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Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-450/3-79-028b
November 1980

Air

EPA

Lead-Acid Battery Manufacture - Background Information for Promulgated Standards

EIS

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Errata Sheet

Lead-Acid Battery Manufacture -
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Promulgated Standards
EPA-450/3-79-028b

1. p. 1-2 -- In the promulgated lead emission limit column of Table 1-1, the entry for grid casting should be changed from 0.40 mg/dscm (0.00024 gr/dscf) to 0.40 mg/dscm (0.000176 gr/dscf), and the entry for lead reclamation should be changed from 4.5 mg/dscm (0.0022 gr/dscf) to 4.5 mg/dscm (0.00198 gr/dscf).

2. pg. 1-7 -- In the baseline emissions column of Table 1-3b, the entry for total emissions from the 6500 bpd plant should be changed from 20476.6 to 27476.6. For the grid casting facility at the 2000 bpd plant, the entry in the proposed standards column should be changed from 187.8 to 387.8, and the entry in the promulgated standards column should be changed from 187.8 to 387.8.

3. pg. 1-11 -- The following substitutions should be made for the entries in the total-scrubber-blowdown/volume, and increase-above-baseline/volume columns of Table 1-5b:

	Total scrubbers blowdown Volume (10^3gal/day)	Increase above baseline Volume (10^3gal/day)
Baseline		
500 bpd plant	0.13	
2000 bpd plant	0.53	
6500 bpd plant	1.85	
Proposed standards (revised estimate)		
500 bpd plant	3.86	3.72
2000 bpd plant	13.42	12.89
6500 bpd plant	44.91	43.06
Promulgated standards		
500 bpd plant	0.53	0.40
2000 bpd plant	2.06	1.53
6500 bpd plant	7.24	5.39

EPA-450/3-79-028b

Lead-Acid Battery Manufacture — Background Information for Promulgated Standards

Emission Standards and Engineering Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

November 1980

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ENVIRONMENTAL PROTECTION AGENCY

Background Information
and Final
Environmental Impact Statement
for Lead-Acid Battery Manufacture

Prepared by:

11/28/80

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1. The promulgated standards of performance limit emissions of lead from new, modified, and reconstructed lead-acid battery manufacturing facilities. Section 111 of the Clean Air Act (42 U.S.C. 7411), as amended, directs the Administrator to establish standards of performance for any category of new stationary source of air pollution that ". . . causes or contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare."

2. Copies of this document have been sent to the following Federal Departments: Labor, Health and Human Services, Defense, Transportation, Agriculture, Commerce, Interior, and Energy; the National Science Foundation; the Council on Environmental Quality; members of the State and Territorial Air Pollution Program Administrators; the Association of Local Air Pollution Control Officials; EPA Regional Administrators; and other interested parties.

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TABLE OF CONTENTS

LIST OF TABLES

1. SUMMARY

On January 14, 1980, the Administrator proposed standards of performance for lead-acid battery manufacture (45 FR 2790) under Section 111 of the Clean Air Act. Public comments were requested on the proposal in the Federal Register. There were 21 commenters composed mainly of lead-acid battery industry and State Agency representatives. Also commenting were representatives of the U.S. Department of Commerce and industries not associated with lead-acid battery manufacturing. The comments that were submitted, along with responses to these comments, are summarized in this document. The summary of comments and responses serves as the basis for the revisions made to the standards between proposal and promulgation.

1.1 SUMMARY OF CHANGES SINCE PROPOSAL

A number of changes have been made to the standards since their proposal. The most significant of these are changes in the emission limitations for the grid casting and lead reclamation facilities. The promulgated emission limits for these facilities are based on levels achievable using impingement scrubbers, while the proposed emission limits were based on levels achievable using fabric filtration. Also, the opacity standard for lead reclamation has been changed from 0 to 5 percent, because of the change in the emission limit for this facility. The changes in the standards of performance for grid casting and lead reclamation are illustrated in Table 1-1, which presents the proposed and promulgated emissions limitations for all facilities affected by the standards.

Another change is the redefinition of the paste mixing facility to include several operations ancillary to paste mixing. These ancillary operations are lead oxide storage, conveying, weighing, and metering operations; paste handling and cooling operations; and plate pasting, takeoff, cooling, and drying operations.

TABLE 1-1. SUMMARY OF CHANGES MADE TO LEAD EMISSION LIMITATIONS BETWEEN PROPOSAL AND PROMULGATION

Affected facility	Proposed lead emission limit[a]	Promulgated lead emission limit[a]
Lead oxide production	5.0 mg/kg (0.010 lb/ton)	No change from proposed limit
Grid casting	0.05 mg/dscm (0.00002 gr/dscf)	0.40 mg/dscm (0.00024 gr/dscf)
Paste mixing	1.0 mg/dscm (0.00044 gr/dscf)	No change from proposed limit
Three-process operation	1.0 mg/dscm (0.00044 gr/dscf)	No change from proposed limit
Lead reclamation	2.0 mg/dscm (0.00088 gr/dscf)	4.5 mg/dscm (0.0022 gr/dscf)
Other lead-emitting operations	1.0 mg/dscm (0.00044 gr/dscf)	No change from proposed limit

[a]For lead oxide production, the emission limit is expressed in terms of lead emissions per kilogram of lead processed.
For grid casting, paste mixing, three-process operation, lead reclamation, and other lead-emitting facilities, emission limits are expressed in terms of lead emissions per dry standard cubic meter of exhaust air.

In addition, the units of the small size cutoff for the standards for lead-acid battery manufacture have been changed from batteries per day (bpd) to lead throughput. The promulgated standards will affect new, modified, or reconstructed facilities at any plant with the capacity to produce in one day batteries which would contain, in total, an amount of lead greater than or equal to 5.9 Mg (6.5 tons). This cutoff corresponds to the 500 bpd cutoff in the proposed standards, and is based on an average battery lead content of 11.8 kg (26 lb) of lead per battery.

The promulgated standards will not require pressure drop monitoring and recording for fabric filters. The pressure drop monitoring and recording requirement has been retained for scrubbers. However, the continuous recording requirement has been changed to a requirement that pressure drop be recorded every 15 minutes. Finally, because of the change in the standard for grid casting, the minimum sampling time for this facility has been reduced from 180 minutes to 60 minutes.

1.2 SUMMARY OF IMPACTS OF THE PROMULGATED ACTION

1.2.1 Alternatives to the Promulgated Action

The control alternatives considered for the lead-acid battery manufacture source category are discussed in Chapter 6 of the Background Information Document (BID) for the proposed standards (Volume I). Five regulatory alternatives were considered for plants larger than the small size cutoff. The control techniques on which the alternatives were based are summarized in Table 1-2.

The promulgated standards correspond to Alternative III, which is based on the use of fabric filtration to control emissions from lead oxide production, paste mixing, three process operation, and other lead-emitting facilities, and scrubbers typically used in the lead-acid battery manufacturing industry to control emissions from grid casting and lead reclamation facilities. This alternative is considered to reflect the degree of emission control achievable through the use of the best demonstrated technology considering costs, nonair quality health and environmental impacts, and energy requirements for lead-acid battery manufacture. The rationale for the selection of Alternative III as a basis for the promulgated standards is discussed in Chapter 2, Section 2.2.

TABLE 1-2. CONTROL ALTERNATIVES CONSIDERED FOR PROPOSED ACTION

	Control techniques on which regulatory alternatives were based				
	Alternative I	Alternative II	Alternative III	Alternative IV	Alternative V
Lead oxide production	A	A	A	A	A
Grid casting -- furnaces	F[a]	S	S	S	S
-- machines	F[a]	F[a]	S	S	S
Paste mixing	F	F	F	S	S
Three-process operation	F	F	F	F	F
Lead reclamation	F	S	S	S	S

A -- Fabric filter, 2:1 air to cloth ratio
F -- Fabric filter, 6:1 air to cloth ratio
S -- Impingement scrubber, ΔP = 1.25 kPa (5 in. W.G.)

[a]As noted in the text, it has been determined that standards for grid casting and lead reclamation cannot be based on fabric filtration.

The proposed standards corresponded to Alternative I. The emission limits and the impact analyses for this alternative had been based on the application of fabric filters to all affected facilities; however, as noted in the preamble to the proposed standards, the emissions limits for Alternative I could also have been achieved using high energy venturi scrubbers. In light of arguments presented by a number of commenters (Chapter 2, Section 2.2), it has been determined that standards for grid casting and lead reclamation facilities cannot be based on the use of fabric filters. Therefore, the costs, and energy and water requirements of venturi scrubbers, which would have met the proposed standards for grid casting and lead reclamation, have been estimated.[1] These estimates have been used to revise the energy, economic, and water pollution impacts projected for Alternative I.

As noted in Volume I of the BID, growth projections for the lead-acid battery manufacturing industry over the next five years range from 3 to 5 percent per year. The environmental, economic, and energy impacts estimated for the promulgated standards in this chapter and in Volume I are based on a growth rate of 3.5 percent per year.

1.2.2 Environmental Impacts of Promulgated Action

The environmental impacts of the regulatory alternatives for lead-acid battery manufacture are discussed in Chapters 6 and 7 of the BID for the proposed standards. The impacts of the promulgated action are summarized and compared to the impacts of the proposed regulation in this subsection. The differences between the impacts of the promulgated standards and the proposed standards are due to the changes in emissions limits for grid casting and lead reclamation. The change in the paste mixing facility definition and other changes are not expected to have significant impacts on lead emissions. The following discussion in conjuction with the environmental impact analysis in Volume I of the BID, represents the final Environmental Impact Statement for the promulgated standards.

