



Diamond Shamrock

October 28, 1983

Mr. Jonas Dikinis
US EPA Region V
230 South Dearborn Street
Chicago, Illinois 60604

Mr. Raymond Basso
Hazardous Waste Site Branch
US EPA Region II
26 Federal Plaza - Room 402
New York, New York 10278

Reference: Request for Information on
2,3,7,8-Tetrachlorodibenzo-p-dioxin Wastes
from Manufacturing Operations

Dear Sirs:

In response to your request for information on 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) manufacturing wastes, we are responding with the best information available to us during the time you allowed. This submittal (Attachment I. A.; Figure 6; Tables 1 - 3) represents our best effort at reconstruction of past operations which have been shut down for over ten years. All of these properties were sold and have not belonged to Diamond Shamrock for several years, and, therefore, our information about subsequent use of the property is limited.

Diamond Chemicals Company
formerly

Diamond Shamrock Corporation
World Headquarters, 717 North Harwood Street, Dallas Texas 75201 Phone 214 922-2000

850920001

Mr. Jonas Dikinis
US EPA Region V
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Mr. Raymond Basso
US EPA Region II
New York, New York

We trust this information will be satisfactory for your needs,
and should you have any added questions, let me know.

Very truly yours,

James B. Worthington
Director, Environmental Affairs

nm

cc: Mr. Michael Catania
Office of Regulatory Services
Department of Environmental Protection CN-402
John Fitch Plaza
Labor and Industry Building - 8th Floor
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ATTACHMENT I. A.

DIAMOND SHAMROCK CHEMICALS COMPANY
RESPONSE TO US EPA INFORMATION REQUEST ON
2,3,7,8 TETRACHLORODIBENZO-p-DIOXIN (2,3,7,8-TCDD)

1. Diamond Shamrock Chemicals Company, previously known as Diamond Alkali Company, operated a phenoxyacetate herbicide plant at 80 Lister Avenue, Newark, New Jersey from 1951 to 1969.

The company does not now manufacture any products based on 2,4,5-trichlorophenol. It did not manufacture 2,4,5-TCP for sale or use as an intermediate. The only other operation was an ester-formulating facility.

The list of product names previously manufactured by the company is given in Table 1. The production information that is available is given in Table 2.

- 2 (a) No technical 2,4,5-TCP was produced or ~~marketed in commercial~~ quantities as a feedstock. Limited quantities of sodium 2,4,5-trichlorophenate were believed sold to Metro Atlantic in Rhode Island. No 2,3,7,8-TCDD or halogenated dioxin analyses are available on that product.

- 2 (b) Purchase of 2,4,5-TCP and its derivatives were made during a brief period in 1960 (April - July). The material and supplies are given below:

<u>Material</u>	<u>Supplier</u>
NA TCP *	Monsanto
Technical 2,4,5-TCP	Hostachem
	Hooker
2,4,5-T **	Cella GmbH.

* NATCP - supplied as a 26.5% aqueous solution of the sodium salt of trichlorophenol.

** 2,4,5-T - Technical 2,4,5-trichlorophenoxy acetic acid.

No 2,3,7,8-TCDD or halogenated dioxin analyses are available.

3. The equipment used in the manufacture of the products was dedicated to the production of phenoxyacetic acids, phenoxyacetate esters or the amine salts of the phenoxyacetic acids.

4 (a) The production of 2,4,5-trichlorophenoxyacetic acid esters at 80 Lister Avenue involved several process steps. The initial step was the production of sodium trichlorophenolate followed by reaction with monochloroacetic acid to yield the sodium salt of trichlorophenoxyacetic acid. This salt was, in turn, reacted with sulfuric acid to yield the 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). Alcohol was added to the 2,4,5-T acid at the proper reaction conditions to give the corresponding ester, or with a suitable amine to give the corresponding amine salt.

Over the period 1951-1969 when the Newark facility was operated, the process was altered several times to improve operability and to increase capacity. The total 2,4,5-T production capacity of the Lister Avenue facility accounted for less than 40% of the total U. S. manufacturing capacity in 1969.

4 (b) During the years from 1951 to 1954, the wastes produced in this process included a filter cake, which contained water insoluble materials (such as 1,2,4,5 tetrachlorobenzene, T₄CB; 2,4,5-trichloroanisole, TCA) and the cake would likely trap any dioxin present in the reaction product. This process was replaced in 1954 (see Figure 6) with steam distillation to remove T₄CB and TCA. Any dioxin present, because of its volatility, would also be removed either partially or totally. The distillate (organics) from this process step was stored for

recycle in the future, subject to development of a process for their use. The first recycle of recovered organics from the steam distillation was made in December 1956 and was henceforth made a routine operation.

Liquid wastes from the 2,4,5-T acid process consisted of aqueous solutions of sodium chloride and sodium sulfate. Prior to October 1954, the aqueous solutions of sodium chloride and sodium sulfate were separate.

