction Act
PHC—Probable Hydrologic Consequence
Pollution abatement area—The part of the permit area that is causing or contributing to the baseline pollution load, including areas that must be affected to bring about significant improvement of the baseline pollution load, and which may include the immediate location of the discharges.
POTW—Publicly-owned treatment works
PPA—Pollution Prevention Act of 1990
Pre-existing discharge—Any discharge resulting from mining activities conducted prior to August 3, 1977.
PSNS—Pretreatment standards for new sources
Reclamation area—the surface area of a coal mine that has been returned to required contour and on which revegetation (specifically, seeding or planting) work has been commenced.
Remining—Coal remining refers to a coal mining operation that began after February 4, 1987 at a site on which coal mining was conducted before August 3, 1977.
RFA—Regulatory Flexibility Act
RUSLE—Revised Universal Soil Loss Equation
SBA—Small Business Administration
SBREFA—Small Business Regulatory Enforcement Fairness Act
Sediment—All undissolved organic and inorganic material transported or deposited by water.
Sediment Yield—the sum of the soil losses from a surface minus deposition in macro-topographic depressions, at the toe of the hillslope, along field boundaries, or in terraces and channels sculpted into the hillslope.
SIC—Standard Industrial Classifications
SMCRA— Surface Mining Control and Reclamation Act
SS—Settleable Solids
TMDL—Total Maximum Daily Loads
Toxic Pollutants—The pollutants designated by EPA as toxic in 40 CFR 401.15.
TSS—Total Suspended Solids
UMRA—Unfunded Mandates Reform Act
U.S.C.—United States Code
WIEB—Western Interstate Energy Board
WTP—Willingness to pay

List of Subjects in 40 CFR Part 434

Environmental protection, Mines, Reporting and recordkeeping requirements, Water pollution control.

Dated: March 30, 2000.

Carol M. Browner,

Administrator.

For the reasons set forth in the preamble, 40 CFR part 434 is proposed to be amended as follows:

PART 434—[AMENDED]

1. The authority citation for part 434 continues to read as follows:

Authority: 33 U.S.C. 1311 1314(b), (c), (e), and (g), 1316(b) and (c), 1317(b) and (c), and 1361.

2. Amend § 434.11 by adding paragraphs (u), (v), (w), (x), (y), and (z) to read as follows:

§ 434.11 General definitions.

(u) The term ''coal remining operation'' means a coal mining operation at a site on which coal mining was conducted prior to August 3, 1977.

(v) The term ''pollution abatement area'' means the part of the permit area that is causing or contributing to the baseline pollution load, including areas that would need to be affected to reduce the pollution load.

(w) The term ''pre-existing discharge'' means any discharge resulting from mining activities conducted prior to August 3, 1977.

(x) The term ''sediment'' shall mean undissolved organic and inorganic material transported or deposited by water.

(y) The term ''sediment yield'' means the sum of the soil losses from a surface minus deposition in macro-topographic depressions, at the toe of the hillslope, along field boundaries, or in terraces and channels sculpted into the hillslope.

(z) The term ''western coal mining operation'' means a surface or underground coal mining operation located in the interior western United States, west of the 100th meridian west longitude, in an arid or semiarid environment with an average annual precipitation of 26.0 inches or less.

3. Revise § 434.50 to read as follows:

§ 434.50 Applicability.

The provisions of this subpart are applicable to discharges from post-mining areas, except as provided in § 434.80.

4. Add subpart G, consisting of §§ 434.70 through 434.74, to read as follows:

Subpart G—Coal Remining

Sec.
434.70 Applicability.
434.71 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).
434.72 Effluent limitations attainable by application of the best available technology economically achievable (BAT).
434.73 Effluent limitations attainable by application of the best conventional pollutant control technology (BCT).
434.74 New source performance standards (NSPS).

Subpart G—Coal Remining

§ 434.70 Applicability.

This subpart applies to pre-existing discharges that are located within pollution abatement areas of a coal remining operation and that are not commingled with waste streams from active mining areas. Pre-existing discharges that are commingled with waste streams from active mining areas are subject to the provisions of § 434.61. Pre-existing dischargers that have been, but are no longer commingled with waste streams from active mining areas, are subject to the provisions of this part. The effluent limitations in this subpart apply to pre-existing discharges until the appropriate SMCRA authority has authorized bond release.