1.2.2.1 Air pollution impacts

The lead emission impact of the promulgated standards is compared with the impact of the proposed standards in Table 1-3 for the 500, 2000 and 6500 bpd (5.9, 23.6 and 76.7 Mg/day or 6.5, 26.0, and 84.5 tons/day of lead)

TABLE 1-3a. ESTIMATED IMPACTS OF PROPOSED AND PROMULGATED STANDARDS ON ATMOSPHERIC EMISSIONS (metric units)

	Uncontrolled lead emissions (kg/yr)	Baseline emissions[a] (kg/yr)	Allowable lead emissions (kg/yr)	
			Proposed standards	Promulgated standards
500 BPD Plant	1562.8	952.2	66.1	70.0
Lead oxide production facility	--[b]	--[b]	--[b]	--[b]
Grid casting facility	51.0	51.0	0.4	3.2
Paste mixing facility	634.9	63.5	8.1	8.1
Three-process operation facility	833.3	833.3	56.6	56.6
Lead reclamation facility	43.6	4.4	1.0	2.1
2000 BPD Plant	6277.5	3835.0	215.9	230.2
Lead oxide production facility	26.5	26.5	13.3	13.3
Grid casting facility	204.0	204.0	1.4	10.9
Paste mixing facility	2539.5	254.0	21.5	21.5
Three-process operation facility	3333.0	3333.0	175.9	175.9
Lead reclamation facility	174.5	17.5	3.8	8.6
6500 BPD Plant	20401.9	12463.4	661.6	709.1
Lead oxide production facility	86.1	86.1	43.1	43.1
Grid casting facility	663.0	663.0	4.6	36.6
Paste mixing facility	8253.4	825.3	55.4	55.4
Three-process operation facility	10832.3	10832.3	546.1	546.1
Lead reclamation facility	567.1	56.7	12.4	27.9

[a]No additional regulatory action.

[b]It is assumed that plants in the 500 bpd size range have no lead oxide manufacturing facilities.

TABLE 1-3b. ESTIMATED IMPACTS OF PROPOSED AND PROMULGATED STANDARDS ON ATMOSPHERIC EMISSIONS (English units)

	Uncontrolled lead emissions (lb/yr)	Baseline emissions[a] (lb/yr)	Allowable lead emissions (lb/yr)	
			Proposed standards	Promulgated standards
500 BPD Plant	3445.3	2099.1	145.8	154.4
Lead oxide production facility	--[b]	--[b]	--[b]	--[b]
Grid casting facility	112.4	112.4	0.9	7.1
Paste mixing facility	1399.7	140.0	17.9	17.9
Three-process operation facility	1837.1	1837.1	124.8	124.8
Lead reclamation facility	96.1	9.6	2.2	4.6
2000 BPD Plant	13839.2	8454.4	476.0	507.5
Lead oxide production facility	58.4	58.4	29.3	29.3
Grid casting facility	449.7	449.7	3.1	24.0
Paste mixing facility	5598.5	559.9	47.4	47.4
Three-process operation facility	7347.9	7347.9	187.8	187.8
Lead reclamation facility	384.7	38.5	8.4	19.0
6500 BPD Plant	44977.6	20476.6	1458.4	1563.2
Lead oxide production facility	189.8	189.8	95.0	95.0
Grid casting facility	1461.6	1461.6	10.1	80.7
Paste mixing facility	18195.3	1819.5	122.1	122.1
Three-process operation facility	23880.7	23880.7	1203.9	1203.9
Lead reclamation facility	1250.2	125.0	27.3	61.5

[a]No additional regulatory action.

[b]It is assumed that plants in the 500 bpd size range have no lead oxide manufacturing facilities.

model plant sizes. As shown in this table, the changes in the standards for grid casting and lead reclamation will have only a slight impact on the emission reduction attributable to the NSPS. The promulgated standards are expected to reduce total lead air emissions from facilities coming on-line during the next five years to about 3.1 Mg (3.4 tons) in the fifth year, while the proposed standards were expected to reduce emissions from these facilities to 2.8 Mg/yr (3.1 tons/yr). Both of these figures represent a decrease in lead emissions of about 97 percent from the lead emissions which would be allowed under current State Implementation Plan (SIP) limits for particulate matter.

Table 1-4 compares the estimated ambient air lead concentration impact of the promulgated action with that of the proposed standards. As shown in the table, the changes in the standards for grid casting and lead reclamation are not expected to have a significant impact on ambient lead concentrations in the vicinities of battery plants. The results of dispersion modelling calculations indicate that the maximum annual ambient impact of lead emissions from a 6500 bpd plant complying with the promulgated regulation would be less than the national ambient air quality standard of 1.5 $\mu g/m^3$ (averaged over a calender quarter).

1.2.2.2 Water pollution impact

The estimated wastewater impact of the promulgated action is compared with that of the proposed standards in Table 1-5. As noted in Section 1.2.1 of this chapter, the water pollution impact analysis for the proposed standards has been revised based on the estimated effluents for venturi scrubbers which would meet the proposed standards for grid casting and lead reclamation.

The promulgated action is expected to result in an increase in the lead content of wastewater of about 0.6 percent, for a typical lead-acid battery plant. It is anticipated that, in early 1981, EPA's Office of Water and Waste Management will propose a regulation which would require zero lead wastewater discharge from grid casting and lead reclamation. Zero discharge from scrubbers controlling these facilities could be accomplished by clarifying and recycling the scrubber effluent. The cost of this treatment is estimated

TABLE 1-4. COMPARISON OF AMBIENT LEAD CONCENTRATION IMPACTS OF PROPOSED AND PROMULGATED REGULATIONS

	Lead emissions (g/sec)	Maximum ambient lead concentration impacts (μg/m³)		
		Hour average	24-hour average	Annual average
500 BPD Plant				
Baseline[a]	0.13	34	19	4
Proposed standards	0.0022	1	<1	<1
Promulgated standards	0.0024	1	<1	<1
6500 BPD Plant				
Baseline[a]	0.58	88	41	8
Proposed standards	0.011	2	1	<1
Promulgated standards	0.013	2	1	<1

[a]No additional regulatory action.

TABLE 1-5a. COMPARISON OF WATER POLLUTION IMPACTS OF PROMULGATED AND PROPOSED STANDARDS

(Metric units)

	Total scrubber blowdown		Increase above baseline		Increase in total plant effluent[a]	
	Volume (kl/day)	Lead content (kg/yr)	Volume (kl/day)	Lead content (kg/yr)	Volume (percent)	Lead content (percent)
Baseline[b]						
500 bpd plant	0.5	3.9				
2000 bpd plant	2.0	15.7				
6500 bpd plant	7.0	51.4				
Proposed standards -- (original estimate)[c]						
500 bpd plant	0	0	0	0	0	0
2000 bpd plant	0	0	0	0	0	0
6500 bpd plant	0	0	0	0	0	0
Proposed standards -- (revised estimate)[d]						
500 bpd plant	14.6	9.4	14.1	5.5	11.2	0.7
2000 bpd plant	50.8	37.5	48.8	21.8	9.7	0.7
6500 bpd plant	170.0	121.8	163.0	70.4	10.0	0.7
Promulgated standards						
500 bpd plant	2.0	8.9	1.5	5.0	1.3	0.6
2000 bpd plant	7.8	35.5	5.8	19.8	1.3	0.6
6500 bpd plant	27.4	115.2	20.4	63.8	1.3	0.6

[a]Based on a total process effluent of about 250 liters per battery, containing about 25 ppm lead by weight.

[b]Emission control technology required to meet typical SIP particulate emissions

[c]Based on fabric filter control of all affected facilities.

[d]Based on venturi scrubber control of grid casting and lead reclamation facilities.

TABLE 1-5b. COMPARISON OF WATER POLLUTION IMPACTS OF PROMULGATED AND PROPOSED STANDARDS

(English units)

	Total scrubber blowdown		Increase above baseline		Increase in total plant effluent[a]	
	Volume (10^3 gal/day)	Lead content (lb/yr)	Volume (10^3 gal/day)	Lead content (lb/yr)	Volume (percent)	Lead content (percent)
Baseline[b]						
500 bpd plant	0.07	9				
2000 bpd plant	0.27	35				
6500 bpd plant	0.93	112				
Proposed standards (original estimate)[c]						
500 bpd plant	0	0	0	0	0	0
2000 bpd plant	0	0	0	0	0	0
6500 bpd plant	0	0	0	0	0	0
Proposed standards (revised estimate)[d]						
500 bpd plant	1.93	21	1.86	12	11.2	0.7
2000 bpd plant	6.73	82	6.46	47	9.7	0.7
6500 bpd plant	22.53	269	21.40	157	10.0	0.7
Promulgated standards						
500 bpd plant	0.26	19	6.19	10	1.3	0.6
2000 bpd plant	1.04	75	0.77	40	1.3	0.6
6500 bpd plant	3.63	243	2.70	131	1.3	0.6

[a]Based on a total process effluent of about 250 liters per battery, containing about 25 ppm lead by weight.

[b]Emission control technology required to meet typical SIP particulate emissions.

[c]Based on fabric filter control of all affected facilities.

[d]Based on venturi scrubber control of grid casting and lead reclamation facilities.

to be less than one percent of the costs which would be allocable to the recommended NSPS for a completely modified or reconstructed 2000 battery per day plant.[1]

1.2.3 Energy and Economic Impacts of Promulgated Action

1.2.3.1 Energy impacts

The energy impacts of the proposed regulation and the regulatory alternatives considered for lead-acid battery manufacture are estimated in Chapter 7 of Volume I of the BID. The estimated impacts of the proposed standards were based on the application of fabric filters to all affected facilities. As noted in Section 1.2.1 of this Chapter, the energy impacts for the proposed regulation have been recalculated based on application of high energy venturi scrubbers rather than fabric filters to grid casting and lead reclamation exhausts. The major portion of the energy required to operate an air emission control system for a lead-acid battery manufacturing facility is electrical energy required to operate the fan which overcomes the pressure drop through the system. Based on particle size data and scrubber efficiency data, it is estimated that high energy venturi scrubbers with pressure drops of about 7.5 kPa (30 in. W.G.) would be needed to meet the emissions limitations for grid casting and lead reclamation in the proposed regulation (Chapter 2, Section 2.2).

In contrast, the promulgated emission standards for grid casting and lead reclamation are based on levels demonstrated to be achievable by impingement scrubbing with a scrubber pressure drop of about 1.25 kPa (5 in. W.G.). Also, the emissions limitations for paste mixing, three-process operation, and other lead emitting facilities in both the proposed and promulgated standards are based on the application of fabric filters with pressure drops of about 1.25 kPa (5 in. W.G.).

