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**COMPANY
CONFIDENTIAL**

*file
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1975

MANUFACTURING IMPROVEMENT PLAN

FOR

PLANT INCINERATOR

DEPARTMENT 790

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DSW 329632

STLCOPCB4076275

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SUMMARY

The incinerator was originally built for the disposal of returned Aroclor. With the closing of the plant landfill to liquid organic wastes in 1974, plans were made to use the excess incinerator capacity for liquid waste disposal. The Manufacturing Improvement Plan has now been expanded to include burning of plant waste in the existing plant incinerator. However, the M.I.P. does not include other methods of disposal for wastes that cannot be burned because of limited incinerator capacity.

Capacity of the plant incinerator is not adequate to burn the projected 5M pounds of residue in 1975. Initially the incinerator was targeted for 6.3M pounds in 1975, but was revised after experiencing excessive downtime and reduced hourly rate while burning plant residues during the last six months.

Incineration rate in 1974 averaged about 870 pounds per hour with a 44% on-stream-time equal to a capacity of 3.4M pounds per year. To meet the projected 5M pounds in 1975, on-stream time must be increased to at least 70%. Such a high on-stream time has never been consistently achieved since the June, 1971, start-up. Nor is there any reason to believe the rate can be increased from 870 pounds per hour to the design rate of 1250 pounds per hour.

Residues not burned in the incinerator must be taken care of by displacement. Adequate storage to handle the excess residue is not available. While capacity has decreased below expectations in 1974, the amount of residue wastes to be incinerated has increased from 6.3M pounds to 8.8M pounds. Outlets are now being sought for all residues except those containing Aroclor.

Technical effort totals 19-1/2 man-months of which 9-1/4 are process engineering. The major effort will consist of:

1. Increasing the incinerator capacity initially to 4M pounds per year by following through with our existing program of operating at lower temperatures, reduced solids in the waste feed and maintaining the physical condition of the incinerator.
2. Further increasing capacity to 5.5M pounds per year by modifying the incinerator burner.
3. Minimizing corrosion of the steel storage tank when handling plant residues from ONA, PNA, and 4-NDPA departments by installing neutralization facilities. The steel wall of the tank is believed to be the catalyst that allows the iron-acid reduction of nitro groups to occur.

Total capital for all projects with defined costs is \$118,800.

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WORK PLAN FOR 1975

Item	Potential Benefits	Capital (Rough)	Priority*	TSD Manpower (Man Months)		Responsible
				Process	Other	
<u>I. CAPACITY</u>						
A. Operate at lower plenum temperature	Reduce downtime and maintenance			0	0	Production
B. Monitor corrosion, erosion at incinerator.	"			1	1	TSD - Mat'l Group
C. Review requirements for spare equipment.	"	To be determined		0	0	Maintenance
D. Install spray at Venturi scrubber.	"	\$1,500	1	1	1	TSD Maintenance
E. Improve feed pump reliability	"	\$2,000		0	0	Maintenance
F. Install new burner	"	\$20,000	1	2	3	TSD, Maintenance, Production
G. Evaluate removal of solids in feed.	"	To be determined		2	0	TSD
TOTAL		\$23,500		6	5	

*Priority 1 - Design will be completed in 1975
Priority 2 - Design will be completed in 1975 manpower permitting
Priority 3 - Backlog

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WORK PLAN FOR 1975

Item	Potential Benefits	Capital (Rough)	Priority*	TSD Manpower (Man Months)			Responsible
				Process	Other		
<u>II. POLLUTION CONTROL</u>							
New stack analyzer for HCl in the stack gas at the incinerator and winterization of sampling times.	Air Pollution Control	\$500	1	0	0		Pollution Group
<u>III. PROCESS CONTROL</u>							
Design and install neutralization facilities.	Prevent corrosion of waste storage tanks.	\$60,000	1	2	2		TSD, Maintenance
Install system to meter Dept. 790 effluent flow.	Give precise total flow from Dept. 790 to the sewer.	\$19,000	1	1/4	1/4		Maintenance
TOTAL		\$79,000		2.25	2.25		