§ 434.71 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30 through 125.32, the following effluent limits apply to pre-existing discharges:

EFFLUENT LIMITATIONS

Pollutant	Requirement
(1) Iron, total	May not exceed baseline loadings (as defined by Appendix B).
(2) Manganese, total	May not exceed baseline loadings (as defined by Appendix B).
(3) pH:	
(i) If all baseline observations are within the range of 6.0 to 9.0	Single observations must be in range of 6.0 to 9.0.
(ii) If any baseline observation is <6.0	Single observations must be ≥ lower limit (as defined by Appendix B) and ≤ 9.0.
(iii) If any baseline observation is > 9.0	Single observations must be ≤ upper limit (as defined in Appendix B) and ≥ 6.0.
(4) TSS	May not exceed 70.0 mg/L for any 1 day. Average of daily values for 30 consecutive days may not exceed 35.0 mg/L.[1]

[1] Except as provided in § 434.63

(b) Additionally, the operator must submit a pollution abatement plan for the pollution abatement area to the permit authority, that in the Best Professional Judgement (BPJ) of the permit writer, represents the Best Available Technology (BAT) currently available. The plan must be incorporated into the permit as an effluent limitation, and must be designed to reduce the pollution load from pre-existing discharges. The plan must identify characteristics of the pollution abatement area and the pre-existing discharges, and describe design specifications for selected best management practices (BMPs). The plan must include periodic inspection and maintenance schedules. The BMPs must be implemented as specified in the plan.

§ 434.72 Effluent limitations attainable by application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, pre-existing discharges must comply with the effluent limitations listed in § 434.71 for iron and manganese. The operator must also submit and implement a pollution abatement plan that, in the Best Professional Judgement (BPJ) of the permit writer, reflects BAT levels of control.

§ 434.73 Effluent limitations attainable by application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, pre-existing discharges must comply with the effluent limitations listed in § 434.71 for pH and total suspended solids. The operator must also submit and implement a pollution abatement plan as specified in § 434.71.

§ 434.74 New source performance standards (NSPS).

NSPS effluent limitations are not applicable to this subcategory. Pre-existing discharges that are located in pollution abatement areas of a coal remining operation and are not commingled with waste streams from active mining areas are considered existing sources and must meet BPT, BAT, and BCT effluent limitations at §§ 434.71 through 434.73.

5. Add subpart H, consisting of §§ 434.80 through 434.84, to read as follows:

Subpart H—Western Alkaline Coal Mining

Sec.
434.80 Applicability.
434.81 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).
434.82 Effluent limitations attainable by application of the best available technology economically achievable (BAT).
434.83 Effluent limitations attainable by application of the best conventional pollutant control technology (BCT). [Reserved]
434.84 New source performance standards (NSPS).

Subpart H—Western Alkaline Coal Mining

§ 434.80 Applicability.

This subpart applies to alkaline mine drainage from reclamation areas associated with western coal mining operations. Reclamation areas not associated with western coal mining operations or that produce acid mine drainage are subject to the provisions established in Subpart E-Post-Mining Areas. The effluent limitations in this subpart apply until the appropriate SMCRA authority has authorized bond release.

§ 434.81 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, the following effluent

limitations apply to alkaline mine drainage from reclamation areas of western coal mining operations:

(a) A western coal mining operator must submit a site-specific sediment control plan for surface reclamation areas to the permitting authority. The sediment control plan must be incorporated into the permit as an effluent limitation. The sediment control plan must identify best management practices. It also must describe design specifications, construction specifications, maintenance schedules, criteria for inspection, as well as expected performance and longevity of the best management practices.

(b) A western coal mining operator must run a watershed model and submit results demonstrating that implementation of the sediment control plan will result in average annual sediment yields that will not be greater than background levels from pre-mined, undisturbed conditions. The operator must use the same watershed model that was or will be used to acquire the SMCRA permit.

(c) A western coal mining operator must design, implement, and maintain sediment control measures in the manner specified in the sediment control plan.

§ 434.82 Effluent limitations attainable by application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, any existing western coal mining operation subject to this subpart must meet the effluent limitations listed in § 434.81.

§ 434.83 Effluent limitations attainable by application of the best conventional pollutant control technology (BCT). [Reserved]

§ 434.84 New source performance standards (NSPS).