The incremental electricity requirements attributable to the promulgated regulation (Alternative III) and the proposed regulation (Alternative I) are compared in Table 1-6. For the proposed regulation, both the original and revised estimates of the electrical energy requirement are presented.

TABLE 1-6. ELECTRICITY REQUIREMENTS FOR PROPOSED AND PROMULGATED STANDARDS

Plant size	Electricity requirements attributable to NSPS (MWh/yr)		
	Proposed regulation		Promulgated regulation
	Original estimate[a]	Revised estimate[b]	
500 BPD	28	51	28
2000 BPD	80	154	80
6500 BPD	252	500	252

[a]Based on fabric filter control of all affected facilities.

[b]Based on venturi scrubber control of grid casting and lead reclamation facilities.

In addition to these electricity requirements, heat energy is expected to be required to raise exhaust gases from paste mixing above their dewpoint and thus prevent baghouse blinding due to excess moisture (Chapter 2, Section 2.2). This requirement would be the same for the promulgated and proposed actions. Total energy requirements for the proposed and promulgated regulations are compared with plant energy requirements in Table 1-7. For the proposed action, the original and revised estimates of total energy requirements are presented. Process energy demands are based on reported total process energy requirements for various plant sizes (Volume I, Chapter 7). Exhaust energy requirements represent requirements for venting facilities to prevent employee exposure. Baseline control energy requirements represent energy needs for controlling emissions to the degree required under a typical SIP particulate regulation. All electrical energy requirements in Table 1-7 are expressed in terms of the amount of heat which would be required to generate the needed electricity (assuming an average power plant efficiency of 34 percent).

The energy required at a new plant to operate emission control devices installed to meet the promulgated regulation will be about 2.7 percent of the total plant energy requirement. The total nationwide increase in electrical energy demand attributable to the promulgated action will be about 2.8 GWh of electricity in the fifth year after promulgation. The fifth year nationwide energy demand increase resulting from action will be approximately 50 PJ/hr (48×10^9 BTU/yr), or the equivalent of about 8.1 thousand barrels of oil per year.

1.2.3.2 Economic impact

The economic impacts of the proposed regulation and the regulatory alternatives are discussed in Chapter 8 of Volume I of the BID. As noted above, the proposed regulation corresponded to Alternative I. The estimated economic impact for the proposed action was based on the application of fabric filters to all affected facilities. However, it has been determined that the proposed emission limits for grid casting and lead reclamation cannot be based on fabric filtration and that high energy (7.5 kPa or 30 in. W.G. pressure drop) venturi scrubbers would be required to achieve

TABLE 1-7. TOTAL ENERGY REQUIREMENTS FOR PROPOSED AND PROMULGATED STANDARDS

(Metric units)

Plant size	Manufacturing process requirements (TJ/yr)	Process and plant exhaust requirements (TJ/yr)	Baseline[a] control requirements (TJ/yr)	NSPS control requirements[b] (TJ/yr)		
				Proposal--original estimate[c]	Proposal--revised estimate[d,e]	Promulgated regulation[e]
500 BPD	35	0.26	0.14	0.25	0.80	0.56
2000 BPD	55	0.80	0.34	0.84	2.34	1.54
6500 BPD	116	2.43	0.82	2.64	7.09	4.46

(English units)

Plant size	Manufacturing process requirements (10^9 BTU/yr)	Process and plant exhaust requirements (10^9 BTU/yr)	Baseline[a] control requirements (10^9 BTU/yr)	NSPS control requirements[b] (10^9 BTU/yr)		
				Proposal--original estimate[c]	Proposal--revised estimate[d,e]	Promulgated regulation[e]
500 BPD	33	0.25	0.13	0.24	0.76	0.53
2000 BPD	52	0.76	0.32	0.80	2.22	1.46
6500 BPD	110	2.30	0.78	2.50	6.72	4.23

[a]Control techniques required to meet typical SIP particulate regulations.

[b]In excess of energy requirements for baseline controls.

[c]Based on fabric filter control of all affected facilities.

[d]Based on venturi scrubber control of grid casting and lead reclamation facilities.

[e]Includes heat energy requirements for paste mixing exhausts.

these limits. Therefore, the economic impacts for the proposed action have been recalculated based on the costs of venturi scrubbers for the grid casting and lead reclamation facilities.

The costs of compliance with the promulgated regulation for new and existing plants are compared with the revised costs for the proposed standards in Table 1-8. For the proposed regulation, the original and revised estimates of economic impacts are presented. The predicted annualized costs of the promulgated action range from 8 percent lower, for existing 6500 bpd plants, to 28 percent lower, for new 500 bpd plants, than the annualized costs which would have resulted for the proposed standards. Also, the projected capital costs for plants complying with the promulgated standards are much lower (18 to 40 percent) than those which would have resulted from the proposed standards.

The cost per battery at a plant where all facilities are affected by the promulgation is expected to range from 23 cents per battery, for a new 6500 bpd plant, to 54 cents per battery, for a completely reconstructed or modified 500 bpd plant. The average incremental cost associated with the promulgated regulation will be about 29 cents per battery, which amounts to about 1.6 percent of the wholesale price of a battery. The total nationwide capital cost of the installed emission control equipment necessary to meet the promulgated regulation for all new, modified, or reconstructed facilities coming on-line over the next five years will be about $8.2 million. The total annualized cost of operating this equipment in the fifth year after promulgation will be about $3.9 million.

1.2.4 Other Environmental Concerns

1.2.4.1 Irreversible and irretrievable commitment of resources

The extent to which the proposed standards for lead-acid battery manufacture would have involved a tradeoff between lead air pollution reduction and energy losses is discussed in Section 7.6.1 of Chapter 7 of the BID for the proposed standards. There are no significant changes to the impacts discussed in this section.

TABLE 1-8. ECONOMIC IMPACTS OF PROPOSED AND PROMULGATED STANDARDS[a]

	Costs allocable to NSPS for proposed action--original estimate[b]			Costs allocable to NSPS for proposed action--revised estimate[c]			Costs allocable to NSPS for promulgated action		
	Capital cost ($1000)	Annualized cost ($1000/yr)	Cost per battery ($)[d]	Capital cost ($1000)	Annualized cost ($1000/yr)	Cost per battery ($)[d]	Capital cost ($1000)	Annualized cost ($1000/yr)	Cost per battery ($)[d]
New Plants									
500 bpd	125	47.5	0.48	200	66.8	0.67	120	47.6	0.48
2000 bpd	211	108	0.27	278	129	0.32	200	107	0.26
6500 bpd	453	284	0.22	517	323	0.25	423	277	0.21
Existing Plants									
500 bpd	150	53.6	0.54	235	69.7	0.69	144	53.4	0.54
2000 bpd	253	118	0.30	329	133	0.33	240	117	0.29
6500 bpd	544	305	0.23	615	327	0.25	508	297	0.23

[a]1977 dollars.

[b]Based on fabric filter control of all affected facilities.

[c]Based on venturi scrubber control of grid casting and lead reclamation facilities.

[d]Based on production at 80 percent of capacity.

1.2.4.2 Environmental impact of delayed standards

The impacts of a delay in setting new source performance standards for lead-acid battery manufacture are discussed in Section 7.6.2 of Chapter 7 of Volume I. There has been no significant change to this impact.

1.2.4.3 Environmental impact of no standard

The environmental impacts of not setting new source performance standards for lead-acid battery manufacture are discussed in Chapter 7, Section 7.6.3 of Volume I of the BID. These impacts have not changed significantly since proposal.

1.3 REFERENCES FOR CHAPTER 1

1. Memo from Battye, W., GCA/Technology Division to Vatavuk, W., EPA Economic Analysis Branch. October 13, 1980. Revised control costs for grid casting and lead reclamation facilities. (Docket No. IV-B-11)

2. SUMMARY OF PUBLIC COMMENTS

A list of commenters, their affiliations, and the EPA docket number assigned to each comment is shown in Table 2-1. Twenty-one letters commenting on the proposed standards and the Background Information Document for the proposed standards were received. The comments have been combined into the following nine categories:

1. General
2. Emission Control Technology
3. Modification and Reconstruction
4. Economic Impact
5. Environmental Impact
6. Legal Considerations
7. Test Methods and Monitoring
8. Reporting and Recordkeeping
9. Miscellaneous

The comments and issues are discussed, and responses are presented in the following sections of this chapter. A summary of the changes to the regulation is presented in Section 1.2 of Chapter 1.

2.1 GENERAL

Comment: The proposed standards exempted facilities at any plant with a production capacity of less than 500 bpd. Some commenters felt that the number of batteries which can be produced at a plant was not the appropriate criterion on which to base the size cutoff. It was pointed out that lead-acid batteries are produced in a variety of sizes, and that emissions from battery production are probably related more to the amount of lead used to produce batteries than to the number of batteries produced.

Response: These are considered to be reasonable comments. Economic impacts of standards as well as emissions are expected to be related to the amount of lead used in a particular battery production operation rather than

TABLE 2-1. LIST OF COMMENTERS ON THE PROPOSED STANDARDS OF PERFORMANCE FOR LEAD-ACID BATTERY MANUFACTURE

Docket number[a]	Commenter and affiliation
IV-D-1	Mr. James H. Hazelwood Georgia Marble Company 2575 Cumberland Parkway, Northwest Atlanta, Georgia 30339
IV-D-2	Mr. James K. Hambright, Director Department of Environmental Resources Bureau of Air Quality P.O. Box 2063 Harrisburg, Pennsylvania 17120
IV-D-3	Mr. Thomas Hatterscheide Gould, Incorporated P.O. Box 43140 St. Paul, Minnesota 55164
IV-D-4	Mr. Richard A. Leiby Assistant Safety Director East Penn Manufacturing Company, Inc. Main Office Lyon Station, Pennsylvania 19536
IV-D-5	Mr. John A. Bitler Vice President, Environmental Resources General Battery Corporation Box 1262 Reading, Pennsylvania 19603
IV-D-6	Mr. William V. Skidmore Acting Deputy General Counsel U.S. Department of Commerce Washington, D.C. 20230
IV-D-7	Mr. Edwin H. Seeger Prather, Seeger, Doolittle and Farmer 1101 Sixteenth Street, Northwest Washington, D.C. 20036
IV-D-8	Mr. W. R. Johnson Environmental Activities Staff General Motors Corporation General Motors Technical Center Warren, Michigan 48090

[a]The identification code for the lead-acid battery manufacture docket is OAQPS-79-1.

