

Compliance Branches; Chiefs, Collection Section; Chiefs, Technical and Office Compliance Branches and Groups; Group Managers; Revenue Officers; Revenue Representatives and Office Collection Representatives.

(5) District Examination: Chiefs of Division; Chiefs of Examination Sections; Chiefs of Examination Branches; Case Managers; Group Managers; Internal Revenue Agents; Tax Auditors; Attorneys, Estate Tax; Estate Tax Examiners.

(6) District Employee Plans and Exempt Organization: Chief of Division; Chief, Examination Branch; Chief, Technical Staff; Group Managers; Internal Revenue Agents; Tax Law Specialists; and Tax Auditors.

(7) Service Center: Chief, Compliance Division; Chief, Examination Branch; Chief, Collection Branch; Chief, Criminal Investigation Branch; Revenue Agents; Tax Auditors; Tax Examiners in the correspondence examination function; and Special Agents.

(c) District Directors, Service Center Directors, Regional Inspectors, and the Chief of Investigation Branch may redelegate the authority under 4(a) of

this Order to Law Clerks (Estate Tax), aides or trainees, respectively, for the positions of Revenue Agent, Tax Auditor, Tax Examiner in the Service Center Correspondence and Processing function, Tax Law Specialists, Revenue Officer, Internal Auditor, Internal Security Inspector, Investigator (Internal Security), Internal Security Assistant, Attorney (Estate Tax) and Special Agent, provided that each such Law Clerk (Estate Tax), aide or trainee shall exercise said authority only under the direct supervision, respectively, as applicable of a Revenue Agent, Tax Auditor, Tax Examiner in the Service Center Correspondence and Processing function, Tax Law Specialist Revenue Officer, Special Agent, Internal Auditor or Internal Security Inspector or Attorney (Estate Tax).

5. Under the authority granted to the Commissioner of Internal Revenue by 26 CFR 301.7622-1, the officers and employees of the Internal Revenue Service referred to in paragraphs 1(b), 1(c), 1(d), and 4(b) and 4(c) of this Order are designated to administer oaths and affirmations and to certify to such papers as may be necessary under the

internal revenue laws and regulations *except* that the authority to certify shall not be construed as applying to those papers or documents the certification of which is authorized by separate order or directive. Revenue Representatives and Office Collection Representatives referred to in paragraph 4(b)(4) of this Order are not designated to administer oaths or to perform the other functions mentioned in this paragraph, except that Revenue Representatives, GS-5 and above, are authorized to certify the method and manner of service, and the method and manner of giving notice, when performing the functions and duties contained in paragraph 1(f) of this order.

6. The authority delegated herein may not be redelegated except as provided in paragraph 4(c).

7. Delegation Order No. 4 (Rev. 13), effective March 21, 1982, is superseded.

Dated: June 13, 1983.

James I. Owens,
Acting Commissioner.

[FR Doc. 83-19150 Filed 7-14-83; 9:45 am]

BILLING CODE 4830-01-M

Sunshine Act Meetings

Federal Register

Vol. 48, No. 137

Friday, July 15, 1983

This section of the FEDERAL REGISTER contains notices of meetings published under the "Government in the Sunshine Act" (Pub. L. 94-409) 5 U.S.C. 552b(e)(3).

CONTENTS

	Items
Equal Employment Opportunity Commission	1
Federal Communications Commission	2
Federal Trade Commission	3
International Trade Commission	4
Postal Service (Board of Governors)	5

1

EQUAL EMPLOYMENT OPPORTUNITY COMMISSION

DATE AND TIME: Tuesday, July 19, 1983, 9:30 a.m. (eastern time).

PLACE: Commission Conference Room 200, second floor, Columbia Plaza Office Building, 2401 E Street NW., Washington, D.C. 20506.

STATUS: Part will be open to the public and part will be closed to the public.

MATTERS TO BE CONSIDERED:

1. Announcement of Notation Vote(s).
2. A Report on Commission Operations (Optional).
3. Freedom of Information Act Appeal No. 83-04-FOIA-084-MK, concerning a request for documents from an open age discrimination charge file.
4. Freedom of Information Act Appeal No. 83-2-FOIA-17-OK, concerning a request for a copy of a Title VII file.
5. Compliance Manual Section 618, Segregating, Limiting and Classifying Employees.
6. Compliance Manual Section 605, Jurisdiction.
7. Proposed Amicus Curiae Participation Procedures.
8. Management Directive 707A, Instructions for the Annual Accomplishment Reports and Plan Updates of the Affirmative Action Programs for Minorities and Women.
9. Notice of Proposed Rulemaking: Revision of 29 CFR 1613, Enforcement of Commission Decisions.

Closed:

1. Litigation Authorization: General Counsel Recommendations.
2. Proposed Revision of EEOC Order 900—Review and Appeals.
3. Proposed Withdrawal of Commissioners Charges.

Note.—Any matter not discussed or concluded may be carried over to a later meeting. (In addition to publishing notices on

EEOC Commission meetings in the Federal Register, the Commission also provides recorded announcements a full week in advance on future Commission sessions. Please telephone (202) 634-6748 at all times for information on these meetings).

CONTACT PERSON FOR MORE

INFORMATION: Treva McCall, Executive Secretary to the Commission at (202) 634-6748.

This Notice Issued July 13, 1983.

[S-1033-83 Filed 7-13-83; 11:36 am]

BILLING CODE 6750-06-M

2

FEDERAL COMMUNICATIONS COMMISSION

Deletion of Agenda Item From July 14th Open Meeting.

July 12, 1983.

The following item has been deleted at the request of the Office of the Managing Director from the list of agenda items scheduled for consideration at the July 14, 1983 Open Meeting and previously listed in the Commission's Notice of July 7, 1983.

Agenda, Item No., and Subject

General—1—Title: Budget Estimates for FY 1985—Submission to the Office of Management and Budget (OMB). Summary: The Commission will consider the Managing Director's recommendations for the Fiscal Year 1985 Budget Estimates to be presented to the Office of Management and Budget on September 1, 1983.

Issued: July 12, 1983.

William J. Tricarico,

Secretary, Federal Communications Commission.

[S-1036-83 Filed 7-13-83; 3:14 pm]

BILLING CODE 6712-01-M

3

FEDERAL TRADE COMMISSION

TIME AND DATE: 2 p.m., Wednesday, July 20, 1983.

PLACE: Room 432, Federal Trade Commission Building, 6th Street and Pennsylvania Avenue NW., Washington, D.C. 20580.

STATUS: Open.

MATTER TO BE CONSIDERED:

Continuation of prior discussion at the meeting of June 13, 1983.

CONTACT PERSON FOR MORE

INFORMATION: Susan B. Ticknor, Office

of Public Information: (202) 523-1892; Recorded message: (202) 523-3806.

[S-1032-83 Filed 7-13-83; 9:35 am]

BILLING CODE 6750-01-M

4

[USITC SE-B3-31B]

INTERNATIONAL TRADE COMMISSION

"FEDERAL REGISTER" CITATION OF PREVIOUS ANNOUNCEMENT: 48 FR 27884, June 17, 1984.

PREVIOUSLY ANNOUNCED TIME AND DATE OF THE MEETING: 10 a.m., Wednesday, July 13, 1983.

CHANGES IN THE MEETING: Additional item added to the agenda as follows:

3. Reconsideration of the vote in Investigation 701-TA-184 (Final) (Frozen Concentrated Orange Juice from Brazil).

In conformity with 19 CFR 201.37(b), Commissioner Eckes, Stern, and Haggart determined by recorded vote that Commission business requires the change in subject matter by addition of the agenda item, affirmed that no earlier announcement of the addition to the agenda was possible, and directed the issuance of this notice at the earliest practicable time.

CONTACT PERSON FOR MORE

INFORMATION: Kenneth R. Mason, Secretary (202) 523-0161.

[S-1034-83 Filed 7-13-83; 1:04 pm]

BILLING CODE 7020-02-M

5

POSTAL SERVICE

(Board of Governors)

Vote to Close Meeting

At its meeting on July 8, 1983, the Board of Governors of the United States Postal Service unanimously voted to close to public observation its next meeting, scheduled for August 1, 1983, in Minneapolis, Minnesota. Each of the members of the Board voted in favor of closing the meeting, which is expected to be attended by the following persons: Governors Hardesty, Babcock, Camp, Hughes, McKean, Ryan, Sullivan and Voss; Postmaster General Bolger; Deputy Postmaster General Finch; Secretary of the Board Harris; General Counsel Cox; Senior Assistant Postmaster General Morris; and Counsel to the Governors Califano.

The meeting to be closed will consist of a discussion of the Postal Service's possible strategies and positions in anticipated collective bargaining negotiations involving parties to the 1981 National Agreements between the Postal Service and four labor organizations representing certain postal employees, which are scheduled to expire in July of 1984. The discussion is likely to involve information prepared for use in connection with the negotiation of collective bargaining agreements under chapter 12 of title 39, United States Code.

The Board of Governors is of the opinion that public access to any discussion of possible strategies that Postal Service management may decide to adopt, or the positions it may decide to assert, in any collective bargaining sessions that may take place would be likely to frustrate action to carry out those strategies or assert those positions successfully. In making this determination, the Board is aware that the effectiveness of the collective bargaining process in labor-management relations has traditionally depended on the ability of the parties to prepare

strategies and formulate positions without prematurely disclosing them to the opposite party. The public has a particular interest in the integrity of this process as it relates to the Postal Service, since the outcome of the negotiations between the Postal Service and the various postal unions, and consequently the cost, quality and efficiency of postal operations, may be adversely affected if the process is altered.

Accordingly, the Board of Governors has determined that, pursuant to section 552b(c)(3) of title 5, United States Code, and § 7.3(c) of title 39, Code of Federal Regulations, the meeting to be closed is exempt from the open meeting requirement of the Government in the Sunshine Act (5 U.S.C. 552b(b)), because it is likely to disclose information prepared for use in connection with the negotiation of collective bargaining agreements under chapter 12 of title 39, United States Code, which is specifically exempted from disclosure by section 410(c)(3) of title 39, United States Code. The Board has determined further, that pursuant to section 552b(c)(9)(B) of title 5, United States

Code, and section 7.3(i) of title 39, Code of Federal Regulations, the discussion is exempt, because it is likely to disclose information the premature disclosure of which is likely to frustrate significantly proposed Postal Service action. Finally, the Board of Governors has determined that the public has an interest in maintaining the integrity of the collective bargaining process and that the public interest does not require that the Board's discussion of its possible collective bargaining strategies and positions be open to the public.

In accordance with section 552b(f)(1) of title 5, United States Code, and section 7.6(a) of title 39, Code of Federal Regulations, the General Counsel of the United States Postal Service has certified that in his opinion the meeting to be closed may properly be closed to public observation, pursuant to sections 552b(c)(3) and (9)(B) of title 5 and section 410(c)(3) of title 39, United States Code, and section 7.3(c) and 7.3(i) of title 39, Code of Federal Regulations.

David F. Harris,
Secretary.

[S-1005-83 Filed 7-13-83; 3:14 pm]
BILLING CODE 7710-12-M

Federal Register

Friday
July 15, 1983

Part II

Department of Labor

Employment Standards Administration,
Wage and Hour Division

**Minimum Wages for Federal and
Federally Assisted Construction; General
Wage Determination Decisions**

DEPARTMENT OF LABOR

Employment Standards
Administration, Wage and Hour
DivisionMinimum Wages for Federal and
Federally Assisted Construction;
General Wage Determination
Decisions

General wage determination decisions of the Secretary of Labor specify, in accordance with applicable law and on the basis of information available to the Department of Labor from its study of local wage conditions and from other sources, the basic hourly wage rates and fringe benefit payments which are determined to be prevailing for the described classes of laborers and mechanics employed on construction projects of the character and in the localities specified therein.

The determinations in these decisions of such prevailing rates and fringe benefits have been made by authority of the Secretary of Labor pursuant to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Stat. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in 29 CFR 1.1 (including the statutes listed at 36 FR 306 following Secretary of Labor's Order No. 24-70) containing provisions for the payment of wages which are dependent upon determination by the Secretary of Labor under the Davis-Bacon Act; and pursuant to the provisions of part 1 of subtitle A of title 29 of Code of Federal Regulations, Procedure for Predetermination of Wage Rates (37 FR 21138) and of Secretary of Labor's Orders 12-71 and 15-71 (36 FR 8755, 8756). The prevailing rates and fringe benefits determined in these decisions shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged on contract work of the character and in the localities described therein.

Good cause is hereby found for not utilizing notice and public procedure thereon prior to the issuance of these determinations as prescribed in 5 U.S.C. 553 and not providing for delay in effective date as prescribed in that section, because the necessity to issue construction industry wage determination frequently and in large volume causes procedures to be

impractical and contrary to the public interest.

General wage determination decisions are effective from their date of publication in the *Federal Register* without limitation as to time and are to be used in accordance with the provisions of 29 CFR Parts 1 and 5. Accordingly, the applicable decision together with any modifications issued subsequent to its publication date shall be made a part of every contract for performance of the described work within the geographic area indicated as required by an applicable Federal prevailing wage law and 29 CFR, Part 5. The wage rates contained therein shall be the minimum paid under such contract by contractors and subcontractors on the work.

Modifications and Supersedeas
Decisions to General Wage
Determination Decisions

Modifications and supersedeas decisions to general wage determination decisions are based upon information obtained concerning changes in prevailing hourly wage rates and fringe benefit payments since the decisions were issued.

The determinations of prevailing rates and fringe benefits made in the modifications and supersedeas decisions have been made by authority of the Secretary of Labor pursuant to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Stat. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in 29 CFR 1.1 (including the statutes listed at 36 FR 306 following Secretary of Labor's Order No. 24-70) containing provisions for the payment of wages which are dependent upon determination by the Secretary of Labor under the Davis-Bacon Act; and pursuant to the provisions of part 1 of subtitle A of title 29 of Code of Federal Regulations, Procedure for Predetermination of Wage Rates (37 FR 21138) and of Secretary of Labor's orders 13-71 and 15-71 (36 FR 8755, 8756). The prevailing rates and fringe benefits determined in foregoing general wage determination decisions, as hereby modified, and/or superseded shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged in contract work of the character and in the localities described therein.

Modifications and supersedeas decisions are effective from their date of

publication in the *Federal Register* without limitation as to time and are to be used in accordance with the provisions of 29 CFR Parts 1 and 5.

Any person, organization, or governmental agency having an interest in the wages determined as prevailing is encouraged to submit wage rate information for consideration by the Department. Further information and self-explanatory forms for the purpose of submitting this data may be obtained by writing to the U.S. Department of Labor, Employment Standards Administration, Wage and Hour Division, Office of Government Contract Wage Standards, Division of Government Contract Wage Determinations, Washington, D.C. 20210. The cause for not utilizing the rulemaking procedures prescribed in 5 U.S.C. 553 has been set forth in the original General Determination Decision.

Modifications to General Wage
Determination Decisions

The numbers of the decisions being modified and their dates of publication in the *Federal Register* are listed with each State.

District of Columbia: DC82-3031	Nov. 12, 1982
Illinois: IL83-2043	June 3, 1983
Louisiana:	
LA82-4021	May 7, 1982
LA82-4053	Nov. 5, 1982
New Jersey:	
NJ83-3015	June 17, 1983
NJ83-3016	June 17, 1983
New Mexico: NM83-4032	Apr. 15, 1983
New York:	
NY81-3024	Apr. 3, 1981
NY81-3030	May 1, 1981
NY81-3045	July 17, 1981
NY81-3048	July 17, 1981
North Carolina: NC82-1027	Apr. 30, 1982
Texas: TX83-4042	June 3, 1983

Supersedeas Decisions to General Wage
Determination Decisions

The numbers of the decisions being superseded and their dates of publication in the *Federal Register* are listed with each State. Supersedeas decision numbers are in parentheses following the numbers of the decisions being superseded.

Arkansas: AR83-4040 (AR83-4049)	May 13, 1983
Colorado: CO82-5103 (CO83-5113)	Feb. 12, 1982
Iowa: IA82-4048 (IA83-4050)	Oct. 1, 1982
Missouri: MO81-4055 (MO83-4051)	July 10, 1981
New Jersey: NJ80-3017 (NJ83-3024)	Feb. 29, 1980
Wyoming: WY82-5106 (WY83-5114)	Mar. 12, 1982

Signed at Washington, D.C., this 8th day of July 1983.

Dorothy P. Come,
Assistant Administrator, Wage and Hour
Division.

BILLING CODE 4510-27-M

MODIFICATION P. 2

DECISION NO. DC82-3031- MOD. #11 (1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	Basic Hourly Rate	Prime Benefits
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	\$15.67	2.88
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	11.25	.85
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	13.00	2.91
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	16.05	2.91
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	14.61	2.51
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	16.57	2.35
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	17.07	2.35
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	17.575	3.015
DECISION NO. DC82-3031 - MOD. #11 (47 FR 51304 - November 12, 1982) District of Columbia; Mary- land Montgomery & Prince Georges Counties; DC Training School Virginia- Independent City of Alex- andria; Arlington; & Fair- fax Counties CHANGE: ASBESTOS WORKERS BRICKLAYERS APARTMENT BUILDINGS OVER FOUR STORIES LIGHT COMMERCIAL/NEW BUILDINGS & ADDITIONS- LIMITED TO 50,000 SQ. FT. IN FLOOR SPACE & NOT TO EXCEED FOUR STORIES IN HEIGHT ABOVE GROUND; SCHOOLS, CHURCHES, MAKE- HOUSES, CHAIN FOOD STORES; SHOPPING MALLS-EXCLUDING ALL STORES OVER 50,000 SQ. FT. IN FLOOR SPACE ALL OTHER WORK IRONWORKERS; REINFORCING PAINTERS (EXCLUDING FAIR- FAX COUNTY) BRUSH, SPRAY, PAPERHANGERS, TAPERS STEEL, SANDBLASTING, SWING STAGE, POWER BRUSHING BOILERMAKERS LATHERS	14.92	1.55

DECISION NO. 1A82-4021 - MOD. #11 (47 FR 19877 - 5/7/82) Pensacola & Casco Falls,, Louisiana CHANGE: Asbestos workers Ironworkers	Basic Hourly Rate	Prime Benefits
DECISION NO. 1A82-4021 - MOD. #11 (47 FR 19877 - 5/7/82) Pensacola & Casco Falls,, Louisiana CHANGE: Asbestos workers Ironworkers	\$16.71	2.935
DECISION NO. 1A82-4021 - MOD. #11 (47 FR 19877 - 5/7/82) Pensacola & Casco Falls,, Louisiana CHANGE: Asbestos workers Ironworkers	13.60	2.36

DECISION NO. 1A82-4053 - MOD. #16 (47 FR 50421 - 11/5/82) Statewide Louisiana CHANGE: Ironworkers - Zone 3 Plasterers - Zone 4	Basic Hourly Rate	Prime Benefits
DECISION NO. 1A82-4053 - MOD. #16 (47 FR 50421 - 11/5/82) Statewide Louisiana CHANGE: Ironworkers - Zone 3 Plasterers - Zone 4	13.60	2.36
DECISION NO. 1A82-4053 - MOD. #16 (47 FR 50421 - 11/5/82) Statewide Louisiana CHANGE: Ironworkers - Zone 3 Plasterers - Zone 4	15.80	.01

DECISION NO. 1A82-1043 - MOD. #2
(48 FR 15096 - June 3, 1983)
Fulton, Hancock, Henderson,
Knox, McDonough, Mercer,
Pettis, Stark, Tazewell, &
Warren Counties, Illinois

Basic Hourly Rate	Prime Benefits
\$17.29	\$2.35
16.14	2.35
14.43	2.35

On-site
Power Equipment Operators:
Area 1Add:
Power Equipment Operators:
Area 1:
Group 1
Group 2
Group 3

Group 1 - Cranes; Hydro Cranes; Shovels; Crane Type Backfiller;
Tower Cranes - Mobile & Crawler & Stationary; Derricks & Hoists
(3 Drum); Draglines; Drott Turbo & Similar types considered as
Cranes; Backhoe; Derrick Boats; Pile Driver and Skid Rigs; Clam
Shell; Locomotive - Cranes; Road Pavers - Single Drum - Dual Drum -
Tri-Satcher; Motor Patrol & Power Blades - Demore - Elevating &
Similar types; Mechanics; Central Concrete Mixing Plant Operator;
Asphalt Batch Plant Operators and Plant Engineers; Gradall; Caisson
Rigs; Skinner Scoop - Kneeling Scooper; Dredges; Suction; All Cherry
Pickers; Work Boat; Ross Carrier; Helicopter; Doser; Trencher;
Trenchpulls - all and similar types; Multiple Unit Earth Movers;
25¢ per hr. for each scoop over one (1) Scoops; Pushcats; Endloaders;
Asphalt Surfacing Machine; Slip Form Paver; Rock Crusher; Heavy
Equipment Greaser (top greaser on spread); CMI, Auto Grade, CMI Belt
Placer & 3 Track and Similar types; Side Booms; Skidding Engineer
on Pipeline; Asphalt Heater & Planer Combination (used to plane
streets); Wheel Tractors (with dozer, hoe or end-loader attachments),
P.W.D. and Similar types; Blaw Knox Squeezer and Similar types;
Trench Machines; Pumpcrete - Beltcrete - Squeezecrete - Squeezer
type pumps and gypsum (operator will clean); Formless Finishing
Machines; Flaherty Spreader or similar types; Screed Man on Laydown
Machine; Vermeer Concrete Saw; Escalated Rate on Crane and Derrick
Booms: .01¢ per hr., per ft. over 80 ft. including jib, \$1.00 per
hour over scale when crane or derrick boom is positioned 50' or
more adjacent ground level or water level

Group 2 - Bulker & Pump; Power Launches; Boring Machine & Pipe
Jacking Machine; Dinkies; P-H One Pass Soil Cement Machines and
similar types; Wheel Tractors (Industry or farm type - other);
Back Fillers; Excld Loader; Fork Lifts; Jeep w/Ditching Machine
or other attachments; Tubeluger; Automatic Cement & Gravel Batching
Plants; Mobile Drills - Soil Testing and similar types; Pugmill
with Pump; All (1) and (2) Drum Hoists; Dewatering System; Straw
Blower; Hydro-Seeder; Boring Machine; Hydro-Boom; Bump Grinders
(self-propelled); Assistant Heavy Equipment Greaser; Apco Spreaders
Tractors (track-type) without Power Units Pulling Rollers; Rollers
on Asphalt - Brick or Macadam; Concrete Breakers; Concrete Spreaders;
Cement Strippers; Cement Finishing Machines & CMI Texture & Seal
Curing Machines; Vibro-Tampers (all similar types self-propelled);

MODIFICATION P. 4

DECISION NO. H23-2643 (Cont'd)

MODIFICATION P. 3

Power Equipment Operators (Cont'd)

Group 1 (Cont'd)

Mechanical Bull Floats; Mixers-over three (3) bags to 272; Winch and Boom Trucks; Tractor Pulling Power Blade or Elevating Grader; Porter Box Rail; Clary Scream; Mule Pulling Rollers; Pugmill without Pump; Barber Green of similar Loaders; Track Type Tractor w/Power Unit attached; Fireman; Spray Machine on Paving; Curb Machines; Paved Ditch Machine; Power Broom; Self-Propelled Conveyors; Power Sub-Grader; Oil Distributor; Straight Tractor; Track Crane Oiler; Truck Type Oiler; 3-4 Pieces Small Equipment; Oiler and 1 Piece Small Equipment.

Group 3 - Trac Air Machine (without attachments); Herman Nelson Heater, Bravo Warner, Silent Glo & similar types, One Engineer will operate 1-3 and after 3 two Operators required; Self-Propelled Concrete Saws; Rollers - five ton and under on earth and gravel; Form Graders; Pump (1) or (2); Light Plant (1) or (2); Generator (1) or (2); Air Compressor (1) or (2); Conveyor (1) or (2) - Operator will clean Welding Machine (1) or (2); Mixer - 3 bags and under; Bulk Cement Plant; Oiler

DECISION NO. NY81-3024 - W.O. #3 (48 FR 20442 - April 3, 1981)	DECISION NO. NY81-3030 - W.O. #3 (48 FR 24850 - May 1, 1981)
BRONX, KINGS, NEW YORK, QUEENS, RICHMOND COUNTIES, NEW YORK	CATTARAUGUS, CHEAUTAQUA & ERIE COUNTIES, NEW YORK
CHANGE: ELECTRICIANS	CHANGE: PAINTERS
Jobbing, maintenance, repair work; alterations and new work up to a contract price of \$50,000	Erie County (Remainder of County), Chautauque County (townships of Dunkirk, Portland, Poultice, Sheridan, Arkwright, Hamover, & Villanova), & Cattaraugus County (townships of Perryss- burg, Dayton, Persia, Otto, Ashford, York- shire, East Otto & Machias)
DECISION NO. NY81-3048 - W.O. #3 (48 FR 37193 - July 17, 1981)	Base Wallcovering, paper hanging epoxy or similar, spray, sand- blasting, swing and scaffold Taping Bridges 38' in depth or 35' from road level Skeleton Steel, Radio- TV Towers, Flagpoles, Water Towers, Stacks
MASSACHUSETTS & SUFFOLK COUNTIES, NEW YORK	Base Wallcovering, paper hanging epoxy or similar, spray, sand- blasting, swing and scaffold Taping Bridges 38' in depth or 35' from road level Skeleton Steel, Radio- TV Towers, Flagpoles, Water Towers, Stacks
CHANGE: ELECTRICIANS Building	
Wiring of single or multiple family dwellings & apartments up to and including 2 stories	
19.50	15.65
29.24+ b+c	3.94
18.55	15.80
378+ .70	16.15
12.20	17.565
344+ .70	3.94
	16.40
	3.94

MODIFICATION P. 5

DECISION NO. N383-3015 - MOD. #2 (48 FR 27991 - June 17, 1983)		Basic Hourly Rates	Fringe Benefits
Bergen, Essex, Hudson, Hunterdon, Middlesex, Morris, Passaic, Somerset, Sussex, Union, and Warren Counties, New Jersey			
<u>Change:</u>			
Bricklayers, Cement Masons, Plasterers and Stonemasons:			
Zone 2	\$16.99	2.82	
Zone 4:			
Bricklayers and Stonemasons:	16.80	3.55	
Cement Masons and Plasterers:	18.05	2.15	
Zone 6	15.70	2.82	
DECISION NO. N383-3016-Mod. #2 (48 FR 28003 - June 17, 1983)		Basic Hourly Rates	Fringe Benefits
Atlantic, Burlington, Camden, Cumberland, Gloucester, Mercer, Ocean and Salem Counties, New Jersey			
<u>Change:</u>			
Carpenters, Insulators and Millwrights:			
Zone 1	\$17.36	20.54	
Ironworkers, Ornamental and Structural:			
Zone 2	14.93	7.20	

MODIFICATION P. 6

DECISION #NHS3-4632-Mod. #7 (48 FR 18413-April 15, 1983)		Basic Hourly Rates	Fringe Benefits
STATEWIDE, NEW MEXICO			
<u>OMIT:</u>			
PAINTERS CLASSIFICATION DEFINITIONS AND WAGE RATES FOR ZONE III, LOMA OTERO & Dona Ana Counties			
<u>ADD:</u>			
PAINTERS CLASSIFICATION DEFINITIONS AND WAGE RATES FOR ZONE III, LOMA OTERO & DONA ANA COUNTIES as follows:			
CLASS A Brush, roller, tapers and paperhangers	\$8.79	1.19	
CLASS B Steel after erection, power driven, tools and axes tools			
CLASS C Spray, sandblast, swing stage, stripping machine	8.935	1.19	
	9.21	1.19	
DECISION NO. N383-4042 - MOD. #3 (48 FR 25106 - 6/3/83)		Basic Hourly Rates	Fringe Benefits
Collin, Dallas, Denton, Ellis, Grayson, Hood, Hunt, Johnson, Kaufman, Palo Pinto, Rockwall, Tarrant & Wise Cos., Texas			
<u>CHANGE:</u>			
Painters:			
Zone 1 - Group 1	\$15.48	1.80	
Group 2	15.72	1.80	
Group 3	15.695	1.80	
Group 4	15.955	1.80	
Power equipment ops.:			
Zone 2 - Group 1	7.265	2.30	
Group 2	15.17	2.30	
Group 3	15.77	2.30	

PAGE 2

DECISION NO.: AR83-4049

SUPERSEDES DECISION

STATE: Arkansas

COUNTIES: Sebastian, Crawford & Washington

DECISION NO.: AR83-4049

DATE: Date of Publication

DATE: May 13, 1983 in 48 FR 21772

SUPERSEDES DECISION NO. AR83-4040 dated May 13, 1983 in 48 FR 21772

DESCRIPTION OF WORK: Building projects (excluding single family homes and apartments up to and including four stories).

WELDERS: Receive rate prescribed for craft performing operation to which welding is incidental.

SEBASTIAN AND CRAWFORD
COS.

ASBESTOS WORKERS
BOILERMAKERS
BRICKLAYERS-SPONMASON
CARPENTERS:
Carpenters
Millwrights-Piledriver-
men
CEMENT MASONS
ELECTRICIANS:
Electricians
Cable splicers
ELEVATOR CONSTRUCTORS
ELEVATOR CONSTRUCTORS
HELPERS
ELEVATOR CONSTRUCTORS
PROBATIONARY HELPERS
IRONWORKERS
LINE CONSTRUCTION:
Linemen-Operator

Cable splicers

Powderman

Truck Driver

Groundman

PAINTERS:

Roller work, sheetwork,
finishing by machinery
Brush
Spray
Swing stage work
Sandblasting-steam
Cleaning
PLASTERERS
PLUMBERS-STEAMFITTERS
ROOFERS
SHEET METAL WORKERS
SPRINKLER FITTERS

Basic Hourly Rates	Fringe Benefits	Basic Hourly Rates	Fringe Benefits
<u>LABORERS:</u>			
16.00	2.05	Group I	\$8.55
16.60	2.415	Group II	8.80
14.15	.69	Group III	8.95
11.19	1.54	Group IV	9.05
12.65	1.54	Group V	9.20
12.50	.64	Group VI	9.45
14.79	3-1/4%	Group VII	9.35
15.04	+1.35	<u>POWER EQUIPMENT OPERATORS:</u>	
13.19	2.69%	Group I	13.63
70.7R	2.69%	Group II	12.24
50.7R	+1.35	Group III	11.76
14.60	+1.35	Group IV	9.76
14.04	3-1/4%	<u>WASHINGTON COUNTY:</u>	
14.29	+1.35	BRICKLAYERS	9.00
90.7R	+1.35	CARPENTERS	7.92
75.7R	+1.35	CEMENT MASONS	7.67
65.7R	+1.35	ELECTRICIANS	9.51
		GLAZIERS	7.60
		IRONWORKERS	6.87
		<u>LABORERS:</u>	
		Common	5.23
		Mason tenders	5.67
		Plasterers tender	7.45
		PAINTERS	8.00
		PLASTERERS	11.22
		PLUMBERS-PIPEFITTERS	11.46
		ROOFERS	7.50
		SHEET METAL WORKERS	7.51
		TILE SETTERS	10.00
		TRUCK DRIVERS	6.05
		<u>POWER EQUIPMENT OPERATORS:</u>	
		Asphalt finishing	6.15
		Asphalt pavers	6.05
		Asphalt rakers	6.39
		Asphalt Dist. operators	5.82
		Bulldozers	5.95
		Backhoes	6.65
	.64	Cranes	6.87
	1.24	Rollers	6.52
	.30	Motor patrol operator	6.88
	3N +	Foundation drill opera- tor	7.29
	1.93	Scrapers	5.75
	2.83		15%

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5(a) (1)(iii)).

