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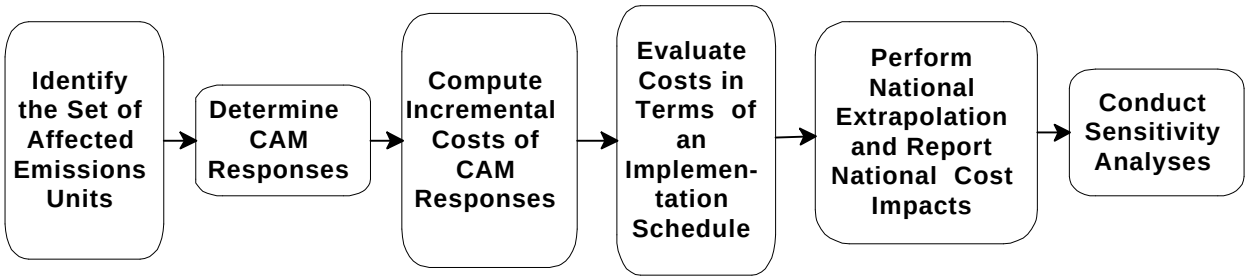
IV COST

IV(A) INTRODUCTION

The cost of the best alternative activity not taken by a source because of a regulatory requirement (i.e., the opportunity cost of the requirement) serves as a measure of the cost of that regulation. This analysis uses market prices as the appropriate measure of the marginal value of alternative actions. Because of the diverse set of sources likely to be affected under part 64, the Agency did not assess economic costs in terms of changes in economic surplus. Therefore, this analysis assumes market prices for labor and monitoring devices provide appropriate signals of opportunity costs. Although part 64 has a broad scope, EPA does not expect the scale of impact for individual sources or industries to lead to any significant divergence between market prices and opportunity costs.

This chapter presents the data, methods and assumptions used to develop estimates of the costs incurred by sources subject to the requirements of part 64. Figure IV-1 provides an overview of the major elements of the analysis. This section begins with a description of the regulatory baseline. Following the description of baseline conditions, this RIA describes the approach used to determine the number of affected emissions units. An accurate accounting of affected emissions units is fundamental to the credible estimation of source regulatory costs. For this study, these data are obtained from data bases maintained by air pollution control authorities in five States (hereinafter “the sample” or “the sample States”).

FIGURE IV-1 OVERVIEW OF CAM COST ANALYSIS



The sample data are sufficiently detailed to determine part 64 applicability and to make inferences about the types of responses necessary to meet § 64.3 monitoring requirements. Given information about how many pollutant-specific emissions units will be affected and what monitoring approaches will be proposed, the third step in the analysis computes the incremental costs associated with various responses to part 64 requirements. Section IV(E) provides a detailed explanation of the data and assumptions used to develop several types of cost numbers.

IV(B) BASELINE REGULATIONS

When measuring the incremental impacts of a proposed regulation, the Agency calculates the costs and benefits to affected entities under two scenarios: with and without the regulation. The state of the world without the proposed regulation forms the analytical baseline for the analysis, incorporating all benefits and costs related to the attainment and maintenance of the existing set of Federal regulations. The state of the world with the proposed regulation incorporates the economic and environmental impacts associated with the alternative regulatory design. The difference between the regulatory baseline and the state of the world with the proposed regulation is a measure of the incremental[5] effect of the proposed rule.

Since 1990, the Agency has promulgated a number of additional regulations which include monitoring requirements. The Agency determined these regulations were sufficient to satisfy CAM requirements and exempted them from additional CAM requirements. Consequently, these post-1990 regulations became part of the CAM baseline. These regulations include:

- Emission limitations or standards proposed after November 15, 1990 pursuant to section 111 (NSPS) and section 112 (NESHAPS) of the Act.
- Stratospheric ozone protection requirements under title VI of the Act.
- Acid Rain Program requirements pursuant to sections 404, 405, 406, 407(a), 407(b) or 410 of the Act.
- Emission limitations or standards that apply solely under an emissions trading program approved or promulgated by the EPA Administrator under the Act that allows for trading emissions within or between sources.
- An emissions cap that meets the requirements of 70.4(b)(12).
- Emissions limitations or standards for which a part 70 or part 71 operating permit specifies a continuous compliance determination method, as long as that method does not reference assumed control factors.

The Agency also excluded pollutant specific emissions units with actual uncontrolled emissions less than one ton per year. These units are excluded from the analysis because they are unlikely to be subject to add-on control requirements under any applicable emission limitations or standards. Subject to additional rule design and applicability issues, all other emission units at major sources are potentially subject to CAM requirements. The objective of this RIA is to measure quantitatively the incremental costs and benefits for the potentially affected emissions units relative to the costs and benefits potentially realized under existing and selected future Federal air environmental regulations.

IV(C) NUMBER OF AFFECTED POLLUTANT SPECIFIC EMISSIONS UNITS

This section describes the data collection and analysis methods used to determine the number of pollutant specific emissions units affected by CAM. The method involved the selection

5 For purposes of this RIA, the terms “marginal”, “additional” and “incremental” have been used interchangeably and the reader should consider them to have the same definition.

of a sample of States that collect and maintain the data required for analysis. The Agency reviewed data from these States to determine the number of pollutant-specific emissions units which met CAM applicability and exemption criteria. In addition, EPA surveyed a subset of the sample State's inspectors to determine baseline monitoring practices and to verify sample State database accuracy. The Agency used the results of this survey to establish the incremental impact of CAM for the surveyed pollutant points and these impacts are then projected to the remaining pollutant point population in the sample States.

IV(C)(1) STATE SELECTION

States for this RIA were originally selected for a similar analysis conducted in conjunction with the EMCC rule. In 1991, when the EMCC effort began, four States were selected: Colorado, Florida, Indiana and Wisconsin. To increase the size and geographic distribution of the sample, Connecticut and Utah were added in 1994. The criteria for selecting States for the EMCC rule, in order of priority, were:

- the availability of reasonably current, complete and electronically accessible pollution specific emissions unit data for all facilities in the State potentially subject to regulation under title V;
- the willingness of State managers to allow their data to be used in the analysis and to commit their compliance program staff to a sample survey;
- States that, altogether, would provide a reasonable representation of industry types throughout the United States; and
- States that, altogether, would provide a reasonable representation of air quality problems throughout the United States.

For the CAM rule, EPA decided to rely on the six EMCC sample States. However, as the CAM rule evolved, it became necessary to develop a separate analysis of pollutant specific emissions units with add-on control equipment. These data were available for all of the sample States except Utah. As a result, Utah was omitted from the analysis and the State selection was reduced from six to five.

IV(C)(2) REPRESENTATIVENESS OF THE SAMPLE STATES

The Agency compared the ratios of facilities in the sample States to a national inventory of facilities to determine the representativeness of the five State sample. The ratios were based on AIRS data (see IV(C)(3), below) and were defined at the 2-digit Source Industrial Classification (SIC) code level. If a sample accurately represents its population, then the relationship between sub-components of the sample should be the same as the relationship for the same sub-components in the population. In a representative sample, one would expect to find about 10 percent of all facilities included in the sample States. In a distribution of sample-to-national ratios, out of the 86 national 2-digit SIC groups, 10 groups in the sample States had between 9.5 and

10.5 percent of the nation's establishments for the same SIC codes.[6] Fifty percent of the sample SIC groups[7] had ratios which fell between 6 and 14 percent. The mode of the distribution was from 9.5 to 10.5 percent, indicating a slight skewing of the distribution toward the lower end of the scale. While there are some SIC groups that are not well represented in the sample States, half of the SIC groups fall within a range of 6 to 14 percent.

The Agency believes that, for purposes of this RIA, the sample adequately represents the national scope of the CAM rule. The mode of the distribution was the tightest interval around the expected 10 percent value. Table IV-1 displays the 2-digit SIC codes which had less than 6 percent representation in the sample States.

TABLE IV-1
TWOSDIGIT SIC CODES IN THE FIVE STATE SAMPLE WITH FACILITY COUNTS BELOW SIX PERCENT OF NATIONAL FACILITY COUNTS

SIC	SIC Identification	SIC	SIC Identification
07	Agricultural services	56	Apparel and accessory stores
08	Forestry	58	Eating and drinking places
12	Coal mining	59	Miscellaneous retail
15	Building construction—general and operative builders	60	Depository institutions
17	Construction—special trade contractors	61	Nondepository credit institutions
21	Tobacco products	62	Security/commodity brokers, dealers, exchanges, etc.
22	Textile mill products	65	Real estate
23	Apparel, other finished products (fabrics & materials)	70	Hotels, rooming houses, camps, other lodging places
28	Chemicals and allied products	78	Motion pictures
32	Stone, clay, glass, and concrete products	79	Amusement and recreation services
40	Railroad transportation	81	Legal services
41	Passenger transportation Local / suburban / inter-urban	82	Educational services
42	Motor freight transportation and warehousing	83	Social services
43	United States Postal Service	86	Membership organizations
44	Water transportation	88	Private households
46	Pipelines, except natural gas	91	Executive, legislative, & general govt., except finance
47	Transportation services	94	Administration of human resource programs
49	Electric, gas, and sanitary services	96	Administration of economic programs
51	Wholesale trade—nondurable goods	97	National security and international affairs
53	General merchandise stores	99	Nonclassifiable establishments

IV(C)(3) BASELINE EMISSION INVENTORIES USED IN THE ANALYSIS

The Agency obtained emission inventory data from EPA's Aerometric Information and Retrieval System (AIRS) and directly from sample States, if it was more complete or up-to-date.

6 14.3 percent of all facilities.

7 38 2-digit SIC groups.

All of the data were obtained from July through December 1995. Table IV-2 indicates the source of data used in the study and how current the inventory was when obtained.

TABLE IV-2
EMISSION INVENTORY SOURCES

State	Source of Data	Date of Inventory Data
Colorado	AIRS	1994
Connecticut	State	1993
Florida	AIRS	1995
Indiana	AIRS	1993
Wisconsin	State	1993

Table IV-3 shows the data elements needed to identify the set of pollutant points which meet the applicability and threshold criteria established in the CAM rule. Each of the data elements shown in Table IV-3 were available for all sample States with the exception of "Potential Emissions" in Colorado. For Colorado, this analysis estimated potential emissions by expanding the operating time for pollutant points from the time given in the emission inventory to continuous operation for a full year. This process, however, could lead to an underestimation of potential emissions. The source database used in this analysis contains pollutant points in operation during the year of the inventory. That means for Colorado, the pollutant point had to be operational in 1994 for it to have been captured by AIRS. However, many sources do not operate all of their equipment all of the time. Often, equipment remains idle due to economic downturns, future expansion, or because the equipment fulfills short term emergency needs. In these cases, extrapolation from the AIRS database does not take into account the potential pollution capabilities of these idle assets.

The projection of Colorado AIRS data may also lead to an overestimation of a facility's potential to emit. Many sources of pollution operate at a capacity which causes less pollution than the area's applicable major source limit. However, when extrapolated from actual to potential emissions, the source could theoretically emit at a lever higher than the area's major source threshold. To minimize the impact on smaller sources, the part 70 operating permits rules allow for such sources to apply for status as a "synthetic minor." In other words, the source agrees to limit its productive capacity in such a manner that the level of pollution it produces does not exceed the major source threshold. For synthetic minor sources, projection of potential emissions does not consider these negotiated capacity limits. Consequently, those sources' contribution to potential emissions may be overstated.

Given the nature of the over- and underestimations involved with estimating potential emissions in Colorado, the Agency could not determine the size or direction of any bias that may result from the methodology chosen. However, since the problems are to some extent offsetting, for this RIA, the Agency assumes the net bias falls within the range of analytical uncertainty.

TABLE IV-3
DATA EXTRACTED FROM EMISSION INVENTORIES

Information	Level of Availability
County Location	Facility
SIC Code	Facility
SCC Code	Point/Segment
Actual Emissions: PM, VOC, CO, SO_2, NO_x	Point/Segment
Control Efficiency	Point/Segment
Control Equipment Code	Point Level
Potential Emissions	Point/Segment
Operating Time	Point/Segment
EPA Class	Facility
Operating Status	Point/Segment
Applicable EPA Program	Facility

Table IV-3 indicates that some data elements were available at the facility[8] level while other data elements were reported for individual points/segments. A facility will generally have many physical locations that emit a variety of pollutants. The distinct sites at which emissions occur are referred to as either points or emissions units. A "pollutant point" is defined to be a point at a facility which emits a specific type of pollutant. Thus, a single point might have many pollutant points. Finally, a segment refers to a specific part of a production process at which emissions are produced.