Table 2-1. (continued)

Docket number[a]	Commenter and affiliation
IV-D-9	Mr. Robert L. Grunwell, President The Hydrate Battery Corporation 3220 Odd Fellows Road Lynchburg, Virginia 24506
IV-D-10	Mr. Richard A. Valentinetti Chief, Air and Solid Waste Programs Agency of Environmental Conservation State Office Building Montpelier, Vermont 05602
IV-D-11	Mr. Sudhir Jagirdar, P.E. Senior Sanitary Engineer State of New York Department of Environmental Conservation 202 Mamaroneck Avenue White Plains, New York 10601
IV-D-12	Mr. Harry H. Hovey, Jr. Director, Division of Air State of New York Department of Environmental Conservation 50 Wolf Road Albany, New York 12233
IV-D-13	Mr. Jack Boys Prestolite Battery Division 511 Hamilton Street Toledo, Ohio 43694
IV-D-14	Mr. James F. McAvoy, Director Environmental Protection Agency State of Ohio Box 1049 Columbus, Ohio 43216
IV-D-15	Mr. Charles C. Miller Director, Air and Land Quality Division Iowa Department of Environmental Quality 900 East Grand Avenue Des Moines, Iowa 50310
IV-D-16	Mr. W. M. Pallies Manager, Health and Safety Exide Corporation P.O. Box 336 Yardley, Pennslyvania 19067

Table 2-1. (continued)

Docket number[a]	Commenter and affiliation
IV-D-17	Mr. J. M. Beaudoin, Manager Health, Safety, and Environmental Control Globe-Union Incorporated 5757 North Green Bay Avenue Milwaukee, Wisconsin 53201
IV-D-18	Mr. John M. Daniel State Air Pollution Control Board Room 1106 Ninth Street Office Building Richmond, Virginia 23219
IV-D-19	Mr. Roger Winslow, President Voltmaster Company, Incorporated P.O. Box 388 Corydon, Iowa 50060
IV-D-20	Mr. Ray Donnelly, Director Office of Legislation and Interagency Programs U.S. Department of Labor Occupation Safety and Health Administration Washington, D.C. 20210
IV-D-25	Mr. Carl C. Mattia Manager, Environmental Activities The PQ Corporation P.O. Box 840 Valley Forge, Pennsylvania 19482

[a]The identification code for the lead-acid battery manufacuture docket is OAQPS-79-1.

to the number of batteries produced. At the time of proposal, it was estimated that odd-size lead-acid batteries represent a very small share of the lead-acid battery market; however the comments received on the proposed standards indicate that a significant number of odd-sized batteries are produced. Industrial batteries, which can be as much as 50 times larger than automobile batteries, are estimated to represent about 7 percent of total U.S. lead-acid battery production.[1]

The small size cutoff for the promulgated regulation is expressed in terms of lead throughput. The promulgated standards will affect new, modified, and reconstructed facilities at any plant with the capacity to produce in one day batteries which would contain, in total, an amount of lead greater than or equal to 5.9 Mg (6.5 tons). This cutoff is equivalent to the 500 bpd cutoff for plants producing typical automobile batteries. The level is based on an average battery lead content of 11.8 kg (26 lb) of lead per battery.

<u>Comment</u>: One commenter questioned whether plant capacity is to be determined based on the maximum demonstrated production rate or the estimated maximum production rate, for the purposes of the small size cutoff.

<u>Response</u>: For the purposes of the small size cutoff, the parameter to be used to determine the production capacity of a plant is the design capacity. The design capacity is the maximum production capability of the plant and can be determined using the design specifications of the plant's component facilities, taking into account process bottlenecks. The design capacity of a plant can be confirmed by checking production records. The figure cited as a plant's production capacity should not be less than the maximum production rate in the plant's records.

<u>Comment</u>: Several commenters felt that the 500 bpd cutoff should be raised to 2000 bpd. This contention was based on the fact that Federal regulations which set minimum standards for State implementation plans (SIPs) for the lead NAAQS do not require ambient air quality monitoring or atmospheric dispersion analyses for plants smaller than 2000 bpd (40 CFR 51.80(a)(1) and 51.84(a)). The commenters considered these cutoffs to be indicative of decision by EPA that battery plants smaller than 2000 bpd are not material contributors to lead air pollution.

Response: It should be noted that the Federal regulations to which the commenters referred only set minimum standards for a lead SIP. Also, as discussed in Section 2.6 of this chapter, the regulatory approach for NAAQS regulations promulgated under Section 109 of the Clean Air Act differs from that for standards of performance promulgated under Section 111 of the Act. The small size cutoff for the standards of performance for lead-acid battery manufacture is based on a thorough analysis of the economic impacts of these standards. The analysis indicated that the economic impact of standards on plants smaller than about 250 bpd could be severe, but showed that the economic impact would be reasonable for plants with capacities greater than or equal to 500 bpd. None of the commenters submitted information indicating that the economic impact of standards might be severe for plants in the 500 to 2000 bpd size range. Therefore, although the small size cutoff is now expressed in terms of lead throughput rather than battery production, the level of the cutoff remains at the lead throughput capacity which corresponds to a production capacity of 500 bpd.

Comment: One commenter stated that the choice of a size cutoff of 500 bpd appears to be arbitrary.

Response: As noted above, the size cutoff of 500 bpd (5.9 Mg/day or 6.5 tons/day of lead) is based on a thorough economic impact analysis of the new source performance standards.

Comment: One commenter stated that, as the regulation is written, the standards of performance would not apply to facilities at plants producing only lead-acid battery components, such as grids.

Response: Standards of performance for lead-acid battery manufacture have been developed as a result of determination made by the Administrator that lead-acid battery manufacturing plants contribute significantly to air pollution, which may reasonably be anticipated to endanger public health or welfare. No such determination has been made for plants producing only certain battery components. In fact, it is not expected that such plants will be constructed, because of the high cost of transporting lead components from plant to plant. EPA will review this regulation four years after the date of promulgation. If battery component plants become prevalent, consideration will be given at that time to applying this regulation to such plants.

Comment: Another commenter felt that the stack gas concentration standards for grid casting, paste mixing, three-process operation, lead reclamation, and other lead-emitting facilities do not allow for differences in the quantity of emissions between small plants and large plants. This commenter recommended that the emissions limits for these facilities be expressed in terms of allowable lead emissions per lead throughput, rather than in terms of exhaust gas lead concentration.

Response: The airflow rate from a particular type of facility increases with the production capacity of the facility. Because the standards for grid casting, paste mixing, three-process operation, lead reclamation, and other lead-emitting facilities limit lead concentration in airstreams, the allowable lead emissions from these facilities increase as the airflow rates increase. Thus, the exhaust gas concentration standards mentioned by the commenter allow for emissions differences between large and small plants.

Comment: Several commenters contended that the 0 percent opacity standard is impractical. These commenters were concerned that emissions from facilities which emit fine particles would exceed 0 percent opacity. Also, some were concerned that emissions from facilities controlled by fabric filters would exceed 0 percent opacity during fabric filter cleaning. However, one commenter stated that the 0 percent opacity standard appears to be achievable for all affected facilities.

Response: The 0 percent opacity standard for lead oxide manufacturing, grid casting, paste mixing, three-process operation and "other lead emitting" facilities is considered reasonable. Lead oxide manufacturing, grid casting, paste mixing, and three-process operation facilities were observed by EPA to have emissions with 0 percent opacity for periods of 3 hours and 19 minutes; 7 hours and 16 minutes, 1 hour and 30 minutes, and 3 hours and 51 minutes, respectively. For grid casting, the observations were made at a facility controlled by an impingement scrubber. For lead oxide production and three-process operation facilities, the observation periods included fabric filter cleaning phases. Also, under the promulgated standards, compliance with the opacity standard is to be determined by taking the average opacity over a 6-minute period, according to EPA Test Method 9, and rounding the average to the nearest whole percentage. The rounding procedure is specified in order to allow occasional brief emissions with opacities greater than 0 percent, which may occur during fabric filter cleaning.

A standard of 0 percent opacity was also proposed for lead reclamation facilities. Emissions with opacities greater than 0 percent were observed from the lead reclamation facility tested by EPA, which was controlled by an impingement scrubber. However, because the proposed emission limit for lead reclamation was based on transfer of fabric filtration technology, the 0 percent opacity standard was considered reasonable. As noted in Section 2.2 of this chapter, the final emission limit for lead reclamation is based on the demonstrated emission reduction capabilities of the impingement scrubber system tested by EPA. Therefore, the opacity standard for lead reclamation has also been changed. The final opacity standard is 5 percent, based on observations at the facility tested by EPA. Emissions from this facility were observed for 3 hours and 22 minutes, and, during this period, emissions ranging from 5 to 20 percent opacity were observed for a total of about 11 minutes. The highest 6-minute average opacity during the 3 hour and 22 minute observation period was 4.8 percent. Therefore, the 5 percent opacity standard for lead reclamation is considered reasonable.

Under the general provisions applicable to all new source performance standards (40 CFR 60.11), an operator of an affected facility may request the Administrator to determine the opacity of emissions from the affected facility during the initial performance test. If the Administrator finds that an affected facility is in compliance with the applicable standards for which performance tests are conducted, but fails to meet an applicable opacity standard, the operator of the facility may petition the Administrator to make an appropriate adjustment to the opacity standard for the facility.

Comment: Some commenters stated that EPA should established a relationship between opacity and emissions before setting opacity standards.