Page 2

DECISION NO. C083-5113

SUPERSTRESS DECISION

STATE: Colorado

COUNTIES: Adams, Arapahoe, Boulder, Clear Creek, Denver, Douglas, Eagle, Elbert, Gilpin, Grand, Jefferson, Lake, Larimer, Morgan, Park, Summit, and Weld

DECISION NUMBER: C083-5113
 Successes Decision No. C082-5103 dated February 12, 1982, in 47 FR 5549
 DESCRIPTION OF WORK: Building Projects (does not include single family homes and apartments up to and including 4 stories)

DATE: Date of Publication

	Basic Hourly Rates	Fringe Benefits
ASBESTOS WORKERS	\$13.27	\$2.98
BOILERMAKERS	14.97	2.575
BRICKLAYERS; Stonemasons:		
Area 1:	14.49	2.01
Area 2:	14.35	2.00
Area 3:	14.05	1.96
Area 4:	14.29	2.00
Area 5:	14.49	2.01
CARPENTERS:		
Area 1:	15.145	3.46
Zone 1:	17.04	3.46
Zone 2:	18.83	3.46
Area 2:	13.105	3.20
Zone 1:	14.74	3.20
Zone 2:	15.38	3.20
Area 3:	13.105	3.20
Zone 1:	14.74	3.20
Zone 2:	15.38	3.20
Area 4:	13.105	3.20
Zone 1:	12.22	3.20
Zone 2:	12.72	3.20
Area 5:	12.97	3.20
Zone 1:	14.87	3.57
Zone 2:	15.37	3.57
Area 6:	15.62	3.57
Zone 1:	15.145	3.36
Zone 2:	17.64	3.36
Area 7:	18.93	3.36
CEMENT MASONS:		
Working with composition materials and color	13.79	2.32
Working on scaffold, swing stage, or temporary platform over 25'	14.29	2.32
	14.04	2.32
CONCRETE WORKERS:		
Area 1:	14.87	3.57
Zone 1:	15.37	3.57
Zone 2:	15.62	3.57
Area 2:	15.145	3.36
Zone 1:	17.64	3.36
Zone 2:	18.93	3.36
DRY WALL FINISHERS:		
Area 1:	12.19	1.88
Zone 1:	12.44	1.88
ELECTRICIANS:		
Area 1:	12.75	1.385
Area 2:	19.10	2.35+
Area 3:	19.35	2.35+
Area 4:	17.85	2.10+
Area 5:	18.10	2.10+
ELEVATOR CONSTRUCTORS:		
Mechanics	17.97	3+2.69
Helpers	12.58	3+2.69
Probationary Helpers	8.985	3+2.69
GLAZIERS:		
Area 1:	13.60	3+1.52
IRONWORKERS:		
Structural, Ornamental, and Reinforcing	14.35	2.71
LATHERS:		
Area 1:	13.44	.01
MASONRY SETTERS:		
Area 1:	13.31	1.55
Area 2:	15.53	2.79
MILLWRIGHTS:		
Area 1:	14.66	2.39
PAINTERS:		
Area 1:	12.19	1.88
Zone 1:	12.44	1.88
ROOFERS:		
Area 1:	12.79	1.88
Area 2:	14.11	1.88
SHEET METAL WORKERS:		
Area 1:	12.90	3.60
Area 2:	15.15	3.65
Area 3:	17.27	3.13
SHEET METAL WORKERS:		
Area 1:	13.32	1.43
Area 2:	18.03	3.36+
SOFT FLOOR LAYERS:		
Area 1:	13.14	2.23
SPRINKLER FITTERS:		
Area 1:	16.67	2.83
TERRAZZO WORKERS:		
Area 1:	15.53	2.79
TILE LAYERS:		
Area 1:	13.31	1.55
Area 2:	15.53	2.54
TILE, MASONRY AND TERRAZZO FINISHERS:		
Area 1:	9.55	3.00
Area 2:	9.70	3.00
FLOOR GRINDERS:		
Area 1:	10.25	3.00

PAINTERS: (Cont'd)

Area 2:

Brush and Roll; Hard-

wood Finishers; Sand-

blast; Pot Tenders

Drywall Finishers (hand)

Spray; Swing Stage and

Chair; Sandblast (ex-

terior); Hazardous

work; Paperhangers;

Drywall Finishers (tool)

Sandblast (interior);

Steeplejack

PLASTERERS; Steamfitters:

Area 1

Area 2

Area 3

ROOFERS

SHEET METAL WORKERS

SOFT FLOOR LAYERS

SPRINKLER FITTERS

TERRAZZO WORKERS

TILE LAYERS:

Area 1

Area 2

TILE, MASONRY AND TERRAZZO

FINISHERS:

Area 1

Area 2

Floor Grinders

Base Grinders

DECISION NO. C083-5113

WELDERS: Receive rate prescribed for craft performing operation to which welding is incidental

LABORERS:

Group	Basic Hourly Rates
Group 1	\$9.95
Group 2	\$10.45
Group 3	\$10.55
Group 4	\$10.85

FRINGE BENEFITS:

\$2.69

POWER EQUIPMENT OPERATORS:

(Other than for work in Tunnels, Shafts, and Raises):

Group	Basic Hourly Rates
Group 1	\$13.40
Group 2	\$13.75
Group 3	\$14.50
Group 4	\$14.10
Group 5	\$14.25
Group 6	\$15.00
Group 7	\$14.40
Group 8	\$15.15
Group 9	\$14.55
Group 10	\$15.30

(For work in Tunnels, Shafts, and Raises):

Group	Basic Hourly Rates
Group 1	\$13.65
Group 2	\$13.90
Group 3	\$14.65
Group 4	\$14.00
Group 5	\$14.25
Group 6	\$14.40
Group 7	\$14.80
Group 8	\$15.55
Group 9	\$14.55
Group 10	\$15.30

FRINGE BENEFITS:

\$3.20

Page 3

TRUCK DRIVERS:

Group	Basic Hourly Rates
Group 1	\$12.91
Group 2	\$13.01
Group 3	\$13.11
Group 4	\$13.16
Group 5	\$13.21
Group 6	\$13.26
Group 7	\$13.31
Group 8	\$13.36
Group 9	\$13.46
Group 10	\$13.51
Group 11	\$13.56
Group 12	\$13.61
Group 13	\$13.71
Group 14	\$13.81
Group 15	\$14.01
Group 16	\$14.11
Group 17	\$14.21
Group 18	\$14.31

FRINGE BENEFITS:

\$2.64

FOOTNOTES:

- a. Employer contributes 8% basic hourly rate for over 5 years' service and 6% basic hourly rate for 6 months' to 5 years' service as Vacation Pay Credit. Seven Paid Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; and Christmas Day
- b. 15 days Paid Vacation after 1600 hours

AREA DESCRIPTIONS

BRICKLAYERS: Stonemasons:

- Area 1: Eagle County
- Area 2: Boulder and Grand Counties
- Area 3: Elbert, Lake and Park Counties
- Area 4: Larimer County
- Area 5: Remaining Counties

CARPENTERS:

- Area 1: Adams, Arapahoe, Boulder, Douglas, Denver, and Jefferson Counties:

- Zone 1: 0 to 20 miles
- Zone 2: 20 to 50 miles
- Zone 3: 50 miles and over

- Area 2: Clear Creek, Elbert, Grand, and Gilpin Counties; Park County (northern area):

- (a) Denver Metropolitan Area including Louisville, Golden, Boulder, and Longmont basing points:

- Zone 1: 0 to 20 miles
- Zone 2: 20 to 50 miles
- Zone 3: 50 miles and over

- Area 3: Morgan County:

- (b) Denver Northeastern Area of Colorado including Greeley, Loveland, and Fort Morgan basing points:

- Zone 1: 0 to 20 miles
- Zone 2: 20 to 50 miles
- Zone 3: 50 miles and over

- Area 4: Larimer County (southeastern portion within Loveland basing point, Zone 1)

- Area 5: Larimer (Remainder of County); Lake and Park Counties (south 40 miles):

- Zone 1: 0 to 40 miles from Post Office in Leadville or Fort Collins

- Zone 2: 40 to 75 miles from Post Office in Leadville or Fort Collins

- Zone 3: All work outside of the 75 mile radius from Post Office in Leadville or Fort Collins

- Area 6: Summit and Eagle Counties

- Area 7: Weld County

AREA DESCRIPTIONS (Cont'd)

ELECTRICIANS:

- Area 1: Elbert and Park Counties
- Area 2: Denver and Jefferson Counties
- Area 3: Remaining Counties

MASONRY SETTERS:

- Area 1: Elbert, Lake, and Park Counties
- Area 2: Remaining Counties

PAINTERS:

- Area 1: Park County (southern half)
- Area 2: Remaining Counties including northern half of Park County

PLUMBERS: Steamfitters:

- Area 1: Southern portions of Douglas, Elbert, and Park Counties
- Area 2: Boulder County
- Area 3: Remaining Counties (including northern portions of Douglas, Elbert, and Park Counties)

TILE LAYERS:

- Area 1: Elbert, Lake and Park Counties
- Area 2: Remaining Counties

LABORERS

Cities within Zones 1 and 2:

- Boulder: Denver, Golden, Leadville, Littleton, Vail
- Fort Morgan: Fort Collins, Greeley, Granby

- Zone 1: That area encompassed by 0 to 30 driving miles from the Main Post Office
- Zone 2: That area encompassed by 30 or more driving miles from the Main Post Office

Group 1: Building Construction Laborer

Group 2: Laborers - underpinning and shoring (eight (8) ft. or more below working surface; Power Tool Operators of all mechanical, air, gas and electrical tools, including self-propelled Buggies and Cement Finishers Tenders. Laborers preparing and placing of stone or any other aggregate in sand bed to be used as exposed face of tilt-up panels. Burners on demolition and Welders, Gunnite Nozzleman and Sandblasters

Group 3: Pipelayers on Building Construction; Jackhammer Operator for underpinning and shoring over twelve (12) ft. below working surface, Bellers and Stemmers on Caisson work; Tenders, Mason and Plaster

POWER EQUIPMENT OPERATORS

A. Counties entirely within Zone 1:

- Boulder: Denver, Douglas, Clear Creek
- Gilpin: Jefferson, Larimer, Morgan
- Weld

B. Counties entirely within Zone 2:

- Grand: Lake, Park, Summit

C. Legal description of the portions of Adams, Arapahoe, Eagle and Elbert Counties which are included within Zone 1, as follows:

All of Adams, Arapahoe, Elbert Counties lying west of the Township line between R59W and R60W of the 8th Guide Meridian West; and all of Eagle County lying West of the Township line between R80W and R81W of the 10th Guide Meridian West

D. Legal description of the portions of Adams, Arapahoe, Eagle and Elbert Counties which are included within Zone 2, as follows:
All of Adams, Arapahoe, Elbert Counties lying East of the Township line between R59 and R60W of the 8th Guide Meridian West, and all of Eagle County lying East of the Township line between R80W & R81W of the 9th Guide Meridian West

(Other than for work in Tunnels, shafts and Raises)

Group 1: Air Compressor; Asphalt Screed; Oiler; Brakeman; Drill Operator - smaller than Williams MF and similar; Tender to Heavy Duty Mechanic and/or Welder; Operators of 5 or more light plants, Welding Machines, Generators, single unit conveyor; Pumps; Vacuum Well Point System; Tractor, under 70 HP with or without attachments; Grade Checker; Compressors, 360 C.F.M. or less

Group 2: Conveyor, handling building materials; Ditch Witch and similar Trenching Machine; Fireman or Tank Heater, road; Forklift; Haulage Motor Man; Pugmill; Portable Screening plant with or without a Spray Bar; Screening Plants, with Classifier; Self-propelled Roller, rubber-tired under 5 tons

Group 3: Asphalt Plant; Backfiller, Bituminous Spreader or Laydown Machine; Cableway Signalman; Caisson Drill; Williams MF, similar and larger; C.M.I. and similar; Concrete Batching Plants; Concrete Finish Machine; Concrete Gang Saws on concrete paving; Concrete Mixer, less than 1 yd.; Concrete Placement Pumps, under 8 inches; Distributors, Bituminous Surfaces; Drill, Diamond and Core; Drill Rigs, Rotary, Churn, or Cable Tool; Elevating Graders, Equipment Lubricating and Service Engineer; Engineer Fireman; Grount Machine; Gunnite Machine; Hoist, 1 drum; Hydraulic Backhoes, wheel mounted under 3/4 yd.; Loader, Barber Green, etc.; Loader up to and including 6 cu. yds.; Machine Doctor; Mechanic; Motor Grader/Blade, rough; Road Stabilization Machine; Rollers, self-propelled, all types over 5 tons; Sandblasting Machine; single unit portable Crusher, with or without Washer; Tie Tamper, wheel mounted; Tractor, 70 HP and over with or without attachments; Trenching Machine Operator; Welder; Winch on Truck

POWER EQUIPMENT OPERATORS (Cont'd)
(Other than for work in Tunnels, Shafts and Raises) (Cont'd)

Group 4: Cable operated Crane, truck mounted; Cable operated power Shovels, Draglines, Clamshells, and Backhoes, 5 cu. yds. and under; Concrete Mixer over 1 cu. yd.; Concrete Paver 34E or similar; Concrete Placement Pumps, 8 inches and over; Crane, 50 tons and under; Hoist, 2 drums; Hydraulic Backhoe, 3/4 yd. and over; Loader, over 6 cu. yds.; Mechanic-welder, heavy duty; Mixer Mobile; Motor Grader/blade, finish; Multiple unit portable Crusher, with or without Washer; Piledriver; Scrapers, single bowl under 40 cu. yds.; Self-propelled Hydraulic Crane; Tractor with sideboom; Truck mounted Hydraulic Crane

Group 5: Cable operated power Shovels, Draglines, Clamshells and Backhoes over 5 cu. yds.; Crane, over 50 ton carrier mounted; Derrick; Electric rail type Tower Crane; Hoist, 3 drum or more; Quad Mine and similar push unit; Scrapers single bowl including pups 40 cu. yds. and tandem bowls and over

Group 6: Cableway; Climbing Tower Crane; Crawler or truck mounted Tower Crane; Wheel Excavator, Tower Crane, truck type

(For work in Tunnels, Shafts and Raises)

Group 1: Brakeman

Group 2: Motorman

Group 3: Compressor (900 CFM and over) serving Tunnels, Shafts and Raises

Group 4: Air Tractors; Grout Machine; Gunnite Machine; Jumbo Form; Mechanic; Welder

Group 5: Concrete Placement Pumps, 8" and over discharge; Mucking Machines and Front End Loaders, underground, Slusher; Mine Hoist Operator

Group 6: Mole

Group 7: Mechanic - Welder, heavy duty

TRUCK DRIVERS

A. Counties entirely within Zone 1: Boulder Denver Clear Creek Weld
Larimer Gilpin Jefferson Morgan

B. Counties entirely within Zone 2: Grand Lake Park Summit

C. Legal description of the portions of Adams, Arapahoe, Eagle and Elbert Counties which are included within Zone 1, as follows: All of Adams, Arapahoe, Elbert Counties lying west of the Township line between R59W and R60W of the 8th Guide Meridian West; and all of Eagle County lying west of the Township line between R80W and R81W of the 10th Guide Meridian West

D. Legal description of the portions of Adams, Arapahoe, Eagle and Elbert Counties which are included within Zone 2, as follows: All of Adams, Arapahoe, Elbert Counties lying East of the Township line between R59W and R60W of the 8th Guide Meridian West; and all of Eagle County lying East of the Township line between R80W and R81W of the 9th Guide Meridian West

Group 1: pickups; Tenders; Dumpmen

Group 2: Dump Trucks, to and including 6 cu. yds.; Sweepers; Flat Rack, single axle; Liquid and Bulk Tankers; single axle

Group 3: Dump trucks, over 6 cu. yds. to and including 14 cu. yds.; Flat Rack, Tandem axle; Battery Men; Mechanics' Tenders; Man Shovel Shuttle Truck or Bus

Group 4: Straddle Truck; Lumber Cartier; Liquid and Bulk Tankers, tandem axle

Group 5: Fork Lift Driver; Fuel Truck; Grease Truck; Combination Fuel and Grease

Group 6: Distributor Truck Driver; Cement Mixer, Agitator Truck to and including 10 cu. yds.; Liquid and Bulk Tankers, semi or combination

Group 7: Multi-purpose Truck; Specialty and Hoisting

Group 8: Dump Trucks, over 14 cu. yds. to and including 29 cu. yds.; High Boy, Low Boy, Floats, semi; Cab operated Distributor Truck Driver, semi; Liquid and Bulk Tankers, Euclid, Electric or similar; Truck Drivers, Dumpster type Youngbushy, Jumbo and similar type equipment

Group 9: Truck Driver, Snow Plow

SUPERSEDES DECISION

STATE: Missouri
 DECISION NO.: M083-4051
 SUPERSEDES DECISION NO. M081-4055 dated July 10, 1981 in 46 FR 3584
 DESCRIPTION OF WORK: Building Projects (excluding single family homes and apartments up to and including 4 stories)

COUNTY: Pulaski
 DATE: Date of Publication

PAGE 2

DECISION NO. 1A83-4050

WELDERS - receive rate prescribed for craft performing operation to which welding is incidental.

FOOTNOTES:

a-Employer contributes 4% of basic hourly rate for over 5 yrs. service & 4% of basic hourly rate for 6 mos. to 5 yrs. of service as Vacation Pay Credit. Seven Paid Holidays A - G
 b-Seven Paid Holidays A - G

PAID HOLIDAYS

A-New Year's Day; B-Memorial Day; C-Independence Day; D-Labor Day; E-Thanksgiving Day; F-the Friday after Thanksgiving Day; G-Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATION DEFINITIONS

GROUP 1 - Cranes including those being used as backhoes, draglines, clamshells, etc.; tower cranes; truck cranes & cherry pickers 125 ton & over rated capacity; derrick/pill drivers & extractors; caisson rigs; side boom & winch truck used for erection of structural steel & moving & setting of heavy machinery; 3 drum hoist; welders/mechanics; locomotive/dredge/leveller; excavators; 2 1/2 & 2 drum hoist; air & electric tugger (on power plants or setting steel or grating); locomotives; plant mixer; farm type tractor (with loaders, backhoes, attachments, etc.); scrapers (tours/pull, etc.); endloaders; dredge (engineer); side boom & winch truck other than Group 1; Motor patrol; bulldozers; push cat; truck cranes & cherry pickers (under 125 ton); concrete mixers (1 yd. & over); ditching machine (8" & over); fork lifts (on steel erection & machinery moving or hoisting above 1 complete story); concrete pump; dewatering pump; temporary hoist cage operated; second man on locomotive; vibrating concrete spreader (Gomaco, C-450 or equal)
 GROUP 2 - Tractors (under 35 HP); with or without attachments; endloaders (under 35 HP) with or without attachments; air compressors (1 or combination of 250 CFM or more); pumps 3" or over; welding machines 600 amps or combination thereof; conveyors; fireman (boiler); generator 75 KW & over; fork lifts (other than above Group 2); pneumatic machine; self-propelled rollers; stump chippers; self-propelled tampers; air & electric tuggers (other than above); ditching machine under 8"
 GROUP 3 - Oilers, mechanical heaters; truck crane drivers; permanent elevators

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5(a)(1)(ii)).

Basic Hourly Rate	Fringe Benefits	Basic Hourly Rate	Fringe Benefits
\$17.44	\$1.75	TRUCK DRIVERS:	
16.27	2.825	Ft. Leonard Wood Only:	
14.00	.50	GROUP 1	\$12.35
		GROUP 2	\$1.75
		GROUP 3	12.50
		GROUP 4	12.57
		GROUP 5	12.62
		GROUP 6	12.77
13.81	2.45	POWER EQUIPMENT OPERATORS:	
Projects \$500,000.00 and over		GROUP 1	15.17
CEMENT MASONS	14.31	GROUP 2	15.17
ELECTRICIANS:	14.53	GROUP 3	15.17
Electricians	15.04	GROUP 4	13.42
Cable Splicers	15.44	GROUP 5:	13.47
	94+	(a)	15.87
	1.89	(b)	16.72
IRONWORKERS, STRUCTURAL,	15.325	(c)	17.17
ORNAMENTAL, REINFORCING	2.77	(d)	17.92
LABORERS:	11.80	(e)	15.67
Laborers, general	1.65	GROUP 6	15.67
Plumbers, laborers, hod carriers, plaster tenders & mason tenders	12.15	GROUP 7	17.07
Powdermen	12.80	GROUP 8	17.57
PAINTERS:	1.85		18.07
Brush & roller	12.00		
Taping, paperhanging & floor work	12.50		
Spray, structural steel & sandblasting	13.25		
PIPEFITTERS	16.85		
FLINGERS	16.005		
SHEET METAL WORKERS	15.16		
	38+		
	3.35		
TRUCK DRIVERS:			
GROUP 1	11.35		
GROUP 2	11.75		
GROUP 3	11.82		
GROUP 4	11.87		
GROUP 5	12.02		
GROUP 6	12.85		
ROOFERS	12.00		
PLASTERERS	15.555		
	1.62		

TRUCK DRIVER CLASSIFICATION DEFINITIONS

GROUP 1 - Flat bed drivers; pick-ups and station wagons; tireman & station attendant; dump, single axle

GROUP 2 - Flat bed, tandem axle; dump, tandem; tank trucks, single axle

GROUP 3 - Agitator & transit-mix

GROUP 4 - Winch trucks; steel haulers, derrick & A-trucks; distributors drivers & operators; tank truck; tandem & semi-tractors; wheel tractors; oilers, greasers & mechanic helpers; heavy excavating & hauling euclids, dumpsters, etc.

GROUP 5 - Fork lifts & high lifts, etc., when unloading or carrying

GROUP 6 - Mechanics

POWER EQUIPMENT OPERATORS CLASSIFICATION DEFINITIONS

GROUP 1 - Backhoe; cableway; crane, crawler or truck; crane, hydraulic truck or cruiser mounted 16 tons & over; crane, locomotive, derrick, steam; derrick car & derrick boat; dragline; dredge; gradall, crawler or tire mounted; locomotive, gas, steam & other powers; piledriver, land or floating; scoop, skimmer; shovel, power (steam, gas, electric or other powers); switch boat; whirley

GROUP 2 - Air tugger w/air compressor; anchor placing barge; asphalt spreader; atney force feeder loader (self-propelled); backfilling machine; boat oper. push boat or tow boat (job site); boiler, high pressure breaking in period; boom truck, placing or erecting; boring machine, footing foundation; bullfloat; cherry picker; combination concrete hoist & mixer such as mixerobile; compressor (when operator runs throttle); compressors, two not more than 50' apart; compressor-generator combination; compressor pump combination; compressor welder combination; concrete breaker (truck or tractor mounted); concrete pump, such as pumpcrete machine; concrete spreader; conveyor, large (not self-propelled) hoisting or moving brick & concrete into, or into & on floor level, one or both; crane, hydraulic rough terrain, self-propelled; crane, hydraulic truck or cruiser mounted under 16 tons; drilling machines, self-powered, used for earth or rock drilling or boring (wagon drills & any hand drills obtaining power from other sources including concrete breakers, jackhammers & barco equipment no engineer required); elevating grader, engine man, dredge; excavator or powerbelt machine; finishing machine, self-propelled oscillating screed; fork lift; grader, road with power blade; highlift; hoist, concrete & brick (brick cages or concrete skips operating in or on tower, tower mobile, or similar equipment); hoist, stack; hydro hammer; lad-a-vator, hoisting brick or concrete; loading machine (such as Barber-Greene); mechanic on job site; mixer, paving; mixer-mobile; mucking machine; pipe wrapping machine; plant, asphalt; plant, concrete producing or ready-mix job site; plant, heating job site; plant, mixing job site; plant, power, generating job site; pumps, two self-power over 2" through 8"; pumps, electric submersible, one through three, over 4"; quad-track; roller, asphalt, top or subgrade; scoop, tractor drawn; spreader box; subgrader; tie tamper; tractor-crawler, or wheel type with or without power unit, power take offs, & attachments regardless of size; trenching machine, tunnel boring machine, vibrating machine, automatic, propelled; welding machines (gasoline or diesel) more than one but not over four (regardless of size); well drilling machine

GROUP 3 - Air tugger w/plant air; boiler, for power or heating shell of buildings or temporary enclosures in connection with construction work; boiler, temporary; compressor, air one; compressor, air (mounted on truck); concrete saw, (self-propelled); conveyor, large (not self-propelled); conveyor, large (not self-propelled) moving brick & concrete (distributing) on floor level; curb finishing machine, ditch paving machine; elevator (building construction or alteration); endless chain hoist; fireman; form grader; generator, one over 30 KW or any number developing over 30

POWER EQUIPMENT OPERATORS CLASSIFICATION DEFINITIONS (Cont'd)

GROUP 3 CONT'D:

KW; greaser; hoist, one drum regardless of size (except brick or concrete); lad-a-vator; manlift; mixer, asphalt, over 8 cu. ft. capacity; mixer, if two or more mixers of one bag capacity or less are used by one Employer on job, an operator is required; mixer, without side loader, 2 bag capacity or more; mixers, with side loader, 2 bag capacity or more; mixer, with side loader, pug mill of size, not paver; oiler on dredge; oiler on truck crane; pug mill operator; pump, sump-self-powered, automatic controlled over 2" during use in connection with construction work; scissor lift (used for hoisting); sweeper, street; tractor small wheel type 50 h.p. & under with grader blade & similar equipment; welding machine, one over 400 amp; winch operating from truck; mechanic in shop GROUP 4 - Boat operator outboard motor (job site); conveyors, such as con-vay-it) regardless of how used; oiler; sweeper, floor

GROUP 5 (a) - Air pressure; oiler engineer operating under ten pounds

(b) - Air-pressure, oiler engineer operating over ten pounds

(c) - Air pressure engineer operating under ten pounds

(d) - Air pressure oiler engineer operating over ten pounds

(e) - Crane, climbing (such as a ladder); crane, pile driving & extracting; crane, using rock socket tool; derrick, diesel, gas or electric, hoisting material erecting steel (150" or more above ground); dragline, 7 cu. yds. & over; hoist, three or more drums in use; scoop, tandem; shovel, power 7 cu. yds. & over; tractor, tandem crawler, tunnel man assigned to work in tunnel or tunnel shaft; wrecking, when machine is working on second or higher; crane-booms (including jib) 100 ft. to 150 feet

GROUP 6 - Crane, boom (including jib) 150 feet to 200 feet

GROUP 7 - Crane, boom (including jib) 200 feet to 250 feet

GROUP 8 - Crane, boom (including jib) 250 feet to 300 feet

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5 (a)(1)(ii)).

SUPERSEDES DECISION

STATE: NEW JERSEY
DECISION NO.: N383-3024

COUNTY: MORRIS
DATE: DATE OF PUBLICATION
Supersedes Number N380-3017 dated February 29, 1980 in 45 FR 13592
DESCRIPTION OF WORK: Residential Construction Projects Consisting of single family homes and apartments up to and including 4 stories.

	Basic Hourly Rates	Fringe Benefits	Basic Hourly Rates	Fringe Benefits
Bricklayers	\$13.80	1.83		Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5 (a)(1)(ii)).
Carpenters	14.75	15.54		
Cement Masons	8.00			
Drywall - Sheetrock Mechanics	13.00			
Electricians	16.075	104+		
		2.26		
Insulation Mechanics	7.24			
Ironworkers, Structural	13.35	3.81		
Laborers:				
Laborers	6.44	.95		
Mason Tenders	9.40	2.95		
Painters	12.05	1.30		
Plumbers & Pipefitters	15.31	2.32		
Roofers	11.75	1.65		
Sheet Metal Workers	14.09	28+		
		.21		
Soft Floor Layers	12.73	16+		
Tile Setters	12.92	.70		
Power Equipment Operators:				
Backhoe	8.00			
Bulldozer	9.00			
WELDER - RATE FOR CRAFT TO WHICH THE WELDING IS INCIDENTAL				

DECISION NO. WY83-5114

Page 2

SUPERSEDES DECISION

STATE: Wyoming

COUNTIES: Converse, Goshen, Laramie,

Natrona, Niobrara and Platte

DATE: Date of Publication

SUPERSEDES DECISION NO. WY82-5106 dated March 12, 1982, in 48 FR 10968

DESCRIPTION OF WORK: Building Projects (does not include single family homes and apartments up to and including 4 stories)

BUILDING CONSTRUCTION:	Basic Hourly Rates	Fringe Benefits
ASBESTOS WORKERS	\$15.39	\$2.44
BOILERMAKERS	14.97	2.575
BRICKLAYERS; Stonemasons:		
Area 1	14.24	.57
Area 2	12.90	1.25
CARPENTERS:		
Carpenters	12.75	2.57
Piledriverman	13.00	2.57
CEMENT MASONS:		
Cement Masons	13.15	.75
Working on Swinging Stage or temporary platforms over 20 ft. high	13.65	.75
Composition Material, Epoxy	13.65	.75
ELECTRICIANS:		
Area 1	16.50	1.50+
Electricians; Technicians	3-3/4	
Area 2:		
Contracts \$250,000 and under:	14.75	1.75+
Electricians	15.70	3-3/4
Contracts over \$250,000:		
Electricians	17.97	2.69+
ELEVATOR CONSTRUCTORS:		
Mechanics	12.58	2.69+
Helpers	8.985	
Probationary Helpers		
IRONWORKERS:		
Structural; Ornamental;	14.15	2.80
Reinforcing		
MARBLE, TILE and TERRAZZO WORKERS:		
Area 1	11.10	.75
MILLWRIGHTS	16.16	2.39

FOOTNOTE:

a. Employer contributes 8% of basic hourly rate for over 5 years' service and 6% of basic hourly rate for 6 months to 5 years' service as Vacation Pay Credit. Paid Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; and Christmas Day

AREA DESCRIPTIONS

BRICKLAYERS; Stonemasons:

Area 1: Goshen, Laramie and Platte Counties
Area 2: Converse, Natrona and Niobrara Counties

ELECTRICIANS:

Area 1: Goshen, Laramie, Niobrara and Platte Counties
Area 2: Converse and Natrona Counties

MARBLE, TILE and TERRAZZO WORKERS:

Area 1: Converse, Natrona and Niobrara Counties

PLUMBERS; STEAMFITTERS:

Area 1: Cheyenne Only
Area 1-A: Goshen, Platte, Laramie Counties, excluding Cheyenne
Area 2: Converse, Natrona and Niobrara Counties:
Zone 1: 10 miles radius from Post Office in Casper
Zone 2: 10 miles radius beyond Zone 1
Zone 3: 20 miles radius beyond Zone 2
Zone 4: 40 miles radius beyond Zone 3
Zone 5: Jurisdiction beyond Zone 4

SHEET METAL WORKERS:

Area 1: Converse, Natrona and Niobrara Counties
Area 2: Goshen, Laramie and Platte Counties

DECISION NO. WT83-5114

Page 3

LABORERS CLASSIFICATIONS

Group 1: General Laborers: All work pertaining to pre-watering, pre-irrigation, and pre-wetting; Axeman and Hand Faller; Bin Wall Installer; Bituminous Curb Builder; Burner (cutting torch); Car and Truck Loader; Carpenter Tender; Cement Mason Tender; Chuck Tender; Concrete Saw; Concrete Worker (wet or dry) (curing and drying); Creosote Material Handler (corrosive enamel or its equal); Dumpman; Erector and Installer (includes the installation of all fences, right of way, median fences, snow fences, etc., guard rails, section rails, reference posts, guide posts, signs and right of way markers); Form Setter (paving); Form Setter Tender (paving); Form Stripper; General Laborer; Gunnite Tender; Hand Operated Vibrator Roller; Jackhammer and Pavement Breaker; Landscaper; Landscaper Tender; Material Handler (lumber, rods, cement, concrete); Mechanical Form Cleaner; Mortar Man on Stone Riprap; Nozzleman (air and water); Operator on pneumatic, electric, gas tamper and similar mechanical tools; Pipe Setter (corrugated, culvert pipe multi-plate, sectional plate and similar type); Pipe Wrapper; Powderman Tender; Power Saw Operator (clearing); Power type Concrete Buggy (push); Power type Concrete Buggy (ride); Riprap Man; Rodman; Sandblaster Pot Tender; Shoring and Lagging Open Ditch; Signalman, grade, concrete, etc.; Scissorman or Hopper Man; Stake Jumper for equipment; Tar and Asphalt Pot Tender; Unloading and packing of steel rods and mesh (reinforcing); Vibrator - concrete; Wrecking & Demolition Crews; Heat Tender and Pilot Car Operator

Group 2: Semi-skilled Laborers: Asphalt Raker and Tamper; Gunnite Nozzleman; High Scaler (using air tool from bos'n chair, swing stage life belt, or block and tackle, shall receive 20¢ per hour more than the classified rate); Sandblaster Nozzleman; Sewer Pipe Installer (non-metallic, Caulker, Collarman, Joister, Mortarman, Rigger, Jacker)

Group 3: Drilling - Blasting: Powderman and Blaster; Wagon drill, Air Track, Diamond and other drills for blasting powder or grouting

Group 4: Tenders: Fork Lift Operator (masonry work); Hodcarriers; Mason Tenders; Plasterer Tenders; Scaffold Builders; Terrazzo Tenders; Tile Setter Tenders

Group 5: Tunnel - underground: Drill Doctors; Finishers; Form Setters and Movers; Jackhammer Man; Machine Man; Miners (Drillers); Piling and/or Caisson Workers; Rebar Man; Spaders; Steelman; Timberman; Tugsters

Group 6: Chuck Tender; Nipper; Top Man or Top Lander

Group 7: Brakeman; Vibrator Man

Group 8: Bull Gang Laborer; Mucker

Group 9: Shifter

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5(a)(1)(ii))

[FR Doc. 83-18208 Filed 7-14-83; 8:45 am]

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Federal Register

Friday
July 15, 1983

Part III

Environmental Protection Agency

**Electroplating and Metal Finishing Point
Source Categories; Effluent Limitations
Guidelines, Pretreatment Standards, and
New Source Performance Standards**

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 413 and 433

[OW-FRL-2383-7]

Electroplating and Metal Finishing Point Source Categories; Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This regulation limits the pollutants that electroplating/metal finishing facilities may discharge to waters of the United States or to publicly owned treatment works (POTW). The Metal Finishing Regulations provide effluent limitations based on "best practicable technology" and "best available technology" and establish new source performance standards and pretreatment standards under the Clean Water Act. In addition, this rule amends the pretreatment standards for existing sources for the Electroplating Point Source Category.

