

Technical Evaluation
and
Preliminary Determination

National Aeronautics and Space Administration
John F. Kennedy Space Center
Kennedy Space Center, Florida

State Permit Numbers:

Curing booths AC 05-65458
Refurbishment and Subassembly Facility AC 05-73084

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

*Copy sent to
Chuck Collins
2/17/84*

May 9, 1984

No. 0158250

RECEIPT FOR CERTIFIED MAIL

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STREET AND NO.
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	RESTRICTED DELIVERY	¢
	SHOW TO WHOM AND DATE DELIVERED	¢
	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
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POSTMARK OR DATE

2/17/84

PS Form 3800, Apr. 1976

P 408 530 385

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Postage	\$
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Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	\$
Postmark or Date	
11/4/83	

PS Form 3800, Feb. 1982

PS Form 3811, Jan. 1979

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Add your address in the "RETURN TO" space on reverse.

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(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
 Peter A. Minderman
 KSC, NASA
 Kennedy Space Center, FL 32899

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	P408530385	

 (Always obtain signature of addressee or agent)

I have received the article described above.
 SIGNATURE Addressee Authorized agent
PS Retman

4. DATE OF DELIVERY: 11-7-83 POSTMARK: 3

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:

YGP

P 408 530 345

RECEIPT FOR CERTIFIED MAIL

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(See Reverse)

Sent to Peter A. Minderman	
Street and No. NASA, Headquarters Bldg.	
P.O., State and ZIP Code Kennedy Space Ctr., FL	
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	\$
Postmark or Date 8/25/83	

PS Form 3800, Feb. 1982

PS Form 3811, Jan. 1979 RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL	SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.		
	1. The following service is requested (check one.)		
	<input checked="" type="checkbox"/> Show to whom and date delivered.....¢		
	<input type="checkbox"/> Show to whom, date and address of delivery.....¢		
	<input type="checkbox"/> RESTRICTED DELIVERY Show to whom and date delivered.....¢		
	<input type="checkbox"/> RESTRICTED DELIVERY. Show to whom, date, and address of delivery.\$		
(CONSULT POSTMASTER FOR FEES)			
2. ARTICLE ADDRESSED TO: Mr. Peter Menderman NASA, Headquarters Bldg. Kennedy Space Ctr., FL 32899			
3. ARTICLE DESCRIPTION:			
REGISTERED NO.	CERTIFIED NO.	INSURED NO.	
	P408530345		
(Always obtain signature of addressee or agent)			
I have received the article described above.			
SIGNATURE <input type="checkbox"/> Addressee <input checked="" type="checkbox"/> Authorized agent			
4. DATE OF DELIVERY 8-29-83		POSTMARK	
5. ADDRESS (Complete only if requested)			
6. UNABLE TO DELIVER BECAUSE:		CLERK'S INITIALS	

NOTICE OF PROPOSED AGENCY ACTION

The Department of Environmental Regulation gives notice of its intent to issue permits to NASA, Kennedy Space Center for the construction of a space shuttle solid rocket booster refurbishment facility and five new cure booths at the Kennedy Space Center, Brevard County, Florida. A determination of best available control technology (BACT) was not required.

A person who is substantially affected by the department's proposed permitting decision may request a hearing in accordance with Section 120.57, Florida Statutes, and Chapters 17-1 and 28-5, Florida Administrative Code. The request for hearing must be filed (received) in the Office of General Counsel of the department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period shall constitute a waiver of any right such person may have to request a hearing under Section 120.57, Florida Statutes.

The applications, technical evaluations and department intent are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the following locations:

DER Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

DER St. Johns River District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803

Comments on this action shall be submitted in writing to Bill Thomas of the Tallahassee office within thirty (30) days of this notice.

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

- (1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.
- (2) All petitions filed under these rules should contain:
 - (a) The name and address of each agency affected and each agency's file or identification number, if known;
 - (b) The name and address of the petitioner or petitioners;
 - (c) All disputed issues of material fact. If there are none, the petition must so indicate;
 - (d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;
 - (e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;
 - (f) A demand for the relief to which the petitioner deems himself entitled; and
 - (g) Such other information which the petitioner contends is material.

I. SYNOPSIS OF APPLICATION

A. Name and Address and Applicant

National Aeronautics and Space Administration - NASA
DF-EMS
Kennedy Space Center, Florida 32899

B. Source Location

The proposed source is located in the Vehicle Assembly Building (Low Bay) at the Kennedy Space Center, in Brevard County, Florida. The latitude and longitude coordinates are 28° 35' 05" N and 80° 39' 00" W respectively.

C. Project Description

The proposed project consists of constructing and operating a Space Shuttle Solid Rocket Booster (SRB) Refurbishment and Subassembly Facility (RSF). Five new cure booths will be added to the existing SRB - RSF at the Vehicle Assembly Building, (VAB) Low Bay. The purpose of this project is to prepare the SRB for reuse in the Space Shuttle program.

The activities involved at these facilities [the original SRB refurbishment facility (1978) and the new facility (1983)] consist of a variety of processes in preparing the solid rocket boosters. These processes include cleaning, surface preparation, painting and thermal coating applications.

Based on a flight rate of 18 launches per year, the facility will service a maximum of 36 SRB annually.

1. Background Information

An air pollution source inventory was conducted by Edward E. Clark Engineers - Scientists, Inc. Dr. Thomas E. Lodge and John J. McNally, Environmental Engineer, of this firm, visited the Kennedy Space Center (KSC) for field investigation and data collection. The results of the field survey regarding the actual operation of the air emission facilities, the summary of emissions from existing and proposed air pollution sources are all compiled in the attached report. It was concluded that the greatest emissions are SO₂ from the heating plants and VOC from the SRB refurbishment and assembly operations at the VAB Low Bay. As a result of SO₂ emissions, KSC will be considered a major emitting facility for SO₂ (163 tons per year) in accordance with Chapter 17-2 Florida Administrative Code.

D. Process Description and Pollution Control System

Within the Refurbishment and Subassembly Facility (RSF), two processes have the potential to emit air pollutants. These processes are the Thermal Protection System (TPS) process and the Thrust Vector Control (TVC) subassembly hot fire test process.

Within the Thermal Protection System process (TPS) area, two major operations are performed in the course of applying thermal protection on SRB structures and components. These operations are 1) The coating application and 2) The hypalon topcoat application.

Thermal Protection System Process (TPS) MSA-1 Coating Application

The MSA-1 coating operation consists of a) batch mixing b) spraying, c) ambient cure and d) hot cure. This first coating (the MSA-1, MSA-2) epoxy ablative coating is dried for solvent removal in recirculated air at ambient temperature and then polymerized (cross-linked) via raising the temperature of the air to +170 degrees Fahrenheit by hot water heating coils in the Air Handling Unit. Further polymerization curing will take place for several more hours.

The maximum operating time for each SRB MSA-1 coating operation is 259 hours.

Hypalon Topcoat Application

The hypalon topcoat operation consists of a) batch preparation, b) spraying and c) ambient cure. This second coating (the hypalon topcoat) and the drying or curing in recirculated air (solvent removal) takes place only at ambient temperature. The maximum operating time for each SRB hypalon topcoat operation is 95 hours.

The spraying of MSA-1 and the spraying of Hypalon take place in separate spraying booths. The spraying booths are for spraying only and separate curing booths are for curing only. Spraying and curing never take place in the same booth.

The time interval between applications of the two coats is estimated to be 100 to 120 hours.

The components which are MSA-1 coated for each Solid Rocket Booster are the nose cap, frustum, forward skirt and the system tunnels. The aft skirt is not MSA-1 coated. This component is covered with cork and only a small area is coated with MTA-2 a trowelable ablative coating. All of the components listed above receive the hypalon topcoat.

Thrust Vector Control (TVC) System Hot Fire Process

The TVC system of each SRB is tested using a small amount of hydrazine fuel.

All hydrazine passing through the catalyst bed is reacted, and the only air pollutant formed through the instantaneous decomposition of the fuel is ammonia.

Controls

Exhaust air from operational areas will be filtered by a filtering system with removal efficiencies of greater than 99 percent. It is expected all fugitive emissions in the spray and cure booths will be captured by this system. The blast booth will use walnut shells for blasting, seventy to eighty percent of which will be recycled. The blast booth will also be provided with a particulate removal system with an efficiency greater than 99 percent.

II. RULE APPLICABILITY

A. State Regulations

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes and Chapter 17-2, Florida Administrative Code.

The proposed facility, Kennedy Space Center, is located in an area currently designated attainment for all criteria pollutants in accordance with Florida Administrative Code, Rule 17-2.420.

The Kennedy Space Center is a major emitting facility for sulfur dioxide (163 tons per year of SO₂) as defined in Rule 17-2.100(95). The VOC emissions, which are generated from the SRB refurbishment activities, are estimated to be 87 tons per year.

This facility category is not on the list of the 28, Major Facility Category, Florida Administrative Code, Table 500-1. Therefore, this project is exempt from provisions of Rule 17-2.500, Prevention of Significant Deterioration.

The proposed project shall be permitted under Rule 17-2.520 Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements.

The proposed facility shall comply with Rule 17-2.610(2) General Particulate Emission Limiting Standards, and Rule 17-2.620(1) and (2) General Pollutant Emission Limiting Standard.

III. SOURCE IMPACT ANALYSIS

A. Emission Limitations

The application of the ablative coating system required for refurbishment of the Solid Rocket Boosters (SRB) will produce emissions of particulate matter (PM) and volatile organic compounds (VOC).

The largest portion of the VOC emissions will result from perchlorethylene and methylene chloride used as solvents. Particulate matter will be generated from surface preparation and thermal coating application.

Ammonia is produced as a product of the instantaneous decomposition of hydrazine fuel in The Thrust Vector Control (TVC) subassembly hot fire test process. It has been estimated that about 500 gallons of hydrazine fuel will be consumed annually to support 18 shuttle launches. Utilization of this fuel quantity will produce about one (1) ton of ammonia per year.

Table 1 summarizes potential to emit all pollutants regulated under the Act which are affected by the proposed project. As the table shows, the proposed emissions do not exceed the significance level set in the PSD regulations. The emission limiting standard selected are listed in Table 2. These permitted emissions are in compliance with all applicable requirements of Chapter 17-2 Florida Administrative Code.