Response: Opacity limits are being promulgated in addition to mass emission limits because the Administrator believes that opacity limits provide the only effective and practical method for determining whether emission control equipment, necessary for a source to meet the mass emission limits, is continuously maintained and operated properly. It has not been the Administrator's position that a single, constantly invariant and precise correlation between opacity and mass emissions must be identified for each source under all conditions of operation. Such a correlation is unnecessary to the opacity standard, because the opacity standard is set at a level such that if the opacity standard is exceeded for a particular facility, one would expect that the applicable emission limitation will also be exceeded. Furthermore, as noted above, a mechanism is provided in the general provisions whereby the operator of a facility can request that a separate opacity standard be set for that facility if, during the initial performance test, the Administrator finds that the facility is in compliance with all applicable performance standards but fails to meet an applicable opacity standard.

Comment: Some commenters felt that additional testing should be conducted before standards are promulgated. Several felt that the Administrator should conduct tests of emissions from Barton lead oxide manufacturing process, rather than base a standard for this process on tests of a ball mill lead oxide process. This comment is discussed in Section 2.2 of this chapter. One commenter contended that the EPA data base is narrow, and that tests should be conducted to determine the variability of the efficiency of emission control systems.

Response: The Administrator has determined that the data base developed by EPA provides adequate support for the promulgated new source performance standards. Standards promulgated under Section 111(b) of the Clean Air Act are intended to require the best demonstrated control technology, considering cost, nonair quality health and environmental impact, and energy impacts. Thus, the promulgated standards are based on tests of facilities which have been determined by EPA to be well controlled and typical of facilities used in the industry. As noted by some commenters, EPA has not tested emissions from facilities producing maintenance-free or low-maintenance batteries or Barton lead oxide production facilities. Differences between such facilities and the facilities tested by EPA are discussed in detail below and in Section 2.1 of this chapter. These differences are not expected to have a significant effect on the controlled lead concentrations achievable using the emission control techniques tested by EPA. Commenters did not refer to nor is EPA aware of any other specific process variations which might influence emissions. In order to allow for variations which may occur between emission concentrations from a particular type of facility, the promulgated lead emissions limits are set above the levels shown to be achievable in EPA tests.

Comment: Some commenters stated that changes have occurred in the lead-acid battery manufacturing industry, which may influence emissions, since the EPA tests were conducted. The changes cited by the commenters were the production of maintenance-free and low-maintenance batteries, and the increasing of volumes of air ventilated from facilities in order to meet more stringent OSHA standards regulating in-plant lead levels.

The commenters briefly described the difference between maintenance-free or low-maintenance batteries and normal-maintenance batteries. The only substantial difference is that a calcium-lead alloy is used to make low-maintenance and maintenance-free batteries, while standard batteries are made using an antimonial lead alloy. This difference influences the grid casting and lead reclamation facilities, where molten lead is processed. The major change is in the makeup of the dross which must be removed from molten lead in these facilities. For grid casting, the calcium alloy also requires the use of soot as a mold release agent. For the antimonial lead alloy used in standard batteries, either soot or sodium silicate can be used.

The commenters stated that exhaust volumes for lead-acid battery facilities have been increased a a result of the revised OSHA standards. One commenter contended that this change will increase the concentration of uncontrolled emissions.

Response: The different makeup of dross in grid casting and lead reclamation facilities producing maintenance-free and low maintenance batteries is not expected by EPA to cause noticeable differences in lead emissions between these facilities and facilities producing standard lead-acid batteries.

The commenters did not give reasons why this difference might be expected to affect emissions. Dross consists of contaminants in the molten lead alloy which float to the surface and must periodically be removed. The presence of a dross layer has an impact on emissions, in that the dross layer serves to reduce fuming from the molten lead. However, this will occur regardless of the composition of the dross layer. Also, because the dross layer is made up chiefly of contaminants from the lead, the entrainment of dross particles in air exhausted from grid casting or lead reclamation facilities will not significantly affect lead emissions. Thus, the effect of the dross layer composition on emissions is expected to be much less than the effects of process operation parameters, such as the frequency of dross removal and the temperature of the molten lead alloy.

The use of soot rather than sodium silicate as a mold release agent in grid casting will not affect uncontrolled lead emissions from this facility. However, the presence of entrained soot in uncontrolled grid casting emissions may require the use of scrubbers rather than fabric filters to control these emissions. This problem is discussed in detail in Section 2.2 of this chapter.

It is acknowledged that the exhaust volumes at the facilities tested by EPA may not have been sufficient for the attainment of the 50 $\mu g/m^3$ OHSA in-plant lead concentration standard. At the time of the tests conducted by EPA the OSHA standard was 200 $\mu g/m^3$. However, higher exhaust volumes would cause a decrease in the concentration of uncontrolled emissions rather than an increase. Also, the additional lead particles captured as a result of the higher exhaust volumes will consist mainly of large particles which are readily captured by control systems.

Comment: One commenter stated that there is a trend in the lead-acid battery manufacturing industry to the use of finer lead oxide in battery pastes in order to increase battery efficiency. The commenter also contended that this particle size change will influence the collection efficiency attainable with fabric filters.

Response: Lead emissions from lead-acid battery manufacture are generated by two mechanisms. Lead oxide fumes are produced in welding, casting, and reclaiming operations, and to a certain extent in lead oxide production. Agglomerates of lead and lead oxide particles are emitted from operations involving the handling of lead oxide, lead oxide paste, and lead grids. The particles which are most difficult to capture are the fume particles. The emission rate and characteristics of these fume particles are not dependent on the size of the lead oxide particles used in battery pastes, but on the temperature of the lead during the operations from which they are emitted. For these reasons, trends in the industry to the use of smaller lead oxide particles are not expected to change the particle size distributions of emissions in such a way that collector performance will be affected.

2.2 EMISSION CONTROL TECHNOLOGY

Comment: Several commenters thought that the proposed standards would have required the use of fabric filtration to control emissions.

Response: The proposed standards would not have required that specific control technology be used for any affected facility, nor will the promulgated standards require specific control techniques. Rather, the standards set emission limits which have been demonstrated to be achievable by the use of the best control systems considering costs, energy impacts and nonair quality environmental impact. The standards do not preclude the use of alternative control techniques, as long as the emission limits are achieved.

Comment: The selection of fabric filtration as the best system of emission reduction for grid casting and lead reclamation facilities was criticized by a number of commenters. These facilities are normally uncontrolled or controlled by impingement scrubbers. The commenters pointed out that only one grid casting facility in the United States is controlled by a fabric filtration system and that this system has been plagued by fires. They explained that the surfaces of exhaust ducts for grid casting and lead reclamation operations become coated with hydrocarbons and other flammable materials. For grid casting, these include bits of cork from the molds, oils used for lubrication, and soot, which is often used as a mold release agent. For lead reclamation, hydrocarbons from plastic and other contaminants charged with lead scrap become entrained in exhaust gases and deposit on the walls of exhaust ducts. These materials are readily ignited by sparks which, the commenters contended, are unavoidable. The commenters stated that fires started in the exhaust ducts will generally propagate to the control system. One commenter indicated that problems caused by such fires are not generally severe for scrubbers, but fires would cause serious damage and emissions excursions if fabric filters were used. The commenters stated that spark arresters would not solve the fire problem, because they too would become coated with flammable materials which would be ignited by sparks.

Apart from the problem of fires, commenters contended that contaminants present in the exhaust gases from grid casting and lead reclamation would cause frequent bag blinding if fabric filters were applied to these facilities. In addition to the materials listed above, sodium silicate, which is often used as a mold release agent for grid casting, was cited by the commenters as an extremely hygroscopic compound which would cause bag blinding.

Commenters also felt that the EPA particle size and emissions test data did not support the contention made by EPA that a fabric filter could achieve 99 percent emission reduction for emissions from grid casting and lead reclamation.

Response: Based on the information available when standards for lead-acid battery manufacture were proposed, EPA had concluded that fabric filtration could be used to control emissions from grid casting and lead reclamation, and that 99 percent collection efficiency could be attained. The problem of bag blinding could be avoided by keeping the exhaust gases from these facilities at temperatures above their dewpoints. Also, it was thought that exhaust duct fires could be prevented by the use of spark arresters. Therefore, the proposed standards for grid casting and lead reclamation were based on tests of uncontrolled emissions from these facilities, and on fabric filter efficiencies demonstrated for the three-process operations for facility and for industries with emissions of similar character to those from lead-acid battery manufacture. In light of the point made by commenters that spark arresters would not prevent fires, EPA has concluded that the standards for grid casting and lead reclamation facilities should not be based on fabric filters.

The proposed emission limitations for grid casting and lead reclamation could probably be achieved using a high energy scrubber such as a venturi; however, because of the particle size of emissions from these facilities, a scrubber pressure drop of about 7.5 kPa (30 in. W.G.) would be required.[2-5] The energy requirement to overcome this pressure drop is not considered reasonable for these facilities. The emission limits for paste mixing, three-process operation, and other lead-emitting facilities are based on the application of fabric filters with average pressure drops of about 1.25 kPa (5 in. W.G.). Thus, the electricity requirement per unit volume of exhaust gas to operate venturi scrubbers for the grid casting and lead reclamation facilities would be roughly six times the electricity requirement per unit volume to control other plant exhausts.

The Administrator has determined that, for the lead-acid battery manufacturing industry, impingement scrubbers operating at a pressure drop of about 1.25 kPa (5 in. W.G.) represent the best system of emission reduction considering costs, nonair quality health and environmental impact and energy requirements for grid casting and lead reclamation. Therefore, in the promulgated standards, the emission limitations for grid casting and lead reclamation have been raised to levels which have been shown to be achievable in tests of scrubbers controlling these facilities. This change represents a change from the regulatory alternative chosen from the proposed standards. The environmental, economic, and energy impacts of the alternative which has been chosen for the promulgated standards are discussed in Chapter 8 of Volumes I. It is estimated that standards based on the application of impingement scrubbers to grid casting and lead reclamation facilities will result in a 50 percent decrease in NSPS electricity requirements from standards requiring venturi scrubbers for these facilities, while having only a slight impact on the emission reduction attributable to the NSPS. (Chapter 1, Tables 1-3, 1-4, and 1-6).