The preamble summarizes the legal authority, background, technical and economic bases, and other aspects of the regulation as well as a summary of comments on the proposed regulation and on the record supporting the proposed regulation. The abbreviations, acronyms, and other terms used in the preamble are defined in Appendix A. (See "Supplementary Information" below for complete table of contents).

The final rule is supported by EPA's technical conclusions detailed in the *Development Document for Effluent Limitations Guidelines, and Standards for the Metal Finishing Point Source Category*, June, 1983. The Agency's economic analysis is found in *Economic Analysis of Effluent Standards and Limitations for the Metal Finishing Industry*, June 1983. Further supporting materials are filed in the record supporting this rulemaking.

DATES: In accordance with 40 CFR 100.01 (45 FR 26048) this regulation shall be considered issued for the purposes of judicial review at 1:00 p.m. Eastern time on July 29, 1983. These regulations shall become effective August 29, 1983.

The compliance date for the BAT regulations is as soon as possible, but no later than July 1, 1984.

The compliance date for New Source Performance Standards (NSPS) and Pretreatment Standards for New Sources (PSNS) is the date the new source begins operations. The

compliance date for Metal Finishing Pretreatment Standards for Existing Sources (PSES) is February 15, 1986 for metals and cyanide. Metal Finishing PSES establishes two levels of toxic organic control; the less stringent must be met by June 30, 1984 for most plants and by July 10, 1985 at plants also subject to Part 420 (Iron and Steel); the more stringent must be met by February 15, 1986. In addition, Electroplating PSES requires toxic organic control by July 15, 1986.

Under Section 509(b)(1) of the Clean Water Act judicial review of this regulation can be obtained only by filing a petition for review in the United States Court of Appeals within 90 days after these regulations are considered issued for the purposes of judicial review. Under Section 509(b)(2) of the Clean Water Act, the requirements of the regulations may not be challenged in later civil or criminal proceedings brought by EPA to enforce these requirements.

Reporting provisions in 40 CFR 413.03 and 433.12 will be reviewed by OMB under the paperwork reduction act and are not effective until approved.

ADDRESS: Technical information may be obtained by writing to Mr. Richard Kinch, Effluent Guidelines Division (WH-552), Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460, Attention: Metal Finishing Rules. Approximately two weeks from publication, the record for this rulemaking will be available for inspection and copying at the EPA Public Information Reference Unit, Room 2404 (Rear) PM-213 (EPA Library). The EPA public information regulation (40 CFR Part 2) provides that a reasonable fee may be charged for copying. Copies of the technical and economic documents may be obtained from the National Technical Information Service, Springfield, Virginia 22161 (703/487-4650). Copies of both documents will be available for review in the public record at EPA headquarters and regional libraries.

FOR FURTHER INFORMATION CONTACT: Mr. Richard Kinch, Effluent Guidelines Division (WH-552), EPA, 401 M Street, S.W., Washington, D.C. 20460, or by calling (202) 382-7159. Economic information may be obtained by writing Ms. Kathleen Ehrensberger, Economics Branch (WH-586), Environmental Protection Agency, 401 M St. S.W., Washington, D.C. 20460, or by calling (202) 382-5397.

SUPPLEMENTARY INFORMATION:

Organization of This Notice

- I. Legal Authority
- II. Background

- A. The Clean Water Act
- B. Prior EPA Regulations
- C. Overview of the Industry
- III. Scope of this Rulemaking
- IV. Data Gathering Efforts
- V. Sampling and Analytical Program
- VI. Industry Subcategorization
- VII. Available Wastewater Control and Treatment Technology
 - A. Status of In-Place Technology
 - B. Control Treatment Options
- VIII. General Criteria for Limitations
 - A. BPT Effluent Limitations
 - B. BAT Effluent Limitations
 - C. BCT Effluent Limitations
 - D. New Source Performance Standards
 - E. Pretreatment Standards for Existing Sources
 - F. Pretreatment Standards for New Sources
- IX. Summary of Final Regulations
 - A. Part 433
 - B. Part 413
- X. Derivation of the Limitations
- XI. Changes from the Proposed Limits
- XII. Pollutants and Subcategories Not Regulated
 - A. Exclusion of Toxic Pollutants
 - B. Exclusion of Subcategories
- XIII. Costs, Effluent Reduction Benefits, and Economic Impacts
 - A. Costs and Economic Impacts
 - B. Executive Order 12291
 - C. Regulatory Flexibility Analysis
 - D. SBA Loans
- XIV. Non-Water-Quality Environmental Impacts
 - A. Air Pollution
 - B. Noise
 - C. Radiation
 - D. Solid Waste
 - E. Energy
- XV. Best Management Practices (BMPs)
- XVI. Upset and Bypass Provisions
- XVII. Variances and Modifications
- XVIII. Implementation of Limitations and Standards
 - A. Relation to NPDES Permits
 - B. Indirect Dischargers
 - C. Applicability and Compliance Dates
 - D. Enforcement
- XIX. Summary of Public Participation
- XX. Availability of Technical Information
- XXI. OMB Review
- XXII. List of Subjects
- XXIII. Appendices
 - A. Abbreviations, Acronyms, and Other Terms Used in This Notice
 - B. Pollutants Excluded From Regulation
 - C. Unit Operations in the Metal Finishing Industry

I. Legal Authority

This regulation is being promulgated under the authority of Sections 301, 304, 306, 307, 308, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 *et seq.*, as amended by the Clean Water Act of 1977, Pub. L. 95-217) (the "Act") and as further amended. This regulation is also being promulgated in response to the Settlement Agreement in *Natural Resources Defense Council, Inc. v.*

Train, 8 ERC 2120 (D.D.C. 1976), as modified, 12 ERC 1833 (D.D.C. 1979), modified by Order dated October 26, 1982.

II. Background

A. The Clean Water Act

The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Section 101(a).

- Section 301(b)(1)(A) set a deadline of July 1, 1977, for existing industrial direct dischargers to achieve "effluent limitations requiring the application of the best practicable control technology currently available" ("BPT").

- Section 301(b)(2)(A) set a deadline of July 1, 1983, for those dischargers to achieve "effluent limitations requiring the application of the best available technology economically achievable . . . which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants" ("BAT").

- Section 306 required that new industrial direct dischargers comply with new source performance standards ("NSPS"), based on best available demonstrated technology.

- Sections 307 (b) and (c) required pretreatment standards for new and existing dischargers to publicly owned treatment works ("POTW"). The Act made pretreatment standards enforceable directly against dischargers to POTW's (indirect dischargers), unlike the requirements for direct dischargers which were to be incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued under Section 402.

- Section 402(a)(1) allows requirements for direct dischargers to be set case-by-case. However, Congress intended control requirements to be based for the most part on regulations promulgated by the Administrator of EPA.

- Section 304(b) required regulations that establish effluent limitations reflecting the ability of BPT and BAT to reduce effluent discharge.

- Sections 304(c) and 306 of the Act required regulations for NSPS.

- Sections 304(g), 307(b), and 307(c) required regulations for pretreatment standards.

- In addition to these regulations for designated industry categories, Section 307(a) required the Administrator to promulgate effluent standards applicable to all dischargers of toxic pollutants.

- Section 308 gave the Administrator authority to collect information necessary to develop and enforce regulations.

- Finally, Section 501(a) authorized the Administrator to prescribe any additional regulations "necessary to carry out his functions" under the Act.

EPA was unable to promulgate many of these regulations by the deadlines contained in the Act, and as a result—in 1976, EPA was sued by several environmental groups. In settling this lawsuit, EPA and the plaintiffs executed a "Settlement Agreement" which was approved by the Court. This agreement required EPA to develop a program and meet a schedule for controlling 65 "priority" pollutants and classes of pollutants. In carrying out this program EPA must promulgate BAT effluent limitations guidelines, pretreatment standards, and new source performance standards for 21 major industries. See *Natural Resources Defense Council, Inc. v. Train*, 8 ERC 2120 (D.D.C. 1976), modified, 12 ERC 1833 (D.D.C. 1979), modified by Order dated October 26, 1982.

Several of the basic elements of the Settlement Agreement program were incorporated into the Clean Water Act of 1977. This law also makes several other important changes in the Federal water pollution control program.

- Sections 301(b)(2)(A) and 301(b)(2)(C) of the Act now set July 1, 1984 as the deadline for industries to achieve effluent limitations requiring application of BAT for "toxic" pollutants. "Toxic" pollutants here includes the 65 "priority" pollutants and classes of pollutants which Congress declared "toxic" under Section 307(a) of the Act.

- Likewise, EPA's programs for new source performance standards and pretreatment standards are now aimed principally at controlling toxic pollutants.

- To strengthen the toxics control program, Section 304(e) of the Act authorizes the Administrator to prescribe certain "best management practices" ("BMPs"). These BMPs are to prevent the release of toxic and hazardous pollutants from: (1) Plant site runoff, (2) spillage or leaks, (3) sludge or waste disposal, and (4) drainage from raw material storage if any of those events are associated with, or ancillary to, the manufacturing or treatment process.

In keeping with its emphasis on toxic pollutants, the Clean Water Act of 1977 also revises the control program for non-toxic pollutants.

- For "conventional" pollutants identified under Section 304(a)(4)

(including biochemical oxygen demand, suspended solids, fecal coliform and pH), the new Section 301(b)(2)(E) requires "effluent limitations requiring the application of the best conventional pollutant control technology" ("BCT")—instead of BAT—to be achieved by July 1, 1984. The factors considered in assessing BCT for an industry are the relationship between the cost of attaining a reduction in effluents and the effluent reduction benefits attained, and a comparison of the cost and level of reduction of such pollutants by publicly owned treatment works and industrial sources. For non-toxic, nonconventional pollutants, Sections 301 (b)(2)(A) and (b)(2)(F) require achievement of BAT effluent limitations within three years after their establishment or by July 1, 1984, whichever is later, but not later than July 1, 1987.

The purpose of this regulation is to establish BPT, BAT, NSPS, PSES, and PSNS for the Part 433 Metal Finishing Point Source Category, and to amend the Part 413 Electroplating PSES.

B. Prior EPA Regulations

On March 28, 1974, EPA promulgated BPT limitations for the electroplating industry but suspended them on December 3, 1976. Interim final pretreatment standards for the electroplating industry were issued on July 12, 1977, and suspended on May 14, 1979. On September 7, 1979, EPA promulgated the Part 413 PSES for the electroplating industry. Amended PSES were promulgated on January 28, 1981 (40 FR 9462).

Currently only those Electroplating PSES are in effect. Nonintegrated indirect discharging facilities must comply with those standards by April 27, 1984. See 47 FR 42698, September 28, 1982. A non-integrated facility is one which does not discharge significant process wastewater, other than from electroplating operations, through a treatment system (or proposed treatment system).

Integrated indirect discharging facilities are also currently covered by the electroplating PSES. These facilities, which prior to treatment combine electroplating waste streams with significant process waste streams not covered by the Electroplating Category, must comply with its provisions by June 30, 1984 (see 48 FR 2774, January 21, 1983).

C. Overview of the Industry

There are 13,500 plants in the electroplating/metal finishing industry. Many discharge wastewaters from

several metal finishing operations other than, and in addition to, electroplating. Part 413 (electroplating) currently applies only to flows from the six specified electroplating processes. These Part 433 (metal finishing regulations) will apply to those electroplating streams and also to wastestreams from most other metal finishing operations within the same plants. The Part 433 PSES will apply only to plants already covered by Part 413; however Part 433 will often cover additional wastewater within the same plants. Thus the Part 433 limits on discharge of toxic metals, toxic organics, and cyanide will apply to most facilities in the electroplating/metal finishing industry.

The industry can be divided into the sectors indicated on Table I. Facilities are either "captives" (those which in a calendar year own more than 50% (area basis) of the materials undergoing metal finishing); or "job shops" (those which in a calendar year do not own more than 50% (area basis) of material undergoing metal finishing).

Captives can be further divided by two definitions: "integrated" plants are those which, prior to treatment, combine electroplating waste streams with significant process waste streams not covered by the electroplating category; "non-integrated" facilities are those which have significant wastewater discharges only from operations addressed by the electroplating category. Many captives (50%) are "integrated" facilities. Whereas captives often have a complex range of operations, job shops usually perform fewer operations. In theory job shops can be divided like captives; in actuality, however, approximately 97% of all job shops in this industry are "non-integrated".

Finally, the entire industry can be divided into "direct" and "indirect" dischargers. "Directs" discharge wastewaters to waters of the United States and are subject to NPDES permits incorporating BPT, BAT, and BCT limitations or NSPS. "Indirects" discharge to POTWs and are subject to PSES or PSNS.

As discussed above, the electroplating/metal finishing industry is currently covered by Part 413 PSES for the Electroplating Category promulgated on September 7, 1979, and amended on January 28, 1981. The effect of today's amendments is to create a new category—Metal Finishing (Part 433)—and to shift most electroplaters to it, replacing their current PSES with new limits which apply uniformly to discharges from their electroplating and other metal finishing operations. This

meets industry's requests for equivalent limits for process lines often found together and greatly reduces the need to rely on the Combined Waste Stream Formula for integrated metal finishing facilities. Direct discharger and new source requirements are also being issued as part of the metal finishing regulations.

Indirect discharging job shop electroplaters and independent printed circuit board manufacturers, however, would be left under the existing Part 413 PSES for Electroplating and are exempted from Part 433. This is consistent with a 1980 Settlement Agreement in which the National Association of Metal Finishers (NAMF), and the Institute for Interconnecting and Packaging Electronic Circuits (IIEPEC) agreed not to challenge the Part 413 PSES in return for the 1981 amendments and EPA's commitment that the Agency did not intend to develop significantly more stringent standards for those plants for the next several years.

TABLE I.—BREAKDOWN OF THE ELECTROPLATING/METAL FINISHING INDUSTRY
(Number of plants per sector 13,470)

	Job shops and IPCBM ¹ (3,470)	Captive facilities (10,000)	
		Nonintegrated	Integrated
Indirect dischargers (10,561)	3,061 job & IPCBM indirect	3,750 nonintegrated captive	3,750 integrated captive
Direct dischargers (2,909)	409 job & IPCBM direct	(²)	(²)

¹ Independent printed circuit board manufacturers.
² 2,500 captive direct.

The Metal Finishing Category covers plants which perform one or more of the following six operations: electroplating, electroless plating, anodizing, coating (phosphating, chromating, and coloring), chemical etching and milling, or printed circuit board manufacture. If a plant performs any of those six operations then discharges from the 46 operations listed in Appendix C are covered by these standards.

In some cases another industrial category may cover wastewater discharges from a metal finishing operation. In such cases the more specific standards of the other Part(s) will apply to those wastewater streams which appear to be covered by both regulations. For example, if a plant performs coating operations in preparation for painting and also performs electroless plating as part of a porcelain enameling process, then these Part 433 standards would apply to discharges from the coating operation; while Part 466 (porcelain enameling)

would apply to discharges from the second operation.

The following regulations will take precedence over metal finishing (Part 433) and electroplating (Part 413) when such an overlap occurs:

Nonferrous metal smelting and refining (40 CFR Part 421)
Coil coating (40 CFR Part 465)
Porcelain enameling (40 CFR Part 466)
Battery manufacturing (40 CFR Part 461)
Iron and steel (40 CFR Part 420)
Metal casting foundries (40 CFR Part 464)
Aluminum forming (40 CFR Part 467)
Copper forming (40 CFR Part 468)
Plastic molding and forming (40 CFR Part 463)

In addition, EPA is excluding from the metal finishing (Part 433) regulation: (1) Metallic platemaking and gravure cylinder preparation conducted within printing and publishing facilities; and (2) existing source job shops and independent printed circuit board manufacturers which introduce pollutants into a publicly owned treatment works. As noted above, the standards do not apply to facilities unless they perform at least one of the following: electroplating, electroless plating, anodizing, coating, chemical etching and milling, or printed circuit board manufacture.

The most important pollutants of concern found in metal finishing industry wastewaters are: (1) toxic metals (cadmium, copper, chromium, nickel, lead, and zinc); (2) cyanide; (3) toxic organics (lumped together as total toxic organics); and (4) conventional pollutants (TSS and oil and grease). These and other chemical constituents degrade water quality, endanger aquatic life and human health, and in addition corrode equipment, generate hazardous gas, and cause treatment plant malfunctions and problems in disposing of sludges containing toxic metals.

These plants manufacture a variety of products that are constructed primarily of metals. The operations, which involve materials that begin as raw stock (rods, bars, sheet, castings, forgings, etc.), can include the most sophisticated surface finishing technologies. These facilities include both captives and job shops. They vary greatly in size, age, number of employees, and number and type of operations performed. They range from very small job shops with less than 10 employees to large facilities employing thousands of production workers. Because of differences in size and processes, production facilities are custom tailored to the individual plant. Some complex products may require the

use of nearly all of the 46 unit operations mentioned above; a simple product may require only one.

Many different raw materials are used by these plants. Basis materials (or "workpieces") are mostly metals; from common copper and steel to extremely expensive high-grade alloys and precious metals. They can also include plastics. Solutions used in unit operations can contain acids, bases, cyanide, metals, complexing agents, organic additives, oils, and detergents. All these materials may enter waste streams during production.

Water use within the metal finishing industry is discussed fully in Section V of the development document (see summary above). Plating and cleaning operations are typically the biggest water users. While most metal finishing operations use water, some may use none at all. Water use depends heavily on the type—and the flow rate—of the rinsing used. Product quality requirements often dictate the amount of rinsing needed for specific parts. Parts involving extensive surface preparation will generally require larger amounts of water in rinsing.

III. Scope of this Rulemaking

This regulation establishes Part 433 BPT, BAT, NSPS, PSES, and PSNS for the Metal Finishing Point Source Category and amends Part 413 PSES for the Electroplating Point Source Category. The BAT goal is to achieve, by July 1, 1984, the best available technology economically achievable that will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants. This regulation does not alter the existing metal and cyanide standards for job shop electroplaters and printed circuit board manufacturers discharging to POTWs.

EPA first studied the electroplating/metal finishing industry to determine whether differences in raw materials, final products, manufacturing processes, equipment, age and size of plants, water use, wastewater constituents, or other factors required separate effluent limitations and standards for different industry subcategories. This study involved a detailed analysis of wastewater discharge and treated effluent characteristics, including, (a) the sources and volume of water, the processes, and the sources of pollutants and wastewater in the plant and (b) the constituents of wastewaters, including toxic pollutants. This analysis enabled the Agency to determine the presence and concentrations of toxic pollutants on the major wastewater discharges.

EPA also identified several distinct control and treatment technologies (both in-plant and end-of-pipe), including those with potential use in the electroplating/metal finishing industry. The Agency analyzed both historical and newly generated data on the performance of these technologies, including their non-water quality environmental impacts on air quality, solid waste generation, water scarcity, and energy requirements.

Cost curves were used to estimate the cost of each control and treatment technology. These cost curves were developed by applying standard engineering analyses to metal finishing wastewater characteristics. Unit process costs were then derived by applying model plant characteristics (production and flow) to the unit cost curve of each treatment process. These unit process costs were added together to yield the total cost at each treatment level.

By considering these factors, EPA was able to characterize the various control and treatment technologies used as the bases for effluent limitations, new source and pretreatment standards. However, the regulations do not require any particular technology. Rather, they require plants to achieve effluent limitations (mg/l) which reflect the proper operation of these technologies or equivalent technologies. Some facilities are already successfully using technologies other than those relied on by the Agency, such as dragout control, recycle, and recovery, to achieve these values.

IV. Data Gathering Efforts

To develop the regulation, EPA began with a review of previous work on the electroplating/metal finishing industry. The major source of information on this is the *Draft Development Document for Effluent Limitations and Standards for the Metal Finishing Point Source Category* (June 1980). Several studies completed before this development document was published also contributed technical information to the metal finishing data base for the following segments of the industry:

- Machinery and Mechanical Products Manufacturing.
- Electroplating.
- Electroless Plating and Printed Circuit Board Manufacturing (Segments of the Electroplating Category).
- Mechanical and Electrical Products.

We also gathered data on the metal finishing industry from literature surveys, inquiries to professional contacts, seminars and meetings, and the survey and evaluation of manufacturing facilities.

We contacted all Federal EPA regions, several State environmental agencies, and numerous suppliers and manufacturers for the metal finishing industry to collect information on: (1) Permits and monitoring data, (2) the use and properties of materials, (3) process chemical constituents, (4) waste treatment equipment, (5) waste transport, (6) and various process modifications to minimize pollutant generation.

Under the authority of Section 308 of the Clean Water Act, the Agency sent three different data collection portfolios (DCPs) to various industries within the Metal Finishing Point Source Category. The first DCP obtained data from 339 of 1,422 plants originally contacted from the machinery and mechanical products industry. The data included general plant information on raw materials consumed, specific processes used, composition of effluent streams, and wastewater treatment. The second DCP obtained data from 365 of the 900 plants originally contacted in the mechanical and electrical products industries. These data covered general plant characteristics, unit operations performed, plating type operations, wastewater treatment facilities, and waste transport. We sent the third DCP to 1,883 companies involved in electroplating. Approximately 1190 plants sent back economic analysis data and information on general plant characteristics, production history, manufacturing processes, process and waste treatment, wastewater characteristics, and treatment costs.

EPA and its contractors also visited 210 manufacturing facilities to collect wastewater samples and pertinent technical information on manufacturing processes and various treatment techniques.

V. Sampling and Analytical Program

EPA focused its sampling and analysis on the toxic pollutants designated in the Clean Water Act. However, we also sampled and analyzed conventional and nonconventional pollutants. Prior to undertaking sampling programs in support of rulemaking actions, EPA had to identify specific toxic pollutants that would be appropriate subjects for investigation. The list of 65 pollutants and classes of pollutants potentially includes thousands of specific compounds, the analyses of which could overwhelm private and government laboratory resources. To make the task more manageable, therefore, EPA selected 129 specific toxic pollutants for study in this rulemaking and other industry rulemakings. The criteria for

choosing these pollutants included the frequency of their occurrence in water, their chemical stability and structure, the amount of the chemical produced, and the availability of chemical standards for measurement.

In addition to the original 129 toxic pollutants (of which three are now considered nonconventional pollutants), EPA checked for the presence, frequency, and concentration of xylenes, alkyl epoxides, gold, fluoride, phosphorus, oil and grease, TSS, pH, aluminum, barium, iridium, magnesium, molybdenum, osmium, palladium, platinum, rhodium, ruthenium, sodium, tin, titanium, vanadium, yttrium, and total phenols.

The criteria used to select plants for sampling visits were: (1) A large percentage of the plant's effluent discharge should result from the manufacturing processes listed in Appendix C; (2) the physical layout of plant plumbing should facilitate sampling of the wastewater type under study; (3) the plant must have waste treatment in place; (4) the mix of plants visited should contain discharges to both surface waters and publicly owned treatment works; and (5) the selected plants should provide a representative geographical distribution to avoid a data base that concentrates on a unique geographical condition. EPA sampled 210 facilities to identify pollutants in plant wastewaters. Before visiting a plant, EPA reviewed all available data on manufacturing processes and waste treatment. We selected representative points at which to sample the raw wastewater entering the treatment systems and the final treated effluents. Finally, we prepared, reviewed, and approved a detailed sampling plan showing the selected sample points and the overall sampling procedure.

Based on this sampling plan, we then took samples at each sample point for 1, 2 or 3 consecutive days. The samples were divided into two analytical groups. Within each group the samples were subjected to various analyses, depending on the stability of the pollutants to be analyzed. The various levels of analysis were conducted at: (1) Local laboratories, (2) EPA's Chicago laboratory, (3) contracted gas chromatography/mass spectrometry (GC/MS) laboratories, and (4) the sampling contractor's central laboratory. The sampling and analysis methods are outlined in the Development Document.

The acquisition, preservation, and analysis of the water samples followed the relevant methods set forth in 40 CFR 136. Although the Agency has not promulgated analytical methods for

many organic toxic pollutants under Section 304(h) of the Act, a number of these methods have been proposed for 40 CFR 136 (44 FR 69464, December 3, 1979; 44 FR 75028, December 18, 1979).

VI. Industry Subcategorization

In developing this regulation, the Agency considered whether different effluent limitations and standards are appropriate for different segments of the metal finishing industry. The Act requires EPA to consider a number of factors to determine if subcategorization is needed. These factors include raw materials, final products, manufacturing processes, geographical location, plant size and age, wastewater characteristics, non-water-quality environmental impacts, treatment costs, energy costs, and solid waste generation.

The metal finishing industry comprises 45 unit operations. These processes generate wastewater that falls into five waste groups, each requiring different treatment to reduce the discharge of pollutants. The five groups are metals, cyanide, hexavalent chromium, oils, and solvents, with significant toxic organics pollutants potentially present in the last two.

These wastes occur in a wide variety of combinations. Throughout the industry, however the wastestreams are alike in one critical sense; they all respond similarly to the treatment system which is already most widely used in the industry. That system was selected as EPA's model technology. Its major components, i.e., precipitation and clarification, are used for all waste streams. After isolated treatment of hexavalent chromium, cyanide, and oil and grease, pollutants in these waste streams are further reduced by passage through the precipitation-clarification system which is also used for metal-bearing wastes.

The Agency has determined that the Metal Finishing Point Source Category need not be subcategorized for regulation. A set of concentration based limitations, based on the performance capabilities of the model technology, can be applied to all metal finishing process effluents.

EPA has, however decided to exempt indirect discharging job shops and independent printed circuit board manufacturers from the Part 433 PSES. This has an effect similar to placing them in a separate subcategory. As noted above, this is consistent with the 1980 Settlement Agreement in which the National Association of Metal Finishers promised to withdraw its legal challenge to those Part 413 PSES if EPA did not,

for the next several years, make them significantly more stringent.

The Agency considered, but decided against production based standard. With the wide range of operations, product quality requirements, existing process configurations, and difficulties in measuring production, no consistent production normalizing relationship could be found. Concentration based limits, however, can be consistently attained throughout the industry.

VII. Available Wastewater Control and Treatment Technology

A. Status of In-Place Technology

Installed control and treatment technologies in the metal finishing industry generally consist of some form of alkaline precipitation and clarification installed at "end-of-pipe" to remove metals. When cyanide or hexavalent chromium wastes are present, these wastewaters are generally segregated and treated upstream.

B. Control Treatment Options

We examined the following control treatment options:

Option 1: Precipitation and clarification. Stream segregation for cyanide, hexavalent chromium and concentrated oily wastes followed by cyanide destruction, chromium reduction and emulsion breaking skimming as necessary. Solvent waste segregation and removal by hauling.

Option 2: Option 1 plus filtration.

Option 3: Option 1 plus in-plant control for cadmium.

VIII. General Criteria for Effluent Limitations

A. BPT Effluent Limitations

The factors considered in defining best practicable control technology currently available (BPT) include: (1) The total cost of applying the technology relative to the effluent reductions that result, (2) the age of equipment and facilities involved, (3) the processes used, (4) engineering aspects of the control technology, (5) process changes, (6) non-water-quality environmental impacts (including energy requirements), (7) and other factors, as the Administrator considers appropriate. In general, the BPT level represents the average of the best existing performances of plants within the industry of various ages, sizes, processes, or other common characteristics. When existing performance is uniformly inadequate, BPT may be transferred from a different subcategory or category. BPT focuses on

end-of-pipe treatment rather than process changes or internal controls, except when these technologies are common industry practice.

The cost/benefit inquiry for BPT is a limited balancing of costs versus benefits, committed to EPA's discretion, which does not require the Agency to quantify benefits in monetary terms. See e.g., *American Iron and Steel Institute v. EPA*, 526 F.2d 1027 (3rd Cir. 1975). In balancing costs against the benefits of effluent reduction, EPA considers the volume and nature of existing discharges, the volume and nature of discharges expected after application of BPT, the general environmental effects of the pollutants, and the cost and economic impacts of the required level of pollution control. The Act does not require or permit consideration of water quality problems attributable to particular point sources, or water quality improvements in particular bodies of water. Therefore, EPA has not considered these factors. See *Weyerhaeuser Company v. Costle*, 590 F.2d 1011 (D.C. Cir. 1978).