Any new source western coal mining operation subject to this subpart must meet the effluent limitations listed in § 434.81.

6. Add appendix B to part 434 to read as follows:

Appendix B to Part 434—Baseline Determination and Compliance Monitoring for Pre-existing Discharges at Remining Operations

I. Summary

1. This appendix presents the procedures to be used for establishing effluent limitations for pre-existing discharges at coal remining operations, in accordance with the requirements set forth in this part, Coal Remining Subcategory. The requirements specify that pollutant levels of total iron, total manganese, and pH in pre-existing discharges shall not exceed baseline pollutant levels. The procedures described in this appendix shall be used for determining site-specific, baseline pollutant levels, and for determining discharge exceedances during coal remining operations. Procedures A and B are alternatives—either one may be selected by a permitting authority. Because pH data examined by EPA do not appear to be well-described by a log-normal distribution, EPA recommends the use of Procedure A for determining pH limits and exceedances.

2. Below are the steps for running Procedures A and B for determining baseline and compliance with baseline pollution loading. Examples of these procedures are provided in Appendix A of EPA's *Coal Remining Statistical Support Document.* In order to sufficiently characterize pollutant levels during baseline determination and during each annual monitoring period, it is required that at least one sample result be obtained per month for a period of 12 months.

3. In those cases where any baseline observation is above 9.0 standard pH units, an upper limit or trigger and compliance should be determined in the same way limits and compliance are determined for pollutant loadings. If the upper limit determined in this manner is less than 9.0, the limit may be set at 9.0. In cases where any baseline observation for pH is less than 6.0 standard pH units, lower limits or triggers and compliance determinations for pH should be determined using transformed data (Y = 14—pH). Once the lower limit or trigger is determined for Y, it should be transformed back (14—Limit for Y), to apply as standard pH units. If the lower limit determined in this manner is greater than 6.0, then the limit may be set at 6.0.

II. Procedure A for Comparing Baseline and Monitoring Loading Observations

Procedure A implements a single observation trigger, and a subtle trigger used for annual comparisons.

A. Calculation and Application of Single Observation Trigger (L)

Step 1. Count the number of baseline observations taken for the parameter of interest. Label this number n.

Step 2. Order all baseline loading observations from lowest to highest. Let the lowest number (minimum) be $x_{(1)}$, the next lowest be $x_{(2)}$, and so forth until the highest number (maximum) is $x_{(n)}$.

Step 3. If less than 17 baseline observations were obtained, then the single observation trigger (L) will equal the maximum of the baseline observations ($x_{(n)}$). Go to step 4.

If at least 17 baseline observations were obtained, calculate the median (M) of all baseline observations:

Instructions for calculation of M:

If n is odd, then M equals $x_{(n/2\ +\ ½)}$.

For example, if there are 17 observations, then $M = X_{(17/2\ +\ ½)} = x_{(9)}$, the 9th highest observation.

If n is even, then M equals 0.5* ($x_{(n/2)}$ + $x_{(n/2\ +\ 1)}$).

For example, if there are 18 observations, then M equals 0.5 multiplied by the sum of the 9th and 10th highest observations.

(a) Calculate M_1 as the median of the subset of observations that range from the calculated M to the maximum $x_{(n)}$

(b) Calculate M_2 as the median of the subset of observations that range from the calculated M_1 to $x_{(n)}$.

(c) Calculate M_3 as the median of the subset of observations that range from the calculated M_2 to $x_{(n)}$.

(d) Calculate the single observation trigger (L) as the median of the subset of observations that range from the calculated M_3 to $x_{(n)}$.

Note: When subsetting the data for each of steps 3a–3d, the subset should include all observations greater than or equal to the median calculated in the previous step. If the median calculated in the previous step is not an actual observation, it is not included in the new subset of observations. The new median value will then be calculated using the median procedure, based on whether the number of points in the subset is odd or even.

Step 4. If a monitoring observation exceeds L, immediately begin weekly monitoring for four weeks (four weekly samples).

Step 5. If any two observations exceed L during weekly monitoring, declare exceedance of the baseline pollution loading.

B. Calculation and Application of Subtle Trigger (T)

Step 1. Calculate M and M_1 of the baseline loading data as described in step 3 for the Single observation trigger above.

Step 2. Calculate M_{-1} as the median of the baseline data which are less than or equal to the sample median M.