EPA measured lead emissions from two grid casting facilities (Volume I, Chapter 4 and Appendix C). One of these facilities was uncontrolled, and the other was controlled by an impingement scrubber. The average lead concentration in the exhaust from the uncontrolled facility was 4.37 mg/dscm

(19.1×10^{-4} gr/dscf). Average uncontrolled and controlled lead emissions from the scrubber controlled facility were 2.65 mg/dscm (11.6×10^{-4} gr/dscf) and 0.32 mg/dscm (1.4×10^{-4} gr/dscf), respectively. The promulgated standard for grid casting, 0.4 mg/dscm (1.76×10^{-4} gr/dscf), is based on the controlled lead emission rate for this facility. The facility is considered typical of grid casting facilities used in the lead-acid battery manufacturing industry. EPA is not aware of any process variations which would result in a significant increase in the emission concentration achievable using a scrubber control system. However, in order to allow for variations in grid casting emissions, the promulgated lead emission limit has been set above the level shown to be achievable in the EPA test.

Grid casting test results were also submitted by two commenters. Data submitted by one commenter for a grid casting facility show average uncontrolled lead emissions of about 2 mg/dscm (9×10^{-4} gr/dscf).[6] The test method used to collect these data is similar to Method 12. Data submitted by the other commenter showed average uncontrolled lead emissions of about 1.1 mg/dscm (4.7×10^{-4} gr/dscf); however, the test method used to gather these data is not known.[7]

Lead reclamation emissions were measured by EPA for a facility controlled by an impingement scrubber (Volume I, Chapter 4 and Appendix C). Average lead concentrations in the inlet and outlet streams from the scrubber were 227 mg/dscm (990×10^{-4} gr/dscf) and 3.7 mg/dscm (16×10^{-4} gr/dscf). The standard for lead reclamation, 4.5 mg/dscm (19.8×10^{-4} gr/dscf), is based on the controlled emission rate measured for this facility. This facility is considered typical of lead reclamation facilities used in the lead-acid battery manufacturing industry. EPA is not aware of any process variations which would result in a significant increase in the emission concentration achievable using a scrubber control system. In order to allow for variation in lead reclamation emissions, the promulgated lead emission standard has been set above the emission level shown to be achievable in the EPA test.

<u>Comment</u>: Several commenters criticized the choice of fabric filtration as the best system of emission reduction for the entire paste mixing cycle. The paste mixing operation is a batch operation consisting of two phases:

charging and mixing. The paste mixing facility is generally controlled by impingement scrubbing, although fabric filtration is often used to control exhaust from the charging phase. The commenters felt that if fabric filtration were to be used for the entire cycle, the moisture present in the exhaust during the mixing phase would cause bag blinding. Therefore, they requested that the emission limit for paste mixing be raised to a level achievable using impingement scrubbers.

Response: If fabric filters are used to meet the emission limit, bag blinding can be prevented by keeping paste mixer exhausts at temperatures above their dew points. The energy which would be required to heat the exhaust gases and the costs for providing insulation for ducts and fabric filters applied to paste mixing facilities were taken into consideration in the energy and economic analyses for the new source performance standards. These costs and energy requirements are considered reasonable. In addition, data submitted by one commenter show that the standard for paste mixing is achievable using scrubbers. Tests were conducted of emissions from two scrubber controlled paste mixing facilities, using methods similar to Method 12. These tests indicated average controlled lead emissions of 0.04 mg/dscm (0.19×10^{-4} gr/dscf) and 0.07 mg/dscm (0.30×10^{-4} gr/dscf) for the two facilities.[8,9] Both of these average concentrations are well below the 1 mg/dscm (4.4×10^{-4} gr/dscf) standard for paste mixing.

Comment: Some commenters contended that EPA test data did not adequately support the statement that 99 percent collection efficiency could be achieved for paste mixing emissions. The commenters felt that the standard for paste mixing should be relaxed.

Response: The standard for paste mixing is considered achievable. Emissions from a paste mixing facility controlled by an impingement scrubber were tested by EPA. The average uncontrolled lead concentration from this facility was 77.4 mg/dscm (338×10^{-4} gr/dscf). Thus, the promulgated regulation is expected to require about 98.7 percent control of lead emissions from paste mixing. EPA tests of a fabric filtration system controlling a three-process operation showed an average lead collection efficiency of 99.3 percent. This fabric filtration system underwent bag cleaning during testing. Also, EPA tests and statements made by several commenters indicate that the particle size distribution for paste mixing emissions is similar to that for three-process operation emissions. Emissions from paste mixing are made up of lead oxide agglomerates, while emissions from three-process operation facilities are made up mainly of agglomerates with some fumes and some other large particles. The above data clearly show that efficiencies greater than 98.7 percent can be achieved for paste mixing emissions.

In addition, EPA tests of a controlled paste mixing facility indicate that the 1 mg/dscm standard for paste mixing is achievable. EPA conducted tests at a plant where paste mixing emissions were controlled by two separate systems. At this plant, paste mixing required a total of 21 to 24 minutes per batch. During the first 14 to 16 minutes of a cycle (the charging phase), exhaust from the paste mixer was ducted to a fabric filter which also controlled emissions from the grid slitting (separating) operation. During the remainder of the cycle (mixing), paste mixer exhaust was ducted to an impingement scrubber which also controlled emissions from the grid casting operation. Uncontrolled or controlled emissions for the paste mixer alone were not tested. The average concentration of lead in emissions from the fabric filtration system used to control charging emissions was 1.3 mg/dscm (5.5×10^{-4} gr/dscf). The average lead content of exhaust from the scrubber used to control mixing emissions was 0.25 mg/dscm (1.1×10^{-4} gr/dscf). The average lead concentration in controlled emissions from this facility was about 0.95 mg/dscm (4.2×10^{-4} gr/dscf) which is slightly below the emission limit of 1 mg/dscm (4.4×10^{-4} gr/dscf). A lower average emission concentration could be achieved by using fabric filtration to control emissions from all phases of paste mixing.

Also, as noted above, one commenter submitted data showing that the standard for paste mixing is achievable using impingement scrubbing to control emissions from the entire cycle.

Comment: Several commenters criticized the fact that the standard for lead oxide production is based on tests conducted at a ball mill lead oxide production facility, but will apply to Barton lead oxide production facilities as well as ball mill facilities. Some commenters stated that the particle size of lead oxide to be collected depends on the type of oxide produced. One commenter stated that Barton facilities are more commonly used to produce lead oxide than ball mill facilities.

Response: However, in both the ball mill process and the Barton process, all of the lead oxide product must be removed from an air stream. In the ball mill process, lead pigs or balls are tumbled in a mill, and the frictional heat generated by the tumbling action causes the formation of lead oxide. The lead oxide is removed from the mill by an air stream. In the Barton process, molten lead is atomized to form small droplets in an air stream. These droplets are then oxidized by the air round them.

EPA tests on a Barton process indicated that Barton and ball mill processes have similar air flow rates per unit production rate (Appendix C of the BID, Volume I). Because these air streams carry all of the lead oxide produced, the concentrations of lead oxide in the two streams must also be similar.

Data submitted by one commenter indicate that the percentage of fine particles in lead oxide produced by the Barton process is similar to the percentage of fine particles in lead oxide produced by the ball mill.[10] These data were obtained by placing samples of captured ball mill and Barton oxides in a Coulter particle counter. The size distributions measured by this technique are representative of the size of the product oxide, rather than the airborne oxide entering the collector. However, the similarity of the percentages of small particles for ball mill and Barton oxides suggest a similarity in the percentages of small particles in the feed streams to the collectors for these two processes.

The similarities between the concentrations and particle size distributions of the oxide bearing air streams in the Barton and ball mill processes support EPA's contention that a similar level of emission control could be achieved for a Barton process as has been demonstrated for the ball mill process. Also, no test data were submitted by the commenters to show that the standard for lead oxide production cannot be achieved by a well controlled Barton process. It should be noted that, to allow for variations in lead oxide manufacturing emissions, the promulgated standard has been set above the emission rate shown to be achievable in the EPA ball mill facility test.

Comment: Several commenters felt that the standard for lead oxide production was too stringent. These commenters stated that engineering calculations using typical fabric filter and cyclone efficiencies indicate that the standard for lead oxide production would not be met by a facility controlled by a cyclone and a fabric filter in series.

Response: The emission limit for lead oxide production of 5 milligrams of lead per kilogram of lead processed is considered reasonable. The limit is based on results of tests of emissions from a ball mill lead oxide production facility with a fabric filter control system. The test showed an average controlled emission rate of 4.2 mg/Kg (8.4 lb/ton) for this facility. The emission limit for lead oxide production of 5 milligrams of lead per kilogram of lead processed is considered reasonable. The limit is based on results of tests of emissions from a ball mill lead oxide production facility with a fabric filter control system. The test showed an average controlled emission rate of 4.2 mg/kg (8.4 lb/ton) for this facility. In estimating the emission reduction which could be achieved for a lead oxide production facility, the commenters used typical fabric filter and cyclone efficiencies. It should be noted that uncontrolled dust streams from lead oxide production are extremely concentrated. At such concentrations, fabric filter and cyclone reduction capabilities are higher than under typical conditions.

Comment: Several commenters stated that the emission limit for the three-process operation was not supported by the BID for the proposed standards. However, one commenter stated that the emission limit appears achievable.

Response: The limit for the three-process operation is based on the results of EPA tests conducted at four plants where fabric filtration was used to control three-process operation emissions. Each of the sets of tests conducted by EPA showed average controlled lead concentrations below the proposed limit. The standard for the three-process operation has been set well above the average emission concentration detected in all of the EPA tests. Therefore, the lead emission limit for the three-process operation facility is considered reasonable.

2.3 MODIFICATION AND RECONSTRUCTION

Comment: One commenter questioned whether the standards would apply to modified or recontructed facilities at a plant where production capacity is increased from below the small size cutoff to above the cutoff as a result of the modification or reconstruction.