B. BAT Effluent Limitations

The factors considered in defining best available technology economically achievable (BAT) include the age of the equipment and facilities involved, the processes used, engineering aspects of the control technology, process changes, non-water-quality environmental impacts (including energy requirements), and the costs of applying such technology (Section 304(b)(2)(B)). The BAT level represents the best economically achievable performance of plants of various ages, sizes, processes, or other shared characteristics. As with BPT, uniformly inadequate performance within a category or subcategory may require transfer of BAT from a different subcategory or category. Unlike BPT, however, BAT may include process changes or internal controls, even when these technologies are not common industry practice.

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

Despite this expanded consideration of costs, the primary factor for determining BAT is the effluent

reduction capability of the control technology. The Clean Water Act of 1977, establishes the achievement of BAT as the principal national means of controlling toxic water pollution from direct discharging plants.

C. BCT Effluent Limitations

The 1977 amendments added Section 301(b)(2)(E) to the Act, establishing "best conventional pollutant control technology" (BCT) for discharges of conventional pollutants from existing industrial point sources. Section 304(b)(4) specified the following as conventional pollutants: BOD, TSS, fecal coliform, and pH. The Administrator designated oil and grease as "conventional" on July 30, 1979, 44 FR 44501.

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

EPA published its methodology for carrying out the BCT analysis on August 29, 1979, (44 FR 50732). In the case mentioned above, the Court of Appeals ordered EPA to correct data errors underlying EPA's calculation of the first test, and to apply the second cost test. (EPA had argued that a second cost test was not required).

BCT limitations for this industry were proposed on October 29, 1982 (47 FR 49176). They were accompanied by a proposed methodology for the general development of BCT limitations. BCT limits for this industry will be promulgated with, or soon after, the promulgation of the final methodology for BCT development. At that time EPA will respond to relevant comments filed in either that rulemaking or in this one.

D. New Source Performance Standards

The basis for new source performance standards (NSPS) under Section 306 of the Act is the best available demonstrated technology. New plants have the opportunity to design the best and most efficient metal finishing

processes and wastewater treatment technologies. Therefore, Congress directed EPA to consider the best demonstrated process changes, in-plant controls, and end-of-pipe treatment technologies that reduce pollution to the maximum extent feasible.

E. Pretreatment Standards for Existing Sources

Section 307(b) of the Act requires EPA to promulgate pretreatment standards for existing sources (PSES), which industry must achieve within three years of promulgation. PSES are designed to prevent the discharge of pollutants which pass through, interfere with, or are otherwise incompatible with the operation of POTW's.

The legislative history of the 1977 Act indicates that pretreatment standards are to be technology-based, analogous to the best available technology for removal of toxic pollutants. The General Pretreatment Regulations which serve as the framework for the final metal finishing pretreatment standards are in 40 CFR Part 403, 46 FR 9404 (January 28, 1981).

EPA has generally determined that there is pass through of pollutants if the percent of pollutants removed by a well-operated POTW achieving secondary treatment is less than the percent removal by the BAT model treatment system. A study of 40 well-operated POTW's with biological treatment and meeting secondary treatment criteria showed that regulated metals are typically removed at rates varying from 20 to 70%. POTW's with only primary treatment have even lower rates of removal. In contrast, BAT level treatment by metal finishing industrial facilities can achieve removals of approximately 97% or more. Thus it is evident that metals from this industry do pass through POTW's. As for toxic organics, data from the same POTW's illustrate a wide range of removal, from 0 to greater than 99%. Overall POTW's have removal rates of toxic organics which are less effective than the metal finishing TTO technology basis of no dumping of toxic organic wastes. The POTW's effluent discharge of specific toxic pollutants ranged from 0 to 4.3 milligrams/liter. Many of the pollutants present in metal finishing wastes, at sufficiently high concentrations, can inhibit biodegradation in POTW operations. In addition, a high concentration of toxic pollutants in the sludge can limit POTW use of sludge management alternatives, including the beneficial use of sludges on agricultural lands.

Section 307 of the Clean Water Act provides that POTW's may grant credit to indirect dischargers, based on the degree of removal actually achieved at the POTW. EPA has General Pretreatment Regulations regulating POTW's authority to grant such credits.

A Federal Register notice of September 28, 1982 explained EPA's latest data and proposed national removal credits for well operated POTW's achieving the national secondary treatment limits. See 47 FR 42698. That proposal is not being relied on in this rulemaking; however if such credits are available the costs of today's standards could be substantially reduced.

F. Pretreatment Standards for New Sources

Section 307(c) of the Act requires EPA to promulgate pretreatment standards for new sources (PSNS) at the same time that it promulgates NSPS. These standards are intended to prevent the discharge of pollutants which pass through, interfere with, or are otherwise incompatible with a POTW. New indirect dischargers, like new direct dischargers, have the opportunity to incorporate the best available demonstrated technologies—including process changes, in-plant controls, and end-of-pipe treatment technologies—and to select plant sites that ensure the treatment system can be adequately installed. Therefore, the Agency sets PSNS after considering the same criteria considered for NSPS. PSNS will have effluent reduction benefits similar to NSPS.

IX. Summary of Final Regulations

In the electroplating/metal finishing industry, the pollutants of concern are cadmium, chromium, copper, lead, nickel, silver, zinc, cyanide, toxic organics, TSS, oil and grease, and pH. The treatment option selected for each effluent limitation, pretreatment standard and new source performance standard is based on the criteria specified in the Clean Water Act. The technologies are discussed in more detail in the Development Document for this rulemaking.

A. Part 433

The pollutants being regulated under BPT limitations are cadmium, copper, chromium, nickel, lead, silver, zinc, total cyanide, TSS, oil and grease and pH. Total toxic organics (TTO) is also being regulated. Compliance with the TTO limit basically involves not dumping concentrated toxic organic wastes, e.g., solvent degreasers and paint strippers. Other sources are generally small, infrequent, and of low concentrations.

For BPT, EPA is setting limits achievable by technology based on precipitation and clarification for all metal finishing effluents. In addition, for cyanide or hexavalent chromium the technology basis incorporates techniques to destroy cyanide and reduce hexavalent chromium to its trivalent state. These effluent limitations reflect the average of the best existing control technologies widely used in the industry and remove approximately 97.6 percent of the raw waste of toxic metals and cyanide, and 99 percent of the toxic organics discharged. The technology is consistent with that used as a basis for PSES for the electroplating industry (January 28, 1981, 40 FR 9462) and the March 28, 1974, suspended, BPT limitations. The limitations are derived in the manner discussed in the following section. They are generally more stringent than those found in currently effective electroplating pretreatment regulations, because EPA is now using a revised and updated data base.

For BAT, EPA is establishing limitations for the toxic pollutants and at a level equivalent to BPT. The Agency seriously considered setting BAT and BAT-level PSES limitations based on BPT level technology plus filtration. Filtration would have led to an additional capital cost of almost \$1.2 billion. In light of the statutory mandate to consider cost in setting BAT, EPA decided to reject the filtration option, because of its very high aggregate cost on a nationwide basis. We did not select in-plant cadmium control because it can require significant re-engineering of process water flow and of product and equipment handling, on a plant-by-plant basis. The changes vary widely and in many cases could be difficult for existing plants to apply. The compliance date for BAT is no later than July 1, 1984, the maximum time allowed by the Act.

For NSPS, EPA is establishing limitations based on BPT/BAT technology plus in-plant control of cadmium. This additional control takes advantage of a new plant's ability to achieve effluent reductions of 69% beyond BAT cadmium levels. The pollutants regulated under NSPS are the same as those regulated under BPT limitations.

For PSES in the Metal Finishing Category, limitations are based on technology equivalent to BAT and BPT. The pollutants regulated under this PSES are the same as the toxic pollutants regulated under BPT (BAT) limitations. A study of 40 well-operated POTW's with biological treatment and meeting secondary treatment criteria showed that regulated metals and

cyanide are typically removed at rates varying from 20 to 70%. POTW's with primary treatment have even lower rates of removal. In contrast, metal finishing PSES-level treatment can achieve removals of approximately 97%. Thus it is evident that metals and cyanide from this industry do pass through POTW's. As for toxic organics, data from the same POTW's illustrates a wide range of removal, from 0% to greater than 99%. Overall POTW's have removal rates of toxic organics which are less effective than the metal finishing TTO technology basis of no dumping of toxic organic wastes. The POTW's effluent discharge of specific toxic pollutants ranged from 0 to 4.3 mg/l. Many of the pollutants present in metal finishing wastes at sufficiently high concentrations can inhibit biodegradation in POTW operations. In addition, a high concentration of toxic pollutants in the sludge can limit POTW use of sludge management alternatives, including the beneficial use of sludges on agricultural lands.

The compliance date for the metal finishing PSES is February 15, 1986 for metals, cyanide, and TTO. Agency analysis indicates that facilities can plan, design, and install the necessary equipment in 31 months, which will be allowed by the specified compliance date. There is also a June 30, 1984 compliance date for an interim toxic organic limit, which can be met by in-house management and handling controls.

For PSNS, limitations are based on technology equivalent to NSPS. The pollutants regulated under PSNS are the same as the toxics regulated under NSPS. As with PSES, these pollutants are necessary for control in PSNS to prevent pass through, interference, and sludge contamination.

B. Part 413

Indirect discharging job shops and independent printed circuit board manufacturers will continue to be regulated under the existing PSES for Electroplating. This is consistent with a 1980 Settlement Agreement in which the National Association of Metal Finishers and the Institute for Interconnecting and Packaging Electronic Circuits agreed not to challenge the Part 413 pretreatment standards for existing source electroplaters, in return for the 1981 amendments and an EPA commitment that, in light of their economic vulnerability, EPA did not plan to develop significantly more stringent standards for those plants for the next several years.

Control of toxic organics is being added to the requirements for facilities under the Electroplating PSES. Examination of the technology requirements, costs, economic impact, and timing indicates that requiring control of toxic organics is consistent with the Settlement Agreement.

First, it will not increase the economic vulnerability of job shops or independent printed circuit board manufacturers. Compliance with the toxic organic standards can be achieved by good management practices (i.e., not dumping waste solvents into the wastewaters). No additional end-of-pipe technology (beyond that already required by Part 413) is necessary. Economic analyses reveal that control of toxic organics does not impose significant additional costs or impacts.

Second, these facilities are being allowed 3 years to comply with the toxic organic standard. Thus, even if control of TTO were considered "more stringent", the time allowed for compliance will amount to 6 years from the date of the Settlement Agreement. That fulfills the Agency's obligation not to develop more stringent standards for these facilities in the next several years.

X. Derivation of the Limitations

EPA began development of these standards by building on the information obtained in developing the Electroplating Pretreatment Standards. For Metal Finishing, 2783 companies were contacted as part of two surveys (one of 1190 plants and the other of 365 plants) and 1555 useable questionnaire responses were obtained. The Agency also selected 322 plants for visits and/or obtained long term self-monitoring data on them.

The data gathering effort was the basis for the Agency's first two critical determinations. First, pursuant to Section 307(b) of the Act, EPA identified those pollutants that would pass through or interfere with a POTW, or its sludge. Second, EPA discovered that a basic and "classic" pollution control technology was widely practiced in the industry. The system is designed to remove toxic metals from raw wastestreams and it has two principal components—precipitation and clarification. Of 1190 surveyed plants, 689 reported treatment present, of these, 426 facilities practiced the precipitation of metals through pH adjustment of wastewater.

EPA then analyzed the data to discover what those classic and commonly used treatment devices could achieve. For each regulated pollutant EPA looked for two key figures: The average concentration that properly

operated technology would achieve over time, and the variability from that average that would be inevitable even at well-operated plants.

To find long-term concentration averages, EPA examined its file of 322 plants which had been visited and/or had sent long-term self-monitoring data to EPA. Of these plants EPA had sampled 72 with precipitation and clarification. After deletions for improper treatment, dilution, and low raw waste concentrations, 30 plants (sampled by EPA from 1 to 6 days) were used for developing the long-term concentration averages. For these plants, EPA had obtained detailed information on treated and untreated (raw) wastewater characteristics.

For most pollutants the average of this data was used for the long term average. EPA sampled data for cadmium and lead appeared too low to represent the range of raw wastes in the industry. For these parameters EPA used available self-monitoring data to calculate the long-term average. Although the Agency has less information on which to judge the adequacy of treatment in the self-monitoring data, these higher values were used by the Agency to compensate for the relatively low raw waste cadmium and lead at EPA sampled plants. The average of the self-monitoring data for lead and cadmium was used for the long-term average.

The regulations specify daily and monthly average maximums. Thus, the limits are developed from the Agency assessment of long term concentration averages multiplied by variability factors. If a plant intends to consistently comply with the regulatory limit it should use the long term concentration average as the basis for design and operation. The following long-term concentration averages were found to be attainable by the technology EPA assessed, and were coded in this rulemaking. They are presented here as guidance to dischargers and control authorities:

Long Term Concentration Averages

Pollutant or pollutant property	Long term concentration average milligrams per liter (mg/l)
Cadmium (T)	0.13
Chromium (T)	0.572
Copper (T)	0.815
Lead (T)	0.20
Nickel (T)	0.942
Silver (T)	0.096
Zinc (T)	0.549
Cyanide (T)	0.18
Cyanide, A	0.06

Long Term Concentration Averages—Continued

Pollutant or pollutant property	Long term concentration average milligrams per liter (mg/l)
Oil & Grease	11.8
TSS	11.16.8
TTO (raw waste)	1.08
TTO (effluent)	0.434

Variability factors were determined by looking at variations that have occurred in the past. This requires multiple observations at single treatment systems. The self-monitoring data collected by EPA provided approximately 12,000 self-reporting observations which were used to derive variability factors. The variability factors were derived by estimating 99th percentiles based on a lognormal distribution, and then dividing those numbers by the average. These Part 433 metal finishing standards are based on the variability expected for one-day and one-month time periods. The monthly variability factors were derived assuming the monthly average was comprised of ten daily observations.

Finally, the Agency multiplied the resulting variability factor by the expected long-term concentration averages. The results were effluent concentration limits based on actual observations of well-operated plants which allowed for the variability observed at all types of reporting facilities. EPA has assessed the cost of this regulation on the assumption that plants design and operate to meet these long term concentration averages. The final limits represent limits which a well-designed and operated plant should meet approximately 99% of the time. If a plant designs and operates its treatment system to achieve the long-term concentration average and reasonable control fluctuations, then it should have very little expectation of exceeding the promulgated limit for each sampling of the discharge.

XI. Changes From the Proposed Limits

As previously stated the limitations are derived using long-term averages and variability factors. Both of these items underwent some changes between proposal and promulgation.

With regard to long-term concentration averages only slight changes were made. Additional data were added to the data base for lead and zinc, and one plant's data for cadmium were excluded due to complexing problems. The long-term concentration average for lead changed

from 0.17 to 0.20 mg/l, zinc changed from 0.582 to 0.549 mg/l, and cadmium changed from 0.19 to 0.13 mg/l.

The derivation of the proposed TTO limit did not distinguish differences between plants. Comments suggested that plants with certain processes should be allowed a higher limit. EPA in response, examined grouping of plants by sources of TTO; e.g. those that perform solvent degreasing, and/or painting. Plants which performed both solvent degreasing and painting had higher raw waste TTO than any other process group. The final TTO limit is based on that process grouping, which is a conservative assumption since it had the highest background concentration. Furthermore, EPA is now promulgating two TTO limits for plants covered by Part 433. The first is based solely on background levels found prior to end-of-pipe treatment. It must be met by June 30, 1984, except that plants covered by Part 420 (iron and steel) need not meet it until July 10, 1985. The second TTO limit is based on effluent data and takes into account the additional removals achieved by end-of-pipe treatment. This second limit must be met by February 15, 1986. Most facilities should be able to meet this limit after installing end-of-pipe treatment to meet the electroplating PSES of Part 413. However Part 433 allows the period until February 15, 1986 in case additional process streams present special compliance problems.

For PSES, job shops and independent printed circuit board manufacturers are regulated only under Part 413. They will have until July 15, 1986 to comply with TTO. Thus "several years" will have followed the Settlement Agreement of 1980.

In calculating variability factors, changes were made to both the daily maximum variability and thirty day variability. First, the daily maximum variability was calculated in the proposal by using lognormal statistics for plants with less than 100 sampling days and a nonparametric procedure for plants reporting 100 or more observations. For the final regulation the Agency found that the larger data sets had a good fit to the lognormal distribution. Thus the Agency is using the lognormal procedure for all data sets. Second, 30 day limits based on the average of 30 samples have been replaced with a monthly average based on 10 samples per reporting period. This is consistent with other recent Effluent Guidelines for similar industrial categories.

In addition, the Agency responded to comments that the statistical methodology used in proposal did not predict percent exceedances of the 30

day limits consistently with the 99% criterion used to derive the limits. The main reason for this was that day to day dependence in the data was not accounted for in deriving the proposed limits. In deriving the 10 sample monthly limits, the Agency examined data dependence in three ways. First, by fitting the data to a statistical time series model; second, by incorporating direct computations of auto-correlations into derivations of the limits; and third, by fitting observed sequences of 10 day averages to a lognormal distribution. The final monthly limits were determined by fitting observed sequences of 10 day averages to a lognormal distribution because this provided the most satisfactory fit to the data. The general effect of these statistical changes was to raise some limits.

Another change is that an alternative amenable cyanide limit is made available to facilities with significant forms of cyanide (i.e., iron cyanides) not controllable by the technology basis.

XII. Pollutants and Subcategories not Regulated

Paragraph 8 of the Settlement Agreement contains provisions authorizing EPA to exclude toxic pollutants and industry categories and subcategories from regulation under certain circumstances.

A. Exclusion of Toxic Pollutants

Paragraph 8 (a) (iii) of the Settlement Agreement authorizes the Administrator to exclude from regulation toxic pollutants:

- Not detectable by Section 304(h) analytical methods or other state-of-the-art methods; or
- Present in amounts too small to be effectively reduced by available technologies; or
- Present only in trace amounts and neither causing nor likely to cause toxic effects; or
- Detected in the effluent from only a small number of sources within a subcategory and uniquely related to those sources; or
- That will be effectively controlled by technologies on which other effluent limitations and standards are based.

Appendix B to this notice indicates the reason for the exclusion of each toxic pollutant excluded from regulation on the basis of the paragraph 8 criteria.

B. Exclusion of Subcategories

In selecting effluent limitations for the Metal Finishing category as a whole, EPA has not established subcategories and, therefore, has not excluded any

subcategories from toxic pollutant regulation. However, as discussed above, job shops and IPCBMs which are existing indirect dischargers remain subject to the less stringent Part 413 requirements.

XIII. Costs, Effluent Reduction Benefits, and Economic Impact

A. Cost and Economic Impacts

The economic impact assessment of this regulation is presented in *Economic Impact Analysis of Effluent Standards and Limitations for the Metal Finishing Industry*. The analysis details the investment and annual costs that the industry will incur as a result of this regulation. The report assesses the impact of effluent control costs in terms of plant closures, unemployment effects, and increases in the costs of production.

Since proposal, the economic impact analysis has been revised to reflect changes warranted on the basis of comments received and as a result of continued EPA review. Monitoring and compliance costs associated with the control of the regulated pollutants have been estimated for each industry sector and are presented below. Also, the economic analysis has been revised to reflect a current nominal cost of capital of 13 percent versus the 10 percent originally used. In addition, the Economic Analysis was revised to more clearly present supporting data from elsewhere in the record. Finally, the indirect discharging captive facilities with flows less than 10,000 gallons per day have been included in the analysis. Costs and impacts for this group are presented separately below. This industry group was inadvertently omitted from the earlier economic impact analysis.

In order to measure the potential economic impact, EPA reviewed its incremental effect on each of the sectors of the industry (described above in the "Overview of the Industry," and Table 1). These impacts are presented separately below for direct and indirect discharging facilities by job shop, independent printed circuit board shop and captive shop facilities. The incremental combined investment and annual costs, which include interest and depreciation, for all metal finishing facilities incurring costs are \$351 million and \$118 million respectively. These costs are in 1982 dollars, as are those presented below. No plant closures or employment effects are projected. Increases in the cost of production average 0.02 percent. If all 10,409 facilities using end-of-pipe treatment technologies are required by the

municipalities and permit writers to monitor 10 days per month, the total annual costs increase by \$61 million from \$118 million to \$179 million. No closures or employment effects are projected to result from this level of monitoring; the average increase in cost of production would be 0.03 percent versus the 0.02 percent presented above. The Agency has determined that this regulation would be economically achievable even if all facilities are required to monitor 10 days a month. No measureable balance of trade effect is expected from this regulation due to the estimated small change in the price of metal finishing products.

BPT

Direct discharging facilities are not expected to incur costs to comply with the metals and cyanide limitations because these facilities are already covered by NPDES permits which set BPT limits on case-by-case best engineering judgments. A 1981 survey of randomly selected permits indicates that nearly all existing permits specify limits equivalent to, or more stringent than, those contained in this regulation.

Direct discharging facilities may incur costs to comply with the limitation on total toxic organics. EPA assessed TTO compliance costs on the assumption that all plants would incur baseline monitoring costs of \$1,904 on a one time basis. EPA believes that almost all plants will then comply through the certification process. Nevertheless, EPA assumed that those facilities which currently dump would not be able to use the certification process and would incur annual compliance costs. (This same procedure was used for TTO compliance under PSES.) EPA has assumed that the annual BPT compliance costs could be \$29,000 for job shops, \$34,700 for independent printed circuit board manufacturers and \$468,000 for captive shop facilities. These costs apply to 10 out of 365 direct discharging job shops, 12 out of 44 direct discharging independent printed circuit board manufacturers, and 162 out of 2,500 direct discharging captive shop facilities. Increases in the cost of production resulting from the control of TTO are not expected to exceed 0.9 percent. No closure or employment effects are projected for these sectors.

BAT

Since the BAT limitations are the same as the BPT limitations, there is no incremental cost or impact associated with compliance with the BAT limitations.

PSES

Indirect discharging job shop and independent printed circuit board facilities are expected to incur costs only to comply with the TTO limitation which is being added to the electroplating pretreatment standards in Part 413. This TTO limitation is included in the regulation because compliance will significantly reduce toxic organic pollution and will cause negligible economic impacts on these industry sectors. EPA is not imposing metals and cyanide limitations more stringent than those specified in the existing applicable pretreatment standards despite evidence that such limits can be reliably achieved by the technology that forms the basis of the current standards. This is consistent with a March 1980 Settlement Agreement in which the relevant trade associations agreed not to challenge the Part 413 pretreatment standards for existing source electroplaters.

Approximately 77 of an estimated 2,734 indirect discharging job shops and 88 of the 327 indirect independent printed circuit board manufacturers are assumed to incur costs to comply with the TTO standard. Annual costs of \$222,500 and \$254,300 respectively are projected for the two sectors. The average annual cost per facility to comply with the TTO limitations is approximately \$2900, primarily for sampling and analysis. No closures or employment effects are projected for these sectors. Production cost increases are expected not to exceed 0.03 percent for the two sectors.

Non-integrated indirect discharging captive facilities with effluent flows greater than 10,000 gallons per day are assumed to incur additional costs to comply with the TTO standard. Control of metals and cyanide can be achieved through capital investment already required by currently effective electroplating regulations. Although the metals and cyanide standards promulgated today are more stringent than those in the currently effective electroplating regulations, they can be met through use of the same pollution control equipment relied on to meet the electroplating pretreatment standards. The \$167,600 of annual costs associated with control of TTO applies to 58 of the 900 nonintegrated captive indirect dischargers with flow greater than 10,000 gpd. No closure or divestitures are expected to occur.

Non-integrated indirect discharging captive facilities with flows less than 10,000 gallons per day will incur costs from both the metals and cyanide standards and the TTO standards.

Unlike the prior group with flows greater than 10,000 gpd, this group was generally exempt from Part 413's precipitation/clarification based pretreatment standards. Their inclusion in the metal finishing standard could necessitate investments in both end-of-pipe and in-plant treatment technologies. The cost for these facilities to comply with the metals and cyanide standards totals \$11.8 million annually. These costs apply to 912 out of an estimated 2850 nonintegrated indirect discharging captive facilities with flows less than 10,000 gpd. Data indicate that the remainder of these plants already have adequate treatment in place. The annual cost to comply with the TTO standard is \$534,600; this applies to 185 facilities. The average increase in the cost of production is approximately one percent. No closure or employment impacts are projected.

Of the 3,750 facilities in the last industry sector, integrated indirect discharging captives, 1,200 may incur aggregate costs of \$104 million annually to comply with the metals and cyanide standards and 243 of these facilities may incur costs of approximately \$705,000 annually to comply with the TTO standard. Integrated shops perform metal finishing operations in addition to electroplating processes. Thus, they are affected by the existing electroplating standards as well as by today's regulation. EPA anticipates that the integrated facilities will comply with the metal finishing standards by treating their total process discharge through a single treatment system that would be more costly than the one required solely to treat electroplating wastewaters.

The costs indicated above reflect the additional costs of complying with the metal finishing standard; the electroplating costs were reviewed in an earlier regulation 40 CFR Part 413, 44 FR 52590, September 7, 1979 and they serve as the baseline for determining the impacts of the metal finishing regulation. To determine the baseline costs required to comply with the electroplating pretreatment standards, EPA first revised its earlier estimates, based on updated surveys of treatment in place, improved estimates of the population of affected captive shops, and calculated costs attributed to the electroplating flow of integrated captive indirect dischargers. The revised estimate (in 1982 dollars) indicates that this sector's costs for compliance with the electroplating pretreatment standards are \$512 million in capital costs and \$169 million in annual costs, including interest and depreciation. EPA now estimates that the major economic

effects of that regulation would be 24 plant closures and six electroplating divestitures which could result in 896 job losses and 84 job transfers.

In estimating the economic impact of today's metal finishing regulation, EPA assessed the costs of treating the additional flows covered by today's regulation at the model plants used in the electroplating analysis. The costs used in conducting the economic impact analysis reflect the cost of treating all process flows, except for the six electroplating process streams specified in Part 413. To the extent these flows include processes not regulated under metal finishing, the costs and resulting impacts overstate the effect of the metal finishing regulation.

EPA's estimates of the effects of these regulations are based on a sample of approximately 1,100 plants. The results have been extrapolated to the full population of 3,750 plants in this sector. For each model plant the analysis determines the incremental increase in the costs of production to comply with the metal finishing standards. If a plant's compliance costs relative to sales are high, the analysis projects metal finishing process line divestitures or plant closures. Additional impacts, thus, are those due to today's metal finishing regulation only. Investment costs are expected to total approximately \$351 million, while annual costs are projected to be approximately \$118 million, including interest and depreciation. The annual costs represent approximately 0.20 percent of the \$60 billion annual value of shipments from integrated indirect captive plants. EPA's analysis projects that this would lead to no plant closures or process line divestitures, and that no employment disruption would result. The TTO portion of these total annual costs shown above is approximately \$705,000. TTO costs apply to 243 of the 3750 integrated indirect discharging captive facilities.

Finally, EPA assessed the combined impact of today's regulation and the electroplating pretreatment regulation on the captive integrated indirect discharging sector of the industry. This analysis, like those for electroplating and metal finishing alone, was based on costs for the treatment technology used for the development of the limitations. Some plants may receive removal credits or install less expensive technology. In addition, EPA has deferred the compliance date for integrated facilities, thereby allowing plants additional time to plan for compliance and not be subject to treatment costs. This analysis indicated

that the combined investment for the captive integrated indirect discharging sector for both regulations was \$827 million, with annual costs of \$274 million, including interest and depreciation. Thirty plants (out of 3,750) might divest their electroplating lines or close, and 980 jobs (out of 450,000) could be lost or displaced. These impacts are the same as those due to the electroplating pretreatment standards alone. No additional closures, divestitures, or unemployment effects are expected from the more stringent standards promulgated today.

NSPS and PSNS

Finally, the requirements for new sources are the same as those for existing sources, except that cadmium must be controlled more stringently. The incremental cost of compliance with the cadmium control ranges from \$14,000 to \$24,000 per facility depending on the water flow. These costs represent between 0.02 and 2.0 percent of projected value of sales for these facilities. Since cadmium plating occurs at only about 15% of the facilities and in-plant controls can be designed into new facilities, there is expected to be no competitive disadvantage for new sources seeking to enter the industry.

Total Toxic Organics

EPA's economic analysis of the TTO limit had its own costing methodology. Its results were incorporated into the impact analyses for the other specified limits. EPA believes, however, that a certification procedure will make these costs unnecessary in almost all cases.

The Agency is offering the certification procedure as an alternative to self-monitoring because frequent monitoring for toxic organics could be expensive. Under the certification procedures facilities can identify the toxic organics used and certify that the resultant wastes are being properly disposed, i.e., recovered or contract hauled. The Agency expects that almost all plants will certify.

Some plants may still be required to monitor. However, estimating the number of facilities that may still be required to monitor TTO must be accomplished indirectly, because there is no history to indicate how control authorities will apply toxic organic requirements and certification alternatives to monitoring. The Agency examined two indicators of the need to require monitoring. The first was the percentage of plants that currently dump waste solvent degreasers. This percentage may approximate the population size that control authorities need to check. Only 24% of the captives

use solvent degreasing, which is the primary source of potential toxic organic violations in these wastewaters. Comparable figures are 10.3% for job shops and 100% for printed circuit board manufacturers.

These wastes can profitably be recovered by the plant and some waste haulers, who pay for waste solvents, have been identified, and are cited in the public record. Approximately 73% of the facilities which utilize solvent degreasers, already properly dispose of this waste. However even the 27% of the population who now dump their solvents will probably stop that practice and be eligible for certification. In addition some of the solvent degreasers that these plants use do not contain any toxic organics. Other sources of toxic organics present at metal finishing plants may compensate for the Agency's conservative assessment on degreasing but this should not be significant since dumped solvent degreasers are clearly the single most significant source of TTO in wastewaters. Thus this approach leads to a conservative overestimation by the Agency.

The second approach was to examine the percentage of EPA sampled data which exceeded the TTO limit and to consider this as a measure of the fraction of facilities needing monitoring. This was 2.6 percent of the data (i.e., 97.4% of sampled data already complies with the TTO limit). The 2.6 percent exceedance rate of the TTO limit during EPA's sampling supports the need for certification and for control authorities to establish reasoned plant specific monitoring frequencies.

For purposes of economic analyses the number of facilities costed for TTO monitoring was estimated to be equivalent to the number of facilities currently dumping solvents. The economic impact analysis also performed two sensitivity analyses. The first was with a greater number of plants monitoring for TTO. The second assumed that plants monitored for TTO monthly instead of quarterly. Both changes led to only slightly different impacts. All scenarios were found to be acceptable and economically achievable.

Summary

The Agency concludes that the final regulation is economically achievable, and the impacts are justified in light of the effluent reductions achieved. The metal finishing regulation will remove an additional 20 million pounds per year of metals and cyanide and 10 million pounds per year of toxic organics.

B. Executive Order 12291

Under Executive Order 12291 the Agency must determine whether a regulation is "Major" and therefore subject to the requirements of a Regulatory Impact Analysis. Major rules impose an annual cost to the economy of \$100 million or more or meet other economic impact criteria. Based on the Agency's estimates this regulation could have an annual effect on the economy of more than \$100 million, making it a major regulation.