IV(C)(4) TITLE V ANALYSIS

Because the CAM rule applies only to facilities subject to title V, sample States were asked to identify their title V major source facilities. None of the sample States had developed a final list at the time of this request, in July 1995. Where States had developed a complete but not final list, it was accepted for this analysis. Where States had developed an incomplete list, it was appended with facilities in the State emissions inventory which met either of the following two criteria:

- The facility was classified as A1; or
- The facility reported actual or potential emissions of any one criteria pollutant at or above the applicable title V major source threshold.

The resulting list of likely title V facilities provided a first cut at the set of pollutant specific emissions units potentially subject to CAM. In the five sample States, the Agency identified 2,909 title V facilities, 1,179 of which had controlled pollutant points. The sample contained 47,609 pollutant points, 4,642 of which were controlled.

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8 This analysis uses the terms "facility" and "source" interchangeably to refer to an economic entity at a single location. This analysis also uses the term "pollutant specific emissions unit" to refer to a pollutant point.

IV(C)(5) EXEMPTIONS

Section 64.2(b) lists several types of emission limitations or standards that are exempt from the requirements of part 64. The set of exempted emission limitations or standards include:

- NSPS and NESHAP programs proposed after November 15, 1990, [9]
- Stratospheric ozone protection requirements under title VI of the Act,
- Acid Rain emission limits under title IV of the Act,
- Emission limitations that apply under approved emissions trading programs, including emission caps and multiple unit limitations,
- Emission limitations or standards for which compliance is determined by means of a continuous compliance determination method.

Because emissions units subject to these type of emission limitations or standards may be subject to other emission limits, no change to the database was made to account for these exemptions. In addition, § 64.2(b)(2) exempts certain municipally-owned, backup utility units from CAM. The database information was insufficient to determine precisely which units would qualify for this exemption, so no adjustment to the database was made to account for this exemption. However, EPA did analyze the potential reductions in burden to small government-owned power plants that occur as a result of this exemption as part of the RFA (see section V).

Although not exempt completely from part 64, certain other pollutant-specific emissions units are excluded from the baseline used to estimate part 64 costs and benefits. These units included those with CEMS and those subject to Acid Rain Program monitoring (SO_2 and NO_x points only). The Agency believes that any part 64 costs for such units as satisfying part 70 periodic monitoring requirements for demonstrating compliance with non-Acid Rain Program emission limitations or standards.

IV(C)(6) EVALUATION OF SIZE APPLICABILITY CRITERIA

Section 64.2(a) defines size applicability criteria for pollutant specific emissions units subject to the requirements of part 64. After consideration of exemptions, part 64 applies to pollutant specific emissions units at major sources subject to part 70 or 71 that satisfy each of the following criteria:

- the unit is subject to an emission limitation or standard for the applicable regulated air pollutant,
- the unit uses a control device to achieve compliance with the applicable requirement, and

9 EPA intends to include continuous compliance monitoring in these new Federal rulemakings where such monitoring is technically and economically feasible.

- the unit has potential pre-control device emissions greater than or equal to 100 percent of the applicable major source threshold.[10]

Based on applicability size considerations, EPA excluded from the CAM baseline pollutant-specific emissions units that had less than 1 ton/year of actual emissions, calculated on an uncontrolled (i.e., without considering control efficiency) basis. The size applicability criteria further refined the set of pollutant points and facilities potentially affected by part 64. Table IV-4 presents the count of pollutant specific emissions units potentially subject to part 64 in the sample States. The table identifies two types of affected pollutant points. The first type is referred to as § 64.5(a) "Large." These pollutant points represent the subset of affected pollutant points that exceed the 100 percent threshold for defining a major source, with controls considered. This subset is specifically identified in § 64.5(a) and § 64.3(b)(4)(ii) . The second type is referred to as § 64.5(b) "Other," referencing the language used in § 64.5(b) of the rule. These pollutant points do not exceed the 100 percent threshold for defining a major source when controls are considered.

TABLE IV-4
POLLUTANT SPECIFIC EMISSIONS UNITS
POTENTIALLY SUBJECT TO PART 64
(Sample States)

Pollutant	Classification	
	§64.5(a) "Large"	§64.5(b) "Other"
VOC	61	543
TSP	76	2,279
SO_2	28	24
CO	15	29
NO_x	3	30
TOTAL	**183**	**2,905**

IV(C)(7) SOURCES AFFECTED BY NEW SOURCE PERFORMANCE STANDARDS (NSPS)

IV(C)(7)(a) CATEGORIZATION OF NSPS UNITS

This analysis treats identifiable NSPS units in the State emission inventories differently from other units in the analysis because these units were excluded from the survey sample

10 A pollutant point is "major" for a regulated pollutant if the potential to emit the pollutant, without taking into consideration the emission reductions achieved by a control device, is greater than or equal to 100 percent of the amount required for a source to be classified as major. The definition of "major source" is identical to the part 70 definition.

obtained during RIA preparation for the EMCC Rule.[11] This RIA relies on the procedures and results used for enhanced monitoring to determine NSPS monitoring requirements. Specifically,

(1) EPA staff reviewed and rated each NSPS category as:

- Satisfying CAM (EMCC) requirements,
- Upgradable to meet proposed monitoring requirements, and
- Not meeting CAM (EMCC) requirements and not upgradable.

(2) Federal EPA staff surveyed EPA Regional staff responsible for NSPS implementation to determine the number of units in each NSPS Subpart nationwide. Because this information is not tracked in a consistent manner nationally or in any EPA Region, these survey estimates were accepted and used for this analysis.

The Agency created a weighted distribution of NSPS units from the survey responses according to the three acceptability ratings. This distribution was expressed in percentages and applied to the number of NSPS units identified in each sample State. Because CAM requires less rigorous monitoring than EMCC and because the NSPS standards typically contain extensive control system performance monitoring requirements, the EMCC analysis may overstate the impact on NSPS units when applied to the CAM rule.

IV(C)(7)(b) ALLOCATIONS OF NSPS POLLUTANT POINTS

The Agency incorporated estimates of NSPS pollutant points into the pollutant point data from the emissions inventories to form a single database. The method described in the previous section produced an estimate of total NSPS pollutant points by response type for the § 64.5(a) “Large” and § 64.5(b) “Other” classifications. However, these estimates did not distinguish the NSPS points by pollutant type. To construct an integrated database, the analysis subdivided NSPS pollutant points according to the original emission inventory distribution of non-NSPS pollutant points for both the § 64.5(a) “Large” and § 64.5(b) “Other” classes. The Agency then defined separate allocation factors for NSPS points according to the following response categories: acceptable systems, upgrades of existing systems and new monitoring systems. This approach assumed NSPS pollutant points in each response category have the same mix of pollutant types as do the non-NSPS points in the emissions inventory database. In cases where there were no non-NSPS pollutant points in an allocation category, the distribution of all NSPS points across pollutants defined the allocation factors for the three response categories.[12]

Table IV-5 presents the results of the NSPS pollutant point allocation procedure by

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11 NSPS units were excluded from the survey sample because it was thought that required monitoring would be adequate as enhanced monitoring. In addition, the inventory data do not identify NSPS subparts for specific units. This makes it difficult to determine baseline monitoring requirements.

12 The calculation of separate weight factors for § 64.5(a) “Large” and § 64.5(b) “Other” based on the distribution of pollutant points for each class may lead to a different allocation than one completed for the total of affected points. However, the difference is small, resulting in a 3 pollutant point difference in the total.

response category and classification for the five sample States. When combined with the data in Table IV-4, the analysis estimates there are 3,344 controlled points in the sample States sample, 241 of which are § 64.5(a) "Large" pollutant points.

TABLE IV-5
NSPS POLLUTANT POINTS AFFECTED BY CAM
(Sample States)

Response Category	Classification	
	§64.5(a) "Large"	§64.5(b) "Other"
New Monitoring Systems Required	1	4
Upgrade Existing Monitoring	2	8
Acceptable Monitoring Systems in Place	55	186

IV(C)(8) STATE SURVEY

The emission inventory data for each State do not provide information on regulatory status or in-place monitoring. This issue was first considered in the EMCC RIA which collected from each sample State a random sample of 75 emission points potentially subject to the EMCC rule. Compliance staff from each State were asked to identify which pollutant-specific emissions units would not be subject to State or Federally enforceable emission limits and which pollutant-specific emissions units had acceptable or partially acceptable monitoring systems already in place. The survey results were then projected to the total population of affected sources in each sample State. Although projections from a small sample contain uncertainty, they provide a necessary adjustment to emission inventory data known to cover many pollutant points that would not be subject to the EMCC (or CAM) rule.

This analysis relies on the EMCC survey results for the CAM rule analysis because the stringency of the EMCC rule allowed the Agency to make assumptions about most monitoring systems. If the EMCC rule deemed a non-exempt monitoring system acceptable for compliance determinations, it would also be acceptable under the CAM rule. Furthermore, this analysis relies on the conservative assumption that if a monitoring system was not acceptable under the EMCC rule, it will not be acceptable under the CAM rule. The Agency did not consider possible State regulation changes implemented since 1994 which regulated pollutant-specific emissions units previously not regulated. Additionally, this RIA did not consider permit actions that would make certain pollutant-specific emissions units exempt from the CAM rule. Both considerations are areas of recent State action which could lead to overstatement of impacts based upon the EMCC survey results.

Of the 375 emission points surveyed in the sample States, 257 pollutant-specific emissions units met the applicability criteria of the July 1997 part 64 Draft. Table IV-6 shows the distribution of these pollutant points by State and affected pollutant. Based on the survey responses obtained for the 375 pollutant points, this analysis projected the number of pollutant points not subject to Federal regulation, the number of pollutant points with existing monitoring systems that would satisfy CAM requirements, and the number of pollutant points with existing

monitoring systems that would require upgrades. The Agency used survey data for controlled points to project § 64.5(a) "Large" and § 64.5(b) "Other" pollutant points, then added allocated NSPS points to form an integrated data set.

Table IV-7 shows the distribution of projected pollutant points by response and State. The number of pollutant points in a State requiring new monitoring systems can be computed as the difference between the count of potentially affected points and the sum of the three adjustment columns. For example, in Colorado, the number of § 64.5(a) "Large" units requiring new monitoring systems equals (34– (0 + 16 + 0)), or 18. This calculation is made from the top of Table IV-7 and the Colorado row. It represents the difference between the number of potentially affected pollutant points (34), and those pollutant points not subject to Federal regulation (0), that have acceptable monitoring systems (16), or have a partially acceptable system (0).

TABLE IV-6
DISTRIBUTION OF APPLICABLE POINTS IN STATE SURVEYS BASED ON AUGUST 1996 PART 64 DRAFT RULE

	Pollutant-specific Emission Units					
State	**VOC**	**TSP**	**SO_2**	**CO**	**NO_x**	**Total Pollutants**
Colorado	3	20	2	1	16	42
Connecticut	13	3	0	1	12	29
Florida	7	29	8	6	16	66
Indiana	15	32	6	4	12	69
Wisconsin	15	23	1	5	7	51
Total	**53**	**107**	**17**	**17**	**63**	**257**

TABLE IV-7
PROJECTED ALLOCATION OF POLLUTANT POINTS BASED ON STATE SURVEYS

§64.5(a) "Large"				
State	**Potentially Affected**	**Not Subject to Federal Regulation**	**Acceptable System**	**Partially Acceptable System**
Colorado	34	0	16	0
Connecticut	9	0	6	0
Florida	113	0	82	2
Indiana	118	0	41	0
Wisconsin	35	0	17	1
§64.5(b) "Other"				
State	**Potentially Affected**	**Not Subject to Federal Regulation**	**Acceptable System**	**Partially Acceptable System**
Colorado	222	0	96	8
Connecticut	140	0	83	1
Florida	431	0	62	37
Indiana	820	0	337	55
Wisconsin	749	22	273	117

The total number of pollutant-specific emissions units affected by CAM in Colorado equals the number of potentially affected points minus those points not subject to Federal Regulations. In Colorado, the total number of § 64.5(a) "Large" affected points is 34. In the five State sample, the analysis estimates there are 309 § 64.5(a) "Large" pollutant points and 2,340 § 64.5(b) "Other" pollutant points, for a total of 2,649 pollutant points.