Response: Circumstances under which an "existing facility" may become an affected facility (a facility which must be in compliance with applicable standards) are described in the modification and reconstruction provisions for new source performance standards (40 CFR 60.14, 60.15). For the purposes of these provisions, an existing facility is defined as "any apparatus of a type for which a standard is promulgated (§60.2(aa))." A lead-emitting operation at a lead-acid battery plant which is smaller than the size cutoff (5.9 Mg/day or 6.5 tons/day of lead throughput) is of a type for which a standard is promulgated and is, therefore, an existing facility. Upon undergoing "modification" or "reconstruction" (defined in §60.14 and §60.15), such a facility would be considered as an affected facility if, during its modification or reconstruction, the production capacity of the plant containing the facility is increased above the small size cutoff.

2.4 ECONOMIC IMPACT

Comment: One commenter contended that new source performance standards would impose a substantial and burdensome cost of the lead-acid battery manufacturing industry. Another stated that battery sales have fallen by 25 percent in recent years.

Response: The economic impacts of new source performance standards on the lead-acid battery manufacturing industry are analyzed and described in detail in Volumes I and II of the BID. These impacts are summarized in Chapter 1. The projected economic impacts are considered reasonable. The expected annualized cost of compliance with the promulgated standards at a typical affected plant is expected to be only about 1.6 percent of the wholesale price of a battery; and the economic impact analysis indicates that this cost could be passed on with little effect on sales.

The market for lead-acid batteries is tied to the automobile market for both original equipment and replacement batteries. The 25 percent drop in sales cited by the second commenter results from the recent decline in the demand for domestic automobiles. This decline is not expected to continue and the sales of the domestic automobile industry are expected to increase in the near future.

Comment: Several commenters contended that the cost of compliance with OSHA standards was not adequately addressed in Volume I of the BID. The commenters also felt that the OSHA standards would require higher ventilation rates than are currently needed, and would thus cause the costs of compliance with new source performance standards to be higher than the estimates made by EPA.

Response: The OSHA compliance costs presented in Volume I are based on the capital and operating control costs which were expected to be required to meet the employee exposure standards of 200 $\mu g/m^3$ originally proposed by OSHA in 1975. The controls include employee care, general plant maintenance, and local ventilation of in-plant lead emission sources. On November 14, 1978, OSHA promulgated an employee exposure standard of 50 $\mu g/m^3$. However, the controls necessary to comply with this standard are expected to be similar to those which would have been necessary for the originally proposed 200 $\mu g/m^3$ standard.[11,12] In addition, the economic impact projected for the OSHA standards in Volume I may be higher than the actual economic impact, because, in a number of cases, work practices can be used to achieve the OSHA standard in place of technological controls.

In Volume I of the BID, the statement is made that a change in the OSHA standards could cause the control costs for the new source performance standards to increase substantially. However, the facility exhaust rates used to estimate the costs of achieving the NSPS were set at levels which would provide good ventilation for the facilities under consideration. The exhaust rates were chosen to achieve a face velocity of 250-300 ft/min for hoods, and 300-350 ft/min for slot-type vents.[13,14] One industry representative stated that face velocities have been increased from 150-200 ft/min to 350-500 ft/min in order to reduce lead levels in the working zone to below $50 \mu g/m^3$.[15] Thus, although the ventilation rates used in the industry to comply with the current OSHA standards may be much higher than those which have been used in the past, they are not much higher than the ventilation rates used to calculate the economic impacts of the promulgated new source performance standards. Thus, it is not expected that the change in the OSHA standards would have a significant impact on the results of the economic impact analysis for the NSPS.

Comment: One commenter stated that the new source performance standards would indirectly require the installation of stacks which would meet the criteria specified by EPA Reference Method 1 for sampling and gas velocity measurements. The commenter stated that the impacts of this requirement were not addressed.

Response: The costs of stacks which meet EPA Method 1 criteria are not considered attributable to new source performance standards. Under SIP regulations, most States require an initial performance test for any new source. Therefore, in the absence of the promulgated standards, most new facilities would nonetheless be required to have stacks.

2.5 ENVIRONMENTAL IMPACT

Comment: A number of commenters stated that lead-acid battery manufacture accounts for a small percentage of total nationwide lead emissions and contended, for this reason, that new source performance standards for lead-acid battery manufacture should not be set. One commenter cited data which indicate that lead emissions from lead-acid battery manufacture accounted for only about 0.32 percent of industrial lead emissions or about 0.014 percent of total nationwide lead emissions in 1975.

Response: It is acknowledged that lead-acid battery plants account for a relatively small share of total nationwide atmospheric lead emissions. In 1975, about 95 percent of U.S. lead emissions resulted from the production of alkyl lead gasoline additive, the burning of leaded gasoline, and the disposal of crankcase oil from vehicles which burn leaded gasoline. These emissions will be reduced substantially as the use of alkyl lead gasoline additives is curtailed. Another 1 percent of nationwide lead emissions is from mining and smelting operations, which are generally located in remote areas. Because lead-acid battery plants are generally located in urban areas -- near the markets for their batteries -- lead emissions from lead-acid battery manufacture may reasonably be anticipated to endanger public health or welfare. Therefore, the Administrator considers the development of new source performance standards for lead-acid battery manufacture to be justified.

Comment: Several commenters recommended that the grid casting facility be removed from the list of affected facilities. According to EPA estimates, grid casting accounts for about 3.2 percent of overall uncontrolled battery plant lead emissions. The commenters stated that it is unreasonable to require sources to control facilities generating such a small percentage of total plant emissions.

Response: Although grid casting is small source of emissions relative to other facilities, it is not an insignificant source. Lead emissions from this facility are controlled at a number of existing plants. Also, if other facilities at a plant were controlled to the extent required under the new source performance standards, but grid casting facilities were left uncontrolled, emissions from grid casting would amount to about 50 percent of the total plant lead emissions. Therefore, the standard for grid casting is considered environmentally beneficial. Also, the costs and energy requirements of controls for this facility have been included in the energy and economic impact analyses of the new source performance standards and are considered reasonable.

2.6 LEGAL CONSIDERATIONS

Comment: One comment which involved legal considerations was that, if fabric filtration is considered the best available control technology for a facility, then an equipment standard requiring fabric filtration should be set for that facility rather than a performance standard. The commenter pointed out that, under Section 111(h) of the Clean Air Act, the Administrator is empowered to promulgate a design, equipment, work practice, or operational standards, or combination thereof.

Response: Section 111(h) states that an equipment standard may be promulgated only if the Administrator determines that it is not feasible to prescribe or enforce a standard of performance. Thus, because performance standards are feasible for the lead-acid battery manufacture source category, the Administrator has no reason to promulgate equipment standards for this source category.

Comment: Another comment which involved legal considerations was that, because a National Ambient Air Quality Standard for lead has been established, new source performance standards regulating lead emissions would be redundant and unnecssary.

Response: It should be noted that the purposes of standards of performance for new sources promulgated under Section 111 of the Clean Air Act differ from the purposes of national ambient air quality standards, which are promulgated under Section 109 of the Act. National ambient air quality standards are established to protect the public health or welfare. Under Section 109 of the Clean Air Act, national ambient air quality standards are to be set at levels such that the attainment and maintenance of the standards are requisite to protect the public health or welfare.

New source performance standards promulgated under Section 111 of the Clean Air Act are not designed to achieve any specific air quality levels, but are instead established to enhance air quality. Under Section 111, such standards are to reflect the degree of emission limitation achievable through application of the best demonstrated technological system of emission reduction considering cost, any nonair quality health and environmental impact, and energy requirements.

Congress expressed several reasons for requiring the setting of new source performance standards reflecting the degree of emission reduction achievable through application of the best demonstrated control technology.[13] First, national standards are needed to avoid situations where some States may attract industries by relaxing standards relative to other States. Second, because the national ambient air quality standards create air quality ceilings which are not to be exceeded, stringent standards for new sources enhance the potential for long term growth. Third, stringent standards may help achieve long-term cost savings by avoiding the need for expensive retrofitting when pollution ceilings may be reduced in the future. Fourth, the standard-setting process should create incentives for improved technology.

2.7 TEST METHODS AND MONITORING

2.7.1. Reference Method 12

Comment: A number of commenters felt that Reference Method 12 was cumbersome and recommended the development of a simpler screening method. The commenters stated that a battery plant may have as many as two dozen stacks and that, at an average cost of $6000 per stack test, the cost of testing an entire plant could be extremely high.

Response: Because controlled emission levels are expected to be near the emission limits for facilities affected by the regulation, a screening method less accurate than Method 12 would not be suitable for determining compliance with the lead-acid battery manufacture regulation. Also, the per plant costs of conducting performance tests using Method 12 are not expected to be as high as the commenters expected. Although existing plants often have a large number of stacks, it is expected that, for newly constructed, modified, or reconstructed plants or facilities, emissions will be ducted to a small number of stacks. In addition, the estimate of $6000 per stack for a compliance test applies only for plants where one or two stacks are to be tested. For plants with a large number of stacks, the cost per stack should decrease considerably.

Comment: One commenter recommended that the minimum sampling time for Method 12 be extended. Others stated that the minimum sampling time for grid casting in the proposed regulation was too long.

Response: For tests with Method 12, the minimum amount of lead needed for good sample recovery and analysis is 100 μg. The minimum sampling rates and times ensure that enough lead will be collected. For grid casting, the minimum sampling time has been changed from 180 minutes, in the proposed regulation, to 60 minutes, in the promulgated action. The change reflects the alteration in the standard for grid casting.

2.7.2 Reference Method 9

Comment: Two commenters expressed concern that Method 9 is not accurate enough to be used to enforce a standard of 0 percent opacity. One commenter stated that it is difficult to discern the difference between 0 percent opacity and 1 percent opacity for a given reading.

Response: No single reading is made to the nearest percent, rather, readings are to be recorded in increments of 5 percent opacity and averaged over a period of 6 minutes (24 readings). For the regulation for lead-acid battery manufacture, the 6 minute average opacity figure is to be rounded to the nearest whole number. The opacity standard for lead-acid battery manufacture is based on opacity data taken for operating facilities, and these data have shown that this standard can be met (Section 2.1 of this chapter).