Table 3 lists all chemical compounds used during the process of refurbishment the space solid rocket boosters.

B. Air Quality Analysis

From a technical review of the application, the Department has determined that the construction and operation of these sources will not have an impact on Florida's ambient air quality standards.

IV. CONCLUSIONS

Based on a review of the data submitted by NASA, the Florida Department of Environmental Regulation (FDER) concluded that compliance with all applicable state air quality regulations will be achieved provided certain specific conditions are met. The impact of constructing and operating a Space Shuttle Solid Rocket Booster (SRB) Refurbishment and Subassembly Facility (RSF), at the Kennedy Space Center will not cause or contribute to a violation of any ambient air quality standard.

TABLE 1

SUMMARY OF EMISSIONS
 SOLID ROCKET BOOSTER
 REFURBISHING AND ASSEMBLY FACILITY

Source	Type of Pollutant	Potential Emissions (tons per year)
VAB-SRB Refurbishing/ assembly activities	VOC *	
	Perchloroethylene	31.8
	Methylene Chloride	42.2
	Others	<u>13.0</u>
Total		87.0
CCAFS - Hanger AF SRM Spray Painting Facilities	VOC **	0.58
	Particulate	0.91

* Perchloroethylene and methylene chloride constitute major VOC air emission (assumed 100% volatile). Emission from other materials estimated to be 15% of total based on volatility and chemical usage.

** Emission estimate obtained from NASA, KSC engineering. Values based on 18 launches per year.

Re: Clark Engineer's report (copy attached) submitted to the Department on January 20, 1984.

TABLE 2A

SUMMARY OF EMISSIONSFive (5) Curing Booths (AC 05-65458)

Pollutant	Potential Emissions (1) (tons per yr)
Perchloroethylene (PERC)	17.80
Methylene Chloride (MECL)	15.45
1,1,1, Trichloroethane (3, TRI)	3.43
Total	36.68

- (1) Potential Emission all based on projected 18 flights per year. Emissions as estimated by the applicant in the application submitted to the St. John's District Office on February 3, 1983.

TABLE 2B

Potential Emissions

Ablative Coating Operation
(AC 05-73084)

<u>Pollutant</u>	<u>lbs/Booster</u>	<u>lbs/Launch</u>	<u>Tons/Launch</u>	<u>Tons/Yr (1)</u> <u>18 Launches/Yr</u>
Perchloroethylene(PERCL)	1576.58	3153.16	1.576	28.37
Methylene Chloride(MECL)	849.34	1698.68	0.849	15.28
1,1,1, Trichloroethane	260.0	520.0	0.26	4.68
Others				2.00
Total	2685.92	5371.84	2.685	50.33

(1) Emissions as calculated by the applicant in the application submitted to the St. John's District Office on July 22, 1983.

Emissions estimates are based on 18 flights per year. There are 2 boosters per launch flight set.

TABLE 3

CHEMICAL COMPOUNDS USED IN SRB-RSF OPERATIONS

Material/Operation	Amount (lb/yr)
<u>Surface Prep</u>	
o PR 1422 Polysulfide Sealing	28.1
- Calcium Dichromate	1.7
- Toluene	1.7
- Dimethyl Formamide	1.7
o DC-93-076 Sealing Comp	168.3
- Dibutyltindilaurate	16.5
o DC 1204 Primer	11.6
- VM&P Naptha	6.6
- Toluene	1.7
- Butanol	1.7
o SS-4004 Silicone Primer	6.6
- N-Butanol	1.7
- Acetone	1.7
- Isopropyl Alcohol	1.7
- Toluene	1.7
o RTV Silicone Rubber	985.1
- Ethyl Silicate	49.5
o Bonaid Etchant S16943	42.9
- Diethylene Glycoldimethyl Ether	36.3
- Napthalene	5.0
- Sodium	1.7
<u>Bostik</u>	
o Methyl Ethyl Ketone	1029.6
o Epoxy Catalyst X-304	1428.9
- Alcohol Solvents	356.4
- Glycol Ether Solvent	214.5
- Ketone Solvent	714.5
- Aromatic Solvent	71.0
o Epoxy Catalyst X-306	844.8
- Amine Curing Solvents	118.8
- Aromatic Solvents	379.5
- Alcohols	422.4

o Bostik Topcoat 443-3	6765.0
- Ketone Solvents	2031.2
- Aromatic Solvents	1016.4
- Glycol Ether Solvents	1692.9
- Alcohol solvents	1587.3
o Bostik Primer 643-3	4827.9
- Aromatic Solvents	1930.5
- Ketone Solvents	1447.1
- Chromium Solvents	1255.7
o Epoxy Enamel Reducer TL-29	11.6
- Ketone Solvents	6.6
- Alcohol Solvents	3.3
- Glycol Ether Solvents	1.7
o Epoxy Primer Reducer	18.2
- Ketone Solvents	8.3
- Aromatic Solvents	5.0
- Alcohol Solvents	5.0
o Alodine 1200	87.5
- Chromic Acid	31.4
- Ferricyanide Salts	18.2
- Complex Fluoride Salts	44.6

MSA-2

o Ethyl Alcohol	1287.0
o PERC	50325.0
o MECL	62205.0
o MECL (wash down)	6418.5
o Adhesive 2216 A&B	15411.0
- Bisphenol A Epoxy Resin	5395.5
- Amine Hardner	7705.5

MTA-2 Mixing

o Epon Curing Agent Z	905.9
o LP-2 Polysulfide Polymer	20,790.0
o Tin dOctoate	8.3
o Epon Resin 828 (Bisphenol-A/ Epichlorohydrin based)	18,810.0

MTA-2 Molding

o Plastilease 512B	64.4
- Isopropyl Alcohol	26.4
o Partall Paste #2	13.2
- AMSCO Solvent #140	
- Petrolite C-700	

- o Partall Paste #10 92.4
 - Methanol
 - Ethyl Acetate
 - Methyl Isoluctyl Ketone
 - N-Butanol

- o 1,1,1 Trichloroethane 224.4

Hypalon Topcoat

- o Hypalon Paint HFR-2200 20790.0
 - Titanium dioxide 1452.0
 - Aluminum Silicate 1666.5
 - Hypalon Rubber 2079.0
 - PERC 9751.5
 - 1,1,1 Trichloroethane 5197.5
 - Hydrocarbon Resin 415.8
- o Accelerator-Gacoflex 5.0
 - Xylol 1.7
 - Diethylamino Ethanol Polymer of Undistilled MDI Isocyanate 1.7
- o PERC 168.3

TPS Cleaning Shop

- o MECL 13,909.5

TPS Test Lab

- o MECL 1782.0
- o 1,1,1 Trichloroethane 107.3
- o 1,1,1 Trichlorofluoroethane 1.7

Hot Fire

- o Isopropyl Alcohol 1897.5
- o Citric Acid 567.6
- o Hydrazine 4537.5

Miscellaneous

- o Solvents ST-397 54.5
 - Mineral Spirits 21.5
 - Xylol 21.5
 - Aromatic Hydrocarbons 11.6
- o Ethyl Alcohol 28.1

o Insta-Foam A	3019.5
- Dichlorodifluoromethane	211.2
- Polymeric Isocyanate	2788.5
- Silicone Surfactant	14.9
o Insta Foam B	3019.5
- Dichlorodifluoromethane	211.2
- Trichlorofluoromethane	280.2
- Amine Catalyst	3.3
- Tris (beta chloroprxy) Phosphate	618.8
- Polyether PClyol	1881.0
o Isopropyl Alcohol	379.5
o Methyl Ethyl Ketone	54.5
o PERC	3267.0
o 1,1,1 Trichlorotrifluoroethane	9.9
o 1,1,1 Trichloroethane	179.9
o Polyamide Epoxy	47.2
- Xylene	6.6
- Methyl Cellosolve	1.7
- Cellosolve	3.3
- Hi-sol 15	1.7
o Methyl Isobutyl Ketone	54.5

Note: The values (lb/yr) represent activities associated with 18 shuttle launches per year. Varying percentages of each of these materials are volatile and thereby contributing VOC emissions. It is estimated that PERCL and MECL contribute to 85% and the other chemicals contribute about to 15% of the total VOC emissions that will result in an overall VOC emissions of 87 tons per year as shown in Table 1.

TREASURY
BUREAU OF GOVERNMENT
FINANCIAL OPERATIONS

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STATE OF FLORIDA
DEPARTMENT OF ENVIRON-
MENTAL REGULATIONS

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\$\$\$400	00

NASA JFK
SPACE CENTER
A1684

Joe O'Brien
REGIONAL DISBURSER OFFICER

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

No 76018

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from NASA, JFK Space Center Date March 12, 1984

Address _____ Dollars \$ 400.00

Applicant Name & Address Same as above

Source of Revenue _____

Revenue Code 001001 Application Number AC 05-73084, AC 05-65458

By Patricia G. Adams

John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

MAR 08 1984

Reply to Attn of: DF-EMS

Mr. C. H. Fancy, P.E.
Deputy Chief, Bureau of Air Quality Mgmt.
Dept. of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Dear Mr. Fancy:

In response to your letter to me dated February 17, 1984,
we are submitting an additional \$400.00 for our permit
application to construct five (5) curing booths in the
Solid Rocket Booster Refurbishment and Subassembly Facility
at the John F. Kennedy Space Center.

If you have any questions or need additional information,
please call me at (305) 867-4049.

Sincerely,


Kirby K. Key
Chief, Environmental Management Staff

Enclosure

DER
MAR 12 1984
BAQM

AC 05-73084
AC 05-63458

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
National Aeronautics and
Space Administration (NASA)
DF-EMS
Kennedy Space Center, Florida

Permit Number: AC 05-65458
Expiration Date: November 30, 1984
County: Brevard
Latitude/Longitude: 28°35'05 "N/
80°39'04 "W
Project: Solid Rocket Refurbishment
and Subassembly Facility five (5)
curing booths

This permit is issued under the provisions of Chapter(s) 403
17-2 and 17-4, Florida Statutes, and Florida Administrative Code Rule(s)
17-2 and 17-4. The above named permittee is hereby
authorized to perform the work or operate the facility shown on
the application and approved drawing(s), plans, and other
documents attached hereto or on file with the department and made
a part hereof and specifically described as follows:

For the construction of five (5) new cure booths added to the
existing Solid Rocket Booster Subassembly and Refurbishment
Facility at the Vehicle Assembly Building, KSC, in Brevard County,
Florida.