IV(D) RESPONSES TO CAM REQUIREMENTS

This section describes the monitoring responses at pollutant points expected to occur due to CAM requirements. One factor common to all affected pollutant points is the presence of an add-on control device. The Agency used control equipment codes from State emission inventories to distinguish between different types of control devices, linking them to a specific type of monitoring response. This linkage allowed the pollutant points in the emissions final inventory to be uniquely assigned to a response category.

IV(D)(1) SELECTING SOURCES WITH ADD-ON CONTROLS

This analysis used control equipment code designations from AIRS to assign pollutant-specific emissions units to response categories. In some cases, the Agency treated AIRS control equipment as a process control, rather than as an add-on emission control device. Table IV-8 lists the AIRS control equipment codes and provides a description of the control type. Only those control equipment types marked as "yes" in the "Used" column in Appendix A qualify as control equipment devices subject to part 64.

The control equipment codes do not identify the specific pollutants that are controlled by a given control device. Therefore, this analysis examined the sample States data to associate control equipment codes to the pollutants emitted from each point. These associations and the count of pollutant-specific emissions units affected are shown in Appendix A. The information presented in Appendix A provides the basis for the unique assignment of § 64.4 monitoring responses to control equipment codes.

TABLE IV-8
CONTROL EQUIPMENT CLASSIFICATIONS

AIRS Codes	Description (efficiency)	AIRS Codes	Description (efficiency)	AIRS Codes	Description (efficiency)
000	No Equipment	034	Well lord/sodium self scrub	068	Alkaline fly ash scrubbing
001	Wet scrubber, (high)	035	Magnesium oxide scrubbing	069	Sodium carbonate scrubbing
002	Wet scrubber, (medium)	036	Dual alkali scrubbing	070	Sodium alkali scrubbing
003	Wet scrubber, (low)	037	Citrate process scrubbing	071	Fluid bed dry scrubber
004	Gravity collector, (high)	038	Ammonia scrubbing	072	Tube and shell condenser
005	Gravity collector, (medium)	039	Cat. oxid. flue gas desulf.	073	Refrigerated condenser
006	Gravity collector, (low)	040	Alk. alumina vapor sp. tank	074	Barometric condenser
007	Centrif. collector, (high)	041	Dry limestone injection	075	Single cyclone
008	Centrif. collector, (medium)	042	Wet limestone inj. roof tank	076	Multi cyclone w/o fly ash reinj.
009	Centrif. collector, (low)	043	H2SO4 plant contact	077	Multi cyclone w/ fly ash reinj.
010	Electrostatic precip. (high)	044	H2SO4 plant double contact	078	Baffle
011	Electrostatic precip, (med.)	045	Sulfuric plant	079	Multi cyclone w/ fly ash reinj.
012	Electrostatic precip, (low)	046	Process change	080	Chemical oxidation
013	Gas scrubber, general	047	Vapor recovery system	081	Chemical reduction
014	Mist eliminator, high velocity	048	Activated carbon adsorption	082	Ozonation
015	Mist eliminator, low velocity	049	Liquid filtration system	083	Chemical neutralization
016	Fabric filter, high temp	050	Packed gas absorber column	084	Activated clay adsorption
017	Fabric filter, medium temp	051	Tray type gas absorb column	085	Wet cyclonic separator
018	Fabric filter, low temp	052	Spray tower	086	Water curtain
019	Catalytic afterburner	053	Venturi scrubber	087	Nitrogen blanket
020	Catal. afterburner heat exch.	054	Process enclosed	088	Conservation vent
021	Direct flame afterburner	055	Impingement plate scrubber	089	Bottom filling
022	Direct flame afterburner	056	Dynamic separator (dry)	090	Conv. to var. vapor sp. tank
023	Flaring	057	Dynamic separator (wet)	091	Conv. to floating roof tank
024	Modified furn./burner design	058	Mat or panel filter	092	Conv. to pressurized tank
025	Staged combustion	059	Metal fabric filter screen	093	Submerged filling
026	Flue gas recirculation	060	Process gas recovery	094	Underground tank
027	Reduce combust air preheat	061	Dust suppression water spray	095	White paint
028	Steam or water injection	062	Dust suppression, etc.	096	Vapor lock balance recovery
029	Low excess air firing	063	Gravel bed filter	097	Not Named
030	Fuel low nitrogen content	064	Annular ring filter	098	Moving bed dry scrubber
031	Air injection	065	Catalytic	099	Miscellaneous control device
032	Ammonia injection	066	Molecular sieve	100	Not Named
033	Control of % O_2 in comb. air	067	Wet lime slurry scrubbing	101	High effic. partic. air filter

IV(D)(2) MONITORING SYSTEM ASSUMPTIONS

Actual control equipment could be identified in State databases for pollutant points potentially subject to the CAM rule. Therefore, the Agency could associate a likely CAM response category with each control system equipment code. In this analysis, the Agency linked broad CAM response categories to each control system equipment code. The CAM response categories for pollutant points with add-on control systems include: continuous emission or opacity monitors, control system parameter monitors, visible emission monitoring, and the use of work practice.

IV(D)(3) COUNTS OF POLLUTANT POINTS BY RESPONSE CATEGORY

The Agency used Table IV-9 to assign each affected pollutant-specific emissions unit to a response category and then evaluated State databases on a source-by-source basis to determine the number of pollutant points that fell into each response category.[13] This process involved three steps. First, the Agency examined the emissions inventory databases for each sample State to define affected points. Second, EPA refined the set of affected points through the survey results. Finally, the Agency used control equipment codes in the State databases to establish monitoring requirements for the pollutant-specific emissions units.

The results of these steps are presented in Tables IV-10 and IV-11. The first table shows the counts of § 64.5(a) "Large" pollutant-specific emissions units in the sample States, presented by pollutant and response category. Table IV-11 contains the corresponding information for § 64.5(b) "Other" pollutant-specific emissions units. These tables include adjustments for the NSPS points and points with existing continuous monitoring systems. Together, the pollutant-specific emission units in the two tables comprise the point counts used in this analysis.

13 A summary of the State/AIRS data bases and the results of the survey, as developed by Perrin Quarles Associates, are included as Appendix B to this chapter.

TABLE IV-9
EXPECTED CAM RESPONSE BY CONTROL EQUIPMENT CATEGORY

AIRS Codes	Control Equipment Description	Response Category*	AIRS Codes	Control Equipment Description	Response Category*
001	Wet scrubber, high efficiency	PM	048	Activated carbon adsorption	WP
002	Wet scrubber, medium efficiency	PM	049	Liquid filtration system	PM
003	Wet scrubber, low efficiency	PM	050	Packed gas absorber column	PM
004	Gravity collector, high efficiency	VE	051	Tray type gas absorb column	PM
005	Gravity collector, medium efficiency	VE	052	Spray tower	PM
006	Gravity collector, low efficiency	VE	053	Venturi scrubber	PM
007	Centrifugal collector, high efficiency	PM	055	Impingement plate scrubber	PM
008	Centrifugal collector, medium efficiency	PM	056	Dynamic separator (dry)	PM
009	Centrifugal collector, low efficiency	PM	057	Dynamic separator (wet)	PM
010	Electrostatic precipitator, high efficiency	COM	058	Mat or panel filter	PM
011	Electrostatic precipitator, med. efficiency	COM	059	Metal fabric filter screen	PM
012	Electrostatic precipitator, low efficiency	COM	063	Gravel bed filter	PM
013	Gas scrubber, general	PM	064	Annular ring filter	PM
014	Mist eliminator, high velocity	WP	065	Catalytic	PM
015	Mist eliminator, low velocity	WP	066	Molecular sieve	WP
016	Fabric filter, high temperature	VE	067	Wet lime slurry scrubbing	PM
017	Fabric filter, medium temperature	VE	068	Alkaline fly ash scrubbing	PM
018	Fabric filter, low temperature	VE	069	Sodium carbonate scrubbing	PM
019	Catalytic afterburner	PM	070	Sodium alkali scrubbing	PM
020	Catalytic afterburner heat exchanger	PM	071	Fluid bed dry scrubber	PM
021	Direct flame afterburner	PM	072	Tube and shell condenser	PM
022	Direct flame afterburner	PM	073	Refrigerated condenser	PM
023	Flaring	PM	074	Barometric condenser	PM
028	Steam or water injection	PM	075	Single cyclone	PM
032	Ammonia injection	PM	076	Multi cyclone without fly ash reinjection	PM
034	Well lord/sodium self scrub	PM	077	Multi cyclone with fly ash reinjection	PM
035	Magnesium oxide scrubbing	PM	079	Multi cyclone with fly ash reinjection	PM
036	Dual alkali scrubbing	PM	080	Chemical oxidation	PM
037	Citrate process scrubbing	PM	081	Chemical reduction	PM
038	Ammonia scrubbing	PM	082	Ozonation	PM
039	Catal. oxidation flue gas desulfurization	PM	083	Chemical neutralization	PM
040	Alkalized alumina vapor space tank	PM	084	Activated clay adsorption	PM
041	Dry limestone injection	PM	085	Wet cyclonic separator	VE
042	Wet limestone injection roof tank	PM	086	Water curtain	VE
043	Sulfuric acid plant contact process	CEMS	087	Nitrogen blanket	WP
044	H2SO4 plant double contact process	CEMS	098	Moving bed dry scrubber	PM
045	Sulfuric plant	CEMS	099	Miscellaneous control device	PM
047	Vapor recovery system	PM	101	High efficiency particulate air filter	VE

* PM – Control System Parameter Monitor; VE – Visible Emissions Monitoring; COM – Continuous Opacity Monitor; WP – Work Practice; CEMS – Continuous Emissions Monitoring System.

TABLE IV-10
§64.5(A) "LARGE" POLLUTANT-SPECIFIC EMISSIONS UNITS
(Sample States)

Response Category	Pollutant					
	VOC	TSP	SO_2	CO	NO_x	Total
Acceptable Systems	0	112	50	0	0	162
Upgrade Instrumental Systems	0	1	1	0	0	2
Upgrade Work Practices	0	1	0	0	0	1
Install Parameter Monitor	54	31	10	15	3	113
Install CEM/COM	0	17	0	0	0	17
Use Visible Emissions Monitoring	0	7	0	0	0	7
Initiate Work Practices	7	0	0	0	0	7
Total	**61**	**169**	**61**	**15**	**3**	**309**

TABLE IV-11
§64.5(B) "OTHER" POLLUTANT-SPECIFIC EMISSIONS UNITS
(Sample States)

Response Category	Pollutant					
	VOC	TSP	SO_2	CO	NO_x	Total
Acceptable Systems	221	628	0	0	2	851
Upgrade Instrumental Systems	51	122	3	0	0	176
Upgrade Work Practices	20	22	0	0	0	42
Install Parameter Monitor	100	334	14	13	25	486
Install CEM/COM	0	35	2	0	0	37
Use Visible Emissions Monitoring	0	731	0	0	0	731
Initiate Work Practices	8	9	0	0	0	17
Total	**400**	**1,881**	**19**	**13**	**27**	**2,340**

IV(E) ESTIMATES OF INCREMENTAL COSTS

Incremental costs for sources subject to the requirements of part 64 can be classified into six categories:

- One time costs for development of § 64.3 proposed monitoring;
- Recurring annual burden costs for incremental (i.e., over and above part 70 requirements) recordkeeping, reporting and certification activities;
- Annualized investment costs associated with installing, testing, operating and maintaining monitoring systems/approaches sufficient to satisfy § 64.3 requirements;
- Recurring costs of an intermittent nature for permit reviews, revisions, or renewals that are associated with part 64;
- Incremental costs incurred as a result of actions taken to come into compliance with an existing emission limitation or standard;
- Permit fees paid by sources to offset costs incurred by permitting authorities to administer part 64 requirements.