2.8 REPORTING AND RECORDKEEPING

Comment: A number of commenters contended that the proposed pressure drop monitoring and recording requirement for control systems would not serve to insure proper operation and maintenance of fabric filters. The commenters pointed out that a leak in a fabric filter would not result in a measurable difference in the pressure drop across the filter. One commenter suggested that the pressure drop monitoring requirement be replaced by an opacity monitoring requirement. Another commenter suggested that the pressure drop requirement be replaced by a requirement of visible inspection of bags for leaks.

Response: Based on the arguments presented by these commenters, it is agreed that proposed pressure monitoring requirement for fabric filters would not serve its intended purpose. Therefore, this requirement has been eliminated. However, pressure drop is considered to be a good indicator of proper operation and maintenance for scrubbers. Therefore, the pressure drop monitoring and recording requirement for scrubbers has been retained.

The pressure drop monitoring requirement for fabric filters has not been replaced by another monitoring requirement. The cost of opacity monitoring equipment may in some cases be comparable to the cost of emission control systems for lead-acid battery manufacturing facilities.[17] This cost is considered unreasonable. Although periodic visual inspection of bags would provide an indication of bag integrity, visual records would not be useful to EPA in the enforcement of the promulgated standards.

Comment: A number of commenters stated that while pressure drop monitoring is useful for scrubbers, continuous recording of pressure drop would be unnecessary and expensive. Some commenters questioned whether a device which cyclically monitors the pressure drop across several emission control systems would be considered a continuous recorder for the systems. These commenters also asked how often such a recorder would have to monitor the pressure drop across a particular control device to be considered a continuous recorder for that device. One commenter suggested the substitution of periodic manual recording of pressure drop for the continuous pressure drop recording requirement. Another commenter questioned the purpose of requiring pressure drop monitoring and recording without a requirement that action be taken at certain pressure drop levels.

Response: The purpose of pressure drop recording requirements is to allow the verification by EPA regional enforcement personnel that emission control systems are properly operated and maintained. The costs of pressure drop recording devices were analyzed and are considered reasonable.[17] The point of what sort of device would satisfy the recording requirement has been clarified in the promulgated standards. It has been determined that for the purposes of this regulation a device which records pressure drop at least every 15 minutes would accomplish the same purposes as a continuous pressure drop recorder. Manual pressure drop recording would not ensure proper operation and maintenance of a control system.

2.9 MISCELLANEOUS

Comment: A number of commenters recommended that the definition of the paste mixing facility be expanded to include operations ancillary to paste mixing, such as lead oxide storage, conveying, weighing, and metering operations;

paste handling and cooling operations; and plate pasting, takeoff, cooling, and drying operations. The commenters stated that paste mixing and operations ancillary to the paste mixing operation are generally interdependent, in that one operation is not run without the others. Also, emissions from paste mixing and ancillary operations are often ducted to the same control device. The commenters were concerned that a minor change made to a paste mixing machine could cause the machine to be affected by the promulgated standards under the reconstruction provisions applicable to all new source performance standards. They stated that the recommended change would avoid this possibility.

Response: These comments are considered reasonable. The operations ancillary to paste mixing were not intended to be considered separate facilities, and the definition recommended by the commenters for the paste mixing facility is considered an appropriate definition. Therefore, this recommendation has been adopted in the promulgated regulation. Because the standard which was proposed for paste mixing is identical to that which was proposed for operations ancillary to paste mixing (other lead-emitting operations), this change will not affect the environmental impacts of the standards.

Comment: One commenter recommended that the operations comprising the three-process operation facility be treated separately. The commenter stated that emissions concentrations may differ for the three operations.

Response: In the development of the new source performance standards, it was found that the operations which make up the "three-process operation" are generally ducted to a common control device.

Comment: One commenter stated that the standards for lead-acid battery manufacture should also cover battery reclaiming operations.

Response: New, modified, and reconstructed lead battery reclaiming operations are covered by new source performance standards for secondary lead smelters, which were promulgated March 8, 1974, and regulate particulate emissions. Because most lead emissions from secondary lead smelters are in the form of particulate matter, the particulate standards serve to regulate lead emissions as well. The possibility of revising the standards to regulate sulfur oxide emissions is currently being studied by EPA.

Comment: Another commenter recommended that precautions be taken to prevent fugitive emissions resulting from the handling of material collected by fabric filters. The commenter cited as an example a plant at which the fabric filter catch is conveyed to storage containers using flexible canvas ducts. These allow the reentrainment into the atmosphere of dust collected by the fabric filter.

Response: Lead emissions from the handling of captured particulate matter are not expected to be significant in comparison with process emissions. Also, the means of handling captured particulate matter would vary from plant to plant. Thus, the Administrator did not consider the development of national standards for such emissions to be justified.

Comment: A revised version of the CRSTER dispersion model was used to assess the ambient air impact of standards of performance for lead-acid battery manufacture. One commenter stated that the CRSTER model, as documented by its users manual (EPA-480/2-77-013), does not address a number of important factors, including aerodynamic building and stack tip downwash, transitional plume rise, spatial separation of emission points, and the fact that most battery plant exhaust gases are discharged at ambient or near ambient temperatures. The commenter also stated that EPA new source review guidelines provide for the use of meteorological data for five years; while for the model lead-acid battery plants, the model was run using data for only one year.

Response: The revised CRSTER model used in the development of the new source performance standards was not fully described in Volume I of the BID. In fact, all of the factors mentioned by the commenter are addressed in the revised model which is described in the docket for the proposed standards (see docket item no. II-B-24). Since the modeling was performed for a hypothetical plant, there was no requirement to use multiple years of meteorological data. As was pointed out, direct extrapolation of the results to an actual plant should not be attempted. If an actual plant were to be modeled, multiple years of meteorological data would be required.

Comment: In the preamble to the proposed standards, the public was specifically invited to submit comments with supporting data on acid mist control. Only one comment was received regarding the acid mist issue. The commenter did not refer specifically to acid mist emissions from lead-acid battery manufacturing, but made the general statement that EPA should devote more attention to all sulfuric acid emissions and effluents.

Response: Since no evidence was submitted which indicated that sulfuric acid mist emissions from lead-acid battery manufacture may reasonably be anticipated to contribute significantly to air pollution, there is no basis for regulation of sulfuric acid mist emissions from this industry at this time.

2.10 REFERENCES FOR CHAPTER 2

1. Economic Impact Statement--Inorganic Lead. Prepared by D.B. Associates for the Occupational Safety and Health Administration. Washington, D.C. February 1977. p. 5-42.

2. Letter and attachments from Hatterscheide, T.E., Gould, Inc. to Central Docket Section, EPA. March 6, 1980. p. 15. Public comment. (Docket No. IV-D-3)

3. Letter and attachments from Beaudoin, J.M., Globe-Union, Inc. to Central Docket Section, EPA. March 13, 1980. Figure 2. Public comment. (Docket No. IV-D-17)

4. Lead-Acid Battery Manufacture -- Background Information for Proposed Standards. U.S. Environmental Protection Agency. EPA-450/3-79-028a. November 1979.

5. Memo from Battye, W., GCA/Technology Division to Fitzsimons, J.G., EPA. April 18, 1980. 7p. Pressure drop requirements to achieve 99 percent control of grid casting and lead reclamation emissions. (Docket No. IV-B-6)

6. Letter and attachments from St. Louis, R., Pennsylvania Department of Environmental Resources. June 9, 1976. 27p. Report of Emissions Testing. (Docket No. IV-D-27)

7. Reference 2. pp. 7,8.

8. Letter and attachments from Hambright, J.K. Pennsylvania Department of Environmental Resources to central Docket Section, EPA. March 6, 1980. Enclosure 5. Public comment. (Docket No. IV-D-2)

9. Report of Emission Testing Performed December 10, 1975 on Entoleter Scrubber, Prestolite Battery Division, Eltra Corp. Temple, Pennsylvania. Spotts, Stevens, and McCoy, Inc. January 15, 1976. 24p. (Docket No. IV-D-27)

10. Reference 2. pp. 13, 14.

11. Occupational Safety and Health Administration, Department of Labor. Occupational Exposure to Lead -- Attachments to the Preamble for the Final Standard. Federal Register. Washington, D.C. 43(225):45585-54488, 54503-54506. November 1978.

12. National Institute for Occupational Safety and Health. The Industrial Environment -- its Evaluation and Control. Washington, D.C. U.S. Government Printing Office, 1973. p. 597-608.

13. Ferris, W. Battery Plant Ventilation Study. Prepared by AB Machine and Equipment Co., inc., Memphis, Tennessee for PEDCo Environmental, Cincinnati, Ohio. October 27, 1980. (Docket No. II-A-1)

References (continued)

14. Telephone conversation between Battye, W., GCA/Technology Division and Ferris, W., Battery Equipment Service Co., Bradenton, Florida. July 3, 1980. (Docket No. IV-E-8)

15. Telephone conversation between Battye, W., GCA/Technology Division and Hatterscheide, T.E., Gould, Inc. April 7, 1980. (Docket No. IV-E-5)

16. Committee on Interstate and Foreign Commerce, House of Representatives. Clean Air Act Amendments of 1977, Report No. 95-294. Washington, D.C. U.S. Government Printing Office, 1977. pp. 184-186.

17. Memo from Battye, W., GCA/Technology Division to Fitzsimons, J.G., EPA. August 15, 1980. Cost of opacity monitors for lead-acid battery manufacturing facilities. (Docket No. IV-D-8)

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15. SUPPLEMENTARY NOTES Volume I discussed the proposed standards and the resulting environmental and economic effects. Volume II contains a summary of public comments, EPA responses and discussion of the differences between the proposed and promulgated standards.

16. ABSTRACT

Standards of performance for the control of emissions from lead-acid battery manufacturing plants are being promulgated under the authority of Section 111 of the Clean Air Act. These standards would apply to new, modified, or reconstructed facilities at any lead-acid battery manufacturing plant with the capacity to produce in one day batteries which would contain in total an amount of lead greater than or equal to 5.9 Mg (6.5 tons). This document contains information on the public comments made after proposal, EPA responses and differences between the proposed and promulgated standards.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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