Construction shall be in accordance with the following permit
application, plans, documents, attachments and drawings except as
otherwise noted on pages 5 through 7, Specific Conditions.

Attachments:

1. Application to construct Air Pollution Sources, DER Form 17-1.122(16).
2. Incompleteness letters of August 25, 1983, November 4, 1983, and February 17, 1984.
3. NASA's letters of October 6, 1983, January 20, 1984 (Clark-Engineers report), and March 12, 1984 (Responses to technical discrepancies).

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL

I. D. Number:
Permit Number: AC 05-65458
Expiration Date: November 30, 1984

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL
GENERAL CONDITIONS:

I. D. Number:
Permit Number: AC 05-65458
Expiration Date: November 30, 1984

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

- a. Having access to and copying any records that must be kept under the conditions of the permit;
- b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
- c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

- a. a description of and cause of non-compliance; and
- b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL

I. D. Number:
Permit Number: AC 05-65458
Expiration Date: November 30, 1984

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

- () Determination of Best Available Control Technology (BACT)
- () Determination of Prevention of Significant Deterioration (PSD)
- () Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

- a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

PERMITTEE:

NASA

DF-EMS

Kennedy Space Center, FL

GENERAL CONDITIONS:

I. D. Number:

Permit Number: AC 05-65458

Expiration Date: November 30, 1984

- b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
- c. Records of monitoring information shall include:
- the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. This facility shall be allowed to operate continuously (8760 hrs per year).
2. Not more than 36 solid rocket boosters will be refurbished during any 12 month period unless a new application for permit to construct is submitted and approved by the Department.
3. Total VOC emissions from the refurbishment of 36 space shuttle solid rocket boosters shall not exceed 87 tons per year for both sources (permits AC 05-65458 and AC 05-73084).

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL

I. D. Number:
Permit Number: AC 05-65458
Expiration Date: November 30, 1984

SPECIFIC CONDITIONS:

4. The amount of chemical compounds used in the overall solid rocket booster refurbishment processes shall not exceed the quantities listed in Table 3 of the preliminary determination.

5. Visible emissions shall not exceed 5% opacity during any 6 minute period. Compliance with this standard shall be determined by EPA Method 9. Visual Determination of the Opacity of Emissions from Stationary Sources as described in Appendix A of 40 CFR 60.

6. Compliance with the VOC emission standard will be determined by monitoring these pollutants (perchloroethylene, PERCL and methylene chloride, MECL). Sampling will be conducted continuously (24 hours per day) for a total of twenty days. Concentration data and calculated mass emission rate will be reported. Thereafter, compliance with the VOC emission limitations will be maintained based on the VOC inventory. Measured concentrations shall be as proposed on page A-4 of the application number AC 05-64548.

7. No objectionable odors are allowed from this facility.

8. The applicant will demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit the Department's St. Johns River District office prior to 90 days of the expiration of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until the expiration date or issuance of an operating permit.

9. Upon obtaining an operating permit, the applicant will be required to submit annual reports on the actual operation and emission of the facility. Quarterly material balance reports (24-hour) shall be required and sent to the Department's St. Johns River District Office to assess emissions and maintain VOC inventory. The quantity of flights performed during that quarter shall be included in the report. Visible emissions test shall be performed in an annual basis.

10. Construction shall reasonably conform to the plans submitted in the application.

11. The applicant shall report any delay in construction and completion of this project to the Department's St. Johns River District Office.

PERMITTEE:

NASA
DF-EMS
Kennedy Space Center, FL

Permit Number AC 05-65458
Expiration Date: November 30, 1984

SPECIFIC CONDITIONS:

12. Reasonable precautions to prevent fugitive particulate emissions during construction such as coating or spraying road and construction sites will be taken by the applicant.

13. This facility shall comply with the provisions and requirements of the attached the general conditions.

Issued this ___ day of _____, 1984

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

___ pages attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:

National Aeronautics and
Space Administration (NASA)
DF-EMS
Kennedy Space Center, Florida
32899

Permit Number: AC 05-73084
Expiration Date: November 30, 1984
County: Brevard
Latitude/Longitude: 28°35'05 "N/
80°39'04 "W
Project: Solid Rocket Refurbishment
and Subassembly Facilities

This permit is issued under the provisions of Chapter(s) 403
17-2 and 17-4, Florida Statutes, and Florida Administrative Code Rule(s)
17-2 and 17-4. The above named permittee is hereby
authorized to perform the work or operate the facility shown on
the application and approved drawing(s), plans, and other
documents attached hereto or on file with the department and made
a part hereof and specifically described as follows:

For the construction/operation of the Space Shuttle Solid
Subassembly and Refurbishment Facility at the Vehicle Assembly
Building, KSC, in Brevard County, Florida.

Construction shall be in accordance with the following permit
application, plans, documents, attachments and drawings except as
otherwise noted on pages 5 through 7, Specific Conditions.

Attachments:

1. Application to construct Air Pollution Sources, DER Form 17-1.122(16).
2. Incompleteness letters of August 25, 1983, November 4, 1983, and February 17, 1984.
3. NASA's letters of October 6, 1983, January 20, 1984 (Clark-Engineers report), and March 12, 1984 (Responses to technical discrepancies).

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL

I. D. Number:
Permit Number: AC 05-73084
Expiration Date: November 30, 1984

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL
GENERAL CONDITIONS:

I. D. Number:
Permit Number: AC 05-73084
Expiration Date: November 30, 1984

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

- a. Having access to and copying any records that must be kept under the conditions of the permit;
- b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
- c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

- a. a description of and cause of non-compliance; and
- b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL

I. D. Number:
Permit Number: AC 05-73084
Expiration Date: November 30, 1984

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

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- () Determination of Best Available Control Technology (BACT)
- () Determination of Prevention of Significant Deterioration (PSD)
- () Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

- a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL
GENERAL CONDITIONS:

I. D. Number:
Permit Number: AC 05-73084
Expiration Date: November 30, 1984

- b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
- c. Records of monitoring information shall include:
- the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. This facility shall be allowed to operate continuously (8760 hrs per year).
2. Not more than 36 solid rocket boosters will be refurbished during any 12 month period unless a new application for permit to construct is submitted and approved by the Department.
3. Total VOC emissions from the refurbishment of 36 space shuttle solid rocket boosters shall not exceed 87 tons per year for both sources (permits AC 05-65458 and AC 05-73084).

PERMITTEE:
NASA
DF-EMS
Kennedy Space Center, FL

I. D. Number:
Permit Number: AC 05-73084
Expiration Date: November 30, 1984

SPECIFIC CONDITIONS:

4. The amount of chemical compounds used in the overall solid rocket booster refurbishment processes shall not exceed the quantities listed in Table 3 of the preliminary determination.

5. Visible emissions shall not exceed 5% opacity during any 6 minute period. Compliance with this standard shall be determined by EPA Method 9. Visual Determination of the Opacity of Emissions from Stationary Sources as described in Appendix A of 40 CFR 60.

6. Compliance with the VOC emission standard will be determined by monitoring these pollutants (perchloroethylene, PERCL and methylene chloride, MECL). Sampling will be conducted continuously (24 hours per day) for a total of twenty days. Concentration data and calculated mass emission rate will be reported. Thereafter, compliance with the VOC emission limitations will be maintained based on the VOC inventory. Measured concentrations shall be as proposed on page A-4 of the application number AC 05-64548.

7. No objectionable odor are allowed from this facility.

8. The applicant will demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit the Department's St. Johns River. District office prior to 90 days of the expiration of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until the expiration date or issuance of an operating permit.

9. Upon obtaining an operating permit, the applicant will be required to submit annual reports on the actual operation and emission of the facility. Quarterly material balance reports (24-hour) shall be required and sent to the Department's St. Johns River District Office to assess emissions and maintain VOC inventory. The quantity of flights performed during that quarter shall be included in the report. Visible emissions test shall be performed in an annual basis.

10. Construction shall reasonably conform to the plans submitted in the application.

11. The applicant shall report any delay in construction and completion of this project to the Department's St. Johns River District Office.

PERMITTEE:

NASA
DF-EMS
Kennedy Space Center, FL

Permit Number AC 05-73084
Expiration Date: November 30, 1984

SPECIFIC CONDITIONS:

12. Reasonable precautions to prevent fugitive particulate emissions during construction such as coating or spraying road and construction sites used by contractor will be taken by the applicant.

13. This facility shall comply with the provisions and requirements of the attached the general conditions.

Issued this ___ day of _____, 1984

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

___ pages attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

February 17, 1984

CERTIFIED MAIL - RECEIPT REQUESTED

Mr. Kirby K. Key
NASA
DF-EMS
Kennedy Space Center, Florida 32899

Dear Mr. Key:


The Bureau of Air Quality Management has received your application for permits to construct five (5) curing booths and existing solid rocket booster refurbishment and subassembly facility at the Kennedy Space Center (Vehicle Assembly Building).

In accordance with Florida Administrative Code Rule 17-4.05(4)(a)4., the construction permit fee for a source having potential emissions of more than 75 tons per year of any single pollutant is \$750 (proposed potential emissions from your facilities are 87 tons per year). Based on this regulation, you need to send a check for \$400 to our Tallahassee office. Our files show that we have already received the amount of \$350.

As soon as the requested fee is received at this office, we will resume processing your applications.

If you have any questions on this request, please call Teresa M. Heron of this office at (904)488-1344.

Sincerely,


C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management

CHF/TH/s

NASA
KENNEDY SPACE CENTER
AIR POLLUTION SOURCE INVENTORY

December 23, 1983

CLARK

engineers - scientists

December 23, 1983

Mr. Kirby K. Key
NASA
DF-EMS
Kennedy Space Center, Florida 32899

Re: Air Pollution Source
Inventory
KSC P.O. CC-32002B

Dear Mr. Key:

Enclosed please find five copies of the Air Pollution Source Inventory prepared, under your technical direction, for the John F. Kennedy Space Center in accordance with the referenced purchase order dated November 30, 1983.