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*Priority 1 - Design will be completed in 1975
Priority 2 - Design will be completed in 1975 manpower permitting
Priority 3 - Backlog

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WORK PLAN FOR 1975

Item	Potential Benefits	Capital (Rough)	Priority*	TSD Manpower (Man Months)		Responsible
				Process	Other	
IV. PLANT IMPROVEMENT						
A. Curb and repave the concrete west of the incinerator	Improved house-keeping and pollution control	Expense - \$ 7,500	1	0	1	TSD, Maintenance
B. New weir for quench column.	Replacement expense.	\$ 7,800	1	0	1/2	Maintenance
TOTAL		\$ 7,800		0	1-1/2	
V. SAFETY						
A. Review flange guarding.	Reduction of potential safety hazard.	Expense -		1/2	1/2	TSD, Maintenance
B. Guards over side entering agitators on waste storage tanks.	Elimination of potential safety hazard	\$ 1,000	1	0	0	Maintenance
C. A second emergency exit on oxidizer level.	Safety	\$ 2,000	1	0	1/2	TSD, Maintenance

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*Priority 1 - Design will be completed in 1975
Priority 2 - Design will be completed in 1975 manpower permitting
Priority 3 - Backlog

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WORK PLAN FOR 1975

Item	Potential Benefits	Capital (Rough)	Priority*	TSD Manpower (Man Months)			Responsible
				Process	Other		
V. SAFETY (Continued)							
D. Replace well water with city water for quench sprays.	Provide improved fire protection.	\$ 5,000	1	1/2	1/2		TSD
TOTAL		\$ 8,000		1	1-1/2		

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*Priority 1 - Design will be completed in 1975
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Priority 3 - Backlog

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WORK PLAN FOR BEYOND 1975

Item	Potential Benefits	Capital (Rough)	Priority*	TSD Manpower (Man Months)		Responsible
				Process	Other	
A. New DSC equipment for analysis of residues in the laboratory.	Allow stability tests on various residues mixtures.	\$20,000		0	0	AR&D
B. Install additional 20,000 gallon tank.	Increase residue handling capacity.	\$20,000		0	1	TSD, Maintenance
C. New foreman's office	Private office for supervision	\$10,000		0	2	TSD, Maintenance
TOTAL		\$50,000		0	3	

*Priority 1 - Design will be completed in 1975
Priority 2 - Design will be completed in 1975 manpower permitting
Priority 3 - Backlog

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A. CAPACITY REQUIREMENTS

4 million pounds of wastes are targeted to be incinerated in 1975. This is based on achieving a 50% on-stream-time with a 900 lb/hr. average rate. Basis for the rate improvement is completion of the following:

1. New refractory installed in plenum and oxidizer by third quarter 1974.
2. New weir (new design) by 2nd quarter 1975.
3. New burner by 4th quarter 1975.

For 1976 and beyond a 5.5M lb/yr capacity is expected because of the new burner. This is equivalent to a 65% on-stream-time and an average rate of 1000 #/hr.

The following table shows the amounts of wastes to be incinerated from each of the plant departments compared to what could be incinerated if the 10M pound/year design capacity were available. A backlog of 2.9M exists of returned Aroclor now in storage. Note that no plans are made to incinerate residues from the ONA, PNA, and para-Phenetidine departments. The 4-NDPA residue (Dept. 255) can be incinerated in 1976 provided the neutralization facilities are installed by late 1975. Plans are to incinerate Chlorophenols/Santophen I residue as long as 4-NDPA can continue to be landfilled.

PROJECTED INCINERATION CAPACITY M LB/YR.