Step 3. Calculate $R=(M_1-M_{-1})$.

Step 4. The subtle trigger (T) is calculated as:

$$T = M + \frac{1.58*[(1.25*R)]}{\left(1.35*\sqrt{n}\right)}$$

where n is the number of baseline loading observations.

Step 5. To compare baseline loading data to observations from the annual

monitoring period, repeat steps 1–3 for the set of monitoring observations. Label the results of the calculations M' and R'. Let m be the number of monitoring observations.

Step 6. The subtle trigger (T') of the monitoring data is calculated as:

$$T' = M' - \frac{1.58 * [(1.25 * R')]}{\left(1.35 * \sqrt{m}\right)}$$

Step 7. If T' > T , conclude that the median loading of the monitoring observations has exceeded the median loading during the baseline period, and declare an exceedance of the baseline pollution loading.

III. Procedure B for Comparing Baseline and Monitoring Loading Observations

Procedure B implements a single observation limit and warning level, a Cumulative Sum limit and warning level, and the Wilcoxon-Mann-Whitney test for annual comparisons. The Cumulative Sum test is run each time a new observation is acquired during monitoring, to test for an increase in the mean of the loading observations.

A. Calculation and Application of Single Observation Limit

Step 1. Count the number of baseline loading observations taken for the parameter of interest. Label this number n.

Step 2. Take the natural logarithm of all baseline loading observations. Label the observations y_1, y_2, y_{31}, ..., y_n.

Step 3. Calculate the average of all the natural logarithms. Label the average E_y.

Step 4. Calculate A using the equation:

$$A = \frac{1}{1 - \left(\frac{2}{n} * 0.5\right)}$$

Step 5. Calculate s_y^2 using the equation:

$$s_y^2 = A * \sum \frac{\left[\left(y_i - E_y\right)^2\right]}{n-1}, \text{ with i ranging from 1 to n.}$$

Step 6. Calculate E_x using the equation:

$$E_x = \exp\left(E_y + 0.5\, s_y^2\right)$$

Step 7. Calculate the single observation limit as:

$$\exp\left[E_y + \left(2.3263 * \sqrt{s_y^2}\right)\right]$$

If the single observation limit is exceeded by any monitoring observation, then declare an exceedance of the baseline pollution loading.

B. Single Observation Warning Level

Step 1. Calculate the warning level as:

$$\exp\left[E_y + \left(1.6449 * \sqrt{s_y^2}\right)\right]$$

where E_y and s_y^2 are calculated in steps 3 and 5 of the single observation limit procedure. If the warning level, but not the single-observation limit, is reached, then an investigation and further action should be considered.

Step 2. Keep and report a graph showing the monitoring observations plotted against month or successive observation times, and also showing the single observation limit, warning level, and E_x.

C. Calculation and Application of Cumulative Sum (Cusum) Limit

This procedure is used to determine whether there is an increase in the mean of monitoring observations, and should be run after each new observation has been collected.

Step 1. Let n be the number of monitoring observations.

Step 2. Take the natural logarithm of all the monitoring loading observations.

Step 3. Order the log-transformed observations based on collection time, and label them so that Y_1 is the first observation taken, Y_2 is the second observation taken, and so forth. Y_n is the last observation taken.

Step 4. Calculate K using the equation:

$K = E_y + 0.25 * s_y$,

where E_y is the baseline mean calculated in step 3 of the single observation limit procedure, and s_y is the square root of the baseline variance calculated in step 5 of the single observation limit procedure.

Step 5. Calculate C_1 using the equation:

$C_1 = Y_1 - K$.

Step 6. Calculate C_2 using the equation:

$C_2 = C_1 + (Y_2 - K)$

If C_2 is negative, then let $C_2 = 0$.

Step 7. Calculate C_3 using the equation:

$C_3 = C_2 + (Y_3 - K)$

If C_3 is negative, then let $C_3 = 0$.

Step 8. Repeat step 7 for each of the remaining times, using the general equation (let t be some time between 3 and n):

$C_t = C_{t-1} + (Y_t - K)$

If C_t is negative, then let $C_t = 0$.

Step 9. Calculate H using the equation:

$H = 8.0 * s_y$

H is the Cusum limit, not to be exceeded by any C_t.

Step 10. If any C_t reaches or exceeds H, then declare an exceedance of the baseline pollution loading.