This report represents the results of our efforts regarding the compilation and evaluation of air emissions associated with the operation of the Kennedy Space Center. These efforts included a field survey of possible emission sources, review of existing air permits at KSC and discussions with appropriate facility personnel.

Accepted EPA handbook methods were used where appropriate to estimate and verify emission values for these air pollution sources. For other processes present at KSC, values were based on information obtained from NASA personnel and numerous environmental reports and studies provided by NASA personnel. This information has been adjusted to reflect a shuttle flight rate of 18 launches per year.

As mentioned in the report, the greatest emissions are SO₂ emissions from the heating plants and VOC emissions from SRB refurbishment and assembly operations at the VAB Low Bay. As a result of SO₂ emissions, KSC will be considered as a major emitting facility by the DER. Each of the facilities included in the report have been discussed with Mr. Bill Thomas of the Bureau of Air Quality, Department of Environmental Regulation, in Tallahassee. Due to the nature of the operations of some of the facilities, no emission estimates will be required. However, further evaluation may be required following the DER review of this initial information.

CLARK

Mr. Kirby K. Key
NASA/KSC
December 23, 1983
PAGE TWO

In addition, there are a few points we would like to bring to your attention at this time. We recommend that all conditions included in existing air permits be reviewed to ensure that there will be no unanticipated restrictions on any operations at KSC (i.e., waste quantities, operating schedule, etc.). Moreover, some further evaluation of the impacts of the hypergolic fuel incinerator and hypergolic scrubbers may be required.

Clark Engineers-Scientists has attempted to be most responsive and thorough in its satisfaction of the KSC Task Description provided under the referenced purchase order, and look forward to discussing the results of the source inventory with you in the very near future.

Very truly yours,



T. A. Paris
Project Manager

TAP/mtf
8349



AIR POLLUTION SOURCE INVENTORY

A. INTRODUCTION

Under John F. Kennedy Space Center, NASA, Order Number CC-32002B of November 30, 1983, Edward E. Clark Engineers-Scientists, Inc., was charged with conducting services for a Kennedy Space Center-wide inventory of all Air Pollution Sources. A complete task description is attached to this report as Enclosure A.

Due to the urgency of the task, based upon the Kennedy Space Center's needs to obtain certain permits, Clark Engineers has moved forward with a well-defined approach to meet the requirements of the task. Dr. Thomas E. Lodge and John J. McNally, Environmental Engineer, visited the Kennedy Space Center for field investigation and data collection. With the assistance of Kennedy Space Center personnel, this initial phase of the investigation was completed. Included was a review of existing DER air permits regarding the details of each of these air emission sources. This information was supplemented and verified by discussions with facility personnel regarding the actual operation of these facilities. In addition, information pertaining to these operations was obtained from numerous reports and studies provided by NASA/KSC personnel assessing the air emissions associated with the processes performed at these facilities.

In order to meet the December 23, 1983 deadline for task completion, singular priority was given. The results of the Clark efforts are submitted in the form of a final report suitable for submission to the Florida Department of Environmental Regulation. That report is presented.

CLARK

B. OBJECTIVE

The approach taken by Clark Engineers-Scientists in satisfying the requirements of the Task Description to the Air Pollution Source Inventory, was to ensure that the questions posed by Mr. C. H. Fancy, P.E., Deputy Chief, Bureau of Air Quality Management, Department of Environmental Regulation, in his letter to Mr. Peter A. Minderman, Director of Engineering Development, KSC, of November 4, 1983, were responded to in every detail. The Mr. C. H. Fancy letter is attached to this report as Enclosure 2. The three questions of significance are repeated here:

1. Is your facility, the Kennedy Space Center, a major emitting facility? (see 17-2.100(62) and 17-2.100(95)FAC for applicable definitions).
2. Are the potential emissions (criteria pollutants) from any equipment operation, or chemical process at this facility over 250 tons per year?
3. How many companies have contracts to operate air pollution sources at the Kennedy Space Center?

The provision of complete responses to these inquiries will permit the Florida DER to determine whether or not the Kennedy Space Center Application must be reviewed under the Prevention of Significant Deterioration (PSD) rule as a modification to a major facility.

CLARK

C. APPROACH

A general field survey was undertaken to identify and evaluate the major air emission sources associated with the support and operation at Kennedy Space Center. Following this survey, existing DER permits were reviewed and evaluated with respect to their contribution to the total air emissions at the Kennedy Space Center. Information collected during these two phases of the inventory program was discussed with Mr. Bill Thomas at the Bureau of Air Quality, Department of Environmental Regulation in Tallahassee, Florida. The nature and magnitude of the air emissions were considered resulting in an appropriate method of treatment for each of these air emission sources.

The actual air emissions based on normal operations would be estimated and submitted to the Department of Environmental Regulation along with a general description of the nature and schedule of operations of other facilities located at the Kennedy Space Center that contribute any air emissions.

Our field survey involved consideration of a wide variety of operations with subsequent evaluation of the magnitude and type of associated air emissions. These sources include heating units varying from the two main heat plants to numerous small heating units, incinerators utilized for pathological waste and contaminated hypergolic fuel wastes, gasoline service stations, sandblasting operations and the major support activities associated with the refurbishment and assembly of the solid rocket boosters required for the Space Shuttle program.

CLARK

Effective air emission permits exist for the following operations:

- o Major Heat Plants
 - Central heat plant A005-24130
A005-34274
A005-34276
 - VAB Annex heat plant A005-24131
A005-34275
A005-34277
- o Pathological Incinerator A005-52118
- o Hypergolic Waste Incinerator A005-37676
- o Vehicle Assembly Building (VAB)- SRB - Refurbishment and Assembly Activities Permit applications submitted

CLARK

D. AIR EMISSION SOURCE DESCRIPTION

The following is a description of each of these activities in order to provide information necessary to evaluate the scale of each of these operations and, ultimately, the magnitude of the air emissions associated with each activity. Each source is listed in Table 1 with resulting emission type.

Major Heat Plants

Central heat plant consisting of three heating units (2 @ 40 MM BTU/hr; 1 @ 16 MM BTU/hr). Operation consists of utilization of one large heating unit full time with very occasional use of the small unit for supplemental heating. All units are presently permitted. Permit emission values and actual emissions are presented in Table 2.

VAB Annex heat plant consisting of three heating (3 @ 16 MM BTU/hr each). Operation consists of utilization of one heating unit full time with use of a second unit approximately one-half year. All units presently permitted. Permit emission values and actual emissions are presented in Table 2.

Pathological Incinerator

This unit is utilized approximately once a month to dispose of pathological wastes generated at the Life Sciences Building at Hangar L - CCAFS. Total waste loading is about two tons/year with negligible emissions.

Hypergolic Fuel Incinerator

This unit is utilized as necessary to dispose of contaminated hypergolic fuel. The waste consists of water with a very low concentration of hypergolic fuel. The unit is located at Fuel Farm #1 at CCAFS with operations resulting in negligible emissions.

TABLE 1
SUMMARY OF AIR EMISSION SOURCES
KENNEDY SPACE CENTER

SOURCE	TYPE OF POLLUTANT	COMMENTS
<ul style="list-style-type: none"> o Heat Plants - Central - VAB annex 	<p>SO₂, CO, NO₂, particulate</p> <p>SO₂, CO, NO₂, particulate</p>	<p>Sulfur dioxide emissions constitute major air emissions from these facilities. Refer to heat plant emissions for actual and permitted emission levels. See emission source description for operation schedule.</p>
<ul style="list-style-type: none"> o Pathological Incinerator 	<p>SO₂, CO, NO₂, particulate</p>	<p>Emissions are negligible due to nature of waste, size of unit, level of usage. See emission source description for operation schedule.</p>
<ul style="list-style-type: none"> o Hypergolic Waste Incinerator 	<p>SO₂, CO, NO₂, particulate</p>	<p>Emissions are negligible due to size of unit and level of usage. See emission source description for operation schedule.</p>
<ul style="list-style-type: none"> o Gasoline Service Stations 	<p>VOC</p>	<p>Emissions negligible. No permit required according to DER regulations.</p>
<ul style="list-style-type: none"> o VAB-Solid Rocket Booster Refurbishment & subassembly 	<p>VOC's particulate</p>	<p>Perchloroethylene and methylene chloride constitute major VOC air emissions. Refer to Tables 3 and 4 for chemical usage and air emission estimates.</p>
<ul style="list-style-type: none"> o CCAFS-Hangar AF Solid Rocket Motor Paint Facility 	<p>VOC's particulate</p>	<p>Emissions result from cleaning preparations and painting of SRM's.</p>
<ul style="list-style-type: none"> o SRM Hot Fire Test Facility 	<p>Ammonia</p>	<p>Emissions result from testing of SRM's.</p>
<ul style="list-style-type: none"> o Sandblasting Ransom Road and other locations 	<p>Particulate</p>	<p>No DER regulation pertains. Estimate of grit consumption required.</p>
<ul style="list-style-type: none"> o Multiple small heater 	<p>SO₂, CO, NO₂ Particulate</p>	<p>Dedicated building service. Emissions negligible. No permit required by DER due to low heat input</p>

TABLE 2

HEAT PLANT EMISSIONS (Tons/year)

SOURCE	Type of Emissions			
	Particu- late	SO ₂	CO	NO ₂
<u>Actual *</u>				
Central Plant	9.30	112.26	3.58	15.76
VAB Annex Plant	4.24	51.18	1.63	7.19
	13.54	163.44	5.21	22.95
<u>Existing Permits **</u>				
Central Plant	5.13	213.8	0	2.40
VAB Annex Plant	5.13	213.8	0	2.40
	10.26	427.6	0	4.80

* Values represent emissions according to EPA AP 42, "Compilation of Air Pollutant Emission Factors", based on actual operational schedule at the heating facilities.

** Values represent emissions listed in existing permits for the heaters at these facilities.

CLARK

Gasoline Service Stations

There are two gasoline service stations operated by the NASA motor pool. There is also one publicly operated service station located in the industrial area at Kennedy Space Center. The throughput level at these facilities requires vapor control during loading although no DER permit is required.