Executive Order 12291 does not require a Regulatory Impact Analysis where its consideration would conflict with the development of regulations pursuant to a court order, as with this metal finishing regulation. EPA has prepared, however, an analysis that contains many of the elements of a Regulatory Impact Analysis. A copy of the analysis can be obtained from Alec McBride, Monitoring and Data Support Division, WH-553, U.S. EPA, 401 M Street, S.W., Washington, D.C. 20460.

C. Regulatory Flexibility Analysis

Pub. L. 96-354 requires that a Regulatory Flexibility Analysis be prepared for regulations that have a significant impact on a substantial number of small entities. The analysis may be done in conjunction with, or as part of, any other analysis conducted by the Agency.

A small business analysis is included in the economic impact analysis. This analysis shows that there will not be a significant impact on any segment of the industry, large or small. Therefore a formal Regulatory Flexibility Analysis was not required.

D. SBA Loans

The agency is continuing to encourage small plants—including circuit board manufacturers—to use Small Business Administration (SBA) financing as needed for pollution control equipment. The three basic programs are: (1) The Guaranteed Pollution Control Bond Program, (2) the Section 503 Program, and (3) the Regular Guarantee Program. All the SBA loan programs are only open to businesses that have: (a) net assets less than \$6 million, and (b) an average annual after-tax income of less than \$2 million, and (c) fewer than 250 employees.

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

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

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

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

XIV. Non-Water-Quality Environmental Impacts

The elimination or reduction of one form of pollution may aggravate other environmental problems. Sections 304(b) and 306 of the Act require EPA to consider the non-water-quality environmental impacts (including energy requirements) of certain regulations. To comply, EPA considered the effect of this regulation on air, noise, radiation, and solid waste generation. While balancing pollution problems against each other and against energy use is difficult, EPA believes that the final regulation best serves overall national goals.

The following are the non-water-quality environmental impacts (including energy requirements) associated with today's regulation.

A. Air Pollution

Compliance with the BPT, BAT, NSPS, PSES, and PSNS will not create any substantial air pollution problems. Alkaline chlorination for cyanide destruction and chromium reduction using sulfur dioxide may produce some emissions to the atmosphere. Precipitation and clarification, the major portion of the technology basis, should not result in any air pollution problems. In addition, control of total toxic organics at the source will result in a decrease in the volatilization of solvents from streams and POTWs.

B. Noise

None of the wastewater treatment processes cause significant objectionable noise.

C. Radiation

None of the treatment processes pose any radiation hazards.

D. Solid Waste

EPA has considered the effect these regulations would have on the accumulation of hazardous waste, as defined under Section 3001 of the Resource Conservation and Recovery Act (RCRA). EPA estimates that the BPT and BAT limitations will not contribute to additional solid or hazardous wastes. However, PSES will increase the solid wastes from these plants by approximately 165,000 metric tons per year. This sludge can be hazardous because it will necessarily contain additional quantities (and concentrations) of toxic metal pollutants. Disposal of these wastes was costed as though they were hazardous.

EPA's Office of Solid Waste has analyzed the solid waste management and disposal costs required by the industry's compliance with RCRA requirements. Some results were published in 45 FR 33066 (May 19, 1980). In addition, RCRA costs have been included in the costs and economic impact analysis during the development of this regulation. However, since November 1980, EPA has received 196 petitions to delist wastes from metal finishing facilities. Seventy-seven have been granted, 104 are pending and 15 have been rejected. Thus it appears that the decision to cost all solid waste disposal as hazardous probably overstated likely costs. Furthermore, the Agency has not assessed the savings likely to occur because of reduced contamination of POTW sludges. Those savings are likely to be considerable.

E. Energy Requirements

EPA estimates that achieving the BPT and BAT effluent limitations will not increase electrical energy consumption.

The Agency estimates that PSES will increase electrical energy consumption by approximately 142 million kilowatt-hours per year. For a typical existing indirect discharger, this will increase energy consumption less than one percent of the total energy consumed for production.

The energy requirements for NSPS and PSNS are estimated to be similar to energy requirement for BAT. However, this can only be quantified in kwh/year after projections are made for new plant construction.

XV. Best Management Practices (BMPs)

Section 304(e) of the Clean Water Act authorizes the Administrator to prescribe "best management practices" ("BMPs"). EPA may develop BMPs that apply to all industrial sites or to a designated industrial category, and may offer guidance to permit authorities in

establishing management practices required by unique circumstances at a given plant.

Although EPA is not prescribing them at this time, future BMPs could require dikes, curbs, or other measures to contain leaks and spills, and could require the treatment of toxic pollutants in these wastes.

XVI. Upset and Bypass Provisions

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

Unlike an upset—which is an unintentional episode—a bypass is an intentional noncompliance to circumvent waste treatment facilities during an emergency.

EPA has both upset and bypass provisions in NPDES permits, and the NPDES regulations include upset and bypass permit provisions. See 40 CFR Part 122.41, 48 FR 14151, 14168 (April 1, 1983). The upset provision establishes an upset as an affirmative defense to prosecution for violation of technology-based effluent limitations. The bypass provision authorizes bypassing to prevent loss of life, personal injury, or severe property damage. Since permittees in the metal finishing industry are entitled to the upset and bypass provisions in NPDES permits, this regulation need not repeat these provisions. Upset provisions are also contained in the general pretreatment regulation.

XVII. Variances and Modifications

Federal and State NPDES permits to direct dischargers must enforce these effluent standards. The pretreatment limitations apply directly to indirect dischargers.

The only exception to the BPT effluent limitations is EPA's "fundamentally different factors" variance. See *E. I. duPont de Nemours and Co. v. Train*, *supra*; *Weyerhaeuser Co. v. Costle*, *supra*. This variance recognizes characteristics of a particular discharger in the category regulated that are fundamentally different from the characteristics considered in this rulemaking. Although this variance clause was set forth in EPA's 1973-1976 industry regulations, it need not be included in this regulation. See 40 CFR Part 125.30.

Dischargers subject to the BAT limitations are also eligible for EPA's "fundamentally different factors" variance. BAT limitations for nonconventional pollutants may be modified under Sections 301(c) and 301(g) of the Act. These statutory modifications do not apply to toxic or conventional pollutants. According to Section 301(j)(1)(B), applications for these modifications must be filed within 270 days after promulgation of final effluent limitations and standards. See 43 FR 40859 (Sept. 13, 1978). These Part 413 and Part 433 regulations do not regulate any non-conventional, non-toxic, pollutants. If any of the regulated pollutants are declared non-toxic, and non-conventional in the future, then dischargers may seek 301(c) or 301(g) modifications.

Indirect dischargers subject to PSES are eligible for the "fundamentally different factors" variance and for credits for toxic pollutants removed by POTW. See 40 CFR 403.7; 403.13; 46 FR 9404 (January 28, 1981). Indirect dischargers subject to PSNS are only eligible for the credits provided for in 40 CFR 403.7. New sources subject to NSPS are not eligible for EPA's "fundamentally different factors" variance or any statutory or regulatory modifications. See *E. I. duPont de Nemours v. Train*, *supra*.

XVIII. Implementation of Limitations and Standards

A. Relation to NPDES Permits.

The BPT, BAT, and NSPS in this regulation will be applied to individual metal finishing plants through NPDES permits issued by EPA or approved State agencies under Section 402 of the Act. The preceding section of this preamble discussed the binding effect of this regulation on NPDES permits,

except when variances and modifications are expressly authorized. This section adds more detail on the relation between this regulation and NPDES permits.

EPA has developed the limitations and standards in this regulation to cover the typical facility for this point source category. In specific cases, the NPDES permitting authority may have to establish permit limits on toxic pollutants that are not covered by this regulation. This regulation does not restrict the power of any permit-issuing authority to comply with law or any EPA regulation, guideline, or policy. For example, if this regulation does not control a particular pollutant, the permit issuer may still limit the pollutant on a case-by-case basis, when such action conforms with the purposes of the Act. In addition, if State water quality standards or other provisions of State or Federal law require limits on pollutants not covered by this regulation (or require more stringent limits on covered pollutants), the permit-issuing authority must apply those limitations.

B. Indirect Dischargers

For indirect dischargers, PSES and PSNS are implemented under National Pretreatment Program procedures outlined in 40 CFR Part 403. The table below may be of assistance in resolving questions about the operation of that program. A brief explanation of some of the submissions indicated on the table follows:

A "request for category determination request" is a written request, submitted by an indirect discharger or its POTW, for a certification on whether the indirect discharger falls within a particular subcategory listed in a categorical pretreatment standard. This assists the indirect discharger in knowing just which PSES or PSNS limits it will be required to meet. See 40 CFR 403.6(a).

A "request for fundamentally different factors variance" is a mechanism by which a categorical pretreatment standard may be adjusted, making it more or less stringent, on a case-by-case basis. If an indirect discharger, a POTW, or any interested person believes that factors relating to specific indirect discharger are fundamentally different from those factors considered during development of the relevant categorical pretreatment standard and that the existence of those factors justifies a different discharge limit from that specified in the categorical standard, then they may submit a request to EPA for such a variance. See 40 CFR 403.13.

A "baseline monitoring report" is the first report an indirect discharger must file following promulgation of a standard applicable to it. The baseline report includes: an identification of the indirect discharger; a description of its operations; a report on the flows of regulated streams and the results of sampling analyses to determine levels of regulated pollutants in those streams; a statement of the discharger's compliance or noncompliance with the standard; and a description of any additional steps required to achieve compliance. See 40 CFR 403.12(b).

A "report on compliance" is required of each indirect discharger within 90 days following the date for compliance with an applicable categorical pretreatment standard. The report must indicate the nature and concentration of all regulated pollutants in the facility's regulated process wastestreams; the average and maximum daily flows of the regulated streams; and a statement of whether compliance is consistently being achieved, and if not, what additional operation and maintenance and/or pretreatment is necessary to achieve compliance. See 40 CFR 403.12(d).

A "periodic compliance report" is a report on continuing compliance with all applicable categorical pretreatment standards. It is submitted twice per year (June and December) by indirect dischargers subject to the standards. The report shall indicate the precise nature and concentrations of the regulated pollutants in its discharge to the POTW; the average and maximum daily flow rates of the facility; the methods used by the indirect discharger to sample and analyze the data, and a certification that these methods conformed to those methods outlined in the regulations. See 40 CFR 403.12(e).

TABLE 2.—INDIRECT DISCHARGERS SCHEDULE FOR SUBMITTAL AND COMPLIANCE

Item/event	Applicable sources	Date or time period	Measured from	Item submitted to
Request for category determination.	Existing	60 days or 60 days	From effective date of standard. From FEDERAL REGISTER Development Document Availability.	Director. ¹
	New	Prior to commencement of discharge to POTW.		
Request for fundamentally different factors variance.	All	180 days or 30 days	From effective date of standard. From final decision on category determination.	Director. ¹
Baseline monitoring report.	All	180 days	From effective date of standard or final decision on category determination.	Control authority. ²
Report on compliance.	Existing	90 days	From date for final compliance.	Control authority. ²
	New	90 days	From commencement of discharge to POTW.	
Periodic Compliance Reports.	All	June and December.		Control authority. ²

¹ Director = a) Chief Administrative Officer of a State water pollution control agency with an approved pretreatment program or b) EPA Regional Water Division Director, if State does not have an approved pretreatment program.

² Control Authority = a) POTW if its pretreatment program has been approved or b) Director of State water pollution control agency with an approved pretreatment program or c) EPA Regional Administrator, if State does not have an approved pretreatment program.

C. Applicability and Compliance Dates

In the electroplating/metal finishing industry some facilities are subject to the Electroplating Category (Part 413) and/or the Metal Finishing Category (Part 433). Table 3 below illustrates which of the regulations are applicable to the various types of facilities. Facilities are subject only to Part 433 (metal finishing) for BPT, BAT, NSPS, and PSNS. For PSES, facilities generally

fall within the applicability of both Parts, although, for each pollutant, only one Part will apply at a given time. There are two exceptions: (1) Existing indirect discharging job shops and IPCBMs have been exempted from the Part 433 Metal Finishing PSES, and (2) metal finishing wastewaters at iron and steel mills are exempted from the Part 413 Electroplating PSES.

TABLE 3.—APPLICABILITY

	Job shops	IPCBM	Captives	Metal finishing at iron and steel mills ¹
PSES:				
Electroplating (Part 413)	x	x	x	
Metal Finishing (Part 433)			x	x
BPT, BAT, NSPS, PSNS:				
Metal Finishing	x	x	x	x

¹ Electroplating process wastewater at iron and steel mills was excluded from the Electroplating PSES by 40 CFR 413.01. Flows from the metal finishing processes at those plants are covered by 40 CFR 433.

The compliance dates for the two categories are presented in Table 4. BPT, BAT, PSNS, and NSPS compliance dates are specified by the Clean Water Act. The compliance dates for Electroplating PSES were set in the Federal Register on September 28, 1982. See 47 FR 42698. Today's regulation allows facilities 3 years to comply with the Electroplating PSES for toxic organics consistent with the Settlement Agreement with NAMF. For metal finishing, the Agency is allowing 31 months for compliance with all parameters. In addition an interim TTO limit has been established for compliance by June 30, 1984; except for metal finishing wastewaters from plants which are also subject to Part 420 (iron and steel), which must comply by July 10, 1985. This last exception is pursuant to a settlement agreement with the steel industry in which EPA agreed that pretreatment requirements would apply to steel discharges in July 1985. It is possible that control of TTO in metal finishing waste streams could, in some cases, lead steel facilities to install treatment technology on the discharge from their steel processes. Therefore, EPA has decided to allow plants covered by Part 420 until June, 1985 to comply with the TTO limit.

TABLE 4.—COMPLIANCE DATES

Regulation	Compliance date
Electroplating PSES for.....	April 27, 1984 (for nonintegrated plants)
Metals and Cyanide (Part 413)	June 30, 1984 (for integrated plants)
Electroplating PSES (Part 413) for TTO. ¹	July 15, 1985
Metal Finishing BPT (Part 433)	As soon as possible.
Metal Finishing BAT	July 1, 1984
Metal Finishing PSES for TTO. ¹	June 30, 1984 (except for plants covered by Part 420); July 10, 1985 (for plants covered by Part 420).
Metal Finishing PSES for Metals, Cyanide and TTO. ²	February 15, 1986.
Metal Finishing NSPS and PSNS	From commencement of discharge.

¹ For these facilities the first TTO limit is based on management practices only.

² This TTO limit is based on management practices followed by precipitation/clarification.

D. Enforcement

A final topic of concern is the operation of EPA's enforcement

program. This was an important consideration in developing this regulation. EPA deliberately sought to avoid standards which would be exceeded by routine fluctuations of well-designed and operated treatment systems. These standards were developed so as to represent limits which such a plant would meet approximately 99% of the time.

The Clean Water Act is a strict liability statute. EPA emphasizes, however, that it can exercise discretion in deciding to initiate enforcement proceedings (*Sierra Club v. Train*, 557 F. 2d 485, 5th Cir., 1977). EPA has exercised, and intends to exercise, that discretion in a manner that recognizes and promotes good-faith compliance.

XIX. Summary of Public Participation

At the time of publication of the proposed metal finishing regulation (August 31, 1982), EPA solicited comments on the proposed rules and, in particular, on six specific issues. Ninety-one commenters responded to these and other issues relating to the electroplating and metal finishing standards. The following parties submitted comments:

Air Transport Association of America
Alpha Industries Inc.
The Aluminum Association Incorporated
American Airlines
American Foundrymen's Society
American Hot Dip Galvanizers
American Metal Stamping Association
Anerock Corporation
Anaconda Aluminum Company
Ansul Fire Protection
Apollo Metals, Inc.
American Telephone and Telegraph Company
Atwood
Babcock and Wilcox
Bausch and Lomb
California Metal Enameling Co.
Caterpillar Tractor Company
Charles A. Frawley
Chrysler Corp.
Control Data Corporation
County Sanitation Districts of Los Angeles County
Cumberland Corporation
D.A.B. Industries, Inc.
Deere and Company
Delta Airlines, Inc.
Department of the Air Force
Eaton Corporation
E. I. DuPont de Nemours and Co.
Eltech Systems Corp.
EMP Laboratories, Incorporated

EPA Region V
ERC-Lancy
Federal-Mogul Corporation
Ferro Corporation
Ford Motor Co.
General Electric Company
General Motors Corporation
Goodyear Aerospace Corporation
Goodyear Tire and Rubber Co.
Gould Electronics and Electrical Products
GTE Services Corporation
GWS Technology, Inc.
Harris Corporation
Harvey Hubbell Incorporated
Hofmann Industries Incorporated
Honeywell
Halogenated Solvent Industry Alliance
Huntington Alloys
Imperial Clevite, Inc.
Institute for Interconnecting and Packaging Electronic Circuits
ITT Telecommunications Corporation
Jenn-Air Corporation
Jayto Corporation
Kaiser Aluminum and Chemical Corporation
Masco Corporation
Manufacturing Association of Central New York
Maytag
Metal Finishing Association of Southern California
Metro Municipality of Metropolitan Seattle
Midland Ross Corporation
Milwaukee Metropolitan Sewerage District
3M Company
Mobay Chemical Corporation
Modine Manufacturing Company
National Association of Metal Finishers
National Electrical Manufacturers' Association
New York State Department of Environmental Conservation
Northern Telecom
Ozark Airlines
PCK Technology Division
PEC Industries
Pioneer Metal Finishing, Inc.
Porcelain Enamel Institute
Porcelain Metals Corporation
Praegitzer Industries Inc.
Raytheon Company
Republic Airlines
Rexnord
Reynolds Aluminum
Rockford Area Chambers of Commerce
R.R. Donnelley and Sons
Sanders Associates Inc.
Sanitary District of Rockford
Sperry Corporation
Square D Company
State of Connecticut Department of Environmental Protection
State of Vermont Agency of Environmental Conservation
State of Wisconsin Department of Natural Resources
United Airlines

Whirlpool Corporation
York Metal Finishing Co.

The major issues raised by commenters are addressed in this section. A summary of all comments received and of our responses is included in the public record for this regulation.

1. Comment: Many commenters objected to the certification language EPA proposed as an alternative to TTO Monitoring. One commenter pointed out that EPA had recently proposed new certification language for signatories to permit applications and reports (40 CFR 122.6) as part of a settlement agreement in the consolidated permits litigation, (*NRDC v. EPA*, and consolidated cases, No. 80-1607, D.C. Cir.) and suggested that EPA adopt that language here.

Response: EPA agrees that changes in the certification language are warranted. First, we believe it is appropriate to modify the proposed language to accord more closely with the certification language agreed to in the consolidated permits settlement agreement concerning 40 CFR § 122.22, formerly § 122.6, 47 FR 25548, 25553 (June 14, 1982). We do not see a significant enough difference between this regulation and § 122.22 to justify substantially different language. Thus, we have adapted the proposed settlement language with minor differences reflecting the particular nature of the TTO certification requirement. This language is substantially similar to that now available for the electrical and electronics industry (Phase I). See 48 FR 15382, April 8, 1983.

Second, we have amended the language to allow the discharger to certify that "no dumping of concentrated toxic organics into the wastewater has occurred since filing the last discharge monitoring report." The proposed language appeared to require the discharger to certify that he is in compliance with the limit; we recognize that it may be difficult to certify to this language in the absence of monitoring. Now, the discharger will be allowed to certify as to his toxic organic management practices. However, because the new wording is less precise (i.e., no "dumping of concentrated toxic organics") and because some commenters pointed to the need for more specificity about certification procedures, we are adding more explicit language requiring the discharger to describe his toxic organic management plan. The proposed language would have required the discharger to specify the toxic organic compounds used and the procedure used to prevent excessive

wastewater discharge of toxic organics, whereas the final language requires the discharger to submit a toxic organic management plan that specifies to the permitting or control authority's satisfaction the toxic organic compounds used; the method of disposal used instead of dumping, such as resale, reclamation, contract hauling, or incineration; and procedures for assuring that toxic organics do not routinely spill or leak into the wastewater. The discharger must also certify that the facility is implementing the toxic organic management plan.

Finally, for direct dischargers, the solvent management plan will be incorporated as a condition of their NPDES permits. A similar requirement does not exist for indirect dischargers because under the Clean Water Act permits are not issued for them by the control authority. However, the pretreatment standard does require indirect dischargers to implement the plan which they submit to the control authority. Both these requirements reinforce the discharger's responsibility to implement his certification statement.

Addition of certification language is intended to reduce monitoring burdens. It does not in any way diminish the discharger's liability for noncompliance with the TTO limitation.

2. Comment: Several commenters questioned EPA's estimate of minimal costs for TTO control stating that significant costs would be incurred from solvent disposal and from compliance monitoring. A number of commenters questioned the statement that costs for solvent disposal could be offset by reclamation of these wastes.

Response: The Agency recognizes that costs can be associated with proper solvent management and compliance monitoring. However, the Agency does not believe these costs will be significant for the majority of the facilities in the industry. 24% of the captives, 10.3% of the job shops and 100% of the printed circuit board facilities perform solvent degreasing. An estimated 73 percent of the facilities using solvent degreasing are already practicing proper disposal of these wastes and would, therefore, not be expected to incur additional costs to comply with the electroplating or metal finishing TTO limits. Facilities not presently practicing proper solvent management would need to implement practices such as contractor removal and/or reclamation.

Costs of proper solvent disposal can be offset by solvent reclamation. In response to comments, the Agency contacted representatives of national solvent reclamation associations. These

representatives indicated that solvent reclamation is a widespread, readily available, and growing practice. In addition to the numerous plants with on-site reclamation facilities, it is estimated that more than 100 independent reclaimers are in operation throughout the country and that reclaimers will pay for spent solvents especially if the solvents are segregated and there is a market demand for the particular solvents.

The Agency recognizes that frequent monitoring for TTO can be expensive. The Agency has attempted to reduce the cost by establishing the certification alternative and by allowing monitoring, when necessary, to be limited to those toxic organics likely to be present in the wastewater of a plant. The Agency believes that almost all facilities will be able to certify in lieu of monitoring.

However, in response to comments on the cost of compliance monitoring, the Agency has re-assessed its cost estimate to consider quarterly monitoring for TTO. This frequency is reflective of a common monitoring frequency required by control authorities. For the reasons explained in section IX, above, EPA believes that its economic analyses of the impacts of the TTO limit are conservative and fully state or overstate the likely actual economic impacts.

3. Comment: Some commenters pointed out that the new source limits for cadmium were not supported by historical performance data. However, no commenters submitted data on performance capabilities of new source technology.

Response: New source standards for cadmium are based on control technology which is designed to reduce cadmium in wastewater discharge from cadmium sources, e.g. cadmium plating, chromating of cadmium plated parts, and acid cleaning of cadmium plated parts. The new source standards for cadmium are based on the amounts of cadmium expected as a background level to be found in wastewaters from plants not involved with cadmium plating. The standards were determined from data on concentrations observed in untreated wastewater from metal finishing plants that do not plate cadmium. It represents the amount of cadmium present from incidental sources, when the principal cadmium sources are full controlled. The data consist of 61 observations from 27 plants. The data were divided into statistically homogeneous groups by plant. The average upon which the standards were based was taken from the group with the highest average cadmium concentration. Estimates of

variability used in determining the limits were obtained from the two highest groups. This was somewhat conservative, because precipitation/clarification systems should achieve significant further removals from these raw waste streams.

The Agency also checked the consistency of the limit with data from EPA sampled precipitation/clarification systems. These data indicated that the new source limit could be achieved alternatively by using precipitation/clarification, rather than total control of the principal cadmium source. This review included plants with cadmium raw wastes of from 0.012 to 1.88 mg/l. The Agency also reviewed the data base used to develop the cadmium limit to verify that it included all available data from non-cadmium plating plants. Prior to promulgation costs were also re-examined to include expenses for control of chromating and acid cleaning of cadmium plated parts, in addition to controlling cadmium plating which was assessed in the proposal.

4. Comment: Commenters suggested various averaging times as the basis for monthly limitations, including 4-day, 30-day, and "N" day averages.

Response: The Agency has evaluated the merits of the suggested alternatives and decided that an average of ten samples (obtained within a one-month period) would provide a reasonable basis for monthly limitations, minimizing the number of samples necessary.

Although it is not anticipated that a monitoring frequency of 10 times per month will always be required, the cost of this frequency of monitoring is presented in the economic impact analysis to the metal finishing regulation. That frequency was selected because if facilities sample 10 times per month they can expect a compliance rate of approximately 99 percent, if they are operating at the expected mean and variability. Plant personnel, in agreement with the control authority, may choose to take fewer samples if their treatment system achieves better long term concentrations or lower variability than the basis for the limits, or if plant personnel are willing to accept a statistical possibility of increased violations. The 10 sample monthly limit is consistent with other regulations and recent proposals for other metals industries, e.g., porcelain enameling, coil coating, batteries, copper, and aluminum forming.

The 4-day average is an inadequate measure of treatment system performance over extended periods. This basis was used for the electroplating rules only under the

special circumstances of a Settlement Agreement.

The N-day average suggested by two commenters was considered by the Agency but was rejected as unnecessarily complex and likely to create confusion for both dischargers and control authorities.

5. Comment: Commenters disagreed on the desirability or need to rescind the electroplating regulations for captive electroplaters upon the compliance date of the metal finishing PSES.

Response: The Part 413 Electroplating PSES will no longer be applicable to captive electroplating when they must comply with the Metal Finishing PSES for metals and cyanide is reached. Captive electroplaters will then be regulated under the Part 433 Metal Finishing PSES. There is no need to maintain two sets of requirements for the same pollutants at the same plants. If, for some reason, Part 433 should become inapplicable, then Part 413 will apply to them.

6. Comment: The majority of commenters responding to the question of the PSES compliance date stated that March 30, 1984 would not provide sufficient time for compliance.

Response: To allow facilities sufficient time to install or upgrade the necessary treatment systems, the Agency is establishing the compliance date of the metal finishing PSES for metals and cyanide to be 31 months from the date of promulgation. This extension is based on an Agency study which showed that 31 months is required to plan, design, and install the recommended treatment technology.

This extension does not apply to compliance with the toxic organics limit, however. For Metal Finishing PSES, an interim TTO level must be achieved by June 30, 1984, based on no end-of-pipe treatment, and the final TTO limit based on end-of-pipe treatment must be achieved 31 months from the date of promulgation. For Electroplating PSES, the TTO compliance date is 3 years from promulgation of this rulemaking. That allows the job shop and IPCBM sectors the maximum allowable time for compliance under the Clean Water Act (CWA).

7. Comment: Commenters stated that the proposed lead limit was not achievable based on the technology recommended. Some argued that plants with high raw waste lead values were not adequately represented in the data base. One commenter submitted additional data.

Response: The Agency reviewed the lead data base to assure that all usable data from plants having a lead source were included. EPA did consider some

additional self-monitoring data that were found to be applicable and excluded data from an originally-considered plant which was not adequately controlling wastewaters. The revised EPA data base was used to derive a final lead limit. The daily maximum for lead has been changed slightly from 0.67 mg/l to 0.69 mg/l. The Agency also examined data submitted during the comment period. These data were not included because of inadequate treatment design and/or operation. For example, TSS values as high as 119 mg/l were submitted, oil and grease was as high as 1395 mg/l and hexavalent chromium was as high as 1.21 mg/l. An examination of the possible effect of including the commenter's data for lead revealed that only a slight change in the limit would have occurred.

8. Comment: Some commenters suggested a small plant exemption from the Metal Finishing regulations, arguing that an exemption should be granted similar to that provided by Part 413 for plants discharging less than 10,000 gallons per day.

Response: Small indirect discharging facilities (<10,000 GPD discharge) were given less stringent requirements in the Electroplating Pretreatment Standards. Many of these facilities are job shops and for the reasons stated above will not be covered by the Part 433 requirements.

The Agency re-examined the effect of the Part 433 metal finishing regulations on small facilities, and, has determined that because job shops and IPCBMs are exempted from the metal finishing PSES there would be no significant economic impacts if the remainder were covered by the metal finishing standards. For indirect captives discharging less than 10,000 GPD, the investment cost would amount to \$36 million with annual costs of \$12 million. There are no estimated plant closure or divestitures. A small facility exemption is not warranted for the Metal Finishing regulation.

9. Comment: Some commenters stated that the addition of a TTO limit to the Electroplating PSES is a violation of the NAMF Settlement Agreement.

Response: Under the March 1980 Settlement Agreement the Agency agreed that:

any further BAT analog standards will be based on treatment technology compatible with the model technology upon which these standards were based In developing BAT analog standards for the industry, EPA will take into account the cumulative impact of these "BPT" regulations in determining what is "economically achievable." . . . As to this segment of the metal finishing industry

that is economically vulnerable, EPA does not believe that more stringent regulations are now economically achievable. Therefore, EPA does not plan to develop more stringent new pretreatment standards for the job shop metal finishing segment in the next several years. Nor does EPA plan to develop in the next several years more stringent standards for the independent printed circuit board segment where significant economic vulnerability also exists.

EPA is not imposing metals and cyanide limitations more stringent than those specified in the Part 413 existing applicable pretreatment standards, despite evidence that such limits can be reliably achieved by the technology that forms the basis of the current standards.

Indirect discharging job shop and independent printed circuit board facilities are expected to incur costs only to comply with the TTO limitation which is being added to the electroplating pretreatment standards in Part 413. This TTO limitation is included in the regulation because it will substantially reduce a significant toxic problem, while compliance will cause negligible economic impacts on these industry sectors. Compliance with the toxic organic standard can be achieved by good management practices (i.e., not dumping waste solvents into the wastewaters). No additional end-of-pipe technology (beyond that required for metals removed) is necessary.

Even under very conservative estimates only 77 of an estimated 2734 indirect discharging job shops and 88 of the 327 indirect independent printed circuit board manufacturers may incur costs to comply with the TTO standard. Total annual costs for all plants of \$222,500 and \$254,300 respectively are projected for the two sectors. The average annual cost per facility to comply with the TTO limitations is approximately \$2900, primarily for sampling and analysis. No closures or employment effects are projected for these sectors. Production cost increases are expected not to exceed 0.03 percent for the two sectors.

The economic impact analysis also performed two sensitivity analyses: the first with a greater number of plants monitoring and, the second, with plants monitoring monthly instead of quarterly. Both changes led to only slightly different impacts. At most only one plant would be affected. All scenarios were found to be acceptable and economically achievable. Thus the TTO limits are not "more stringent standards" in the sense of the Settlement Agreement, which expressly tied "stringency" to "economic vulnerability".

Finally, the TTO limits need not be complied with before 1986. Thus, even if control of TTO were considered significantly more stringent the time allowed for compliance will amount to 6 years from the date of the Settlement Agreement. That fulfills the Agency's 1980 obligation not to develop significantly more stringent standards for those facilities for the next several years.

10. Comment: Some commenters stated that the proposed TTO limit could not be met using a combination of solvent management and common metals treatment. Several commenters also pointed out that plants previously in compliance with the metals limitations under Electroplating PSES may now require installation of common metals treatment to meet the TTO limit.