DEPT.	PRODUCT	PROJECTED WASTE GENERATION IN 75	1975	1976	1977	1978	1979
219/222	ONA/PNA	0.37	0	0	0	0	0
226	} Chlorophenols	2.90	1.6	2.9	2.9	2.9	2.9
237		"					
239		Santophen I					
246	Aroclor	2.4	2.4	2.4	2.4	2.4	2.4
247	p-Phen	.22	0	0	0	0	0
255	4-NDPA	2.9	0	0	0	0	0
TOTAL		8.79					
ANNUAL RATE			4.0	5.5	5.5	5.5	5.5

B. COSTS

Production cost standard incineration cost is \$0.0862 per pound for a 6.3M pound annual rate. Actual incineration cost is expected to be greater than \$0.10 per pound due to the lower operating capacity. The year-to-date cost through November, 1974, is \$0.125.

Because the incinerator cannot operate at design rate, some residue must be displaced. Assuming all residues not containing Aroclor are displaced the out-of-pocket costs to Monsanto would be roughly \$317,000 as shown below:

<u>Dept.</u>	<u>Amount/Year</u>	<u>Disposal Cost/Lb.</u>	<u>Total Cost</u>
ONA/PNA	370,000 #	\$ 0.07	\$ 26,000
p-Phenetidine	220,000 #	\$ 0.07	15,000
Chlorophenol Santophen I	2,900,000 #	\$ 0.075	218,000
4-NDPA	2,900,000 #	\$ 0.020	<u>58,000</u>
			\$ 317,000

In the above list, only Chlorophenol/Santophen I wastes are now burned in the plant incinerator.

Cost Improvement

One cost improvement item has been included in the 1975 Plant CIP as follows:

<u>PROJECT</u>	<u>Gross Annual Savings Rate</u>	<u>Current Year Net Savings</u>	<u>Unbudgeted Current Year Expenses</u>	<u>Estimated Capital Required</u>	<u>Estimated Completion Date</u>	<u>Odds of Success</u>
Incinerator - Improve reliability of the waste feed pump - reduce repair cost.	\$ 2,084	\$ 345	--	\$ 2,000	11/1/75	85%

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C. CAPACITY IMPROVEMENT

Current work to achieve a 4M pound per year rate includes:

1. Operating the incinerator at a lower temperature and rate to help prevent rapid destruction of the refractory.
2. Continued monitoring the corrosion rate of the atomizer in an effort to find better materials of construction; and making complete inspections of the interior when the incinerator is down to find better ways to maintain the incinerator.
3. Reviewing requirements for spare equipment.
4. Providing clean-up sprays up-stream of the Venturi scrubber to minimize plugging.
5. Improving the reliability of the waste feed pump.

Additional work planned to achieve a 5.5M pound per year rate depends upon the success of a new DBY burner tested at John Zink, the manufacturer of the plant incinerator. This new burner is designed to operate with solids in the waste feed, does burn with a lower flame temperature, is expected to require less maintenance and operate at higher rates. If such a burner cannot destroy PCB's, an alternate is to evaluate the use of a kiln to remove solids in the feed. These solids now deposit in the incinerator causing frequent shutdowns.

D. POLLUTION CONTROL

A new stack HCl analyzer is needed and sample lines should be winterized. Additional stack sampling will be required to determine the efficiency of PCB destruction while operating at lower incinerator temperature.

E. PROCESS CONTROL

Neutralization facilities will be designed and installed to prevent serious condition of the waste storage tanks when handling ONA, PNA, and 4-NDPA plant waste residues.

A system to meter the department's total discharged effluent, already designed, will be installed.

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F. PLANT IMPROVEMENT

The concrete west of the incinerator will be repaved and curbed. The work will improve housekeeping and aid in controlling PCB losses to the environment.

A new quencher weir will be installed above the downcomer because future repairs are not possible.

G. SAFETY

Safety work required in 1975 will include:

1. Review of flange guarding because of the introduction of plant wastes.
2. Installation of guards over side entering agitators on the waste storage tanks.
3. Installation of a second emergency exit on the oxidizer level.
4. Replacement of well water with city water on the quencher spray nozzles.
5. Review of the function of the incinerator interlocks.

H. ENERGY

Energy conservation will mainly result in the effort to increase the on-stream-time. Incineration of waste is self-sustaining, requiring no gas or oil once the incinerator has been heated to the desired temperature.

Recovery of the waste heat is impractical because of the excessive internal corrosion and high solids levels.

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