	<u>Throughput Gallons/Month</u>
o GSA Motor Pool	60,000 (+ 9,000 Diesel)
o Contractor's Road Station	30,000
o Industrial Area (public station)	<u>30,000</u>
Total	120,000

Vehicle Assembly Building - Solid Rocket Booster Refurbishment and Assembly

These operations are limited to the activities in the original SRB refurbishment facility (1978) as well as the new facility completed in 1983. Both of these facilities are located in the VAB Low Bay. Activities involved here consist of a variety of processes in preparing the solid rocket boosters. These processes include cleaning, surface preparation, painting and thermal coating applications. The emissions included are based on activities required to support a flight rate of 18 shuttle launches per year. Table 3 presents a list of chemicals used for these SRB refurbishment activities based on their flight rate.

TABLE 3
CHEMICAL USAGE IN SRF RSP OPERATIONS
VEHICLE ASSEMBLY BUILDING*

(* Values represent activities associated with 18 shuttle launches per year)

Material	Amount (lbs/yr)
<u>Surface Prep</u>	
o PR 1422 Polysulfide Sealing	28.1
- Calcium Dichromate	1.7
- Toluene	1.7
- Dimethyl Formamide	1.7
o DC-93-076 Sealing Comp	168.3
- Dibutyltindilaurate	16.5
o DC 1204 Primer	11.6
- VM&P Naptha	6.6
- Toluene	1.7
- Butanol	1.7
o SS-4004 Silicone Primer	6.6
- N-Butanol	1.7
- Acetone <i>Alcohol</i>	1.7
- Isopropyl Alcohol	1.7
- Toluene	1.7
o RTV Silicone Rubber	985.1
- Ethyl Silicate	49.5
o Bonaid Etchant S16943	42.9
- Diethylene Glycoldimethyl Ether	36.3
- Napthalene	5.0
- Sodium	1.7
<u>Bostik</u>	
o Methyl Ethyl Ketone	1029.6
o Epoxy Catalyst X-304	1428.9
- Alcohol Solvents	356.4
- Glycol Ether Solvent	214.5
- Ketone Solvent	714.5
- Aromatic Solvent	71.0
o Epoxy Catalyst X-306	844.8
- Amine Curing Solvents	118.8
- Aromatic Solvents	379.5
- Alcohols	422.4

Ref: Batelle Environmental Analysis Report, May, 1983

CLARK

TABLE 3
CHEMICAL USAGE IN SRF RSP OPERATIONS
VEHICLE ASSEMBLY BUILDING*
(continued)

(* Values represent activities associated with 18 shuttle launches per year)

Material	Amount (lbs/yr)
o Bostik Topcoat 443-3	6765.0
- Ketone Solvents	2031.2
- Aromatic Solvents	1016.4
- Glycol Ether Solvents	1692.9
- Alcohol solvents	1587.3
o Bostik Primer 643-3	4827.9
- Aromatic Solvents	1930.5
- Ketone Solvents	1447.1
- Chromium Solvents	1255.7
o Epoxy Enamel Reducer TL-29	11.6
- Ketone Solvents	6.6
- Alcohol Solvents	3.3
- Glycol Ether Solvents	1.7
o Epoxy Primer Reducer	18.2
- Ketone Solvents	8.3
- Aromatic Solvents	5.0
- Alcohol Solvents	5.0
o Alodine 1200	87.5
- Chromic Acid	31.4
- Ferricyanide Salts	18.2
- Complex Fluoride Salts	44.6
<u>MSA-2</u>	
o Ethyl Alcohol	1287.0
o PERC	50325.0
o MECL	62205.0
o MECL (wash down)	6418.5
o Adhesive 2216 A&B	15411.0
- Bisphenol A Epoxy Resin	5395.5
- Amine Hardner	7705.5
<u>MTA-2 Mixing</u>	
o Epon Curing Agent Z	905.9
o LP-2 Polysulfide Polymer	20,790.0
o Tin Octoate	8.3
o Epon Resin 828 (Bisphenol-A/ Epichlorohydrin based)	18,810.0

CHEMICAL USAGE IN SRF RSP OPERATIONS
VEHICLE ASSEMBLY BUILDING*

(continued)

(* Values represent activities associated with 18 shuttle launches per year)

Material	Amount (lbs/yr)
<u>MTA-2 Molding</u>	
o Plastilease 512B	64.4
- Isopropyl Alcohol	26.4
o Partall Paste #2	13.2
- AMSCO Solvent #140	
- Petrolite C-700	
o Partall Paste #10	92.4
- Methanol	
- Ethyl Acetate	
- Ethanol	
- Methyl Isobutyl Ketone	
- N-Butanol	
o 1,1,1 Trichloroethane	224.4
<u>Hypalon Topcoat</u>	
o Hypalon Paint HFR-2200	20790.0
- Titanium dioxide	1452.0
- Aluminum Silicate	1666.5
- Hypalon Rubber	2079.0
- PERC	9751.5
- 1,1,1 Trichloroethane	5197.5
- Hydrocarbon Resin	415.8
o Accelerator-Gacoflex	5.0
- Xylol	1.7
- Diethylamino Ethanol Polymer of Undistilled MDI Isocyanate	1.7
o PERC	168.3
<u>TPS Cleaning Shop</u>	
o MECL	13,909.5
<u>TPS Test Lab</u>	
o MECL	1782.0
o 1,1,1 Trichloroethane	107.3
o 1,1,1 Trichlorofluoroethane	1.7

CHEMICAL USAGE IN SRF RSP OPERATIONS
VEHICLE ASSEMBLY BUILDING*
 (continued)

(* Values represent activities associated with 18 shuttle launches per year)

Material	Amount (lbs/yr)
<u>Hot Fire</u>	
o Isopropyl Alcohol	1897.5
o Citric Acid	567.6
o Hydrazine	4537.5
<u>Miscellaneous</u>	
o Solvents ST-397	54.5
- Mineral Spirits	21.5
- Xylol	21.5
- Aromatic Hydrocarbons	11.6
o Ethyl Alcohol	28.1
o Insta-Foam A	3019.5
- Dichlorodifluoromethane	211.2
- Polymeric Isocyanate	2788.5
- Silicone Surfactant	14.9
o Insta Foam B	3019.5
- Dichlorodifluoromethane	211.2
- Trichlorofluoromethane	280.2
- Amine Catalyst	3.3
- Tris (beta chloroprxy) Phosphate	618.8
- Polyether PClyol	1881.0
o Isopropyl Alcohol	379.5
o Methyl Ethyl Ketone	54.5
o PERC	3267.0
o 1,1,1 Trichlorotrifluoroethane	9.9
o 1,1,1 Trichloroethane	179.9
o Polyamide Epoxy	47.2
- Xylene	6.6
- Methyl Cellosolve	1.7
- Cellosolve	3.3
- Hi-sol 15	1.7
o Methyl Isobutyl Ketone	54.5

CLARK

Varying percentages of each of these materials are volatile and thereby contributing VOC emissions. The largest portion of these emissions will result from perchloroethylene and methylene chloride. It is estimated that together these two chemicals contribute approximately 74 tons per year VOC emissions based on 18 launches annually. It is estimated that the other chemicals contribute about 15 percent of the VOC emissions which will result in a total VOC emission of about 87 tons/year as shown in Table 4. These emissions are based on the assumption that all the volatiles in the materials will ultimately reach the atmosphere. The emissions, as a result, are considered conservative since a portion of these materials will be recovered as waste materials.

Particulate matter will be generated from surface preparation and thermal coating applications. Exhaust air from these operational areas will be filtered by efficient filtering systems with removal efficiencies of greater than 99 percent. As a result no significant particulate emissions are expected from these operations.

Cape Canaveral Air Force Station, Hangar AF, Solid Rocket Motor Paint Facility

This facility involves cleaning and painting of the recovered solid rocket boosters. Based on a flight rate of 18 launches per year, the facility will service a maximum of 36 SRB annually. The blast booth will use walnut shells for blasting, seventy to eighty percent of which will be recycled. The blast booth will also be provided with a particulate removal system with an efficiency greater than 99 percent. The two paint spray booths will be directed through the roof and will utilize a set of efficient filters to remove paint particles. In-depth environmental assessments of this facility have resulted in conclusions that no significant emissions will occur from these operations. Estimates of these emissions are listed in Table 4.

CLARK

TABLE 4
SOLID ROCKET BOOSTER
REFURBISHING AND ASSEMBLY ACTIVITIES
AIR EMISSIONS SUMMARY

SOURCE	TYPE OF POLLUTANT	AMOUNT (TONS/YEAR)
VAB-SRB Refurbishing/ Assembly Activities	VOC *	
	perchloroethylene	31.8
	Methylene chloride	42.2
	Others	13.0
		<u>87.0</u>
CCAFS - Hanger AF SRM Spray Painting Facility	VOC **	0.58
	particulate	0.91

* Chemical usage information obtained from Batelle Environmental Analysis report. Perchloroethylene and methylene chloride constitute major VOC air emission (assumed 100% volatile). Emission from other materials estimated to be 15% of total based on volatility and chemical usage.

** Emission estimate obtained from NASA, KSC engineering. Values based on 18 launches per year.

CLARK

Solid Rocket Motor Hot Fire Test Facility

Preparation of the solid rocket motors for shuttle launching requires test firing of the motors. It has been estimated that about 500 gallons of hydrazine fuel will be consumed annually to support 18 shuttle launches. Utilization of this fuel quantity will produce about one ton of ammonia per year.

In addition to the major air emission sources there also exists minor sources such as isolated sand blasting and spray painting facilities. These include facilities located at Ransom Road and Contractor's Road. Based on the size of these operations, no significant emissions are anticipated. According to present DER rules, no control practices are required although further evaluation may be required in the future.

CLARK

E. SUMMARY

From the preceding information, it is seen that the majority of the air emissions generated at the Kennedy Space Center may be attributed to two large scale operations in particular. These operations include the two major heating plants and the chemical processes associated with the refurbishment and assembly of the solid rocket boosters currently taking place at the Vehicle Assembly Low Bay Facilities. In addition, several other operations have been evaluated with respect to air emissions. The scope of these activities has been described with the conclusion that these operations will not result in significant air emission contributions.

The major emission sources and amounts of associated pollutants is presented in Table 5. It can be seen from this table that SO₂ and VOC constitutes the major emission constituents with SO₂ emissions of about 163 tons/year. Significant VOC emissions are discharged to the atmosphere, the majority of which, 87.0 tons/year, are generated from SRB refurbishment activities at the VAB Low Bay facilities.