Response: The Agency has reviewed the TTO data base, reevaluated the mean and variability factor, and revised the effluent limit for TTO. The major factor contributing to the change was the examination of the TTO levels at certain groupings of plants. The most notable discovery was that plants that performed both solvent degreasing and painting tended to have the highest background concentrations of any process grouping. The limit has been based on these plants. Where plants are otherwise subject to a regulation whose technology basis includes precipitation/clarification for removal of metals, the TTO limit has been based on effluent data from precipitation/clarification treatment systems. We have also established a TTO limit of 4.57 mg/l based on only management practices. This limit is being used as an interim requirement prior to installation of pollution/equivalent to precipitation/clarification, and for plants discharging less than 10,000 gpd and now covered by the Part 413 Electroplating PSES. Thus today's regulation specifies an interim TTO limit for small plants (<10,000 gallons per day) because these plants may not already have common metals treatment in place. Furthermore, the Agency notes that most facilities should be capable of achieving compliance with the ultimate TTO standard even without end-of-pipe treatment, simply through strict management control of toxic organics. 89% of the TTO data prior to end-of-pipe treatment would comply with the final TTO limit based on the inclusion of precipitation/clarification.

11. Comment: Several commenters recommended an amenable cyanide limit as an alternative to a total cyanide limit because amenable cyanide more accurately reflects the performance of alkaline chlorination treatment.

Response: Most facilities should be able to meet the total cyanide limit. However, sufficient information has been presented on cyanide formulations and formation of complexes to support the possibility that a significant population could fail to meet the limitations. The technology basis is alkaline chlorination which destroys amenable cyanides. Thus, the final rules include an alternative cyanide limit for plants generating significant quantities of complexed cyanide. The data and basic calculations for the alternative cyanide limit were presented in the proposed development document. The Agency rejected specifying a limit only for amenable cyanide. While complexed cyanide are substantially less toxic, a review of literature indicates that significant transformation of complexed cyanides into amenable cyanides will occur in the aquatic environment due to the presence of sunlight. If any water quality problems occur due to the use of this alternative, the control authority should examine alternative technologies, i.e., precipitation with ferrous sulfate.

12. Comment: Several commenters suggested that fluoride, iron, and hexavalent chromium be regulated.

Response: The Agency did not establish limitations for fluorides, iron, or hexavalent chromium because it was determined that these parameters were (1) not present in sufficiently high quantities to warrant regulation or (2) would be removed by controlling a regulated parameter.

The historical performance data for fluoride in effluent from plants with Option 1 treatment systems shows that the mean concentration was 6.58 mg/l; well below levels required by categorical regulations for other industries, i.e., inorganic chemicals, and electrical and electronic components (phase I).

Iron was not selected for regulation because it would be substantially reduced during proper precipitation/clarification treatment. Thus control of regulated pollutants will also effect control of iron.

A limit was not established for hexavalent chromium because it will be controlled by regulating total chromium. The technology basis does include the cost for hexavalent chromium stream segregation and reduction. As stated in the development document, chemical hexavalent chromium reduction can readily achieve final hexavalent chromium concentrations of 0.16 mg/l for a daily maximum and 0.10 mg/l for a maximum monthly average. Additionally, monitoring for total

chromium has a distinct cost advantage over monitoring for hexavalent and subsequently trivalent chromium. If any of these or other parameters cause problems with achieving local water quality requirements, then the control authority must specify further requirements on a plant-by-plant basis.

13. Comment: Several commenters stated that EPA's method for distributing costs for indirect dischargers between the Part 413 electroplating and the Part 433 metal finishing regulations is misleading and unrealistic. Electroplating compliance costs for captive indirect dischargers have not yet been incurred. When these plants do comply, it will be with both regulations in a one-time investment. Therefore, no costs should be attributed to Electroplating; rather, all costs should be considered as Metal Finishing compliance costs.

Response: The fact that a company may make a one time investment doesn't necessarily mean that all the costs should be attributed to the Part 433 Metal Finishing Standard. The compliance date for Part 433 is now generally two years after compliance is required by Part 413.

When EPA conducts its economic analysis of a guideline, it identifies the incremental costs and impacts, as well as the incremental pollutant removals, of that particular guideline. If other previously promulgated regulations pertain to the same industry, the costs and associated pollutant removals would have been identified in previous economic and environmental analyses. With the metal finishing regulation, the electroplating costs are baseline costs; the will occur even if metal finishing is not promulgated. Costs and impacts of metal finishing are incremental to electroplating; the effect of electroplating isn't negated or obviated because it may be more efficient for plants to make a one time investment.

For non-integrated captive indirect dischargers (more than 10,000 gallons per day), this incremental investment cost is zero. Non-integrated facilities discharge process wastewaters from electroplating operations only. Although these wastewaters are covered by metal finishing standards which are more stringent than electroplating standards, the treatment system installed to meet the electroplating standards will be sufficient to meet the metal finishing limits. This treatment system will be the same whether or not metal finishing is promulgated. The costs associated with installation of this treatment system have already been included in the electroplating analysis and there is no

need to include them in the metal finishing regulatory costs.

For integrated captive indirect dischargers, the incremental investment cost is not zero. Integrated facilities discharge wastewaters from other types of processes in addition to electroplating. Although the facility may segregate its electroplating effluent stream for treatment, it is usually more economical to combine waste streams and build a single treatment facility. This treatment facility will be larger than the facility which would have been constructed to treat a segregated electroplating effluent stream alone. The costs assigned to metal finishing are those incremental costs over and above the amount that would have been spent for treatment of the segregated electroplating effluent stream.

Finally, as noted above, EPA did assess the combined impact of today's regulation and the electroplating pretreatment regulations on the captive integrated indirect discharging sector of the industry, assuming both costs would be borne at the same time. The impacts are the same as those due to the electroplating pretreatment standards alone. No additional closures, divestitures, or unemployment effects are expected from the more stringent standards promulgated today.

14. Comment: Several commenters stated that the Agency should do a Regulatory Impact Analysis as required by Executive Order 12291.

Response: Executive Order 12291 does not require a Regulatory Impact Analysis where its consideration would conflict with the development of regulations pursuant to a court order, as with this metal finishing regulation. EPA has prepared, however, an analysis that contains many of the elements of a Regulatory Impact Analysis. This report is included in the public record for this regulation.

15. Comment: Several commenters stated that the Metal Finishing Guidelines are not economically achievable.

Response: EPA's *Economic Analysis of Proposed Effluent Standards and Limitations for the Metal Finishing Industry* provides an in-depth analysis of the economic impacts of the proposed guidelines. This analysis considers the compliance costs (both capital and annual) for two regulatory options. The economic impacts in terms of plant closures, process divestitures, employment losses, and cost increases are also presented for both options. Analysis results are presented for each segment of the industry that is being regulated: direct discharging job shops

and captives, indirect discharging job shops and captives, and integrated printed circuit board manufactures.

Results for Option I, the selected option, are summarized on Exhibit I-4 and I-5 of the referenced report. The direct discharging segment (both job shops and captives) will incur costs to comply with the TTO limitation only. Indirect discharging job shops and independent printed circuit boards also will incur costs to comply with the TTO standard only. Annual compliance costs at these facilities are less than \$2,900. No closures or employment effects are projected. Indirect discharging captives will incur a total of \$116 million in annual compliance costs. The analysis indicates that this segment is composed primarily of large plants, many of which are members of diversified industrial corporations. As a result, there are no projected impacts among captive plants. The costs of production for indirect discharging captives are projected to increase from 0.2 to 1.0 percent.

The absence of closure or employment effects combined with a small increase in the cost of production ranging from 0.2 to 1.0 percent for all plants covered by the metal finishing regulation indicate that the guidelines are economically achievable.

16. Comment: Commenters questioned the assumption that captive operations have no capital availability problem. They say that the economic conditions have changed and capital availability could indeed be a problem.

Response: Changes in the availability of capital are reflected in the cost of capital. To reflect the increase in the cost of capital, EPA adjusted its nominal cost of capital assumption in the Economic Impact Analysis to 13 percent from the 10 percent cost of capital used in the proposed regulation. To the extent that an increase in the cost of capital is a problem today for metal finishers, it would show up in the impact analysis conducted under the higher cost of capital. No changes in closures or divestitures resulted from the increased cost of capital assumption.

17. Comment: Several commenters stated that EPA did not properly consider the impact on small businesses, specifically the costs of compliance and resultant economic impacts for captive indirect dischargers whose electroplating process flow is less than 10,000 gpd. EPA implicitly assumed that all of these plants are in compliance with the Electroplating Pretreatment Standards, but in fact these Standards exempted plants from compliance whose flow were less than 10,000 gpd. Therefore, they will incur costs and

economic impacts to comply with Metal Finishing Guidelines.

Response: The commenters are correct. The agency has since analyzed the impact on indirect discharging captives with metal finishing process flows of less than 10,000 gpd. The analysis concluded that a total of 912 plants will incur compliance costs. The total capital cost of compliance for this universe is estimated at \$35 million with annual costs of \$12 million. No closures or employment effects are projected for this industry segment.

18. Comment: Commenters questioned the assumption that the metal finishing demand curve is inelastic.

Response: Metal finished products face a wide range of demand elasticities. However, there are no good substitutes for metal finishing due to the quality it imparts on materials. As a result, an increase in the cost of metal finishing will not bring a more than proportional decrease in the use of metal finishing. The analysis assumed that demand for metal finishing is in the inelastic range but did not assume that all cost increases could be passed through. In fact, the captive closure analysis assumes that a plant's captive operations will not be able to pass through a pollution control cost increase if it amounts to more than 5 percent of their total revenue. If the ratio of annual costs to total revenue was larger than 5 percent, the plant was projected to close.

19. Comment: Commenters stated that they thought captive facilities will be at a competitive disadvantage because job shops are exempted from metal finishing standards.

Response: Captives are very rarely in direct competition with job shops, vying for the same customers. Captive platers, by definition, service their own firm's needs. A captive firm will maintain a plating process for its cost advantages, scheduling control, and specialty processes. In the Agency's survey of captive facilities, over 64 percent indicated they performed metal finishing in-house because it was either less expensive to do so or the work flow didn't allow interruption of work. It is true that job shops will often receive a captive's overflow work, but this does not make them price competitors. Also, almost three-fourths of the indirect discharging captive facilities and all direct discharging captives and job shops already have treatment in place. To the extent there may be changes in the competitive position of captives versus job shops, most of these changes would have occurred already. Finally, indirect discharging job shops were exempted from the metal finishing

regulation specifically because of their economic vulnerability. Job shops tend to be much smaller than captives; they average 26 employees and \$1.3 million in sales versus over 100 employees and \$14 million in sales for captives.

20. Comment: A comment was made that the definition of a job shop may force some "job shops" to be classified as captives.

Response: EPA proposed a definition of job shops based on 50% ownership of treated material. This is in accord with existing practice by an overwhelming portion of the affected industry. An examination of the survey of job shops revealed that 95% of the facilities stated that their work was either 100% job ordered or 100% captive. Only 0.26% of the facilities reported that more than 25%, but less than 50%, of their production was done on materials owned by others.

The final definition of a job shop has been modified slightly, making the measurement of "not more than 50% ownership" on a yearly basis. This responds to a commenters' fear of repeated reclassification as a result of business transactions. Now facilities will not be reclassified on a day-to-day basis.

The definition is also appropriate because, the fact that a facility is purchasing materials to be processed indicates some availability of capital. If so the less stringent Part 413 requirements are less appropriate for economic reasons.

The agency considered various job shop definitions from commenters and trade association by-laws, including:

- "As its major operation the application of a surface treatment to the products of others."
- "A shop which has purchased orders from more than 50 percent of the materials in process."
- "Parts to be finished are transported from the customer's plant to the finishers and then back."
- "As its major operation the application of a surface treatment to the products of others."
- "A metal finisher who works to other's specifications, making his services, available to the public at all times."

While some of these, notably the first, are close to the proposed and final definitions, all suggestions included substantial ambiguity. In light of the relaxed standards for job shops it is important that the definition be precise and that captive shops not evade Part 433 merely by taking on nominal outside orders. EPA therefore chose a bright-line test that clearly expressed the

overwhelmingly prevailing practice in the industry.

EPA's definition is consistent with our 1978 survey of the industry, which asked for the "percent of electroplating done on materials owned by others (basis area plated)" and further defined a job shop as "a manufacturing operation performing work on materials owned by others."

XX. Availability of Technical Information

The basis for this regulation is detailed in four major documents. Analytical methods are discussed in *Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants*. EPA's technical conclusions are detailed in *Development Document for Effluent Guidelines, New Source Performance Standards and Pretreatment Standards for the Metal Finishing Point Source Category*. The Agency's economic analysis is presented in *Economic Impact Analysis of Effluent Limitations and Standards for the Metal Finishing Industry*. A summary of the public comments received on the proposed regulation is presented in a report "Responses to Public Comments, Proposed Metal Finishing Effluent Guidelines and Standards," which is part of the public record for this regulation.

Technical information may be obtained by writing to Richard Kinch, Effluent Guidelines Division (WH-552) EPA, 401 M Street, S.W., Washington, D.C. 20460 or by calling (202) 382-7159.

Additional information concerning the economic impact analysis may be obtained from Ms. Kathleen Ehrensberger, Economics Branch (WH-586), EPA, 401 M Street, S.W., Washington, D.C. 20460 or by calling (202) 382-5397.

Copies of the technical and economic documents will be available from the National Technical Information Service, Springfield, Virginia 22161, (703) 487-4650.

XXI. OMB Review

This regulation was submitted to the Office of Management and Budget for review, as required by Executive Order 12291. No written comments were received.

In accordance with the Paperwork Reduction Act of 1980 (Pub. L. 96-511), the reporting and recordkeeping provisions in 40 CFR 413.03 and 433.12 that are included in this regulation will be submitted for approval to OMB. They are not effective until OMB approval has been obtained and the public is notified

to that effect through a technical amendment to this regulation.

XXII. List of subjects

40 CFR Part 413

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

40 CFR Part 433

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

Dated: July 5, 1983.

William D. Ruckelshaus,
Administrator.

Authority: Secs. 301, 304, 306, 307, 308, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 *et seq.*, as amended by the Clean Water Act of 1977, Pub. L. 95-217).

[Note.—These appendices will not appear in the CFR.]

XXIII. Appendices

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

Act—The Clean Water Act.

Agency—The U.S. Environmental Protection Agency.

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

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

BMPS—Best management practices under Section 304(e) of the Act.

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

Captive—A facility which owns more than 50% (annual area basis) of the materials undergoing metal finishing.

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

Development Document—*Development Document for Effluent Limitations, Guidelines, and Standards for the Metal Finishing Point Source Category*, EPA 440-1-80-091-A, June 1980.

Direct discharger—A facility that discharges or may discharge pollutants into waters of the United States.

Indirect discharger—A facility that discharges or may discharge pollutants into a publicly owned treatment works.

Job Shop—A facility which owns not more than 50% (annual area basis) of the materials undergoing metal finishing.

Integrated facility—One that performs electroplating operations (including electroplating, electroless plating, chemical etching and milling, anodizing, coating, and printed circuit board

manufacturing) as only one of several operations necessary for manufacture of a product at a single physical location, and has significant quantities of process wastewater from non-electroplating operations. In addition, to qualify as "integrated," a facility must combine one or more plant electroplating process wastewater lines before or at the point of treatment (or proposed treatment) with one or more plant sewers carrying process wastewater from non-electroplating manufacturing operations.

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

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

POTW—Publicly owned treatment works.

PSES—Pretreatment standards for existing sources of indirect discharges promulgated under Section 307(b) of the Act.

PSNS—Pretreatment standards for new sources of direct discharges, promulgated under Section 307 (b) and (c) of the Act.

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

TTO—Total Toxic Organics is the summation of all values greater than .01 milligrams per liter for each of the specified toxic organics.

Appendix B—Pollutants Excluded From Regulation

(1) Toxic Pollutants—found in only a small number of sources and effectively controlled by the technologies on which the limits are based:

Antimony
Arsenic
Asbestos
Beryllium
Mercury
Selenium
Thallium

(2) Conventional Pollutants:

BOB
Fecal Coliform

Appendix C—Unit Operations in the Metal Finishing Industry

1. @Electroplating
2. Electroless Plating
3. Anodizing
4. Coating (Chromating, Phosphating, and Coloring)
5. Chemical Etching and Milling
6. Printed Circuit Board Manufacturing
7. Cleaning
8. Machining
9. Grinding
10. Polishing
11. Tumbling

12. Burnishing
13. Impact Deformation
14. Pressure Deformation
15. Shearing
16. Heat Treating
17. Thermal Cutting
18. Welding
19. Brazing
20. Soldering
21. Flame Spraying
22. Sand Blasting
23. Other Abrasive Jet Machining
24. Electric Discharge Machining
25. Electrochemical Machining
26. Electron Beam Machining
27. Laser Beam Machining
28. Plasma Arc Machining
29. Ultrasonic Machining
30. Sintering
31. Laminating
32. Hot Dip Coating
33. Sputtering
34. Vapor Plating
35. Thermal Infusion
36. Salt Bath Descaling
37. Solvent Degreasing
38. Paint Stripping
39. Painting
40. Electrostatic Painting
41. Electropainting
42. Vacuum Metalizing
43. Assembly
44. Calibration
45. Testing
46. Mechanical Plating

PART 413—ELECTROPLATING POINT SOURCE CATEGORY

For the reasons stated above, EPA is amending Part 413 of 40 CFR, Chapter I as follows:

1. Section 413.01 is amended by revising paragraph (a) to read as follows:

§ 413.01 Applicability and compliance dates.

(a) This part shall apply to electroplating operations in which metal is electroplated on any basis material and to related metal finishing operations as set forth in the various subparts, whether such operations are conducted in conjunction with electroplating, independently, or as part of some other operation. The compliance deadline for metals and cyanide at integrated facilities shall be June 30, 1984. The compliance date for metals and cyanide at non-integrated facilities shall be April 27, 1984. Compliance with TTO for all facilities shall be July 15, 1986.¹ These

¹ The Consent Decree in *NRDC v. Train*, 12 ERC 1833 (D.D.C. 1979) specifies a compliance date for PSES of no later than June 30, 1984. EPA has moved for a modification of that provision of the Decree. Should the Court deny that motion, EPA will be required to modify this compliance date accordingly.

Part 413 standards shall not apply to a facility which must comply with all the pollutant limitations listed in § 433.15 (metal finishing PSES).

2. Section 413.02 is amended by adding a new paragraph (i), as follows:

§ 413.02 General definitions.

(i) the term "TTO" shall mean total toxic organics, which is the summation of all quantifiable values greater than 0.01 milligrams per liter for the following toxic organics:

Acenaphthene
Acrolein
Acrylonitrile
Benzene
Benzidine
Carbon tetrachloride (tetrachloromethane)
Chlorobenzene
1,2,4-trichlorobenzene
Hexachlorobenzene
1,2-dichloroethane
1,1,1-trichloroethane
Hexachloroethane
1,1-dichloroethane
1,1,2-trichloroethane
1,1,2,2-tetrachloroethane
Chloroethane
Bis (2-chloroethyl) ether
2-chloroethyl vinyl ether (mixed)
2-chloronaphthalene
2,4,6-trichlorophenol
Parachlorometa cresol
Chloroform (trichloromethane)
2-chlorophenol
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3-dichlorobenzidine
1,1-dichloroethylene
1,2-trans-dichloroethylene
2,4-dichlorophenol
1,2-dichloropropane (1,3-dichloropropene)
2,4-dimethylphenol
2,4-dinitrotoluene
2,6-dinitrotoluene
1,2-diphenylhydrazine
Ethylbenzene
Fluoranthene
4-chlorophenyl phenyl ether
4-bromophenyl phenyl ether
Bis (2-chloroisopropyl) ether
Bis (2-chloroethoxy) methane
Methylene chloride (dichloromethane)
Methyl chloride (chloromethane)
Methyl bromide (bromomethane)
Bromoform (tribromomethane)
Dichlorobromomethane
Chlorodibromomethane
Hexachlorobutadiene
Hexachlorocyclopentadiene
Isophorone
Naphthalene
Nitrobenzene

2-nitrophenol
4-nitrophenol
2,4-dinitrophenol
4,6-dinitro-o-cresol
N-nitrosodimethylamine
N-nitrosodiphenylamine
N-nitrosodi-n-propylamine
Pentachlorophenol
Phenol
Bis (2-ethylhexyl) phthalate
Butyl benzyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
Diethyl phthalate
Dimethyl phthalate
1,2-benzanthracene (benzo(a)anthracene)
Benzo(a)pyrene (3,4-benzopyrene)
3,4-Benzofluoranthene (benzo(b)fluoranthene)
11,12-benzofluoranthene (benzo(k)fluoranthene)
Chrysene
Acenaphthylene
Anthracene
1,12-benzoperylene (benzo(ghi)perylene)
Fluorene
Phenanthrene
1,2,5,6-dibenzanthracene (dibenzo(a,h)anthracene)
Indeno (1,2,3-cd) pyrene (2,3-o-phenylene pyrene)
Pyrene
Tetrachloroethylene
Toluene
Trichloroethylene
Vinyl chloride (chloroethylene)
Aldrin
Dieldrin
Chlordane (technical mixture and metabolites)
4,4-DDT
4,4-DDE (p,p-DDX)
4,4-DDD (p,p-TDE)
Alpha-endosulfan
Beta-endosulfan
Endosulfan sulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide (BHC-hexachlorocyclohexane)
Alpha-BHC
Beta-BHC
Gamma-BHC
Delta-BHC
(PCB-polychlorinated biphenyls)
PCB-1242 (Arochlor 1242)
PCB-1254 (Arochlor 1254)
PCB-1221 (Arochlor 1221)
PCB-1232 (Arochlor 1232)
PCB-1248 (Arochlor 1248)
PCB-1260 (Arochlor 1260)
PCB-1016 (Arochlor 1016)
Toxaphene
2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)

3. Section 413.03 is amended by adding the following:

§ 413.03 Monitoring requirements.

(a) In lieu of monitoring for TTO, the control authority may allow industrial users of POTWs to make the following certification as a comment to the

periodic reports required by § 403.12(e): "Based on my inquiry of the person or persons directly responsible for managing compliance with the pretreatment standard for total toxic organics (TTO), I certify that, to the best of my knowledge and belief, no dumping of concentrated toxic organics into the wastewaters has occurred since filing the last discharge monitoring report. I further certify that this facility is implementing the solvent management plan submitted to the control authority."

(b) In requesting that no monitoring be required industrial users of POTWs shall submit a solvent management plan that specifies to the control authority's satisfaction the toxic organic compounds used; the method of disposal used instead of dumping, such as reclamation, contract hauling, or incineration; and procedures for assuring that toxic organics do not routinely spill or leak into the wastewater.

(c) If monitoring is necessary to measure compliance with the TTO standard the industrial user need analyze only for those pollutants which would reasonably be expected to be present.

4. Section 413.14 is amended by adding paragraphs (f), (g), and (h), as follows:

§ 413.14 Pretreatment standards for existing sources.

(f) In addition to paragraphs (a) and (b) the following limitation shall apply for plants discharging less than 38,000 1 (10,000 gal) per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	4.57

(g) In addition to paragraphs (a), (c), (d), and (e) the following limitation shall apply for plants discharging 38,000 1 (10,000 gal) or more per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	2.13

(h) In addition to paragraphs (a), (b), (c), (d), (e), (f), and (g) the following shall apply: An existing source

submitting a certification in lieu of monitoring pursuant to § 413.03 of this regulation must implement the toxic organic management plan approved by the control authority.

5. Section 413.24 is amended by adding paragraph (f), (g) and (h), as follows:

§ 413.24 Pretreatment standards for existing sources.

(f) In addition to paragraphs (a) and (b) the following limitation shall apply for plants discharging less than 38,000 1 (10,000 gal) per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	4.57

(g) In addition to paragraphs (a), (c), (d), and (e) the following limitation shall apply for plants discharging 38,000 1 (10,000 gal) or more per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	2.13

(h) In addition to paragraphs (a), (b), (c), (d), (e), (f), and (g) the following shall apply: An existing source submitting a certification in lieu of monitoring pursuant to § 413.03 of this regulation must implement the toxic organic management plan approved by the control authority.

6. Section 413.44 is amended by adding paragraph (f), (g), and (h), as follows:

§ 413.44 Pretreatment standards for existing sources.

(f) In addition to paragraphs (a) and (b) the following limitation shall apply for plants discharging less than 38,000 1 (10,000 gal) per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	4.57

(g) In addition to paragraphs (a), (c), (d), and (e) the following limitation shall apply for plants discharging 38,000 1

(10,000 gal) or more per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	2.13

(h) In addition to paragraphs (a), (b), (c), (d), (e), (f), and (g) the following shall apply: An existing source submitting a certification in lieu of monitoring pursuant to § 413.03 of this regulation must implement the toxic organic management plan approved by the control authority.

7. Section 413.54 is amended by adding paragraph (f), (g), and (h), as follows:

§ 413.54 Pretreatment standards for existing sources.

(f) In addition to paragraphs (a) and (b) the following limitation shall apply for plants discharging less than 38,000 1 (10,000 gal) per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	4.57

(g) In addition to paragraphs (a), (c), (d), and (e) the following limitation shall apply for plants discharging 38,000 1 (10,000 gal) or more per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	2.13

(h) In addition to paragraphs (a), (b), (c), (d), (e), (f), and (g) the following shall apply: An existing source submitting a certification in lieu of monitoring pursuant to § 413.03 of this regulation must implement the toxic organic management plan approved by the control authority.

8. Section 413.64 is amended by adding paragraphs (f), (g), and (h), as follows:

§ 413.64 Pretreatment standards for existing sources.

(f) In addition to paragraphs (a) and (b) the following limitation shall apply

for plants discharging less than 38,000 1 (10,000 gal) per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	4.57

(g) In addition to paragraphs (a), (c), (d), and (e) the following limitation shall apply for plants discharging 38,000 1 (10,000 gal) or more per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	2.13

(h) In addition to paragraphs (a), (b), (c), (d), (e), (f), and (g) the following shall apply: An existing source submitting a certification in lieu of monitoring pursuant to § 413.03 of this regulation must implement the toxic organic management plan approved by the control authority.

9. Section 413.74 is amended by adding paragraphs (f), (g) and (h), as follows:

§ 413.74 Pretreatment standards for existing sources.

(f) In addition to paragraphs (a) and (b) the following limitation shall apply for plants discharging less than 38,000 1 (10,000 gal) per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	4.57

(g) In addition to paragraphs (a), (c), (d), and (e) the following limitation shall apply for plants discharging 38,000 1 (10,000 gal) or more per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	2.13

(h) In addition to paragraphs (a), (b), (c), (d), (e), (f), and (g) the following shall apply: An existing source

submitting a certification in lieu of monitoring pursuant to § 413.03 of this regulation must implement the toxic organic management plan approved by the control authority.

10. Section 413.84 is amended by adding paragraphs (f), (g) and (h), as follows:

§ 413.84 Pretreatment standards for existing sources.

(f) In addition to paragraphs (a) and (b) the following limitation shall apply for plants discharging less than 38,000 1 (10,000 gal) per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	4.57

(g) In addition to paragraphs (a), (c), (d), and (e) the following limitation shall apply for plants discharging 38,000 1 (10,000 gal) or more per calendar day of electroplating process wastewater:

Pollutant or pollutant property	Maximum for any 1 day
TTO	2.13

(h) In addition to paragraphs (a), (b), (c), (d), (e), (f), and (g) the following shall apply: An existing source submitting a certification in lieu of monitoring pursuant to § 413.03 of this regulation must implement the toxic organic management plan approved by the control authority.

In addition, for the reasons stated above, EPA is establishing a new Part 433 to Title 40 of the Code of Federal Regulations to read as follows:

PART 433—METAL FINISHING POINT SOURCE CATEGORY

Subpart A—Metal Finishing Subcategory

- Sec.
- 433.10 Applicability; description of the metal finishing point source category.
- 433.11 Specialized definitions.
- 433.12 Monitoring requirements.
- 433.13 Effluent limitations representing the degree of effluent reduction attainable by applying the best practicable control technology currently available (BPT).
- 433.14 Effluent limitations representing the degree of effluent reduction attainable by applying the best available technology economically achievable (BAT).
- 433.15 Pretreatment standards for existing sources (PSES).

433.16 New source performance standards (NSPS).

433.17 Pretreatment standards for new sources (PSNS).

433.18 [Reserved]

Authority: Sec. 301, 304(b), (c), (e), and (g), 306(b) and (c), 307(b) and (c), 308 and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1971, as amended by the Clean Water Act of 1977) (the "Act"); 33 U.S.C. 1311, 1314(b) (c), (e), and (g), 1316(b) and (c), 1317(b) and (c), 1318 and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567, Pub. L. 95-217.

Subpart A—Metal Finishing Subcategory

§ 433.10 Applicability; description of the metal finishing point source category.

(a) Except as noted in paragraphs (b) and (c), of this section, the provisions of this subpart apply to plants which perform any of the following six metal finishing operations on any basis material: Electroplating, Electroless Plating, Anodizing, Coating (chromating, phosphating, and coloring), Chemical Etching and Milling, and Printed Circuit Board Manufacture. If any of those six operations are present, then this part applies to discharges from those operations and also to discharges from any of the following 40 process operations: Cleaning, Machining, Grinding, Polishing, Tumbling, Burnishing, Impact Deformation, Pressure Deformation, Shearing, Heat Treating, Thermal Cutting, Welding, Brazing, Soldering, Flame Spraying, Sand Blasting, Other Abrasive Jet Machining, Electric Discharge Machining, Electrochemical Machining, Electron Beam Machining, Laser Beam Machining, Plasma Arc Machining, Ultrasonic Machining, Sintering, Laminating, Hot Dip Coating, Sputtering, Vapor Plating, Thermal Infusion, Salt Bath Descaling, Solvent Degreasing, Paint Stripping, Painting, Electrostatic Painting, Electropainting, Vacuum Metalizing, Assembly, Calibration, Testing, and Mechanical Plating.

(b) In some cases effluent limitations and standards for the following industrial categories may be effective and applicable to wastewater discharges from the metal finishing operations listed above. In such cases these Part 433 limits shall not apply and the following regulations shall apply:

- Nonferrous metal smelting and refining (40 CFR Part 421)
- Coil coating (40 CFR Part 465)
- Porcelain enameling (40 CFR Part 466)
- Battery manufacturing (40 CFR Part 481)
- Iron and steel (40 CFR Part 420)
- Metal casting foundries (40 CFR Part 464)
- Aluminum forming (40 CFR Part 467)
- Copper forming (40 CFR Part 468)
- Plastic molding and forming (40 CFR Part 463)

(c) This Part does not apply to: (1) Metallic platemaking and gravure cylinder preparation conducted within printing and publishing facilities; and (2) existing indirect discharging job shops and independent printed circuit board manufacturers which are covered by 40 CFR Part 413.)

§ 433.11 Specialized definitions.

The definitions set forth in 40 CFR and the chemical analysis methods set forth in 40 CFR 136 are both incorporated here by reference. In addition, the following definitions apply to this part:

(a) The term "T", as in "Cyanide, T", shall mean total.

(b) The term "A", as in "Cyanide A", shall mean amenable to alkaline Chlorination.

(c) The term "job shop" shall mean a facility which owns not more than 50% (annual area basis) of the materials undergoing metal finishing.

(d) The term "independent" printed circuit board manufacturer shall mean a facility which manufactures printed circuit boards principally for sale to other companies.