IV(E)(1) PROPOSED MONITORING

When a source has pollutant-specific emission units which meet part 64 applicability conditions, § 64.3 requires the source to develop and submit proposed monitoring to the appropriate PA. The submission should include a description of the monitoring approach, frequency of monitoring, verification of operational status, quality assurance activities, data availability percentages, and justification for the proposed monitoring.[14]

To estimate the cost of responding to § 64.3 requirements, this analysis identifies the activities to be performed, determines the number of pollutant-specific emissions units that will be required to perform the activity, and develops an estimate of the per unit impact associated with the activity. The product of per unit impact and number of units affected provides an estimate of the cost impact for each activity.

IV(E)(1)(a) ACTIVITIES

The activities needed to prepare a submission to meet § 64.3 requirements include:

- Review of part 64 requirements to determine applicability,
- Determination of CAM monitoring approach,
- Specification of CAM monitoring elements, and
- Preparation of CAM monitoring justification.

These activities are identified in the first column of Table IV-12. The Agency assumes applicability determination is a one-time task for each facility, with the same level of effort for each title V source with controlled units. Determination of a CAM monitoring approach will be

14 The content of this submission is described in § 64.4.

performed for every control device at sources required to propose a specific monitoring approach for pollutant-specific emissions units (see § 64.4(g) and (f)). Each monitoring approach should specify the proposed technique (e.g., recording combustion temperature at the incineration point of effluent gases), identify the frequency and method of data collection, establish performance criteria, and recommend a quality assurance program. The Agency assumes §64.5(a) "Large" and § 64.5(b) "Other" pollutant points will have an equivalent effort.

TABLE IV-12
§64.3 MONITORING DESIGN COSTS

Activity	Applicability	Count*	Unit Impact	Annual Cost*** (1,000 1995$)
1. Review Requirements and Determine Applicability	Facilities affected by parts 64 and 70	1,179	20 hours/facility	$1,061
2. Determine CAM Monitoring Approach	Units w/o existing monitoring	1,415	3 hours/pseu**	191
	Units with existing monitoring	1,234	1 hour/pseu	56
3. Specify CAM Monitoring Elements	Units w/o existing monitoring			
	-Non CEM/COM response	1,361	16 hours/pseu	980
	-CEM/COM response	54	8 hours/pseu	19
	Units with existing monitoring			
	-Non CEM/COM response	1,033	8 hours/pseu	372
	-CEM/COM response	201	4 hours/pseu	36
4. Prepare CAM Monitoring Justification	Units w/o existing monitoring			
	-Non CEM/COM response	1,361	4 hours/pseu	218
	-CEM/COM response	54	2 hours/pseu	4
	Units with existing monitoring			
	-Non CEM/COM response	1,033	2 hours/pseu	83
	-CEM/COM response	201	1 hour/pseu	8

* Counts for activity 1 are facilities. Counts for other activities are pollutant-specific emissions units. All count information is for the five State sample only.
** pseu – pollutant-specific emissions unit.
*** Annual costs for Activities 1, 2 and 3 are based on a composite hourly rate of $45. Labor costs for Activity 4 are based on hourly rate of $40. See Section (E)(1)(c) for discussion.

The third activity identifies how the proposed monitoring approach will be implemented. This activity requires owners or operators to select performance indicators for each applicable control device. The indicators establish monitor performance characteristics and must provide reliable data for detection of significant adverse changes in control equipment performance. For the selected indicators, the design criteria must also (1) specify operating ranges which reflect normal operating conditions and (2) propose data collection sufficient to document continued operation of the control device in a satisfactory manner. Again, the Agency assumes equivalent effort between § 64.5(a) "Large" and § 64.5(b) "Other" pollutant points.

Part 64 also requires sources to submit justification that supports the proposed monitoring approach. The type of documentation required could reference generally available information,

existing applicable requirements or site-specific data, if available. The documentation should demonstrate the adequacy of proposed indicator ranges to detect significant adverse changes in control performance. The language of part 64 requires site-specific testing to be used in establishing indicator ranges unless the owner or operator can justify using other information such as manufacturer's data or engineering assessments. Existing site-specific testing data will generally be applicable. The burdens and costs associated with conducting testing to justify proposed monitoring are accounted for in section IV(E)(3)(b).

IV(E)(1)(b) APPLICABILITY

Section 64.2 provides guidance to owners or operators about the applicability of part 64 to pollutant-specific emissions units. Following promulgation of part 64, all part 70 sources will need to review the CAM requirements and determine the applicability of part 64. The review should consider possible exemptions, use of a control device, and potential to emit.

Section IV(E)(1)(a) described the activities that correspond to the development of proposed monitoring. The level of effort for these activities differs according to the presence of existing monitoring. If the source conducts monitoring as a requirement for an applicable requirement, such monitoring may also satisfy part 64 requirements. This reduces the effort required to determine a specific monitoring approach relative to the case where monitoring does not currently exist. Furthermore, part 64 allows sources proposing continuous emission or opacity monitoring to rely directly on that monitoring information to justify proposed monitoring. This should reduce the cost of specifying CAM monitoring elements and preparing the justification. However, part 64 also identifies constraints for continuous monitoring devices, other than CEMS, which lead to incremental costs for sources proposing monitoring which include continuous monitoring systems.

Column two of Table IV-12 provides a descriptive breakdown of pollutant points according to the presence of existing monitoring and the presence of a continuous monitoring system. These distinctions permit separate cost assumptions for each case. The count of pollutant-specific emissions units that fall into each applicability class can be determined from the sample States data base and are shown in the third column of Table IV-12.

IV(E)(1)(c) UNIT IMPACTS

Column four of Table IV-12 summarizes the unit impacts for the preparation of proposed monitoring. All estimates are shown in terms of labor hours to complete the activity. Throughout Section IV(E), unit cost and hour estimates represent values which have been developed by EPA, unless otherwise noted. No new capital investments will be needed for these activities. The Agency developed burden hour estimates through a review of prior impact analyses.[15] Source review of part 64 applicability requirements, determination of an approach for CAM monitoring, and the specification of CAM monitoring elements are assumed to be performed by a combination

15 The impact estimates for activities 2, 3 and 4 are presented on a pollutant point basis. Although there may be economies of scale in performing these activities, the data did not identify significant opportunities for realizing such economies.

of management and technical in-house personnel with an average fully loaded cost of $45 per hour, which is consistent with the average labor cost assumptions used in other current EPA regulatory analyses.[16] The Agency assumes the preparation of CAM monitoring justification requires only technical labor, at an hourly rate of $40 per hour.

The last column in Table IV-12 shows the annual cost of each activity in thousands of 1995 dollars. The sum of monitoring design costs across the four activities is about $3 million for the five sample States. These annual costs are computed as if all activities occur in a single time period.

IV(E)(2) RECURRING COSTS FOR RECORDKEEPING, REPORTING AND CERTIFICATION ACTIVITIES

IV(E)(2)(a) ACTIVITIES

Section 64.9 addresses the annual recordkeeping and reporting requirements of part 64. CAM does not establish significant new requirements for these burden activities beyond those already established by part 70. In particular, the part 70 requirements for semi-annual reporting and five year records maintenance remain unchanged. The content of these provisions, however, is slightly expanded. For example, part 64 language clarifies that CAM recordkeeping must include, in addition to data collected for part 70 purposes, information on Quality Improvement Plan (QIP) activities, monitoring downtime incidents and data used to document the adequacy of CAM monitoring. Similarly, reporting activities must identify excursions from operating ranges and the results of any QIP implementation activities.[17]

Parts 70 and 71 require sources to identify, as part of the annual compliance certification, each permit term or condition that is the basis of the certification and the method(s) used to determine compliance status. Parts 70 and 71 explicitly reference part 64 as an applicable monitoring method. Consequently, additional costs may occur related to part 64 which involve certification activities.

Table IV-13 shows the estimated burden impacts of these activities. For pollutant points which need to upgrade existing monitoring systems, there will be incremental recordkeeping, reporting, and certification requirements. For pollutant points that require additional monitoring activities, this analysis assumes a more rigorous incremental recordkeeping burden in addition to reporting and certification requirements.

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16 Cost estimates are in terms of real 1995 dollars. The source's average labor rate reflects an assumed rate of $60 per hour for management staff and $40 per hour for technical staff with three quarters weight going to technical staff. The individual labor rates assumed for management and technical staff reflect comments provided by OMB during the EMCC rulemaking. During the review process, OMB identified a range of labor rate estimates used by EPA in other recent analyses. Based on that information, this analysis selected values generally consistent with the other studies.

17 Part 64 does not require a QIP to be developed as part of the proposed monitoring. Furthermore, the QIP is not intended to become part of a part 70 permit.

TABLE IV-13
ANNUAL BURDEN IMPACTS FOR
RECORDKEEPING, REPORTING AND CERTIFICATION ACTIVITIES

Activities		Applicability*		Sample State Count	Unit Impact	Annual Cost** (1,000 of $1995)
1.	Incremental Recordkeeping	Upgrades to Existing Instrumental Monitors		178	0.5 hours/week (52 weeks/year)	$185
		Upgrades to Existing Work Practice Procedures		43		45
2.	Incremental Reporting	Acceptable Systems		1,013	0.5 hours/report (2 reports/year)	$41
		Upgrades to Existing Instrumental Monitors		178		7
		Upgrades to Existing Work Practice Procedures		43		2
		Install/Use Parameter Monitor		599		24
		Install/Use CEM/COM		54		2
		Use VE Monitoring		738		30
		Initiate Work Practices		24		1
3.	Annual Facility Certification	Acceptable Systems		1,013	3 hours/facility per year (converted to impact per pollutant point by dividing by average number of pollutant points per facility	$61
		Upgrades to Existing Instrumental Monitors		178		11
		Upgrades to Existing Work Practice Procedures		43		3
		Install/Use Parameter Monitor		599		36
		Install/Use CEM/COM		54		3
		Use VE Monitoring		738		44
		Initiate Work Practices		24		1
4.	New Recordkeeping Burden	Install/Use Parameter Monitor	§64.5(a) "Large"	113	$8,940*CRF5 0.5 hours/day	$82
			§64.5(b) "Other"	483	(260 days per year)	2,512
		Install/Use CEM/COM	§64.5(a) "Large"	7	$8,940*CRF5 0.5 hours/day	$12
			§64.5(b) "Other"	37	(260 days per year)	192
		Initiate Work Practices	§64.5(a) "Large"	7	1.5 hours/day (260 days per year)	$109
			§64.5(b) "Other"	17	0.5 hours/day (260 days per year)	88
		Initiate VE Monitoring		738	0.1 hours/day (260 days per year)	$768

* Applicability refers to response category.
** Activities 1, 2 and 4 use technical staff at $40 per hour. Activity 3 uses management staff at $60 per hour. The average number of major pollutant points per CAM facility is about 3. CRF5 is the annualizing factor for a 5 year stream of costs using a 7 percent real rate of discount. It is equal to 0.244.

IV(E)(2)(b) APPLICABILITY

To facilitate preparation of Information Collection Request (ICR) documentation, Table IV-13 reports activities (in rows) with associated response categories in the applicability columns. All affected pollutant points must perform incremental reporting and annual facility certifications.

Pollutant points without acceptable existing monitoring will need to perform additional recordkeeping. Pollutant points that newly install or initiate monitoring to meet part 64 requirements are assumed to have a greater incremental recordkeeping burden relative to pollutant points with existing monitoring.

IV(E)(2)(c) UNIT IMPACTS

Column 4 of Table IV-13 shows each activity's associated unit impacts, in labor hours. This analysis assumes that the per unit burden for each activity is the same across all response types that perform the activity. Recordkeeping and reporting activities are assumed to be performed by technical staff at a cost of $40 per hour. Annual facility certifications will be made by management staff at a cost of $60 per hour. These labor category rate estimates are generally consistent with rate estimates used in other current EPA rulemakings.

For pollutant points with new recordkeeping burden, § 64.3(b)(4)(ii) and (iii) identify separate monitoring frequency requirements for § 64.5(a) "Large" and § 64.5(b) "Other" emission units. This distinction is shown in Table IV-13. For § 64.5(a) "Large" pollutant points that newly install parameter or continuous monitors, this analysis assumes the source will install a Data Acquisition System (DAS).[18] MRI, an EPA contractor, determined the total cost of a DAS to be $8,940 (MRI 1995). Annualizing that cost over a 5 year service life and a real discount rate of 7 percent, the Agency applied a cost of $727 per pollutant point per year in this analysis.