These emission levels indicate that only the SO₂ emissions are above 100 tons/year. Therefore, in response to the Department of Environmental Regulation letter from Mr. C. H. Fancy, dated November 4, 1983, the Kennedy Space Center would be categorized as a major emitting facility with emissions exceeding 100 tons/year for one of the DER designated criteria pollutants. However, none of the emission parameters approach the 250 tons/year emission level.

TABLE 5
SUMMARY OF
KENNEDY SPACE CENTER
AIR EMISSIONS

EMISSION SOURCE	EMISSION TYPE	AMOUNT (TONS/YEAR)
Heaters- Central Heating Plant and VAB Annex Heating Plant	SO ₂	163.4
	NO ₂	23.0
	CO	5.2
	Particulate	13.2
VAB - SRB RSF Operations	VOC	87.0
CCAFS-Hanger AF Spray Painting Facility	VOC	0.6
	Particulate	0.9
TOTAL EMISSIONS	SO ₂	163.4
	NO ₂	23.0
	CO	5.3
	Particulate	14.4
	VOC	87.6

TASK DESCRIPTION
FOR
AIR POLLUTION SOURCE INVENTORY

The contractor shall conduct a KSC-wide inventory of all air pollution sources for the purposes of regulatory compliance in obtaining air permits for KSC projects.

The contractor shall identify all stationary sources which are applicable to calculating maximum potential pollutant emissions at KSC as a possible "major facility", as defined by Florida Administrative Code 17-2.100(95). Data shall be collected on each source, and appropriate calculations shall be performed to determine the maximum "potential emissions," as defined in FAC 17-2.100(124), for each regulated pollutant (SO₂, CO, etc.) for KSC as a whole.

The task shall be completed by December 23, 1983. There shall be a final report suitable for submission to the Florida Department of Environmental Regulation. Office area shall be provided in the KSC Headquarters Building, Room 3206.

Enclosure 1

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

November 4, 1983

CERTIFIED MAIL - RECEIPT REQUESTED

Mr. Peter A. Minderman
Director of Engineering
Development, KSC, NASA
Headquarters Building
Kennedy Space Center, Florida 32899

Dear Mr. Minderman:

The Department has received your response to our request on October 6, 1983. After review of your data, we concluded that additional information is needed in order to determine whether your application must be reviewed under the PSD rule as a modification to a major facility. The information needed is as follows:

1. Is your facility, the Kennedy Space Center, a major emitting facility? (See 17-2.100(62) and 17-2.100(95)FAC for applicable definitions)
2. Are the potential emissions (criteria pollutants) from any equipment operation, or chemical process at this facility over 250 tons per year?
3. How many companies have contracts to operate air pollution sources at the Kennedy Space Center?

As soon as the above information is received, we will resume processing your application. If you have any questions on this request, please call Bill Thomas at (904) 488-1344, or write to me at the above address.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Enclosure 2

CHF/TH/s

John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

Reply to Attn of: DF-EMS

NOV 29 1983

Mr. C. H. Fancy, P. E.
Deputy Chief
Bureau of Air Quality Management
Dept. of Environmental Regulation
Twin Towers Office Bldg.
2600 Blair Stone Road
Tallahassee, FL 32301-8241

DER
DEC 01 1983
BAQM

Dear Mr. Fancy:

We are in receipt of your letter of November 4, 1983, requesting additional information concerning the potential air emissions from our facility. Since we do not have sufficient factual data to provide answers to your questions, we have initiated a source inventory of our facility to collect the required data. This task is scheduled for completion in late December. We will transmit the results of the inventory to you in early January so that you may continue to process our currently active permit applications.

If you have any questions or suggestions concerning this inventory, please contact Mr. Kirby Key at (305) 867-4049.

Sincerely,

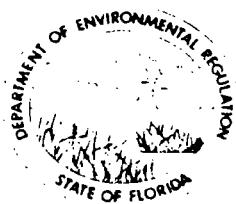

Peter A. Minderman
Director of Engineering Development

File

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

November 4, 1983

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Director of Engineering
Development, KSC, NASA
Headquaraters Building
Kennedy Space Center, Florida 32899

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Sincerely,

Bill Thomas

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices And/Or To Other Than The Addressee		
To: _____	Locn.: _____	
To: _____	Locn.: _____	
To: _____	Locn.: _____	
From: _____	Date: _____	
Reply Optional []	Reply Required []	Info. Only []
Date Due: _____	Date Due: _____	

ST. JOHNS RIVER DISTRICT

TO: Bill Thomas

THROUGH: *[Signature]* A. Alexander

THROUGH: *[Signature]* T. Hunnicutt *JH*

FROM: C. Collins *cmc*

DATE: October 20, 1983

SUBJECT: Brevard County - AP
Kennedy Space Center

DER
OCT 31 1983
BAQM

Ms. Theresa Heron and I have discussed this AC05-65458 application for the addition of five (5) curing booths to the Rocket Booster Insulating Operation.

We have already asked several questions on this, but it fits in with an application CAPS has received for the existing spray booth. We prefer that you go for a construction permit, Public Notice, etc. even on the existing unit.

CMC:es

cc: Theresa Heron

Enclosures

1-10

[Faint handwritten notes]

ENTERED MAR 04 1983

DER PERMIT APPLICATION TRACKING SYSTEM MASTER RECORD

FILE#000000065458 COEN DER PROCESSOR:C M COLLINS DER OFFICE:ORL
 FILE NAME:MINDERMAN, PETER A. DATE FIRST REC: 02/93/83 APPLICATION TYPE:AC
 APPL NAME:KENNEDY SPACE CENTER/NASA APPL PHONE:(305)867-2565 PROJECT COUNTY:05
 ADDR:DIR DESIGN ENGRING: HDQTRS BLDG CITY:KENNEDY SPACE CTR ST:FLZIP:32899
 AGNT NAME: AGNT PHONE:() - CITY: ST: ZIP:
 ADDR: CITY: ST: ZIP:

ADDITIONAL INFO REQ: 3/3/83 / / / / REC: / / / / / /
 APPL COMPLETE DATE: / / COMMENTS NEC:Y DATE REQ: / / DATE REC: / /
 LETTER OF INTENT NEC:Y DATE WHEN INTENT ISSUED: / / WAIVER DATE: / /

HEARING REQUEST DATES: / / / / / /
 HEARING WITHDRAWN/DENIED/ORDER -- DATES: / / / / / /
 HEARING ORDER OR FINAL ACTION DUE DATE: / / MANUAL TRACKING DESIRED:N

THIS RECORD HAS BEEN SUCCESSFULLY ADDED 02/93/83 13:46:01

FEE PD DATE#1:02/93/83 \$0400 RECEIPT#00068851 REFUND DATE: / / REFUND \$
 FEE PD DATE#2: / / \$ RECEIPT# REFUND DATE: / / REFUND \$

APPL:ACTIVE/INACTIVE/DENIED/WITHDRAWN/TRANSFERRED/EXEMPT/ISSUED:AC DATE:02/93/83
 REMARKS:EXHAUST VENT - SPRAYING ROOM: SOLID ROCKET BOOSTER REFURBISHMENT FAC

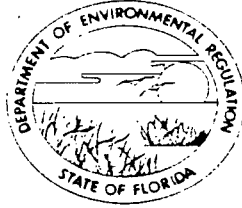
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STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

ST. JOHNS RIVER DISTRICT

3319 MAGUIRE BOULEVARD
SUITE 232
ORLANDO, FLORIDA 32803-3767



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

ALEX SENKEVICH
DISTRICT MANAGER

March 3, 1983

Peter A. Minderman
Director of Design Engineering
Kennedy Space Center, NASA
Headquarters Building
Kennedy Space Center, Florida 32899

OSJ-83-0610

Dear Mr. Minderman:

Brevard County - AP
Kennedy Space Center, NASA
Solid Rocket Boosters Refurbishment
AC05-65458

We are in receipt of your application to construct the referenced source and the following information is needed to complete your application.

1. Your signature must be placed on the application.
2. Section I A. "Attach letter of Authorization" also fill in the date.
- OK* 3. Section V - Please furnish items 7 & 8. The blue prints encompass electrical demolition plans, air conditioning details, etc. and we need a smaller generalized plot plan as required by this section.
4. Please give us more information on the process.
 - OK* A. Are the coatings dried by air or placed in an ovens atmosphere?
 - OK* B. Do both spraying operations take place in the same booth? Do spraying and drying take place in the same booth?
 - OK* C. What is the time interval between the coats?
 - OK* D. How many stacks are involved, one for each booth?
 - OK* E. Are there any filter pads to control the particulate emissions?
5. Please give us the mg/m³ concentration for the AL S.O₂ and

Peter A. Minderman
Page Two
OSJ-83-0610
March 3, 1983

T.O₂ and relate this to the threshold limit values for these substances.

6. As there are five spray booths or five sources of emission involved, five permits are required. List them as CB1, CB2, etc. Additional fees of \$400.00 are required.
7. Please state the pounds per hour of VOC per gallon of coating, excluding water in accordance with Rule 17-2.650(1)(f)13.b. This is for evaluation information.

Sincerely,

Charles M Collins

Charles M. Collins, P.E.
Air Engineering

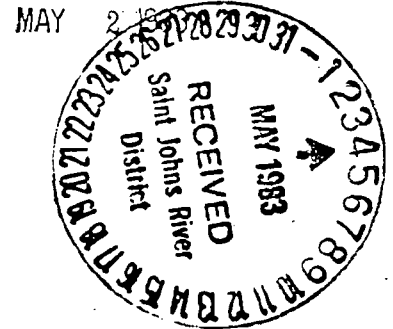
CMC:es

Enclosures: Applications

John F. Kennedy Space Center
Kennedy Space Center Florida 32899

Reply to Attn of DE

Department of Environmental Regulation
Attn: Mr. C. M. Collins, P.E.
Air Engineering
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803



Subject: Brevard County - AP, Kennedy Space Center, NASA,
Solid Rocket Boosters Refurbishment
AC05-65458

In reference to DER letter OSJ-83-0610 dated March 3, 1983,
the answered details are numerically itemized in accordance
with that letter.