(e) The term "TTO" shall mean total toxic organics, which is the summation of all quantifiable values greater than .01 milligrams per liter for the following toxic organics:

Acenaphthene
Acrolein
Acrylonitrile
Benzene
Benzidine
Carbon tetrachloride (tetrachloromethane)
Chlorobenzene
1,2,4-trichlorobenzene
Hexachlorobenzene
1,2-dichloroethane
1,1,1-trichloroethane
Hexachloroethane
1,1-dichloroethane
1,1,2-trichloroethane
1,1,2,2-tetrachloroethane
Chloroethane
Bis (2-chloroethyl) ether
2-chloroethyl vinyl ether (mixed)
2-chloronaphthalene
2,4,6-trichlorophenol
Parachlorometa cresol
Chloroform (trichloromethane)
2-chlorophenol
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
N-nitrosodi-n-propylamine
Pentachlorophenol
Phenol
Bis (2-ethylhexyl) phthalate
Butyl benzyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
Diethyl phthalate
Dimethyl phthalate
1,2-benzanthracene
(benzo(a)anthracene)

Benzo(a)pyrene (3,4-benzopyrene)
 3,4-Benzofluoranthene (benzo(b)fluoranthene)
 1,12-benzofluoranthene
 (benzo(k)fluoranthene)
 Chrysene
 Acenaphthylene
 Anthracene
 1,12-benzoperylene (benzo(ghi)perylene)
 Fluorene
 Phenanthrene
 1,2,5,6-dibenzanthracene
 (dibenzo(a,h)anthracene)
 Indeno(1,2,3-cd) pyrene (2,3-o-phenylene
 pyrene)
 Pyrene
 Tetrachloroethylene
 Toluene
 Trichloroethylene
 Vinyl chloride (chloroethylene)
 3,3-dichlorobenzidine
 1,1-dichloroethylene
 1,2-trans-dichloroethylene
 2,4-dichlorophenol
 1,2-dichloropropane (1,3-dichloropropene)
 2,4-dimethylphenol
 2,4-dinitrotoluene
 2,6-dinitrotoluene
 1,2-diphenylhydrazine
 Ethylbenzene
 Fluoranthene
 4-chlorophenyl phenyl ether
 4-bromophenyl phenyl ether
 Bis (2-chloroisopropyl) ether
 Bis (2-chloroethoxy) methane
 Methylene chloride (dichloromethane)
 Methyl chloride (chloromethane)
 Methyl bromide (bromomethane)
 Bromoform (tribromomethane)
 Dichlorobromomethane
 Chlorodibromomethane
 Hexachlorobutadiene
 Hexachlorocyclopentadiene
 Isophorone
 Naphthalene
 Nitrobenzene
 2-nitrophenol
 4-nitrophenol
 2,4-dinitrophenol
 4,6-dinitro-o-cresol
 N-nitrosodimethylamine
 N-nitrosodimethylamine
 Aldrin
 Dieldrin
 Chlordane (technical mixture and
 metabolites)
 4,4-DDT
 4,4-DDE (p,p-DDX)
 4,4-DDD (p,p-TDE)
 Alpha-endosulfan
 Beta-endosulfan
 Endosulfan sulfate
 Endrin
 Endrin aldehyde
 Heptachlor
 Heptachlor epoxide (BHC-
 hexachlorocyclohexane)
 Alpha-BHC
 Beta-BHC
 Gamma-BHC
 Delta-BHC
 (PCB-polychlorinated biphenyls)
 PCB-1242 (Arochlor 1242)
 PCB-1254 (Arochlor 1254)
 PCB-1221 (Arochlor 1221)
 PCB-1232 (Arochlor 1232)
 PCB-1248 (Arochlor 1248)

PCB-1260 (Arochlor 1260)
 PCB-1016 (Arochlor 1016)
 Toxaphene
 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)

§ 433.12 Monitoring requirements.

(a) In lieu of requiring monitoring for TTO, the permitting authority (or, in the case of indirect dischargers, the control authority) may allow dischargers to make the following certification statement: "Based on my inquiry of the person or persons directly responsible for managing compliance with the permit limitation [or pretreatment standard] for total toxic organics (TTO), I certify that, to the best of my knowledge and belief, no dumping of concentrated toxic organics into the wastewaters has occurred since filing of the last discharge monitoring report. I further certify that this facility is implementing the solvent management plan submitted to the permitting [or control] authority." For direct dischargers, this statement is to be included as a "comment" on the Discharge Monitoring Report required by 40 CFR 122.44(i), formerly 40 CFR 122.62(i). For indirect dischargers, the statement is to be included as a comment to the periodic reports required by 40 CFR 403.12(e). If monitoring is necessary to measure compliance with the TTO standard, the industrial discharger need analyze for only those pollutants which would reasonably be expected to be present.

(b) In requesting the certification alternative, a discharger shall submit a solvent management plan that specifies to the satisfaction of the permitting authority (or, in the case of indirect dischargers, the control authority) the toxic organic compounds used; the method of disposal used instead of dumping, such as reclamation, contract hauling, or incineration; and procedures for ensuring that toxic organics do not routinely spill or leak into the wastewater. For direct dischargers, the permitting authority shall incorporate the plan as a provision of the permit.

(c) Self-monitoring for cyanide must be conducted after cyanide treatment and before dilution with other streams. Alternatively, samples may be taken of the final effluent, if the plant limitations are adjusted based on the dilution ratio of the cyanide waste stream flow to the effluent flow.

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

(a) Except as provided in 40 CFR 125.30-32, any existing point source subject to this subpart must achieve the following effluent limitations

representing the degree of effluent reduction attainable by applying the best practicable control technology currently available (BPT):

BPT EFFLUENT LIMITATIONS

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cadmium (T)	0.69	0.26
Chromium (T)	2.77	1.71
Copper (T)	3.38	2.07
Lead (T)	0.69	0.43
Nickel (T)	3.98	2.38
Silver (T)	0.43	0.24
Zinc (T)	2.61	1.48
Cyanide (T)	1.20	0.69
TTO	2.13	
Oil & Grease	52	26
TSS	60	31
pH	(¹)	(¹)

¹ Within 6.0 to 9.0.

(b) Alternatively, for industrial facilities with cyanide treatment, and upon agreement between a source subject to those limits and the pollution control authority, the following amenable cyanide limit may apply in place of the total cyanide limit specified in paragraph (a) of this section:

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cyanide (A)	0.85	0.32

(c) No user subject to the provisions of this subpart shall augment the use of process wastewater or otherwise dilute the wastewater as a partial or total substitute for adequate treatment to achieve compliance with this limitation.

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

(a) Except as provided in 40 CFR 125.30-32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by applying the best available technology economically achievable (BAT):

BAT EFFLUENT LIMITATIONS

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cadmium (T)	0.69	0.26
Chromium (T)	2.77	1.71
Copper (T)	3.38	2.07
Lead (T)	0.69	0.43

BAT EFFLUENT LIMITATIONS—Continued

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Nickel (T)	3.98	2.38
Silver (T)	0.43	0.24
Zinc (T)	2.61	1.48
Cyanide (T)	1.20	0.65
TTO	2.13	

(b) Alternatively, for industrial facilities with cyanide treatment, and upon agreement between a source subject to those limits and the pollution control authority, the following amenable cyanide limit may apply in place of the total cyanide limit specified in paragraph (a) of this section:

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cyanide (A)	0.86	0.32

(c) No user subject to the provisions of this subpart shall augment the use of process wastewater or otherwise dilute the wastewater as a partial or total substitute for adequate treatment to achieve compliance with this limitation.

§ 433.15 Pretreatment standards for existing sources (PSES).

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES):

PSES FOR ALL PLANTS EXCEPT JOB SHOPS AND INDEPENDENT PRINTED CIRCUIT BOARD MANUFACTURERS

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cadmium (T)	0.69	0.26
Chromium (T)	2.77	1.71
Copper (T)	3.38	2.07
Lead (T)	0.69	0.43
Nickel (T)	3.98	2.38
Silver (T)	0.43	0.24
Zinc (T)	2.61	1.48
Cyanide (T)	1.20	0.65
TTO	2.13	

(b) Alternatively, for industrial facilities with cyanide treatment, upon agreement between a source subject to those limits and the pollution control authority, the following amenable cyanide limit may apply in place of the total cyanide limit specified in

paragraph (a) of this section:

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cyanide (A)	0.86	0.32

(c) No user introducing wastewater pollutants into a publicly owned treatment works under the provisions of this subpart shall augment the use of process wastewater as a partial or total substitute for adequate treatment to achieve compliance with this standard.

(d) An existing source submitting a certification in lieu of monitoring pursuant to § 433.12 (a) and (b) of this regulation must implement the solvent management plan approved by the control authority.

(e) An existing source subject to this subpart shall comply with a daily maximum pretreatment standard for TTO of 4.57 mg/l.

(f) Compliance with the provisions of paragraph (c), (d), and (e) of this section shall be achieved as soon as possible, but not later than June 30, 1984, however metal finishing facilities which are also covered by Part 420 (iron and steel) need not comply before July 10, 1985.¹ Compliance with the provisions of paragraphs (a), (b), (c) and (d) of this section shall be achieved as soon as possible, but not later than February 15, 1986.¹

§ 433.16 New source performance standards (NSPS).

(a) Any new source subject to this subpart must achieve the following performance standards:

NSPS

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cadmium (T)	0.11	0.07
Chromium (T)	2.77	1.71
Copper (T)	3.38	2.07
Lead (T)	0.69	0.43
Nickel (T)	3.98	2.38
Silver (T)	0.43	0.24
Zinc (T)	2.61	1.48
Cyanide (T)	1.20	0.65
TTO	2.13	
Oil and Grease	52	26
TSS	60	31
pH	(¹)	(¹)

¹ Within 6.0 to 9.0.

¹ The Consent Decree in *NRDC v. Train*, 12 ERC 1833 (D.D.C. 1979) specifies a compliance date for PSES of no later than June 30, 1984. EPA has moved for a modification of that provision of the Decree. Should the Court deny that motion, EPA will be required to modify this compliance date accordingly.

(b) Alternatively, for industrial facilities with cyanide treatment, and upon agreement between a source subject to those limits and the pollution control authority, the following amenable cyanide limit may apply in place of the total cyanide limit specified in paragraph (a) of this section:

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cyanide (A)	0.86	0.32

(c) No user subject to the provisions of this subpart shall augment the use of process wastewater or otherwise dilute the wastewater as a partial or total substitute for adequate treatment to achieve compliance with this limitation.

§ 433.17 Pretreatment standards for new sources (PSNS).

(a) Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS):

PSNS

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cadmium (T)	0.11	0.07
Chromium (T)	2.77	1.71
Copper (T)	3.38	2.07
Lead (T)	0.69	0.43
Nickel (T)	3.98	2.38
Silver (T)	0.43	0.24
Zinc (T)	2.61	1.48
Cyanide (T)	1.20	0.65
TTO	2.13	

(b) Alternatively, for industrial facilities with cyanide treatment, and upon agreement between a source subject to these limits and the pollution control authority, the following amenable cyanide limit may apply in place of the total cyanide limit specified in paragraph (a) of this section:

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cyanide (A)	0.86	0.32

(c) No user subject to the provisions of this subpart shall augment the use of process wastewater or otherwise dilute the wastewater as a partial or total substitute for adequate treatment to achieve compliance with this limitation.

(d) An existing source submitting a certification in lieu of monitoring pursuant to § 433.12 (a) and (b) of this regulation must implement the solvent management plan approved by the control authority.

§ 433.18 [Reserved]

[FR Doc. 83-18839 Filed 7-14-83; 8:45 am]

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Registered Federal Report

Friday
July 15, 1983

Part IV

Office of Personnel Management

Airway Science Curriculum; Approval of
Demonstration Project Final Plan

OFFICE OF PERSONNEL MANAGEMENT

Demonstration Project: Airway Science Curriculum

AGENCY: Office of Personnel
Management.

ACTION: Notice of approval of a
demonstration project final plan.

SUMMARY: Title VI of the Civil Service Reform Act of 1978 authorizes the Office of Personnel Management to conduct demonstration projects which experiment with new and different personnel management concepts under controlled conditions. A proposed Airway Science Curriculum demonstration project plan was published in the *Federal Register* on March 18, 1983 (48 FR 11672). This is the final demonstration project plan approved by the Office of Personnel Management.

DATES: *Approval date:* The demonstration project plan was given final approval by the Office of Personnel Management on July 7, 1983.

Implementation date: The demonstration project may be implemented after the expiration of the 90-day congressional review period which ends on October 10, 1983.

FOR FURTHER INFORMATION CONTACT:

(1) On technical matters concerning the demonstration project, such as development of the curricula and participation in the demonstration project by educational institutions: At FAA, Judy Branting, (202) 426-8844.

(2) On OPM demonstration project approval processes: At OPM, Donald Hill, (202) 254-6486.

SUPPLEMENTARY INFORMATION:

1. *Background.* The Federal Aviation Administration (FAA) has submitted a proposal for consideration as a demonstration project under Title VI of the Civil Service Reform Act of 1978 (92 Stat. 1185) entitled "Airway Science Curriculum Demonstration Project." The purpose of the project is to compare performance, job attitudes, and perceived potential for supervisory positions of individuals recruited for several of FAA's technical occupations who have an aviation-related college-level education, or its equivalent, with individuals recruited for the same occupations through traditional methods. In order to accomplish this purpose, FAA, with assistance from the University Aviation Association, developed a model Airway Science Curriculum which emphasizes college-level courses in aviation, science and

technology, mathematics, management, and general studies. Applicants for FAA positions as air traffic controller, electronic technician, aviation safety inspector, and computer specialist who enter through the demonstration Airway Science Announcement will be rated on their possession of the knowledges, skills, abilities, and other characteristics contained in the model Airway Science Curriculum and ranked and selected from a separate register parallel to those currently in use. Additionally, applicants for air traffic controller positions must pass the air traffic control examination, and applicants for aviation safety inspector must hold listed certificates and ratings.

A proposed demonstration project plan was published on March 18, 1983, in the *Federal Register* (48 FR 11672). On that same date, copies of the proposed plan were transmitted to both Houses of the Congress as required by 5 U.S.C. 4703(b)(4). The public comment period began on March 18, 1983, and ended on May 17, 1983. A public hearing was held on the proposed demonstration project plan on April 22, 1983, in the FAA auditorium in Washington, D.C.

2. Summary of Comments.

A. Analysis of Comments

Comments received during the comment period and at the public hearing are categorized as follows (Note: Persons who both appeared as hearing witnesses and wrote letters to OPM, the content of which was similar to the hearing testimony, are counted once as a hearing witness.):

	Hear- ing wit- nesses	Letters
Expression of overall project support, without offering suggestions or comments	2	3
Expression of overall project support, with comments or suggestions offered for improvement	6	4
Neutral to project, with comments offered	0	0
Opposition to project	0	0
Total number of witnesses and letters	8	9

B. Nature of Comments

Persons submitting comments observed or suggested that:

1. Because of the specificity of the curriculum, consideration for participation in the project should be given to those schools which have a proven demonstrated ability to produce aviation graduates.

2. Competition in the current job market for similar skills and technical requirements suggests that GS-9 is a

more competitive hiring level for positions than GS-7.

3. The addition of an intern program would be helpful.

4. The five-year demonstration period is too short to effectively evaluate the program and affects adversely those students who work full time and take more than the usual time to obtain their degrees.

5. A group other than the Civil Aeromedical Institute (CAMI) should evaluate the program. CAMI had much impact on the effectiveness of technical and managerial training programs as they related to the air traffic controller work environment, but was unable to alert management to the problems within FAA, or to determine or offer a constructive resolution to the August 1981 strike of air traffic controllers.

6. FAA should be more actively involved in the approval of aviation programs.

7. The number of persons to be hired under the Aviation Safety Inspector and Computer Science tracks is questionable.

8. FAA violated its labor contract by bypassing the Professional Airways Systems Specialists Union during the development of the project.

9. FAA needs to clarify (a) its criteria for evaluating the effectiveness of each educational institution's airway science curriculum; (b) the meaning of the terms knowledges, skills, abilities, and other characteristics; and (c) the criteria used to evaluate substitute experience or training.

10. FAA should decentralize the program to its regions so that educational institutions may have easy access to FAA.

11. FAA needs more coordination with the aviation industry.

12. Civil service testing of candidates seems unnecessary after they have obtained the airway science degree and other credentials, such as flight certification.

13. The curriculum is not tied to a valid job analysis of skills and knowledges needed for the occupations.

14. The airway science curriculum needs further review and clarification:

(a) The program is inflexible in allowing for the required general educational requirements of most universities.

(b) The proposed curriculum makes questionable distinctions and separations of general education and technical courses.

(c) Problems exist with course titles, e.g., lack of specificity, misleading, duplicative with other courses, and nondescriptive.

(d) Inflexible guidelines stifle the offering of innovative and elective courses.

15. Information should be provided as to whether a master's degree program will be developed.

16. FAA should let the American Council on Education evaluate its training programs to determine whether college level credit can be given for them.

17. Students will be hard pressed financially to obtain the airway science credits needed, since the credits are in addition to what students have or are taking.

18. Since many students and existing employees are enrolled in or have completed associate degree programs, an interface between these programs and the airway science curriculum needs to be established.

19. FAA should develop incentives for students and employees to enroll in airway science programs, such as scholarships, summer jobs, internships, on-the-job training, tuition reimbursement, and work schedule coordination.

20. Students who complete nontraditional degree programs through a combination of experience, professional course work in community colleges, and transfer arrangements for a liberal arts education may be at a disadvantage when the airway science program is evaluated.

21. The project plan neglects the recruitment of present knowledgeable employees.

22. FAA should consider nontraditional off-campus programs for existing employees in addition to the mentioned correspondence courses, such as videotaping, teleconferences, and off-campus courses. The suggestor offered to help in developing such programs.

3. *Response to Comments.* Comments on the curriculum noted that (a) it is too restrictive, (b) does not permit innovative approaches to education, (c) will be difficult to implement because of existing collegiate general education requirements, (d) will create difficulties for students completing non-traditional degree programs, and (e) was not job-related because a valid job analysis was not conducted. FAA intended to create a rigorous, demanding four-year program. With the advice and assistance of educators from the University Aviation Association (UAA), curricula were designed to meet the stated intent. Those institutions which are interested in participating in the project but feel that the curriculum constraints will not permit their involvement should contact the FAA. The generic curricula are

recommended guidelines and there is some latitude allowed in the review process for accommodation of existing collegiate general education requirements. The actual curricula presented by educational institutions and recognized by the FAA may vary from the generic, provided the individual curriculum proposals meet the spirit and intent of the program.

The demonstration project contemplates that individuals will be graduated from accredited four-year degree granting institutions. Those individuals who do not have a four-year degree from schools whose curriculum has been recognized by FAA will be considered for employment by the FAA provided that they can show that they possess the knowledges, skills, abilities, and other characteristics (KSAOs) provided by the generic curricula. Guidelines are now being developed for two-year schools on how to participate in the program through affiliation with four-year institutions.

Specific comments were made regarding the relationship of the curricula and the KSAOs needed to perform the work of covered occupations. These comments focused on the failure to conduct valid job analyses so that the relationship of the curricula to the occupations could be shown. The purpose of the demonstration project is to test the relationship of the KSAOs provided by the curriculum against job performance and to compare the performance of Airway Science trained individuals with that of individuals recruited through the normal hiring process. The FAA has many individuals employed currently who have been hired because of their specific job-related skills. Past FAA experience has shown that increasing the general level of education alone does not result in improved performance in some occupations. FAA has not been able to test the premise that a specific educational background, one that is related to aviation and the specific technical area, will produce a different type of employee.

The curriculum evaluation process was addressed in several comments. Some persons suggested that the FAA be more actively involved in the approval of aviation programs, that clarification be given for evaluating the effectiveness of each educational institution's airway science curriculum, and that the program be decentralized so that educational institutions may have easy access to the FAA. The FAA is actively involved in the approval of aviation programs at educational institutions by reviewing the recommendations made by the UAA

curriculum evaluation committee, determining modifications necessary for FAA recognition, and providing advice and assistance to institutions during the review and FAA recognition process. This provides clarification of changes needed for curriculum recognition during the evaluation process. Further, the FAA has revised the demonstration project plan to eliminate duplications in the curricula and clarify some of the course requirements. As the demonstration project progresses, much wider use will be made of regional resources and interested institutions will be able to work directly with knowledgeable individuals at the regional level. National program direction will continue to be exercised on such issues as project framework, curriculum recognition, hiring guidelines and announcements, and evaluation.

Several comments dealt with the implementation of airway science opportunities for current FAA employees and to the development of a master's degree program. A related comment suggested that FAA let the American Council on Education evaluate its internal training programs to determine whether college level credit can be given for them. Those individuals in the FAA who are now employed in positions other than the occupations covered by the program may apply for consideration for employment as a demonstration project participant in the same manner as any outside candidate. Their success in competition for employment under the demonstration project authority will depend on the extent to which they possess the desired KSAOs. Moreover, FAA is developing a program which will provide an opportunity for existing employees who do not have an airway science background to pursue the necessary education. All employees will be encouraged to participate, especially those in the technical occupations who do not have a bachelor's degree. A master's degree program may be developed for those employees who already possess an undergraduate degree. However, neither of these programs would be a part of the demonstration project. As to the evaluation of FAA's training programs, the American Council on Education has already completed a review of FAA's technical and managerial training for the purpose of evaluating its college credit equivalency.

A labor organization alleged during the hearing that FAA violated its labor management contract responsibilities by bypassing the organization during the development of the project. FAA states

that it informed all affected labor organizations and requested comments on the draft project plan prior to its publication in the *Federal Register*. No response was received by the end of the requested comment period.

Other comments referred to miscellaneous matters. The FAA established the GS-7 entry level for individuals presenting the KSAOs sought. The GS-7 level was selected as an incentive for graduates to pursue the stringent airway science curriculum. Entry into the covered occupations above this level was not contemplated because of the relationship of the skills presented to the requirements of higher level work.

A structured internship program was not envisioned as part of the demonstration project. Inclusion of work periods in a Federal position for all participants in the curriculum would create confusion for the identity of the program and increase the cost of the project. One of the larger purposes in the creation of the airway science curricula was development of a common recruiting source for Federal, State, and private aviation-related employment opportunities. The FAA will make every effort to employ some individuals enrolled in airway science courses in summer employment programs and when other temporary employment opportunities arise.

FAA agrees that the five-year demonstration period is too short but five years, with extensions permitted for evaluation purposes only, is the maximum time the law permits for demonstration projects. Examining, whether using assembled or unassembled procedures, is still considered necessary to determine whether all candidates have the desired qualifications, and to rank candidates for selection consideration.

The expertise for evaluating the project resides among the staff at the Civil Aeromedical Institute and CAMI will remain as the organization responsible for evaluating the project. Additionally, OPM will monitor CAMI's evaluation activities on the demonstration project.

4. *Demonstration Project Changes.* No individuals or organizations oppose the approval of the demonstration project. Hearing testimony and letters are very supportive of the project and most of the comments would be considered as helpful suggestions for improving the project. Therefore, changes to the project plan, which are explained below, are few. The referenced page numbers refer to the pages of the proposed project plan which was published in the *Federal Register* on March 18, 1983.

A. On page 11674, under "Waiver of Law or Regulation Required," the waiver of 5 U.S.C. 3308 has been deleted from the project plan since this waiver is not needed. A minimum educational requirement does not exist, since substitution of other training and experience is permitted for the prescribed education.

B. On page 11675, the chart in column 1 under "Positions/Employees Affected," and the text under "Duration," have been changed to reflect the fact that no employees will enter the demonstration program during 1983 and that the program will run through 1988.

C. On page 11679, in the charts containing the Airway Science Curriculum, changes have been made to several course titles listed under the subject areas Computer Science, Aviation, and Aircraft Systems Management in order to eliminate duplications in the curricula and clarify some of the course requirements.

Office of Personnel Management.
Donald J. Devine,
Director.

The final demonstration project plan as approved by the Office of Personnel Management reads as follows:

Federal Aviation Administration

Airway Science Curriculum Demonstration Project Plan

Background

The 1980's and beyond present the Federal Aviation Administration (FAA) with great sociotechnological challenge. The decade began with a strike by a major segment of the FAA work force as almost 12,000 air traffic controllers failed to report to duty and were subsequently terminated from the agency. A major reconstitution of that work force is now underway. Shortly thereafter, the FAA also embarked upon a program to modernize the National Airspace System (NAS) by reconfiguration and consolidation of facilities and equipment and by introduction of more sophisticated automation. This program will be implemented over the next 20 years. The combination of disrupted work force and technological change calls for a reexamination of the requirements and capabilities of the human systems upon which the NAS depends.

The Problem

The FAA is composed of a work force in which technical professions such as air traffic control and electronics technology predominate (Figure 1). Individuals in these occupations may

possess limited educational backgrounds in that, for many, formal academic training concluded with high school (Figure 2). As a consequence, same FAA employees are narrowly focused in their occupational area.

The breadth of knowledge or commitment to aviation may not extend beyond the task at hand. These limitations can have serious implications for employees' ability to perceive their role within the total system and to progress to supervisory and managerial positions with the necessary leadership and human relations skills.

Air Traffic Controller	19,514
Electronics Technician	8,192
Engineering	2,239
Aviation Safety Inspector	1,875
Clerical/Secretarial	2,667
Other	9,204
Wage Grade	2,182
Total	45,873

Figure 1. FAA Employment by Occupations (As of June 30, 1982)

Of equal concern is the adaptability of such employees to an increasingly technical and automated environment such as is envisioned within the NAS Plan. Over the next 20 years, FAA jobs will involve from a preponderance of direct interface with operational equipment to an interface characterized by sophisticated automated controls and diagnostic devices. Thus, the skills and aptitudes of today's work force will need to be enhanced since an advanced skill level and skill and mix for which there is no direct or immediate preparation will be required. Employees will have to possess the broad-knowledge base, perspective, and flexibility to accept and cope with this transition in the workplace.

Education level	Agency (per cent)	Air traffic controller (per cent)	Electronics technician (per cent)	Aviation inspector (per cent)
Non high school grad	2.0	0.7	1.2	0.0
High school grad	71.9	75.9	82.8	47.3
Associate degree	8.3	8.5	10.8	17.4
Bachelor degree	15.4	14.2	4.9	30.3
Masters degree	2.2	0.7	0.3	4.5
Doctorate	0.2	0.0	0.0	0.5

Figure 2. Educational Level of FAA Employees by Occupation (Based on information provided by employee upon entrance on duty.)

Proposed Solutions

The FAA is aware that the upgrading of a work force of 45,000 to 50,000 individuals, even over a period of time, is a tremendous undertaking. Corrective actions must be multifaceted and address current employees as well as those who will be hired in the future.

The FAA is already making plans to adjust its extensive technical training program to accommodate technological advances in equipment, systems, and configurations. The agency is also well along with its implementation of computer-based instruction which will facilitate this process.

Attention has also been focused on the FAA's supervisory and management training program. The mandatory aspects of initial training for individuals newly selected for such positions have been reinforced and the content reoriented to a greater emphasis on human relations, leadership, and accountability rather than on procedural requirements. More funds have been allocated to the training function in general, and more managers and supervisors have been urged to enroll in supplemental management training. For other employees, the agency is recommending preparatory training courses to enhance potential for first-line supervisory positions.

Lastly, but perhaps of most promise, all FAA employees will be encouraged to continue their higher education on their own initiative and, for the most part, after hours. Credit in the selection process for FAA positions will be awarded for such efforts.

Working with the academic community, the FAA has developed a specific recommended college level curriculum. The model curriculum was developed by the University Aviation Association and the FAA to respond to the needs generated by the revision of the National Airspace System. The curriculum was designed to meet normal university academic and accreditation requirements, to be easily adapted to existing aviation-related programs, to have the flexibility to allow individual educational institutions the option of offering any number of the five areas of concentration according to their individual resources, and to be attractive to students seeking careers in both Government and the aviation industry. Contacts are being made with colleges and universities to ascertain how current employees can enhance their knowledge and skills by pursuing this Airway Science curriculum through residency, correspondence, and credit for equivalent FAA training.

All the above efforts to improve the quality of the FAA work force can be accomplished within authority currently available to the FAA. Still required, however, is the means to assure that some portion of the individuals joining the agency in the coming years possess the same knowledges, skills, abilities and other characteristics (KSAO's) such as those attained by graduates of an Airway Science curriculum. It is anticipated that some, though not all, FAA or target occupation vacancies would be filled by such individuals and that this intake would contribute to overall performance within the agency. Included in this category are individuals who meet the qualification standards approved by the Office of Personnel Management (OPM) and FAA for the demonstration through substitution of other training and experience which is equivalent to all or part of the model curriculum. Examples of equivalency substitution might include associate degrees in electronics, flight certificates, and aviation-related military training. The recruitment of Airway Science trained individuals¹ is the subject of the demonstration project described below.

Demonstration Project

Objectives

The demonstration project is focused on developing alternative qualifications and recruitment sources primarily for agency technical occupations. The project is designed to compare performance of selected individuals who have an aviation-related college education or its equivalent with individuals employed through traditional recruiting methods. The specific objectives of the project are as follows:

1. Recruitment/hiring of individuals who have completed or have the equivalent of a model college-level curriculum of general studies, mathematics, science and technology, management, and aviation courses.
2. Evaluation of the concept that individuals with this background recruited for FAA occupations are better able to perform the functions of the job than individuals recruited through existing methods. If this is the case, then that background can be substituted for general and specialized experience in hiring at the GS-7 level for specific FAA occupations.

¹ For the purposes of this plan, "Airway Science trained individuals" include graduates of educational institutions offering recognized Airway Science programs and other individuals who have acquired the requisite KSAO's through experience, training and/or formal education.

3. Assessment of the performance, job attitudes, and potential of Airway Science trained individuals versus those of individuals employed by current procedures.

4. Determination of the impact of this program on the employment and career progression of women and minority candidates.

Methodology

The project goal of development of alternative qualifications and recruitment sources for agency occupations will emphasize a coordinated effort to recruit individuals with nontraditional backgrounds, screening of individuals based on training, and selections for employment from registers existing parallel to those currently in use. The salient features of each specific change are as follows:

1. *Announcement.* The intake method for this project will be called the Airway Science Announcement for FAA positions. It would be a semiannual announcement for Airway Science occupations. Opening of the announcement would be timed to coincide with the academic year so that offers of employment could be made at the completion of school terms.

The announcement would provide for entry at the GS-7 level in all covered occupational areas. There will be four areas: air traffic control (GS-2152), airway facilities (GS-0856), aviation safety inspector-general aviation operations and maintenance (GS-1825), and computer sciences (GS-334).

The examination process would be on an unassembled basis. For each occupational area, a separate evaluation process will be jointly developed by FAA and the OPM. The rating schedule developed will be structured so that applicants who present the equivalent KSAO's provided by the courses or course equivalents specified in the model Airway Science curriculum will be placed at the top of the group. For the air traffic area, candidates must also pass the current air traffic control examination. For the aviation safety inspector occupations, candidates must hold listed certificates and ratings. Successful candidates would be eligible for employment consideration for a one-year period with an extension of one additional year granted upon written request.

The OPM will provide consulting assistance during the term of the project and will coordinate the evaluation function to ensure compliance with laws, regulations, and policies not

waived by the project. The Special Examining Division (SED) of the Mike Monroney Aeronautical Center, located in Oklahoma City, Oklahoma, will accomplish the examination process and maintain registers of candidates for FAA use.