For § 64.5(a) "Large" pollutant points which initiate Work Practices, the Agency determined the recordkeeping burden at 1.5 hours per day per pollutant point. This activity will be performed by technical staff at $40 per hour. For § 64.5(b) "Other" pollutant points that initiate Work Practices or newly install parameter or continuous monitoring systems, this analysis assumes a new recordkeeping burden of 0.5 hours per day for technical staff. EPA assumes the recordkeeping burden for new Visible Emissions Monitors to be the same for § 64.5(a) "Large" and § 64.5(b) "Other" pollutant points.

To present the certification impact on a "pollutant point" basis, the Agency averaged the three hour per facility estimate over the number of pollutant points per facility. The sample States analysis averaged three major pollutant points per facility.

IV(E)(2)(d) ANNUAL COST

The last column of Table IV-13 shows the annual cost impact of the recordkeeping, reporting and certification activities, with separate values for each response type. Annual cost equals annual burden hours times the labor rate appropriate for that response, times the number of affected pollutant points. For example, the annual cost of incremental recordkeeping that will upgrade existing instrumental monitoring will be the product of 0.5 (hours/week), 52 (weeks/year), 40 ($1/hour) and 178 pollutant points, or $185,120 for the five sample States.

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18 A single DAS unit can handle the data from a number of monitors. Consequently, this analysis assumes a single DAS will, on average, be sufficient for each facility.

IV(E)(3) ANNUALIZED MONITORING COSTS

As part of the development of the proposed monitoring, owners or operators must propose a monitoring approach for each pollutant-specific emissions unit subject to the requirements of part 64. Based on information in the sample States data base, this analysis establishes a set of responses which characterizes the types of monitoring approaches most likely to be proposed. This section addresses the costs of these monitoring responses and considers the extent of part 64 applicability for each response type. Separate tables are presented for each monitoring response. This permits the calculation of costs at a disaggregate level and highlights the sensitivity of costs to the allocation of pollutant points to response categories. The monitoring responses expected to occur at pollutant-specific emissions units include:

- Upgrades to Existing Work Practice Procedures,
- Installation of Parametric Monitoring,
- Installation of CEM/COM,
- Use of Visible Emissions Monitoring, and
- Initiation of Work Practice Procedures.

These monitoring responses require a range of actions or activities. In some cases, monitoring will be performed as manual activities (e.g., work practices) which do not involve extensive capital investments. In other cases, capital investment costs and the operation and maintenance of the monitoring system will be major cost elements. This section summarizes the monitoring response costs for each response type identified above.

IV(E)(3)(a) UPGRADES TO EXISTING WORK PRACTICE PROCEDURES

Table IV-14 reports the monitoring costs associated with upgrades to existing work practice procedures. In this response category, the monitoring activities are limited to the additional effort needed to manually collect information related to the proposed indicators of control performance at each pollutant-specific emissions unit. The incremental effort due to part 64 will involve an additional 0.5 hours per day, over 260 days of source operation per year, by technical staff at a cost of $40 per hour. [19] Therefore, this analysis estimates the annual cost per pollutant point to be $5,200. For the 43 pollutant points in the sample States, the annual cost is $223,600. [20]

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19 Unit impacts for monitoring activities are based on Agency estimates. The days of source operation per year represent an assumed operation of 5 days a week throughout the year.

20 Throughout this section, costs are reported only for monitoring activities. Costs for other types of activities, such as recordkeeping, reporting and certification or revisions are presented in other sections.

TABLE IV-14
MONITORING RESPONSE COSTS FOR POLLUTANT POINTS UPGRADING EXISTING WORK PRACTICE PROCEDURES

Activities	Applicability*	Sample State Count	Unit Impact**	Annual Cost (1,000 1995 $)
Perform Additional Work Practice Tasks	Selected VOC and TSP points	43	0.5 hours/day (260 days per year)	$224

* Applicability determined from State surveys.
** Activity performed by technical staff at a cost of $40 per hour.

IV(E)(3)(b) INSTALLATION OF PARAMETER MONITORS

Table IV-15 reports the monitoring costs for pollutant-specific emissions units installing a parameter monitor. First, emissions units must verify the adequacy of their proposed monitoring approach. The Agency assumes 30 percent of all units which propose parameter monitoring will need to verify indicator ranges and overall acceptability through baseline tests similar to Relative Accuracy Test Audits (RATA), at an estimated cost of $16,140 each. For costing purposes, this analysis assumes that the RATA-like tests will be conducted once per five year permit cycle. The Agency annualized this cost over five years at a discount rate of 7 percent.

The remaining 70 percent of all units that propose parameter monitoring will demonstrate adequacy by less rigorous means. The demonstrations might reference other approved plans for units of similar characteristics or engineering calculations, or summarize historical data to document the units' prior emission control performance. For these units, verification will require 20 hours of technical staff time per year at a cost of $40 per hour. The combined unit cost for initial verification of proposed parameter monitoring is estimated to be $1,741 per year. This is the weighted sum of the two types of responses.

The fourth column of Table IV-15 shows the purchase and installation cost of monitoring equipment. The table provides separate estimates for each pollutant because different pollutants require different parameters. The Agency estimated the annualized equivalent of the capital investment over a 20 year equipment life (MRI 1995).

Table IV-15 displays the costs for the third parameter, operations and maintenance (O&M), in constant annual values. Consequently, the annual cost impact was calculated as the product of the per unit cost and the number of affected units. For example, with respect to VOCs, the calculation for costs produces a total cost of 155 units times $130 per year, or $20,150.

TABLE IV-15
MONITORING RESPONSE COSTS FOR POLLUTANT POINTS INSTALLING PARAMETER MONITORS

Activities	Applicability*	Sample State Count	Unit Impact**	Annual Cost (1,000 1995 $)
Initial Performance Verification	Pollutant points of all pollutant types	599	$1,741	$1,043
Purchase and Installation of Monitoring Equipment	VOC	155	$1,255 * CRF	$18
	TSP	363	2,680 * CRF	92
	SO_2	24	2,080 * CRF	5
	CO	28	10,940 * CRF	29
	NO_x	28	10,940 * CRF	29
Operation and Maintenance of Monitoring Equipment	VOC	155	$130	$20
	TSP	363	270	98
	SO_2	24	210	5
	CO	28	900	25
	NO_x	28	900	25

* Applicability determined from State surveys.
** Cost data for capital purchases and O&M from MRI (1995). CRF is the capital recovery factor (0.0944).

IV(E)(3)(c) INSTALLATION OF CEM/COM

Table IV-16 reports the monitoring costs for pollutant-specific emissions units installing a Continuous Emission Monitor (CEM) or a Continuous Opacity Monitor (COM). The activities for this response are similar to those described for the installation of a parameter monitor. Units that install a continuous monitor system will incur costs:

- to demonstrate the adequacy of the proposed monitoring system,
- for the purchase and installation of monitoring equipment, and
- for the operation and maintenance of the monitoring equipment.

Table IV-16 displays the costs of demonstrating, purchasing, installing, operating, and maintaining CEM equipment for TSP and SO_2 (MRI, 1995). The costs for initial performance demonstrations differs with the type of pollutant monitored. For SO_2, this analysis assumes testing will cost $15,000 every five years, or about $3,658 per year. For TSP, testing will require $1,500, or about $366 on an annualized basis, based on Agency estimates. The Agency does not anticipate CEMs for VOC, CO or NO_x. CEM cost estimates are for stand-alone systems. The Agency did not allow for time sharing of a single monitoring system by a number of pollutant points or the monitoring of more than one pollutant type with a singe CEM. These two assumptions produce estimates which may overstate actual burdens and costs. However, the Agency does not expect many points will use CEMs, and believes any bias on total costs from these assumptions will be small. The annual costs for O&M of continuous systems are reported in the bottom row of Table IV-16. Column three of Table IV-16 shows the Agency's estimate of the number of units expected to install a CEM/COM in the sample States.

TABLE IV-16
MONITORING RESPONSE COSTS FOR POLLUTANT POINTS INSTALLING CEM/COM

Activities	Applicability*	Sample State Count	Unit Impact**	Annual Cost (1,000 1995 $)
Initial Performance Verification	TSP SO_2	51 2	$366 3,658	$19 7
Purchase and Installation of Monitoring Equipment	TSP SO_2	51 2	$26,150 * CRF 101,150 * CRF	$126 19
Operation and Maintenance of Monitoring Equipment	TSP SO_2	51 2	$7,400 10,940	$377 22

* Applicability determined from State surveys.
** Cost data for capital purchases and O&M from MRI (1995). CRF is capital recovery factor (0.0944).

IV(E)(3)(d) USE VISIBLE EMISSIONS MONITORING

Many TSP pollutant points will propose visible emissions monitoring as a monitoring approach. Table IV-17 reports the monitoring costs for these pollutant points. The additional monitoring activity performed for this response category is the manual monitoring of emissions. Given minimum monitoring for applicable requirements, there will already be some level of visible emissions monitoring at many major sources of TSP prior to CAM. Therefore, verification of the adequacy of the proposed monitoring approach can rely on existing data. Furthermore, it will not be necessary to incur additional costs to train staff to perform the measurements or to log the readings. These assumptions limit the new monitoring costs to the additional labor costs of visible emissions monitoring.

TABLE IV-17
MONITORING RESPONSE COSTS FOR POLLUTANT POINTS USING VISIBLE EMISSIONS MONITORING

Activities	Applicability*	Sample State Count	Unit Impact**	Annual Cost (1,000 1995 $)
Manual Monitoring	TSP	738	0.5 hours/day (260 days/year)	$3,838

* Applicability determined from State Surveys.
** Manual monitoring is performed by technical staff at a cost of $40 per hour.

IV(E)(3)(e) INITIATE WORK PRACTICE PROCEDURES

Table IV-18 reports the monitoring costs for pollutant-specific emissions units that propose to initiate work practice procedures. Based on an analysis of pollutant points in the

sample States sample, it is estimated that some TSP and VOC pollutant points will propose this response. The activities associated with the work practices involve the purchase of equipment (VOC only), manual monitoring and Quality Assurance (QA) activities. The assumptions related to these actions are shown in column four of Table IV-18. The unit impacts shown in Table IV-18 are based on data developed by EPA and reflect impacts for the entire facility. The monthly facility impacts can be divided by three to obtain the equivalent impact per pollutant point.

TABLE IV-18
MONITORING RESPONSE COSTS FOR POLLUTANT POINTS INITIATING WORK PRACTICE PROCEDURES

Activities	Applicability*	Sample State Count	Unit Impact**	Annual Cost (1,000 1995 $)
Manual Monitoring	VOC TSP	15 9	20 hours/month per facility 20 hours/month per facility	$47 20
Quality Assurance	VOC TSP	15 9	4 hours/month per facility 4 hours/month per facility	$9 4
Purchase Equipment	VOC	15	$5,000 * CRF10 (per facility)	$4

* Applicability determined from State surveys.
** Unit impacts are listed for the entire facility. CRF10 is the capital recovery factor for an asset with a service life of 10 years and equals 0.1424. Activities 1 and 2 are performed by technical staff at a cost of $40 per hour.

EPA established the cost of the purchase of monitoring equipment for VOC work practice efforts at $5,000, with a service life of 10 years. The annualized cost per facility for work practice monitoring equipment is $712 per facility, or $237 per pollutant point. For the 15 VOC pollutant points in the sample States the annualized cost impact is about $3,560, shown in the last column of Table IV-18.

IV(E)(4) RECURRING COSTS FOR REVIEWS, REVISIONS AND RENEWALS

Section 64.6 addresses requirements for approval of proposed monitoring. Revisions to part 64 proposed monitoring and reopenings of a part 70 permit because of monitoring problems are addressed by part 70. The costs of these actions fall into two classes: responses that are brought about by source decisions or actions and responses that are initiated by permitting authorities.

This analysis assumes that proposed monitoring will be fully prepared and approved in a timely fashion. No costs are included for additional plan review beyond that which is required for initial submission. § 64.6 allows sources to receive conditional approval of a CAM monitoring approach subject to test verification. This analysis does not consider additional CAM costs that might arise if a proposed monitoring approach is later found to be inadequate for CAM purposes.