1. Mr. Henry Paul is Deputy Director of Engineering Development and is authorized to sign for the Director.

2. As Director of Engineering Development, I am the authorized representative for the Kennedy Space Center.

3. Applicable information from Drawing 79K24431 and others have been condensed and reduced in size for your convenience.

Sketch I - Site plan, the work area within VAB for this construction.

Sketch II - Floor plan, new curing booths versus existing booths on the same floor within the VAB.

Sketch III - The duct work of the curing booths and new exhaust building.

Sketch IV - Schematic for curing process and flow diagram for complete hardware spraying and curing.



4. More information on the process.

(A) The first coating is the MSA-1 epoxy ablative coating and is dried for solvent removal in recirculated air at ambient temperature and then polymerized (cross-linked) via raising the temperature of the air to 170 degrees Fahrenheit plus or minus by hot water heating coils in the Air Handling Unit. Further polymerization curing will take place for several more hours. The second coating is the hypalon paint, and the drying or curing in recirculated air (solvent removal) takes place only at ambient temperature.

(B) The spraying of MSA-1 and the spraying of Hypalon take place in separate spraying booths. The spraying booths are for spraying only and separate curing booths are for curing only. Spraying and curing never take place in the same booth.

(C) The time interval between applications of the two coats is estimated to be 100 to 120 hours.

(D) There is only one stack to the atmosphere. Each booth has its own duct work leading to the exhaust building which in turn combines the input exhaust from the five 32" diameter ducts into two outlets and then into one 48" vertical stack at the discharge point to the atmosphere. Please refer to Drawing 79K24431, Sheets 27, 28, and 29 of 45.

(E) There are two filters in the path of the exhausted air to the atmosphere. One is the filter in the cure booth during the recirculation of air, and the other is in the exhaust building before the exit of exhausted air into the atmosphere. See Sheet 29 of 45, Drawing 79K24431.

5. There are no data for the concentrations (mg/M^3) of aluminum silicate and titanium oxide in the exhaust air. These are contained only in the coating layer of the hypalon paint. When KSC purchases the paint from the vendor, the two compounds are already suspended in the mixed paint. They are both inert solids and because of their very low vapor pressures (near zero), there should not be any of them in the exhaust air. There are no data about the threshold limit for aluminum silicate, which is listed as non-toxic. For titanium oxide, according to NIOSH/OSHA, the permissible exposure limit for TiO₂ powder is 15 mg/M^3 , and 10 mg/M^3 is the limit recommended by American Conference of Government Industrial Hygienists (ACGIH).

NO TRACE TO
Ti DIOXIDE

151
 * 6. Although KSC is applying for a DER construction permit for the five curing booths, there is no spraying associated with this construction permit. Of even greater importance, is the fact that even though there will be five new curing booths, there is only one new stack (48") to the atmosphere. See Sheet 17 of 45, Drawing 79K24431. In accordance with FDER Rule 17-2 F.A.C., the definition of "source" in 17-2.100(150) eliminates the "curing booth" itself as a "source," for the curing booth itself is not a complete unit accomplishing a specific purpose. It is only part of a combined exhaust system. Secondly, it does not have an atmospheric emission or discharge point. In accordance with 17-2.100(52), F.A.C., "emission point" or "discharge point" is defined as "the point at which an air pollutant first enters the atmosphere." Therefore, in accordance with FDER Rule 17-2, F.A.C., this permit application is for one emission source only, based on the new 48" stack.

7. KSC does not have operational data such as pounds per hour of VOC per gallon of coating, excluding water in accordance with your stated Rule 17-2.650(1)(f)13.b. The materials involved in the MSA-1 ablative and the Hypalon paint are all measured in weight, not rate, units. In addition, we assume your stated Rule 17-2.650(1)(f)13.b is in error for it is described as "control standards" for "cutback asphalts water emulsion" which is not applicable to this process.

If any additional information is desired, please contact Mr. R. C. Johnson, DF-FSE-2, 305-867-4104.

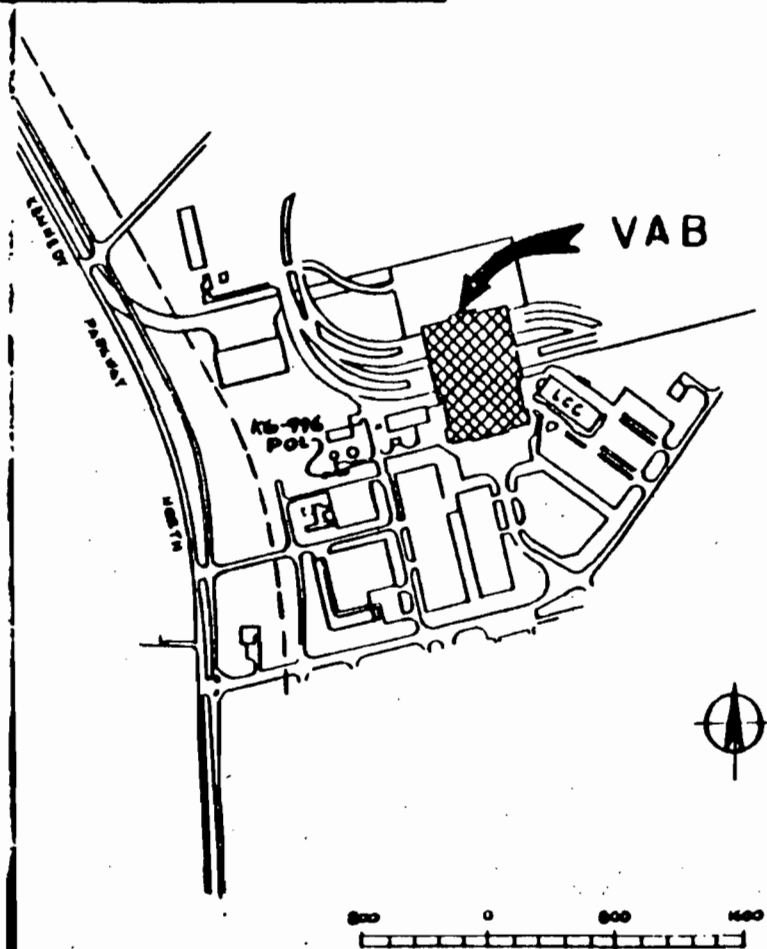
Peter A. Minderman

Peter A. Minderman
 Director of Engineering Development

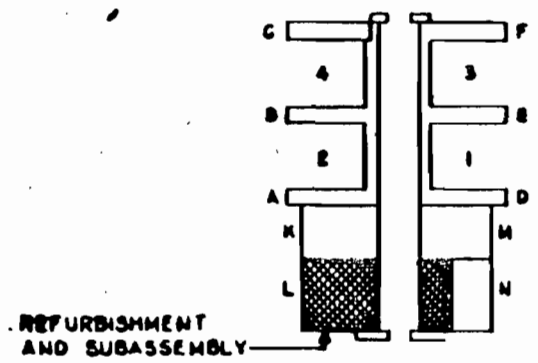
Enclosures

* *it was*

NOTES: - THIS DRAWING SHOWS SPECIFICATIONS ON OTHER SHEETS AND IS NOT TO BE USED FOR CONSTRUCTION UNLESS A SEPARATE SET OF CONSTRUCTION DOCUMENTS IS PROVIDED. THE USER SHALL BE RESPONSIBLE FOR THE ACCURACY OF ANY INFORMATION CONTAINED HEREIN AND THE USER SHALL BE RESPONSIBLE FOR THE PROTECTION OF ANY INFORMATION CONTAINED HEREIN. THE USER SHALL BE RESPONSIBLE FOR THE PROTECTION OF ANY INFORMATION CONTAINED HEREIN. THE USER SHALL BE RESPONSIBLE FOR THE PROTECTION OF ANY INFORMATION CONTAINED HEREIN.



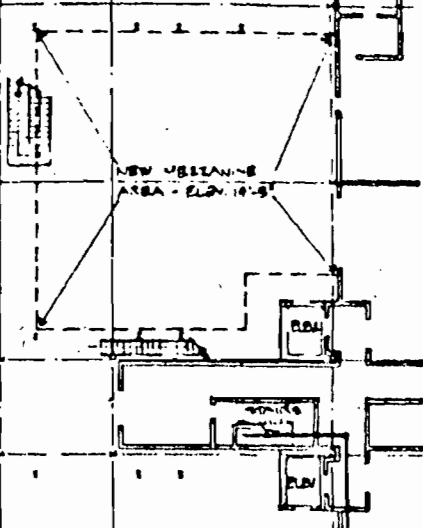
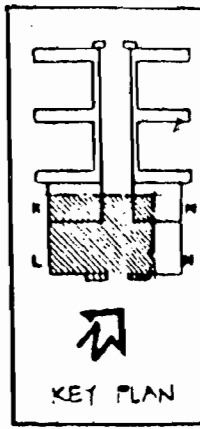
AREA PLAN
1" = 300'



VAB KEY PLAN

REV	DATE	DESCRIPTION	DATE	APP'D
REVISIONS				
SIGNATURES		DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	
DRAWN TC		8/01	JOHN F. KENNEDY SPACE CENTER, NASA	
CHECKED GE		8/01	GODDARD SPACE CENTER, FLORIDA	
ENGINEER			SITE PLAN	
SUBMITTED				
APPROVED				
		SIZE 8	SHEET A1	
		PROJ. NO. PCN 84080		

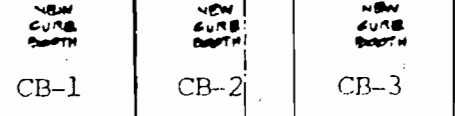
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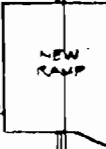
NEW PULLING DOOR & HOUSING