2. *Qualifications.* The Appendix contains the generic Airway Science curriculum outline, subject area parameters, and areas of concentration. Each area of concentration will qualify individuals for certain occupational categories in FAA. The Airway Science curriculum will be the basis for the rating guides used in the qualifications review process. Experience and training may be substituted for education to the extent that such experience and/or training is equivalent to the KSAO's provided by the curriculum. Figure 3 shows the relationship between the areas of concentration and FAA positions.

The entry at GS-7 is established as an incentive to pursue a stringent degree program and to enhance the agency's ability to recruit well-qualified individuals. The College Placement

Council reported in July 1982 that liberal arts graduates received employment offers with the average salary level at approximately \$17,000 per year and that engineering technology graduates received offers of \$23,496 per annum. In comparison, a beginning GS-5 salary is \$13,369, and at GS-7 earns \$16,559.

Completion of degree requirements or presentation of a combination of education, training and experience that are judged to be substantially equivalent to the KSAO's provided by the curriculum will satisfy all general and specialized experience qualification requirements for appointment at the GS-7. Physical qualifications as well as requisite background/security investigations would be required as for current eligibles.

FAA Occupation	Curriculum Concentration Area
Air Traffic Control Specialist	Airway Science Management Airway Computer Science Aircraft Systems Management Airway Electronic Systems
Electronics Technician	

Aviation Safety Inspector (General Aviation Maintenance)	Aircraft Systems Management
Aviation Safety Inspector (General Aviation Operations)	Aviation Maintenance Management
Computer Systems Programmer/Analyst	Airway Computer Science

Figure 3. FAA Occupations and Curriculum Concentrations

3. *Employment.* All FAA employing jurisdictions anticipate selecting eligibles under this program. The Special Examining Division will provide certificates of eligibles to FAA personnel offices upon request. Each employment office will be responsible for arranging necessary preemployment interviews, medical examinations, and security investigations. Selection for a position in this program would result in career or career-conditional appointment. Eligibles employed would have to serve a probationary period and would be subject to the same requirements as other Federal employees. An overview of the demonstration intake process is included as Figure 4.

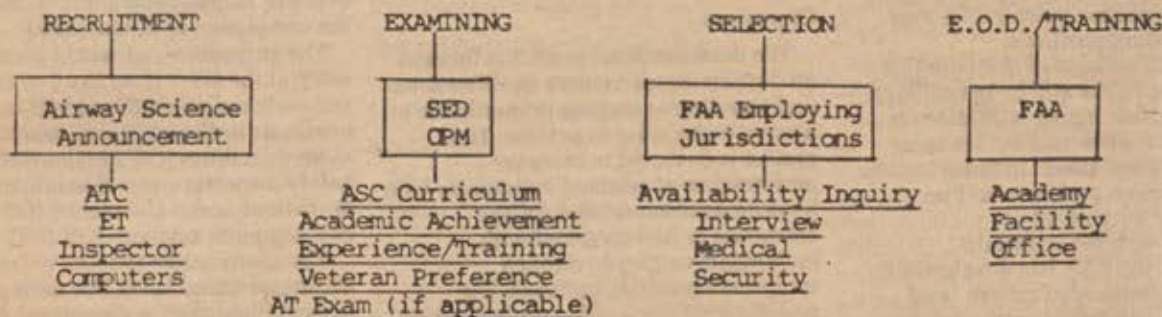


FIGURE 4. INTAKE PROCESS FOR AIRWAY SCIENCE DEMONSTRATION PROJECT

Waivers of Law or Regulation Required

In order to accomplish the demonstration project, provisions of law and regulations require waiver or modification. Included are those pertaining to entry-level qualifications for certain occupations. The specific citations are as follows:

(a) 5 CFR 300.103(a) and (b) Basic Requirements.

The law and implementing regulations require that employment practices of the Federal Government be based on a job analysis to identify: basic duties and responsibilities, knowledges, skills, and abilities required to perform the duties and responsibilities, and factors important in evaluating candidates.

In order to test the premise that the KSAO's provided in Airway Science curriculum can be substituted for general and specialized experience now required by published qualification standards in specific occupations, the FAA must require that applicants demonstrate completion of degree requirements or have a background of training and experience substantially equivalent to the curriculum as a prerequisite for consideration under the Airway Science Announcement.

(b) 5 CFR 511.101 (b)(3) Definitions.
5 CFR 511.203 Exercise of Authority.

These sections define qualifications and limit agency authority in determining qualifications to that

granted by OPM. The demonstration project is designed to employ Airway Science trained individuals in GS-7 entry level positions in the FAA. Published qualification standards exist for all of these positions. Waiver of these published qualification standards is required to permit entry at the GS-7 level to the extent that the project conflicts with pertinent provisions. These standards are promulgated under the above authorities. The following qualification standards and examining guides would be affected: (Qualifications established under 5 U.S.C. Chapt. 51)

• Air Traffic Control Specialist (GS-2152)

- Feb 76 (TS 158)
 Dec 80 (TS 183)
 and ATCS Examining Guide, Oct 68 (TS 88)
 • Airway Safety Inspector Series (GS-1825)
 January 75 (TS 114)
 • Computer Specialist Series (GS 334)
 March 1981 (TS 186)
 • Electronics Technician Series (GS-0856)
 March 66 (TS 97)
 December 75 (TS 156)
 and ET Examining Guide, Mar 66 (TS 65)
 • Handbook x-118, Part II
 Section III—Crediting Education

That portion of the qualification standards for each occupation listed above relating to general and specialized experience and substitution of education for experience would be modified so that a candidate for employment with a bachelor's degree conforming to the Airway Science curriculum or one who can demonstrate substantially equivalent KSAO's would meet the general and specialized experience requirement to qualify for the GS-7 level. For the purposes of the demonstration project, those individuals without any related background would rate as not qualified. Existing guides would not be used, but alternative rating guides would be developed.

Positions/Employees Affected

The subjects of the demonstration project are potential employees who can demonstrate possession of the Airway Science KSAO's. Those hired concurrently through existing intake methods and other FAA employees will not be affected.

Upon approval of the demonstration project, the FAA goal is to hire up to 500 Airway Science trained individuals a year (10-15% of total FAA hires and 20-30% in target occupations) as soon as they are available, primarily into major technical occupations. As more and more individuals obtain Airway Science related qualifications, the number accessible for recruitment will also increase. At this early stage, an estimate of the number of individuals to be hired by occupation may be illustrated as follows:

	1984	1985	1986	1987	1988
Air traffic controller	70	215	355	355	355
Electronics technician	25	72	122	122	122
Aviation safety inspector	4	10	18	18	18
Computer science	1	3	5	5	5
Total	100	300	500	500	500

Duration

It is proposed that the project begin in the fall of 1983 with the first Airway Science Announcement. The initial recruits would enter the FAA during early 1984. Hiring would continue at intervals over a 5-year period through 1988. Evaluation efforts would begin with tracking of the first Airway Science employees as they enter on duty in 1984. Since the subjects critical to the evaluation would accumulate over the life of the project and full-performance level would not be achieved for several years after entry, the evaluation phase of the demonstration will extend through 1990.

Training

No additional training is expected as an outcome of the demonstration project. Airway Science selectees will adhere to the same FAA training requirements as those established for any new entrant into the particular occupational specialty. Airway Science selectees entering into the air traffic program, as an example, will complete all phases of Academy training before proceeding to field facilities and on-the-job training. Similarly, only the timing of the training, not the specific courses, may differ for those Airway Science candidates hired as aviation safety inspectors. Since these inspectors will lack the specialized experience of usual candidates at the GS 9/11/12 levels, their courses may be administered earlier in their careers, on a group basis (with other Airway Science candidates), and within a tighter time frame.

Anticipated Benefits

The result of the demonstration project is expected to be a cadre of well-qualified individuals well-suited to the occupations necessary to support the National Airspace System of the future. The criticality of these jobs and the capability of the people that fill them to the safety of the aviation public cannot be overstated. Indeed, the beneficiaries of a highly qualified FAA work force are all those whose lives are impacted by air transportation—the public at large.

The demonstration project will also allow the FAA to resolve the question of whether a specific knowledge base or educational/experiential background lends itself to success in certain occupations and ultimately to perceived potential for supervisory positions. It will also provide data on whether extended exposure through a specified academic program, for those who enter with this background, will promote among women and minorities a greater interest in and aptitude for technical

professions, such as those which are aviation-related.

Both the Airway Science group and control groups will be the objects of intensive investigations as to ability to accomplish jobs tasks, job satisfaction, relationships with peers and supervisors, perception of organizational role, etc. Information should also be available on the job needs and demands of employees with substantially different academic backgrounds. It is expected that the data obtained from these research efforts are equally valuable to numerous governmental and private organizations as to the efficacy and essentiality of this preparation to similar occupations.

Cost

The costs of the demonstration project to the Government are detailed below. Certain expenditures are associated with the curriculum itself. The cost of recruitment pertains to the screening, rating, and ranking process. Other resources are required for the travel, computer processes, and survey instruments associated with the evaluation phase.

Curriculum Development and Coordination	\$35,000
Recruitment, Hiring, Employment	110,400
Evaluation	105,000
Total	\$250,400

¹ Compensation for FAA personnel working on the project as a portion of their regular duties is not included.

Evaluation

Introduction

For assistance in the design and conduct of an evaluation of the Airway Science Curriculum Demonstration Project, the FAA will rely heavily on research psychologists at its Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma. The CAMI staff has extensive experience in assessing, most particularly, the effectiveness of technical and managerial training programs and subsequent job performance and have an existing data bank, computer processes, and models which can be readily adapted to the demonstration project. The following sections describe the general form of the project evaluation model and the specific application of the model to the evaluation of the Airway Science Demonstration Project. The OPM will be involved in the planning and conduct of the evaluation as necessary to meet its responsibilities under title 5, United States Code.

The General Model

The following sections described the project evaluation model. The four components of the model are: (1) Design evaluation, (2) implementation evaluation, (3) formative evaluation, and (4) summative evaluation. Program design and implementation evaluations, as the terms imply, occur at the beginning of the project. Formative and summative evaluations occur simultaneously and serve to evaluate the process and course of the project as well as its products. Each of these evaluation components uses the techniques of statistical analysis and various reporting systems.

Design Evaluation

The project design evaluation involves ensuring the proper development of several tasks that make up the project implementation plan. The overall

objectives of the project will be clearly defined and each expected outcome of the project will be listed. The outcomes will be organized by broad categories and related to the objectives of the project. The Airway Science curriculum will be reviewed so that determination can be made as to whether curriculum content is designed in a manner as to produce the qualified employees envisioned in the design of the project. Careful documentation of every step will be made during this evaluation phase by the evaluation staff with regular reports on the progress of the design.

Implementation Evaluation

The implementation evaluation phase monitors project implementation and ensures and documents that the project is implemented strictly according to the design. Any changes made to the design during implementation will be carefully documented and the design revised. The

implementation evaluation stage will ensure that the stated process is operational, intact, and stable. This evaluation will be accomplished by means of frequent status studies during the implementation stage. Data will be collected on each aspect of the process and a determination made about the state of implementation. Direct observation will also be made on a periodic schedule. The status studies will be generally be made into a report for project officials with suggestions to improve or expedite implementation. Shortcomings in implementation will be noted in each report. It is at this juncture that it is assured that candidates hired under the Airway Science Announcement meet the selection criteria anticipated in the design of the project. Figure 5 is a flow chart depicting the process of implementation evaluation.

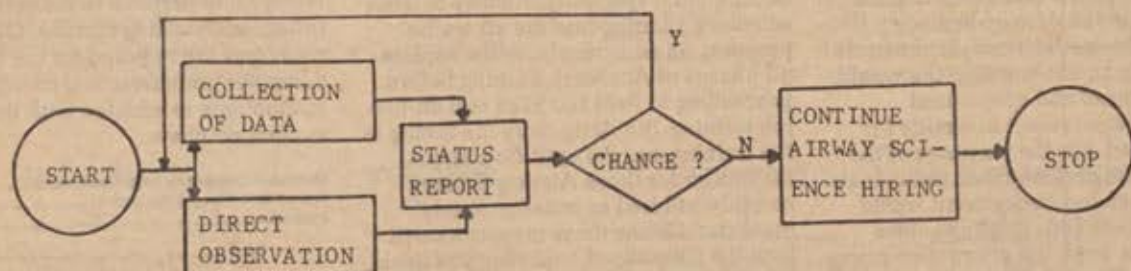


FIGURE 5. FLOW CHART OF IMPLEMENTATION EVALUATION PHASE

Formative Evaluation

When the project is determined to be operational, intact, and sufficiently stable, formative and summative evaluations will begin. The formative evaluation will be an ongoing process to ensure that the project maintains on target. It will consist of a cyclic process of collecting data and statistics related to the project criteria. This monitoring process gauges the operational stability of the project and the quality of Airway Science candidates being employed by the FAA. It is also a method for monitoring compliance with the Uniform Guideline for Employee Selection.

The data base for formative evaluation will be extensive. It will contain information on each Airway Science employee and each member of the control groups as to OPM minority status code, all pertinent attitude information such as expectation and the set/information given to them prior to coming in to the FAA, individual and

composite scores for selection tests, if any, other information used for points in selection, such as education, experience, and veterans' preference, FAA training, and pass/fail information and training scores, if applicable to the occupational group under study. Similarly, item response for all tests during any FAA training phases will also be maintained.

Statistics and reports will be summarized for research purposes and for transmittal to FAA project officers. Statistics on all FAA training and job performance measures will include sample sizes, means, standard deviations, intercorrelations, and pass/fail rates. Reliabilities and tests for parallelism will be calculated for all tests and performance ratings. These statistics will be maintained on record in both computer backup files and hard copy. Administrative formative evaluation reports will include sample sizes, means and intercorrelations on all relevant measures; and pass/fail rates and performance ratings will be

stratified by minority status, sex, any prior experience, predevelopmental/noncompetitive entry, veterans' preference, educational level, option, and region. These reports will be prepared semiannually.

When, based on the formative summary data, there appears to be a problem in how the project is running, the evaluators will have the responsibility to alert the appropriate FAA project officials and prepare a concise report identifying the problem areas. Isolating the exact area of concern may require some special statistical analyses. The attitude information, where appropriate, will be employed as a covariate in the analyses. If it becomes apparent that, in any stage of employment prior to journeyman/full performance level, Airway Science employees are not meeting performance expectations, the report will recommend review of the project design phase for

possible curriculum or selection adjustment.

Summative Evaluation

The summative evaluation will consist of a continual assessment of the quality of the products of the project. While formative evaluation is summarized semiannually and serves as an immediate feedback loop for ongoing project revisions, if needed, summative evaluation will occur on a larger scale across a longer time span (e.g., on a yearly basis). Formative evaluation will be concerned with internal project accuracy and stability and project reliability. Summative evaluation, however, will be a check on the quality of the output from the stabilized project

by comparison of the job performance of Airway Science employees and that of control group members hired into the same occupations through existing intake methods.

The summative data base will consist of several components. It will contain a comprehensive tracking of the career progression of every Airway Science and control group entrant into the FAA. It will contain data for every individual on types of facilities/offices where the person has been employed, measures of job performance at each of these sites (criterion measures), types of attrition and why, whether a person changed job classification and why, and attitude and demographic information.

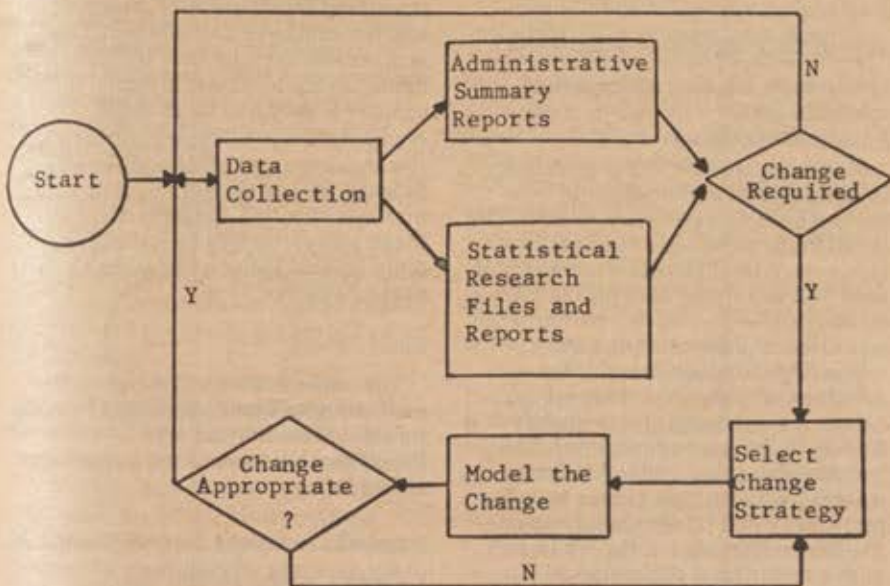


FIGURE 6. FLOW CHART OF THE GENERAL PROCESS FOR BOTH FORMATIVE AND SUMMATIVE EVALUATION

Statistics and reports will be summarized from the summative data base on a regular schedule for research and as information for decisionmaking. Statistics will include sample sizes, means, standard deviations, intercorrelations, attrition rate and analyses of variances (ANOVA) comparing the Airway Science employees with control groups. Administrative summative reports will include sample size, means, intercorrelations, and results of the ANOVA; and attrition data will be stratified by minority status, sex, prior experience, veterans' preference, training, educational level, reasons for attrition, and region.

If the summative data base demonstrates a problem in the project, a need for a major project revision may be indicated. The data will be reviewed very carefully, employing statistical analyses to isolate the source of the problem. As in the formative evaluation, the FAA management will be alerted to the problem but, in addition, in the case of summative data, OPM officials will be notified. Major project revisions require careful planning and more detailed attention than revisions based on formative data. Figure 6 flow charts the general process for both formative and summative evaluation.

Design evaluation	Implementation evaluation	Formative evaluation	Summative evaluation
Objective: To state goals, develop, define, document project objectives.	To ensure that the design was fully and correctly implemented and is intact and stable.	To ensure that the project stays on target and to add and evaluate refinements changes to the project in a systematic manner. More concerned with project reliability.	To measure the quality of the final project product. What is the project payoff? More concerned with project validity.
Method: Careful documentation and description of major systems and subsystems of the project; use of flowcharts, PERT, tables, graphs, and general systems analysis technology.	Frequent status studies with data indicating the extent of implementation for each area of the process. Regular status reports are issued.	Maintenance of an ongoing data base that measures project stability and collection of data that would be sensitive to any change introduced. Regular reports to management.	Collection and analysis of data on career progress of Airway Science employees. Periodic reports on the data analysis.
Relation to decisionmaking: Determining the best plan of action to accomplish the project objectives.	Status reports offer suggestions for improvement and indicate where implementation is falling short.	Offers information on project stability through regular reports and information on the effects of any program change. Also offers information on EEO impact.	Offers information on the quality of the project product that is especially useful for long-term planning and needed change.

Figure 7—Summary of the Four Components of the Project Evaluation Model.

Application of the Model for Assessment of Products of the Airway Science Demonstration Project

The following design will be employed to determine project effects for the air traffic control specialists, electronics technicians, and aviation safety inspectors (computer science personnel are discussed later).

Applicants and selectees from the Airway Science program will be compared with a concurrent control group selected via the usual process. A series of ANOVAs will be performed on the: (1) Initial selection battery scores, (2) FAA training scores, (3) on-the-job performance measures, and (4) a job attitude measure, stratified by race, sex, and experimental and control group.

The ANOVA Design is illustrated in Figure 8.

	Experimental		Control	
	Men	Women	Men	Women
Minority				
Nonminority				

Figure 8. ANOVA Design for determining project effects by occupational group.

Comparisons on the frequencies within various demographic categories for the experimental and control groups, as well as between all persons who are Airway Science curriculum majors versus those Airway Science majors who apply for FAA positions, will be tested via Chi-Square statistical tests. Further demographic comparisons will

not be made because of the lack of available data.

Measures Employed

Measures used for initial selection, training scores, and on-the-job performance measures are described in detail in the previously cited studies. However, a brief generic description of each will be offered here for the FAA training scores, on-the-job performance measures, and the attitude survey.

The FAA conducts training for selectees in each of the three job categories, spanning approximately 4 to 5 years to the journeyman level. The training phases cover: (1) Academic material with multiple choice tests for proficiency and (2) simulated and on-the-job performance of the job tasks with standardized performance assessments. Academic and performance data are maintained and will be used in the analyses on a structured interval basis.

Once journeyman level is achieved, a periodic (annual) performance assessment is made comparing each person to others at that level of experience on several critical performance elements. Current performance criteria have already been developed and applied in the air traffic occupation. Similar criteria will be developed for electronics technicians and aviation safety inspectors employing an abbreviated form of the critical incident method. Data from the performance assessment are also maintained and will be employed in the analyses. The employee attitude survey (to be administered annually with the

performance appraisal) is a combination of the items contained in the OPM's Federal Employee Attitude Survey and several items specific to the FAA organization.

Airway Science candidates hired by the FAA into computer science positions will likely constitute a very small sample size (perhaps 5 or less annually). Such small samples preclude proper statistical comparisons with a control group. While the same data maintained for the three previously described groups will also be maintained for these personnel, a different strategy will be employed to determine project effects. On an annual basis, concurrent with their performance appraisal, an in-depth case study will be performed via a structured interview with the employee and the employee's supervisor. The elements of the interview will cover in-depth the same factors involved in the attitude survey and an in-depth comparison by the supervisor between the employee and other non-Airway Science trained employees at that level on the critical job elements. Data from these interviews will be utilized in a more clinical fashion to determine project effects.

Final Report

The entire findings of the project evaluation will be summarized in a final report written in American Psychological Association scientific report form.

Appendix.—Airway Science Curriculum

Generic Curriculum Outline

Subject Areas

General Studies

To include written and oral communication, social and behavioral sciences, humanities and the arts.

Mathematics

Basic math courses to serve as foundations for computer science, science, and areas of concentration.

Science and Technology

To include physics, geography, chemistry and appropriate technology, and/or engineering courses.

Computer Science

To include basic applied computer science courses.

Management

To include general management courses.

Aviation

To include aviation safety, law, navigation, communication, flight, meteorology, history, and operations.

Areas of Concentration

- (1) Airway Science Management.
- (2) Airway Computer Science.
- (3) Aircraft Systems Management.
- (4) Airway Electronic Systems.
- (5) Aviation Maintenance Management.

Subject Area Parameters**General Studies (27 Semester Hours)**

Purpose: To provide the opportunity for the extension of basic learning and communication skills, development of intellectual curiosity, and assessment of a social and historical perspective necessary for a broadly based, "well-rounded" individual.

Course Content: Courses will be designed to teach the skills that have been called "the foundations" of education. Critical thinking, cognitive and analytical skills, artistic skills, and communication skills are typical areas to be offered to satisfy this section of the curriculum.

Sample Courses: Composition, Speech, Economics, Languages, Logic, Government, and Technical Writing.

Mathematics (25 Semester Hours Math, Science, and Technology Combined)

Purpose: To offer a mathematical background specifically directed toward managerial personnel functioning in a high technology environment, including the preparation necessary for an Area of Concentration in Airway computer Science and in Airway Electronic Systems.

Course Content: Specific topics should include college level algebra, analytical geometry, trigonometric functions, exponential and logarithmic functions, vectors and vector notation, matrix theory and applications, functional notation, basic integration and differentiation, linear equations and inequalities, elementary probability and descriptive statistics, and linear programming.

Sample Courses: Algebra, Calculus, Geometry, Trigonometry, Analytic Geometry, Statistics, and Math Methods.

Science and Technology (See Above)

Purpose: To expose the student to those scientific disciplines which foster and develop logical and in-depth thought processes particularly pertinent for managers in such a fast developing

and electronically evolving working environment.

Course Content: Specific topics should include areas in the physical sciences as well as general technology that would have application to the aviation industry.

Sample Courses: Physics, Chemistry, Physical Science, Geography, Meteorology, Introduction to Engineering, and Technology and Society.

Computer Science (9 Semester Hours)

Purpose: To provide the fundamental foundations required for a manager to understand, appreciate, and effectively work with high technology personnel in a complex and dynamic computer oriented industry.

Course Content: Specific topics should include data processing, computer languages (their use and applications), data base management, micro and mini computers, computer security, office automation, societal impacts, graphic usage, and simulation.

Sample Courses: Information Systems, Introduction to Computers, Micro Computers, Systems Analysis, Data Processing, Computer Science, Computer Programming, Computer and Society, and Computer Architecture.

Management (9 Semester Hours)

Purpose: To provide an educational background in management related areas expressly directed toward understanding and interacting with the human and interpersonal relationships necessarily developed in such a diverse field as aviation.

Course Content: The student will be required to have a general understanding of basic management concerns including those topics dealing with organization, motivation, and interpersonal relations. Curriculum is to include basic supervision concepts.

Sample Courses: Business Communications, Personnel Management, Principles of Management, Techniques of Supervision, Organizational Behavior, and Administrative Problems.

Aviation (15 Semester Hours)

Purpose: This section of the curriculum will provide the student with a broad knowledge of aviation operations, the aviation industry, the problems of flight and aircraft systems, and the need to integrate these facets into a comprehensive understanding of the aviation community as a whole.

Course Content: Courses in this area are designed to create an awareness of the operational environment of flight and aircraft systems, as well as the problems of aviation as a dynamic and growth oriented industry.

Sample Courses: Aviation History, Navigation and Communication, Introduction to Aeronautics, Aviation Meteorology, Aviation Safety, and Aerospace Legislation.

Areas of Concentration**I. Airway Science Management**

Coursework in this area will prepare students specifically for a variety of administrative and management positions in the aviation community. It will be oriented to the technology of aviation through the core requirements of the curriculum.

Numerous career options exist both in industry and the Government in management areas related to aviation activities to include such positions as airport manager, general aviation operation manager, air carrier management and air traffic control.

II. Airway Computer Science

This program will consist of a series of computer science courses that will prepare the individual to function in diverse areas of computer operation, design, maintenance, troubleshooting, and programming within the field of aviation.

Career options will continue to expand as flight, navigation, communication, and information processing systems increasingly become computerized and automated. It is assumed that these graduates will be capable of assuming management and supervisory positions in time.

III. Aircraft Systems Management

This area of concentration focuses on aircraft flight operations and has as its major goal the preparation of persons with qualifications as professional pilots but who have a science/technology orientation.

The Program would include courses leading to at least commercial certification and instrument and multiengine ratings. In addition, students would take advanced work in Aerodynamics, Propulsion Systems, Aircraft Structures and Systems, and Aircraft Performance. The graduates will hold a current flight instructor certificate with airplane, instrument, and multiengine ratings.

Graduates can expect to enter fields with the Government as aviation safety officers or operations pilots or in industry as professional pilots and/or flight operations managers.

IV. Airway Electronic Systems

This area of concentration will include a comprehensive study of the theories of electronics as well as

practical experiences which would prepare the graduate to assume duties for a career in Government and general aviation electronics. They will be qualified to work not only in maintenance and troubleshooting, but also in supervision, management, testing, and developmental work.

V. Aviation Maintenance Management

The area of concentration will include an in-depth coverage of the theoretical and practical aspects of airframe and powerplant maintenance. In addition to possessing the bachelor's degree, the graduates will hold a mechanics certificate with A and P ratings. They will be qualified to work not only in maintenance and troubleshooting, but also in supervision and management.

GUIDELINES FOR A CURRICULUM IN AIRWAY SCIENCE

[Core Sample Curriculum]

Subject Areas

General Studies:	
English Composition	(3)
Technical Writing	(3)
Economics	(6)
Government	(3)
Psychology	(3)
Humanities	(3)
History	(3)
Speech	(3)
Total	27
Math/Science/Technology:	
Algebra/Trigonometry	(3)
Calculus	(3)
Physics	(6)
Geography	(4)
Statistics	(3)
Chemistry	(4)
Total	25
Computer Science:	
Introduction to the Computer	(3)
Computer Programming I	(3)
Computer Science Elective	(3)
Total	9
Management:	
Principles of Management	(3)
Organizational Behavior	(3)

GUIDELINES FOR A CURRICULUM IN AIRWAY SCIENCE—Continued

[Core Sample Curriculum]

Techniques of Supervision	(3)
Total	9
Aviation:	
Introduction to Aeronautics or Private Pilot Certification	(3)
Aviation Legislation	(3)
Flight Safety	(3)
Air Traffic Control	(3)
The National Airspace System	(3)
Total	15
Areas of Concentration Students will choose one area (see following table for areas of concentration sample curricula)	
Total	40
Total	125
Areas of Concentration/Sample Curricula	
I. Airway Science Management:	
Introduction to Sociology	(3)
Theories of Personality	(3)
Psychology of Communication	(3)
Intro to Interpersonal Communication	(3)
Communication Theory and Models	(3)
Introduction to Administrative Problems	(3)
Air Transportation	(3)
Airport Management	(3)
Theories of Personnel Management	(3)
Concepts of Air Transport Utilization	(3)
Labor/Management Relations	(3)
Operations Management	(2)
Management Decisionmaking	(2)
Approved Electives	(3)
Total	40
II. Airway Computer Science:	
Computer Programming II	(3)
Advanced Computer Programming	(3)
Computer Operating Systems	(3)
Assembler Language Programming	(3)
Data Structures	(3)
Computer Methods and Applications I	(3)
Computer Methods and Applications II	(3)
Introduction to Microcomputers	(3)
Introduction to Office Automation	(3)
Theory of Programming Languages and Complex Construction	(3)
Mathematical modeling and Computer Simulation	(4)
Computer Architecture	(3)
Approved Electives	(3)
Total	40
III. Aircraft Systems Management:	
Commercial Pilot Certification	(5)
Instrument Rating	(5)

GUIDELINES FOR A CURRICULUM IN AIRWAY SCIENCE—Continued

[Core Sample Curriculum]

Multi-engine Rating	(1)
CFI-Airplane	(3)
CFI-Instruments	(3)
Advanced Aerodynamics and Aircraft Performance	(3)
Advanced Aircraft Systems	(3)
Meteorology	(3)
Weather Reporting and Analysis	(3)
Aviation Management	(3)
Air Transportation	(3)
CFI-Multiengine	(3)
Total	40
These graduates must hold a Flight Instructor Certificate with Airplane, Instrument, and Multiengine ratings.	
IV. Airway Electronics Systems:	
Theory of Electronics	(3)
Calculus II	(3)
Math Analysis	(3)
Microprocessor Theory and Application	(3)
Advanced Computer Programming	(3)
Solid State Devices	(3)
Integrated Circuits	(3)
Engineering Drawing	(2)
Electrical Circuits	(3)
Digital Logic Application	(3)
Advanced Logic Analysis	(3)
Reliability and Maintainability Theory and Systems Engineering	(3)
Electrical and Power Principles	(2)
Approved Electives	(3)
Total	40
V. Aviation Maintenance Management:	
Engineering Drawing	(2)
Aircraft Materials	(2)
Propulsion	(6)
Propulsion Laboratory	(6)
Structures	(6)
Structures Laboratory	(6)
Aircraft Systems	(3)
Avionics Systems	(3)
Reliability and Maintainability Theory and Systems Engineering	(3)
Approved Electives	(3)
Total	40
These graduates must hold the Airframe and Powerplant Technicians Ratings (Mechanics).	

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