Over time, sources may need to make revisions to proposed monitoring to reflect a modification in process operations, applicability of a new or different emissions limitation or

standard, or a desire to propose a more cost-efficient monitoring approach. These changes to proposed monitoring, taken as part of normal business operations, should be reflected as part of recurring costs associated with part 64. This analysis assumes that each pollutant point will have one permit revision per permit cycle that can be associated with CAM requirements. Any revisions are assumed to take place on a uniform basis over the 5 year permit cycle. When fully implemented, this means that about 500 CAM revisions are expected per year. This is the same order of magnitude of permit revisions estimated to occur in part 70 for significant permit modifications.

Table IV-19 summarizes the activity, applicability and impact information for revisions and renewals. Separate estimates are provided for pollutant points with existing monitoring prior to promulgation of part 64 versus those that do not have existing monitoring. This reflects the belief that owners or operators of pollutant points with existing monitoring will experience less uncertainty about what is needed for adequate monitoring.

TABLE IV-19
RECURRING COSTS FOR REVISIONS AND RENEWALS

Activities	Applicability*	Sample State Count	Unit Impact*	Annual Cost (1,000 1995 $)
Revisions	w/o Existing Monitoring with Existing Monitoring	1,415 1,234	20 hours/permit cycle 10 hours/permit cycle	$226 99
Renewals	All pollutant points	2,649	8 hours/renewal	954

* Revisions use technical staff at a cost of $40 per hour. Renewals require a mix of technical and management staff at a composite rate of $45 per hour.

Initial proposed monitoring will be submitted at permit renewal for many 64.5(b) “Other” pollutant points. Since part 70 permits are approved on a five year cycle, the Agency includes the proposed monitoring for these points on the same schedule, with the impact shown on the last row of Table IV-19. Timing issues associated with renewals are addressed in Section IV(F)(3).

IV(E)(5) INCREMENTAL COSTS OF BEHAVIORAL ACTIONS

There will be real costs associated with measures sources may take to reduce emissions in order to comply with their underlying emissions standards in response to monitoring under CAM. Costs as well as emissions reductions benefits will result from sources having to reduce emissions overall, and/or to respond to periods of excess emissions more quickly, thus reducing their frequency and duration. Such costs would be due to increased expenditures for operation and maintenance and capital equipment. EPA has not estimated the cost associated with emissions reductions that may result; EPA believes such costs are not attributable to CAM — but to the underlying emissions standards.

If sources cannot achieve or maintain compliance, § 64.8 may require implementation of a QIP. QIP implementation involves problem evaluation and improved control performance. The latter activities may require owners or operators to upgrade preventive maintenance procedures, improve process operations, adopt control system upgrades or other activities that will better ensure compliance. All of these activities will lead to additional costs to sources. However, it is not clear that these costs are assignable to part 64.

The baseline for the part 64 analysis is the existing set of air quality regulations which have been subjected to cost analyses during their own rule development process. The costs of coming into compliance with these other rules have been fully evaluated; and to add the costs of coming into compliance as a result of part 64 monitoring would be to double-count such costs. The total cost of air quality regulations should not reflect the part 64 related costs of coming into compliance. Therefore, for this analysis, the incremental costs of part 64 are restricted to those costs associated with improvements in monitoring and the reporting, recordkeeping, certification and permit modification costs required by part 64. The costs of coming into compliance are not included in this RIA.

IV(E)(6) THE EFFECT OF PERMIT FEES ON PART 64

Part 70 requires sources of pollution to pay permit fees sufficient to offset the costs incurred by its PA in managing its operating permits program. Since part 64 introduces additional requirements for PAs, these incremental costs must be incorporated into the operating permit fee. This section summarizes the incremental (i.e., beyond part 70) costs to PAs due to part 64.

This analysis considers source permit fees to be a transfer payment with a net social benefit of zero. To truly net out, PAs would need to spend fee collections in a way which matched the opportunity costs of the source's best alternative use of the same funds. If one considers the PA to "purchase" air quality improvements through its operating permits program, then if we consider the best alternative use of the fee by sources to also be pollution management, the opportunity costs of both activities may be similar. Furthermore, while CAM affects major sources, part 70 sources with no part 64 requirements incur the same increase in fees. Spreading the same cost over a larger pollution base reduces the increase in fees to part 64 sources, much like a subsidy on the permit fee. By making a zero net social benefits assumption, the Agency avoids a prolonged and somewhat intractable analysis of a minor consideration of the part 64 rule.

The remainder of this section identifies PA costs from part 64 requirements. The presentation is similar to earlier sections of this chapter. The first subsection describes the types of activities that will be performed by PAs, followed by an analysis of the applicability (scope) of PA activities. The end of this section summarizes unit impacts and annual costs.

IV(E)(6)(a) PA ACTIVITIES

Table IV-20 identifies the activities performed by PAS in response to part 64. First, each PA must read and interpret part 64 with respect to its particular conditions. Only then can it review sources' submissions and approve proposed monitoring approaches. The PA will also make applicability determinations for each source to ensure all applicable units have been considered by the source. Once the PA approves a monitoring approach, it must periodically

review reports and re-certify each facility. In addition, the PA has to review and approve any revisions to a source's monitoring approach. Finally, the PA must review and approve permit renewals. This analysis assumes equivalent effort will be required by the PAS to review monitoring data from § 64.5(a) "Large" and § 64.5(b) "Other" pollutant points.

TABLE IV-20
INCREMENTAL COSTS TO PERMITTING AUTHORITIES

Activities	Basis of Applicability	Sample State Count *	Unit Burden**	Annual Cost*** (1,000 of $1995)
Familiarization with part 64	Agency	5	600 hours/Agency	$120
Review of Monitoring Approach Submissions	Units w/o existing monitoring			
	S Non CEM/COM response	1,361	2 hours/pseu	109
	S CEM/COM response	54	1 hour/pseu	2
	Units with existing monitoring			
	S Non CEM/COM response	1,033	1 hour/pseu	41
	S CEM/COM response	201	0.5 hours/pseu	4
Applicability Determinations	All pollutant points	2,649	0.67 hours/pseu	71
Review of Semi-Annual Reports	All pollutant points	2,649	1 hour/pseu (2 reports/ year)	212
Facility Certification	All pollutant points	2,649	0.33 hrs/pseu	35
Revisions	Units w/o existing monitoring	1,415	5 hours/permit cycle	57
	Units with existing monitoring	1,234	2.5 hours/permit cycle	25
Permit Renewal	All pollutant points	2,649	1 hour/renewal	106

* Activity 1 count is the number of Agencies. All other counts are for pollutant-specific emissions units.
** pseu = pollutant-specific emissions units. Fully loaded labor cost is $40.00 per hour.
*** Annual costs for Activity 5 assume that revisions occur uniformly over the five year permit cycle.

IV(E)(6)(b) APPLICABILITY

The second column of Table IV-20 describes the basis of applicability for each activity. While the first activity is defined at the Agency level, EPA expects all other categories to have applicability related to its number of pollutant points. This impact is broken out in the table by the type of existing monitoring and the type of response. The entries in the "Sample State Count" column match the numbers displayed in Table IV-12 for the corresponding activities undertaken by sources. For example, Table IV-12 identifies 1,033 pollutant points with existing monitoring and a non CEM/COM response that will specify CAM monitoring elements. These are the same 1,033 pollutant points shown in Table IV-20 for PA review of part 64 monitoring approach submissions at pollutant points with existing monitoring and a non CEM/COM response.

IV(E)(6)(c) UNIT IMPACT

The burden for each activity is shown in the fourth column of Table IV-20. This analysis uses a $40 per hour permit authority labor rate, in real 1995 dollars. This is a fully loaded cost and is based on data provided by State Agency permit fee demonstrations. A derivation of this rate is included in Appendix C.

EPA Regional offices will also incur costs to review part 64 monitoring requests by sources. Unlike PA costs, EPA costs are not transferred back to the sources. Based upon information from other programs, the Agency estimates that no more than 2 percent of affected pollutant points will need a review, or 52 requests in the sample States. If each request requires 2 hours of review at the regional office and the loaded hourly labor cost is $34, each request processed by EPA will cost $68, for a total cost of $3,536 per year.

IV(F) IMPLEMENTATION OF PART 64

IV(F)(1) PART 64 IMPLEMENTATION GUIDANCE

The Agency linked part 64 implementation to the approval of part 70 permit applications to provide a smooth transition to CAM. For each affected pollutant-specific emissions unit with the potential to emit greater than or equal to 100 percent of the amount of a pollutant required for a source to be classified as a major source (§64.5(a) "Large"), the owner or operator is required to submit proposed monitoring with an initial or supplemental part 70 permit application if:

(i) On or after 180 days following final promulgation of part 64, a part 70 application has:
  a) Not been filed;
  b) Not yet been determined to be complete by the PA; or

(ii) With an application for a significant permit revision to a part 70 permit if the conditions in (i) above are not applicable; or

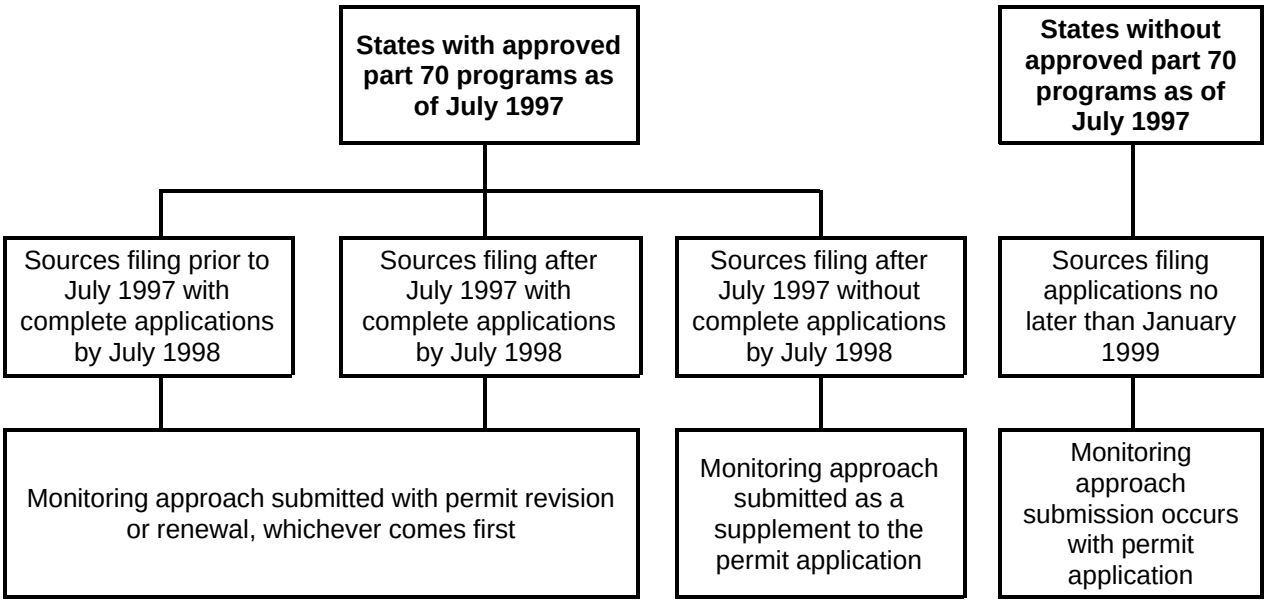
(iii) No later than the next application for renewal of a part 70 operating permit if no significant revisions occur and the conditions in (i) above are not applicable.

For all other affected pollutant-specific emissions units, § 64.5(b) requires sources to submit proposed monitoring at their renewal of a part 70 or a part 71 permit. In summary, sources submit proposed monitoring with a permit application, as a supplement to a pending permit application, at permit renewal, or as a revision to an approved application. This section discusses these alternative schedules for part 64 implementation.

IV(F)(2) ASSUMPTIONS

The Agency made specific assumptions about permit completeness, approvals and renewals. Figure IV-2 shows a breakdown of the § 64.5(a) "Large" pollutant points according to when a source would submit its monitoring approach, based on the discussion in Appendix D. The Agency identified two important dates for each affected pollutant point: the date of permit issuance and the date that monitoring approach submissions are required. These dates fully define the flow of part 64 related actions across time for the large units. The flow of activity for § 64.5(b) "Other" units is simpler, being tied to permit renewal only.