Existing Booths

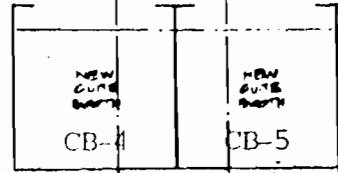


Existing Booths

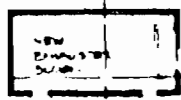


REMOVE END WOOD CAS. CL. S. CAS. & TO ACCOMMODATE CONC. TOPPING & REPLACE

Existing Booths

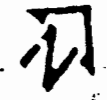


EXISTING REPAIR ROOM

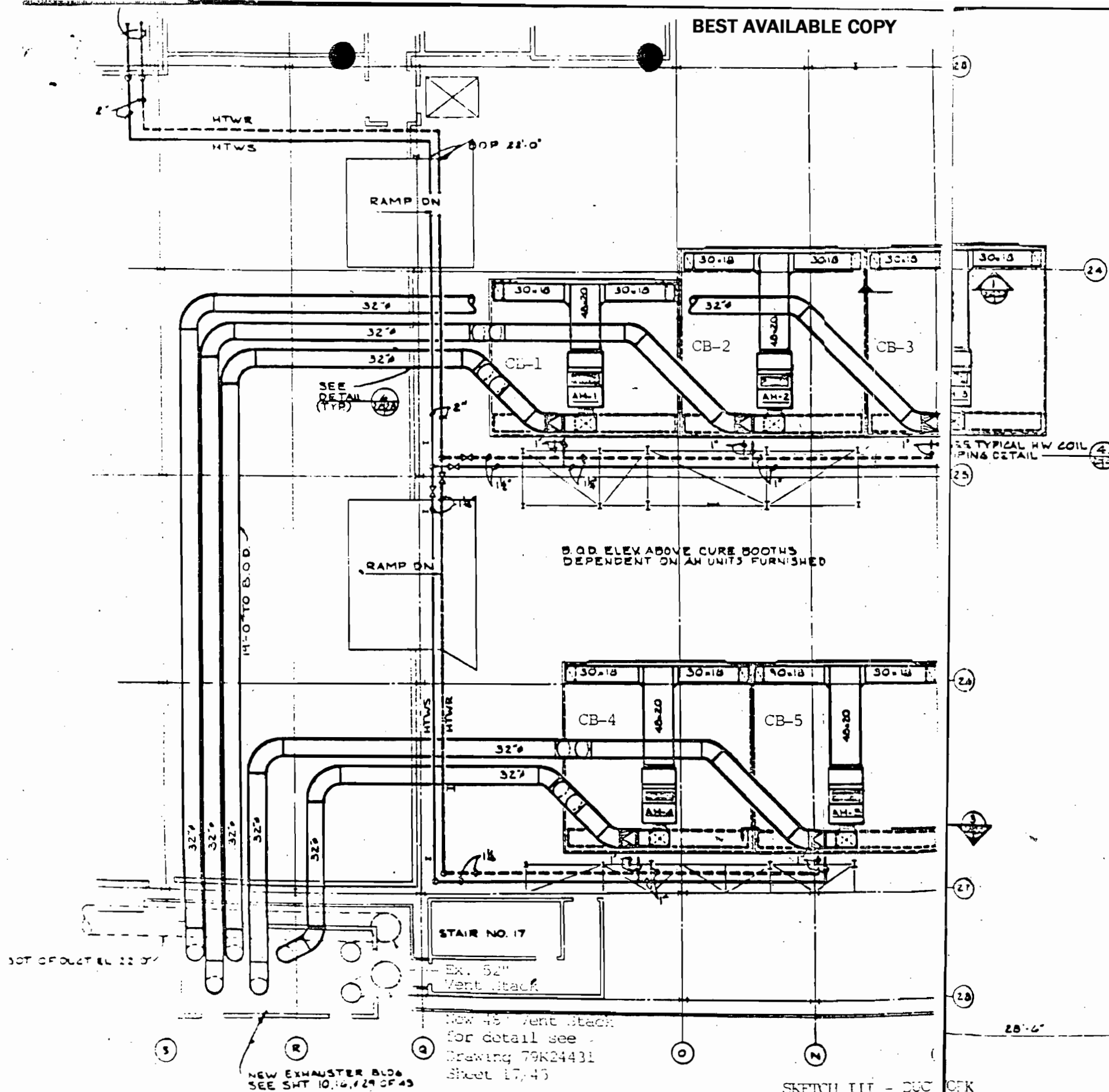


(W) V (U) (S) (R) (Q) (O) (N) (M) (L) (K) (J) (I)

PARTIAL FLOOR PLAN - VAB LOW BAY
SCALE 1/4" = 1'-0"

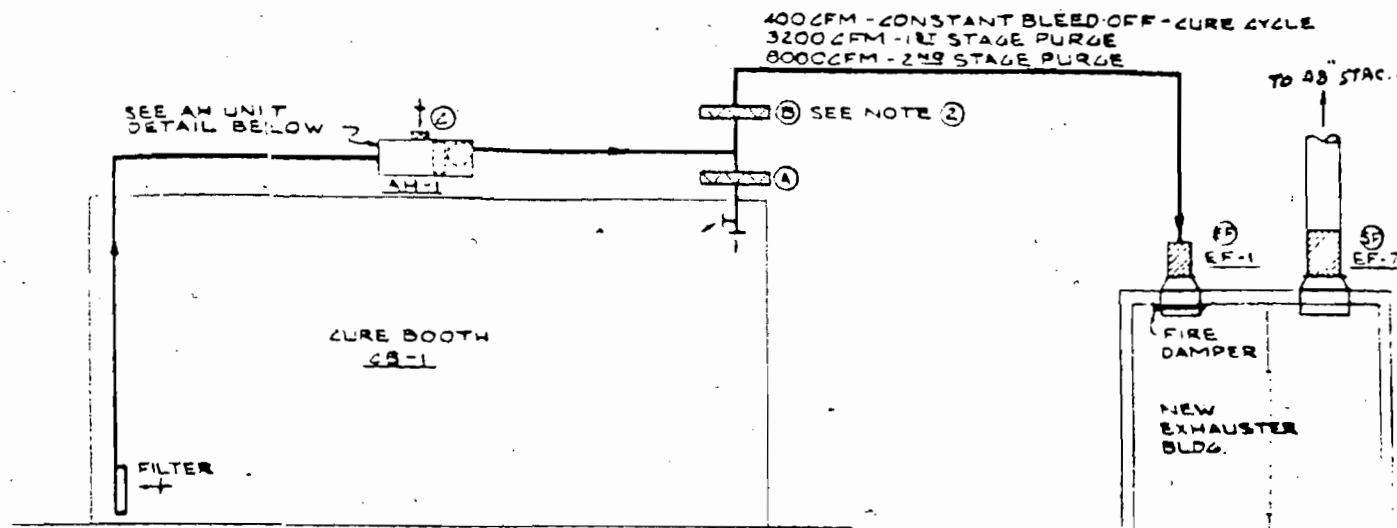


SKETCH II



SKETCH III - DUC C/PK

BEST AVAILABLE COPY



SCHEMATIC NEW CURE BOOTH AIR SYSTEM
TYPICAL FOR FIVE
NO SCALE

NOTE (2)

DAMPER (B) SHALL BE MODIFIED SO BLADES CANNOT CLOSE COMPLETELY. WHEN DAMPER MODULATES TO THE "CLOSED" POSITION IT WILL STILL PERMIT A BLEED-OFF OF 400 ± CFM.

TYPICAL OPERATING SEQUENCE FOR ONE CURE BOOTH
CURE CYCLE

SRB SUBASSEMBLY MOVED INTO CURE BOOTH AND O.H. DOOR IS CLOSED.

DAMPER (A) IS FULL OPEN. DAMPER (B) IS CLOSED. (SEE NOTE (2))
DAMPER (C) IS CLOSED.

AH-1 IS STARTED AND CONTROL VALVE ON HZ-1 MODULATES TO FULL OPEN POSITION.

AS AIR PRESSURE BUILDS UP DUE TO THE INCREASE IN TEMPERATURE WITHIN THE BOOTH, AIR (300/400 CFM) IS BLEED OFF THRU DAMPER (B) TO MAINTAIN A NEGATIVE PRESSURE WITHIN THE CELL THROUGHOUT THE CURE CYCLE.

CURE BOOTH OPERATES AT THESE CONDITIONS FOR 2 48 HOURS.

PURGE CYCLE - 1ST STAGE

AH-1 CONTINUES TO RUN AND CONTROL VALVE ON HZ-1 REMAINS OPEN.

DAMPER (A) CLOSES 40% DAMPER (B) OPENS 40%.

DAMPER (C) OPENS 100%

FAN (E) AND (F) FAN IS STARTED.

CURE BOOTH OPERATES AT THESE CONDITIONS FOR 2 4 MINUTES.

PURGE CYCLE - 2ND STAGE

AH-1 CONTINUES TO RUN. CONTROL VALVE ON HZ-1 CLOSES.

DAMPER (A) CLOSES. DAMPER (B) OPENS 100%

DAMPER (C) CLOSES

FANS (E) AND (F) CONTINUE TO RUN.

CURE BOOTH O.H. DOOR IS OPENED.

CURE BOOTH OPERATES AT THESE CONDITIONS FOR 2 4 MINUTES.

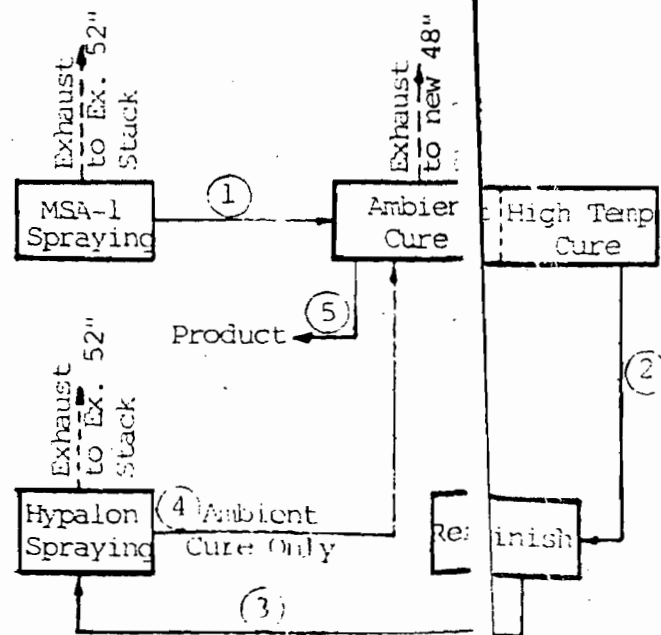
SHUT DOWN

AH-1 STOPS.

DAMPER (A) RETURNS TO FULL OPEN POSITION.

DAMPER (B) RETURNS TO FULL CLOSED POSITION.

FANS (E) AND (F) STOP.



FLOW DIAGRAM