Step 11. Keep and report a graph showing C_t versus successive observation times and showing the Cusum limit H.

D. Cusum Warning Level

Step 1. Let W_1 be the Cumulative Sum warning level for the first observation collected, W_2 be the Cumulative Sum warning level for the second observation taken, and so forth.

Step 2. Calculate K_w and H_w using the equations:

$K_w = E_y + 0.5 * s_y$,

$H_w = 3.5 * s_y$

Step 3. Calculate W_t by using steps 5 through 8 of the Cusum limit procedure, replacing K with K_w.

Step 4. If any W_t reaches or exceeds H_w, then an investigation and further action should be considered.

Step 5. Keep and report a chart W_t vs. month or successive observation time, and showing the Cusum warning level H_w. Consider making an investigation and taking action when the warning level is reached.

E. Annual comparisons

Compare baseline year loadings with current annual loadings using the Wilcoxon-Mann-Whitney test. Instructions for running the test are below:

Step 1. Steps for running Wilcoxon-Mann-Whitney test:

(a) Let n be the number of baseline loading observations taken, and let m be the number of monitoring loading observations taken.

(b) Order the combined baseline and monitoring observations from smallest to largest (the observations do not need to be log-transformed for this test).

(c) Assign a rank to each observation based on the assigned order: the smallest observation will have rank 1, the next smallest will have rank 2, and

so forth, up to the highest observation, which will have rank n + m.

If two or more observations are tied (have the same value), then the average rank for those observations should be used. For example, suppose the following four values are being ranked: 3, 4, 6, 4.

Since 3 is the lowest of the four numbers, it would be assigned a rank of 1. The highest of the four numbers is 6, and would be assigned a rank of 4. The other two numbers are both 4. Rather than assign one a rank of 2 and the other a rank of 3, the average of 2 and 3 (i.e., 2.5) is given to both numbers.

(d) Sum all the assigned ranks of the n baseline observations, and let this sum be S_n.

(e) Obtain the critical value (C) from Table 1. For the case where 12 monthly samples were collected for both baseline and monitoring (i.e., n=12 and m=12), the critical value is 121.

(f) Compare C to S_n. If S_n is less than C, then the monitoring loadings have exceeded the baseline loadings. Alternatively, calculate S_m as the sum of ranks for the monitoring observations; if S_m exceeds $C' = [n(n+m+1) - C]$, then the monitoring loadings have exceeded the baseline loadings.

STEP 2.—EXAMPLE CALCULATIONS FOR WILCOXON-MANN-WHITNEY TEST

Baseline Data	8.0	9.0	9.0	10.0	12.0	15.0	17.0	18.0	21.0	23.0	28.0	30.0
Monitoring Data	9.0	10.0	11.0	12.0	13.0	14.0	16.0	18.0	20.0	24.0	29.0	31.0
Baseline Ranks	1.0	3.0	3.0	5.5	8.5	12.0	14.0	15.5	18.0	19.0	21.0	23.0
Monitoring Ranks	3.0	5.5	7.0	8.5	10.0	11.0	13.0	15.5	17.0	20.0	22.0	24.0

Note.—Sum of Ranks for Baseline is Sn = 143.5, critical value is Cn, m = 121.

TABLE 1 TO APPENDIX B.—CRITICAL VALUES (C) OF THE WILCOXON-MANN-WHITNEY TEST (FOR A ONE-SIDED TEST AT THE 95% LEVEL)

[In order to find the appropriate critical value, match column with correct n (number of baseline observations) to row with correct m (number of monitoring observations)]

n / m	10	11	12	13	14	15	16	17	18	19	20
10	83	98	113	129	147	165	185	205	227	249	273
11	87	101	117	134	152	171	191	211	233	256	280
12	90	105	121	139	157	176	197	218	240	263	288
13	93	109	126	143	162	182	202	224	247	271	295
14	97	113	130	148	167	187	208	231	254	278	303
15	100	117	134	153	172	193	214	237	260	285	311
16	104	121	139	157	177	198	220	243	267	292	318
17	107	124	143	162	183	204	226	250	274	300	326
18	111	128	147	167	188	209	232	256	281	307	334
18	114	132	151	172	193	215	238	263	288	314	341
20	118	136	156	176	198	221	244	269	295	321	349

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