FIGURE IV-2. OVERVIEW OF MONITORING APPROACH FOR § 64.5(A) "LARGE" POLLUTANT POINTS SUBMISSION ACTIVITY



The following assumptions have been made to develop an implementation schedule which is consistent with the part 64 language:

- Part 64 promulgation will occur in January 1998, with July 1998 occurring 180 days after part 64 promulgation.
- 45 States will have approved part 70 permit programs as of July 1997.
- 90 percent of all part 70 sources will have filed a part 70 application by July 1998.

- There is homogeneity between sources and emissions units. Therefore, 90 percent of all part 64 affected units will be at sources that have filed a part 70 application by July 1998.

Appendix D provides a description of the implementation events included in this RIA.

IV(F)(3) TIMING OF PART 64 COSTS

Section IV(E) identified the costs of specific implementation actions identified in Appendix D independent of time. The analysis must also consider when the actions take place and how many sources will incur these costsTable IV-21 displays the expected distribution of CAM submissions over time.

The second column of Table IV-21 shows the estimated percentage of § 64.5(a) "Large" pollutant points that will be issued a part 70 permit at the date shown in the first column of the table. Similarly, the third column presents the estimated percentage of § 64.5(a) "Large" pollutant points that will need to submit a proposed monitoring approach by the date shown in the first column of the table. The entries in columns two and three each sum to unity. That is, all part 64.5 (a) "Large" pollutant points will be at sources that will be issued a part 70 permit and will require a monitoring approach submission. The schedule for § 64.5(b) "Other" pollutant points follow the same time line for permit issuance as shown in Table IV-21. However, all monitoring approach submissions will occur at the source's permit renewal.

Tables IV-22 and IV-23 summarize the percentage of pollutant points that will perform the various activities by date for § 64.5(a) "Large" and § 64.5(b) "Other" pollutant points, respectively. Entries in the tables represent the proportion of pollutant points affected at any time. Columns two, three, four, and six display activities performed once at a pollutant point and therefore sum to unity. When a source has installed its monitoring system, it performs column six ("Perform Monitoring") activities on a continuing basis. Therefore, the percent of sources in column six increases over time until it reaches 100 percent in January of 2008. The entries for the last two columns represent permit revision and renewal. Neither column should be totaled, since some pollutant points will experience more than one review and Tables IV-22 and IV-23 span a period greater than five years.

To simplify the analysis, this analysis assumes all part 64 activities occur at the same time for all sources, rather than spread over the period between promulgation and the deadline for each activity. The costs associated with each activity occur at the same time as the activity. In particular:

- The review of rule requirements will be performed when part 64 is promulgated.
- The development of proposed monitoring will occur 6 months prior to the submission of the proposed monitoring approach.
- Installation, operation, and maintenance of part 64 related monitoring occur 6 months following a source's monitoring approach submission to allow for review and approval of the monitoring by PAs.
- All testing to demonstrate adequacy also takes place 6 months following monitoring approach submission.
- Revision activities occur uniformly over the permit cycle

- Part 64 related permit renewal actions take place 6 months prior to the target renewal date.

TABLE IV-21
PERCENTAGE OF § 64.5(A) "LARGE" POLLUTANT POINTS ASSOCIATED WITH PERMIT ISSUANCE AND MONITORING APPROACH SUBMISSIONS

	Percent Associated with Action	
Date	**Permit Issuance**	**Monitoring Approach Submission**
January 1996	20%	
July 1996		
January 1997	20	
July 1997		
January 1998	20	
July 1998		
January 1999		29.5%
July 1999	5	
January 2000	5	4.5
July 2000	5	0.4
January 2001	8.33	20.0
July 2001	5	0.8
January 2002	8.33	17.0
July 2002		1.1
January 2003	3.33	13.9
July 2003		1.1
January 2004		
July 2004		4.2
January 2005		
July 2005		3.9
January 2006		
July 2006		3.5
Total*	100%	100%

* Columns may not sum to 100% due to rounding.

TABLE IV-22
PERCENT OF POLLUTANT POINTS BY DATE AND ACTIVITY
(§64.5(A) "LARGE")

Date	Percent Associated with Activity						
	Review Require-ments	Determine Approach	Specify Monitoring Elements	Perform Monitoring	Justification	Revisions	Renewals
January 1998	100						
July 1998		29.5	29.5%		29.5%		
January 1999				29.5%		0.9%	
July 1999		4.5	4.5		4.5		
January 2000		0.4	0.4	34.1	0.4	1.8	
July 2000		20.0	20.0		20.0	0.0	20.0%
January 2001		1.0	1.0	54.5	1.0	6.8	
July 2001		17.0	17.0		17.0	0.2	20.0
January 2002		1.0	1.0	72.2	1.0	11.9	
July 2002		14.0	14.0		14.0	0.5	20.0
January 2003		1.0	1.0	87.3	1.0	15.7	
July 2003						0.7	
January 2004		4.2	4.2	88.4	4.2	17.0	5.0
July 2004						1.5	5.0
January 2005		3.9	3.9	92.6	3.9	17.0	5.0
July 2005						2.3	28.3
January 2006		3.5	3.5	96.5	3.5	17.0	5.0
July 2006						3.0	28.3
January 2007				100.0		17.0	
July 2007						3.0	23.3
January 2008				100.0		17.0	

TABLE IV-23
PERCENT OF POLLUTANT POINTS BY DATE AND ACTIVITY
(§64.5(B) "OTHER")

Date	Percent Associated with Activity						
	Review Require-ments	Determine Approach	Specify Monitoring Elements	Perform Monitoring	Justification	Revisions	Renewals
January 1998	100						
July 1998							
January 1999							
July 1999							
January 2000							
July 2000		20.0	20.0		20.0		20.0
January 2001				20.		4.0	
July 2001		20.0	20.0		20.0		20.0
January 2002				40.0		8.0	
July 2002		20.0	20.0		20.0		20.0
January 2003				60.0		12.0	
July 2003							
January 2004		5.0	5.0	60.0	5.0	12.0	5.0
July 2004		5.0	5.0		5.0	1.0	5.0
January 2005		5.0	5.0	70.0	5.0	13.0	5.0
July 2005		8.3	8.3		8.3	2.0	28.3
January 2006		5.0	5.0	83.3	5.0	14.7	5.0
July 2006		8.3	8.3		8.3	3.0	28.3
January 2007				96.7		16.3	
July 2007		3.3	3.3		3.3	3.0	23.3
January 2008				100.0		17.0	

The format of Tables IV-22 and IV-23 allows direct calculation of the discounted present value of activity costs over time. The formula for the discounted present value of a discrete stream of costs is:

EQUATION IV-1

$$DPV_t = \sum_{t=1}^{T} \frac{\left(C_t \bullet N \bullet W_t\right)}{\left(1 + r_t\right)^t}$$

where DPV_t is the discounted present value in the year of promulgation;
T is the end year of the stream;
C_t is the unit cost of an activity in year t;
N is the number of pollutant points;
W_t is the pollutant point weight factor in year t;
r_t is the real rate of discount in year t.

This analysis assumes that C_t is constant over time and that r_t equals 7 percent in accordance with the Office of Management and Budget's guidance. W_t is provided for various discrete dates in Tables IV-22 and 23. Values for N were identified in Section B. The product of N and W_t provides the estimate of the number of pollutant points that will incur costs for a given activity at period t. This product, times the unit activity cost at period t. C_t, produced the total activity costs at period t. The calculations begin in 1998, the year of CAM promulgation.

The variable that remains to be specified is T, the end of the time horizon for the stream of costs. The Agency considered several options for defining T. One option computed costs for a pre-specified number of permit cycles for each pollutant point. This approach allowed for a close connection to part 70 but cycles occured at different points in time. Therefore, any interpretation of annualized cost measures across all points would not be straightforward. The Agency also considered a life cycle cost analysis in which T would extend into the distant future, reducing the net present value of any costs close to zero. This option would force more explicit recognition of possible changes in variables due, for example, to technological improvements, that might otherwise safely be ignored in the short-term (Booz-Allen & Hamilton, 1994).

The Agency selected a single value for T, ten years, representing the period from January 1, 1998 to December 31, 2007, represented in Equation IV.1. A time horizon of 10 years was selected to allow for at least one permit renewal action for all part 64 points. This calculation is made under the assumptions that the total number and mix of pollutant points affected by part 64 remains unchanged over this period and that there are no changes in the unit cost assumptions presented in Section E.

IV(F)(4) COSTS IN SAMPLE STATES

Table IV-24 reports the discounted present value of costs for § 64.5(a) "Large" pollutant points with separate entries shown for each activity. The top half of the table includes costs for activities undertaken at the source. Activity 5 for sources ("Perform Monitoring"), includes

recordkeeping, reporting, certification and monitoring tasks. The bottom half of the table shows costs borne by PAs that will be paid by sources in the form of increased permit fees. Table IV-25 presents equivalent information for § 64.5(b) "Other" pollutant points. Another way to present costs that occur over time is as an annualized value. Annualized costs are the stream of constant (levelized) costs that provide the same discounted present value as the actual stream of costs.[21] Annualized cost estimates are provided in Table IV-26. The total annualized cost impact for all pollutant points is estimated to be about $5.4 million in the sample States. This estimate does not include the cost of coming into compliance with existing emission limitations or standards.

TABLE IV-24
COSTS OF CAM IN SAMPLE STATES
(§64.5(A) "LARGE")

Activity	Discounted Present Value (Thousands of $1995 as of January 1, 1998)
A. Source-Specific	
1. Review Requirements	$ 95.4
2. Determine Monitoring Approach	22.3
3. Specify Monitoring Elements	120.3
4. Prepare Justification	26.7
5. Perform Monitoring	3,680.4
6. Revisions	30.7
7. Renewals	117.1
Subtotal	4,092.9
B. Permitting Authority	
1. Rule Review	10.8
2. Review Monitoring Approach	12.9
3. Applicability Determinations	6.8
4. Review Reports	122.9
5. Certification	21.1
6. Revisions	38.3
7. Renewals	12.6
Subtotal	225.4
Total Discounted Present Value	**4,318.3**

21 One formula for the annualizing factor is:

$$A = \left[\frac{r}{1 - \left(\frac{1}{1 + r} \right)^t} \right]$$

where r is the discount factor and t is the time horizon.

TABLE IV-25
COSTS OF CAM IN SAMPLE STATES
(§64.5(B) "OTHER")

Activity	Discounted Present Value (Thousands 1995 $ as of January 1998)
A. Source-Specific	
1. Review Requirements	$965.7
2. Determine Monitoring Approach	157.3
3. Specify Monitoring Elements	904.5
4. Prepare Justification	201.0
5. Perform Monitoring	30,507.8
6. Revisions	178.9
7. Renewals	886.8
Subtotal	33,802.0
B. Permitting Authority	
1. Rule Review	$109.2
2. Review Monitoring Approach	96.9
3. Applicability Determinations	59.3
4. Review Reports	608.6
5. Certification	102.4
6. Revisions	223.6
7. Renewals	102.4
Subtotal	1,295.4
Total Discounted Present Value	**35,097.4**

Table IV-26
ANNUALIZED COSTS FOR SAMPLE STATES - ALL POLLUTANT POINTS
(IN MILLIONS OF $1995)

Type of Cost	§64.5(a) "Large"	§64.5(b) "Other"	Total
Source-Specific	$0.58	$4.81	$5.39
Permitting Authority	0.03	0.18	0.21
Total	**0.61**	**4.99**	**5.60**

IV(G) NATIONAL EXTRAPOLATION

Previous sections provided annualized cost estimates of CAM for sources in the sample States included in the emissions inventory database. This section extrapolates the results for the sample States to a national total. This analysis extrapolates to the nation by multiplying the results of the sample States study by a factor of 10. This factor was selected after a review of the representativeness of the sample States sample data. As discussed in Section B(2), half of all source categories have between 6 and 14 percent coverage in a comparison of the sample States sample used in this analysis and a national data base. The mode of the distribution is the 10 percent interval.

IV(G)(1) NATIONAL COUNT OF AFFECTED POLLUTANT POINTS

Table IV-27 shows 26,490 pollutant points expected to be affected by the requirements of part 64. Separate entries are provided by pollutant type and response category. The national count of points corresponds to the sum of the estimates for § 64.5(a) "Large" and § 64.5(b) "Other" pollutant points presented in Tables IV-10 and IV-11, respectively, after multiplication by ten for national extrapolation. As discussed in Section IV(B)(2), the sample States sample appears to be a representative sample. Furthermore, more detailed extrapolation approaches used for the Enhanced Monitoring rule indicated that a simple multiplicative extrapolation based on the count of sample States is appropriate.

IV(G)(2) NATIONAL SOURCE COSTS OF CAM

The incremental source costs of CAM include the costs of developing monitoring that meets the design criteria, the costs of recordkeeping, reporting and facility certification, monitoring costs, and CAM-related costs of permit revisions and renewals. National costs associated with these activities are derived as a factor of ten greater than those reported for the sample States sample. Table IV-28 presents the national cost estimates for all part 64 pollutant points. Separate entries are provided for individual cost elements. The discounted present values of source costs is around $380 million. The dominant source-specific activity is incremental monitoring, accounting for over 90 percent of costs. This activity includes reporting, recordkeeping, certification and monitoring tasks.

The annualized (levelized) values of the discounted stream of costs are shown in Table IV-29. The total annualized cost estimate for CAM is estimated to be $56 million ($1995), of which $2 million results from PA costs, which are transferred to sources through increased permit fees. The annualized costs are computed over a ten year horizon which reflects the time from promulgation in January of 1998 to the time when all pollutant points have experienced at least one permit renewal.

TABLE IV-27
NATIONAL COUNT OF POLLUTANT POINTS
(All Pollutant Points)

	Pollutant					
Response Category	**VOC**	**TSP**	**SO_2**	**CO**	**NO_x**	**Total**
Acceptable Systems	2,210	7,400	500	0	20	10,130
Upgrade Instrumental Systems	510	1,230	40	0	0	1,780
Upgrade Work Practice	200	230	0	0	0	430
Install Parameter Monitoring	1,540	3,650	240	280	280	5,990
Install CEM/COM	0	520	20	0	0	540
Use VE Monitoring	0	7,380	0	0	0	7,380
Initiate Work Practices	150	90	0	0	0	240
Total	**4,610**	**20,500**	**800**	**280**	**300**	**26,490**

TABLE IV-28
NATIONAL CAM COSTS
(All Pollutant Points)

Activity		Discounted Present Value (Millions of $1995 as of January 1998)
A. Source-Specific		
1.	Review Requirements	$10.6
2.	Determine Monitoring Approach	1.8
3.	Specify Monitoring Elements	10.2
4.	Prepare Justification	2.2
5.	Perform Monitoring	341.9
6.	Revisions	2.1
7.	Renewals	10.0
	Subtotal	378.8
B. Permitting Authority		
1.	Rule Review	$1.2
2.	Review Submissions	1.1
3.	Applicability Determinations	0.7
4.	Review Reports	7.3
5.	Certifications	1.2
6.	Revisions	2.6
7.	Renewals	1.2
	Subtotal	15.3
Total Discounted Present Value		**394.1**

TABLE IV-29
ANNUALIZED NATIONAL CAM COSTS - ALL POLLUTANT POINTS
(Millions of $1995)

Type of Cost	Annualized Cost
Source-Specific	$53.9
Permitting Authority	2.1
Total	**56.0**

IV(H) SENSITIVITY ANALYSES

The following discussions detail the Agency's use of sensitivity analyses to determine the relative effect of changes in different CAM factors. The first section discusses changes in outcomes due to changes in CEMS/COMS costs. The second and third sections discuss the expected effects of changes in labor rates and the implementation schedule. The final section discusses the effect of variation in rule design.

IV(H)(1) VARIATION IN CEMS/COMS COSTS

The largest one-time cost for an activity identified in Section D is the cost of purchasing and installing a Continuous Emission Monitoring System (CEMS) for SO_2. MRI (1995) estimates that the capital cost for an SO_2 CEMS is $101,150, based on information collected from vendors of CESS. The costs derived in Section D use this value as a point estimate. However, public comments received as part of the Enhanced Monitoring rulemaking offered a range of alternative cost estimates. Some commenters, for example, believed that the effective cost of a CEMS should be lower because of opportunities for timesharing and multiple gas analysis. Other commenters suggested higher costs, based on personal experience.

The sensitivity of the analysis to variations in CEMS costs is evaluated by increasing the estimated cost of purchasing, installing, operating and maintaining an SO_2 CEMS by 25 percent. An identical percent increase is applied to the cost of a COM. The effect of these changes on overall annualized costs is about 1.4 percent. This small change occurs primarily because of the few number of pollutant points that will propose a continuous system as a new monitoring approach.

IV(H)(2) VARIATION IN LABOR RATES

The basic cost analysis assumes that labor costs at sources affected by CAM will be $40 per hour for technical staff and $60 per hour for management staff. These rates are fully loaded rates in 1995 dollars and are derived from rates used in other recent EPA rulemakings. Although there does not appear to be a consensus on an approved rate for a specific labor category, a weighted average of the rates used in this analysis is generally consistent with the rates used in recent analyses of the operating permits program. However, variation in the actual labor rates is likely and it would be informative to better understand how changes in labor rate assumptions affect the overall cost estimates.

Labor rates were increased by 10 percent for both labor categories and costs were recomputed. This change increases annualized costs for §64.5(a) “Large” pollutant points by 6.0 percent and increases costs for §65.4(b) “Other” pollutant points by 9.4 percent. Thus, there is more nearly an equal percent response in costs to a given percent change in labor rates. Labor rates are related to costs in this way because the rates are used as multiplicative factors in many of the cost calculations. Other variables, such as the count of affected points, are also multiplicative factors in the analysis and are expected to exhibit the same behavior.

IV(H)(3) VARIATION IN IMPLEMENTATION SCHEDULE

Annualized costs are sensitive to assumptions about the time stream of costs. In the basic analysis, part 64 implementation is tied to the submission of part 70 applications and the issuance of permits, with some part 64 sources not required to submit monitoring design criteria until nearly a decade after part 64 promulgation. An alternative implementation schedule might require a more immediate response to part 64 by all affected sources. For example, if submission of monitoring design criteria was tied to part 64 promulgation, costs for rule review, criteria development, justification and monitor operation would be realized for all affected pollutant points by January 1999 or at the date of permit issuance, if the permit is issued after January 1999. Activities related to revisions would also begin at this earlier date as long as a permit had been issued by January 1999. Activities related to renewals would keep the schedule outlined in the basic analysis since this task is tied to the issuance of a part 70 permit.

With part 64 implementation requirements moved forward in time, annualized source costs each increase by 91 percent, with the §64.5(b) "Other" pollutant points accounting for most of this effect. Therefore, delaying full implementation of part 64 reduces annual costs to sources by a significant amount. Furthermore, permitting authority costs also increase under the compressed schedule. If monitoring design submissions and related activities are tied to part 64 promulgation, permitting authority costs are estimated to increase by 30 percent and 75 percent for §64.5(a) "Large" and §64.5(b) "Other" pollutant points, respectively. There may also be additional costs for permitting authority adjustments needed to handle short-term increases in workload volume. That is, capacity constraints could raise permitting authority costs. These adjustment costs have not been quantified for this sensitivity analysis.

IV(H)(4) VARIATION IN RULE DESIGN

The statutory authority for CAM is related to language in the Clean Air Act Amendments of 1990 at section 114(a)(3). In October 1993, EPA proposed an Enhanced Monitoring rule in the Federal Register to address these statutory requirements. CAM has evolved out of public comment received on the proposed Enhanced Monitoring rule and subsequent discussions between EPA and stakeholders. Among the major differences between the 1997 part 64 Draft rule and the EM rule are less prescriptive (more flexible) approaches to acceptable monitoring and a revised set of applicability conditions which omit uncontrolled pollutant points from part 64 requirements.

In addition to the 1997 part 64 Draft CAM rule, which is the focus of the earlier parts of this section, two alternatives have been formally analyzed in terms of economic effects: 1) the EM rule; and 2) a CAM alternative which includes all major controlled points, minor pollutant points and major pollutant points without add-on controls (1996 part 64 Draft). Chapter III of this RIA provides an overview of the key features of these alternatives. A preliminary analysis of costs was performed for the 1995 part 64 Draft rule. However, a complete assessment of responses was not made.

Table IV-30 summarizes the applicability criteria for the proposed Enhanced Monitoring rule and for the two CAM alternatives. The table notes other key features of each alternative that serve to differentiate the alternatives from one another. The two CAM alternatives differ primarily in the applicability of the regulation to pollutant points. The 1996 part 64 Draft is the most inclusive and covers major and minor pollutant points at major sources. In this option, all major sources for a specific pollutant would be subject to part 64. The 1997 part 64 Draft could

TABLE IV-30
ALTERNATIVE RULE DESIGNS

	Applicability Criteria	Other Features
Enhanced Monitoring	Pollutant points with the potential to emit pollutants in an amount greater than 30 percent of the major source threshold.	Monitoring responses focus on data acquisition needed to certify compliance.
1996 part 64 Draft	Major and minor points at major sources.	Monitoring responses focus on data acquisition to better ensure compliance and to provide for quicker problem identification and resolution; pollutant points with insignificant actual emissions are excluded. Major sources defined in terms of potential to emit without controls.
1997 part 64 Draft	Major pollutant points with add-on controls.	Monitoring responses same as in 1996 part 64 Draft. Periodic monitoring fills gaps for unaffected major sources.

exclude some major sources. However, these sources would be subject to periodic monitoring requirements under part 70.

Table IV-31 presents comparative results for the alternative rule designs. Comparisons are made for affected pollutant points, three cost measures, and the incidence of a CEMS/COMS. The pollutant point information provides a basis for comparison across alternatives on the scale of impact of alternative rule designs. EM pollutant points number about the same as the 1997 part 64 Draft. This is consistent with the applicability criteria. EM exceeds the 1997 part 64 Draft by a small amount because the pollutant point threshold in EM is 30 percent of the major source threshold. The 1996 part 64 Draft is the most inclusive covering all major sources with significant actual emissions. The 1997 part 64 Draft removes all minor pollutant points and uncontrolled major pollutant points included in the 1996 part 64 Draft.

TABLE IV-31
COMPARATIVE RESULTS FOR ALTERNATIVE RULE DESIGNS

Measure	Rule Design		
	EM	1996 part 64 Draft	1997 part 64 Draft
1. Affected Pollutant Points	33,915	81,205	26,490
2. CAM Monitoring Approaches*	N/A	7	4
3. Monitoring Systems*	979	140	49
4. Permitting Authority*	20	4	2
5. Percent of Pollutant Points with CEMS or COMS	>50	0.66	1.4

* Annualized costs in millions of 1995 dollars. Costs for EM have been converted to 1995 dollars using the Consumer Price Index for all Urban Consumers.

N/A Not Available.

The second row of Table IV-31 contains estimates of the costs of developing monitoring criteria. These are the annualized costs for rule review, selection of monitoring approach, specification or monitoring approaches and justification of selected monitoring approaches. These tasks vary among alternatives but should generally be thought of as the initial costs of part 64 which establish the monitoring design criteria. No estimate is shown for the EM alternative because the scenario analyzed represents costs in the fifth year after rule implementation and the initial costs for preparation of an EM “protocol” have already been incurred.

Row 3 of Table IV-31 shows the costs of purchasing, installing, operating and maintaining monitoring systems. These costs represent the response costs detailed in earlier sections of this chapter. The differences in costs are significant across rule designs. Some of the differences are attributable to the mix of affected points. However, differences in the mix of responses is also an important factor.

One factor which contributes greatly to the large difference in monitoring system costs between EM and the CAM options is the percent of points that propose a continuous emissions monitoring system. As shown in row 5 of the table, the EM rule is estimated to result in more than 50 percent of affected points requiring a continuous system. Alternatively, the CAM options have a much smaller incidence of continuous systems.

Permitting authority costs have a pattern similar to the monitoring system costs. In this case, CAM has lower costs for permitting authorities relative to EM because there is less review and verification of proposed monitoring approaches.

In summary, the 1997 part 64 Draft is estimated to affect the fewest pollutant points and has the lowest incremental cost among the alternatives considered. EPA believes the design reflected in the 1997 part 64 Draft will be sufficient to ensure on-going compliance with applicable requirements. On a cost-effectiveness basis, the 1997 part 64 Draft is therefore preferred over the other alternatives.