Muriatic acid was also produced as a by-product in the process building from the hydrogen chloride produced in the chlorination of acetic acid/anhydride to monochloroacetic acid and the chlorination of phenol to 2,4-dichlorophenol. This acid was produced in processes not related to the production of 2,4,5-trichlorophenol and was generally sold.

The plant was expanded in 1967 by the addition of a new 2,4-D acid unit and conversion of the old 2,4-D acid unit to 2,4,5-T acid manufacture. The removal of dioxin from the product was accomplished in a carbon adsorption column. After the expansion in 1967, activated carbon in the adsorption column was treated with muriatic acid and hot water washes to remove iron hydroxide. These treatment solutions were then disposed of to the industrial

sewer. Spent carbon was removed from the unit and handled by an off-site contractor, Mr. Nick Toscano.

The process wastes were filter cake from product filtration, spent carbon from the carbon column and sludge removed from the process area waste sump. In 1967, these wastes totaled eight (8) tons per year. In 1969, the wastes totaled three and a half (3.5) tons per year.

Production operations by Diamond Shamrock were terminated in August 1969.

5. Equipment used for the manufacture of the phenoxy herbicides was dedicated to this service. Production of the phenoxy acetic acids (2,4-D and 2,4,5-T) was conducted in two separate production lines, one dedicated to D and the other dedicated to T. Conversion of these acids to the esters or salts was conducted in a common set of reactors in a campaign style. Clean-out between changes in products was accomplished with aqueous washes. These wastes were disposed to the industrial sewer.
6. After 1967, wastes from the processes were in the main aqueous waste stream which were discharged to the industrial sewer.

Activated carbon was used for the removal of 2,3,7,8-TCDD from aqueous solution of sodium 2,4,5-TCP from 1967 until shut-down. Spent carbon from this operation was drummed and disposed of off-site by waste disposal contractor. At the time the plant was shut down, the current charge of carbon was left in the Na2,4,5-TCP purification column. The subsequent owners of the plant were informed of the contents of this column.

Wastes were hauled off the site by a contractor, Mr. Nick Toscano, but the disposal site used by Mr. Toscano is unknown.

7 (a) There were, to our knowledge, no wastes from the Diamond Shamrock operations in storage at the time of the sale of the Newark property.

(b) The process wastes were filter cake from product filtration, spent carbon from the carbon column and sludge from the process area waste sump. These wastes totaled eight (8) tons per year in 1967 and three and one half (3.5) tons per year in 1969. Wastes were hauled off the site by a contractor, Mr. Nick Toscano, but the disposal site used by Mr. Toscano is unknown.

8. No testing for 2,3,7,8-TCDD or halogenated dioxins was performed on the wastes.

9. The EPA, through its own testing program, possesses data on the environmental levels in the vicinity of 80 Lister Avenue. Additional information obtained by Diamond Shamrock at the Lister Avenue site is included in Table 3.

TABLE 1

PRODUCT NAMES

Diamond Alkali Company

The Line Rider
Line Rider 4T
Line Rider 22
Line Rider LV-4T
Line Rider LV-6T
Line Rider LV-6T-OS
Line Rider LV-21
Line Rider LV-3D/3T
Line Rider 3D/3T-OS
Line Rider Amine 22
Line Rider Amine 4T
Line Rider Amine 4T-2
Line Rider Invert-T Concentrate
Line Rider Invert D/T
Line Rider Invert D/T Concentrate
Line Rider Silvex LV-4TP
Dormant Cane LV-6T-OS
Dormant Cane LV-3D/3T-OS
Dacamine 2D/2T
Dacamine 4T

The Fence Rider
Fence Rider "45"
Fence Rider 4T
Fence Rider 6T
Fence Rider 22
Fence Rider LV-4T
Fence Rider LV-6T
Fence Rider LV-22
Fence Rider LV-3D/3T
Fence Rider 334T
Crop Rider Amine 4T-2
Crop Rider Amine 4T
Crop Rider Silvex-LV-4TP
Agent Orange

Other Private Labels

Swift Formula #2
Gold Bear 55
Gold Bear 22
Amoco Brush Killer
Amoco 2,4,5-TLV Ester

TABLE 2

SALES OF PRODUCT (TECHNICAL EQUIVALENT)
(IN POUNDS)

	July through June <u>1960-1961</u>	July through June <u>1961-1962</u>	July through June <u>1962-1963</u>	July through June <u>1963-1964</u>	July through June <u>1964-1965</u>	July through June <u>1965-1966</u>	July through June <u>1966-1967</u>
T-Acid	156,908	250,342	430,355	484,705	145,854	302,569	-
Isopropyl T	22,049	45,253	38,529	84,769	441,803	8,708	31,856
Butyl-T	34,447	403,947	484,640	258,742	244,174	71,923	1,139,271
EH-T	580,343	885,688	996,687	738,791	510,523	459,344	431,788

702,485 gallons of agent orange were manufactured from October 1966 to October 1968.
9,775 gallons of agent orange were manufactured in April 1964.

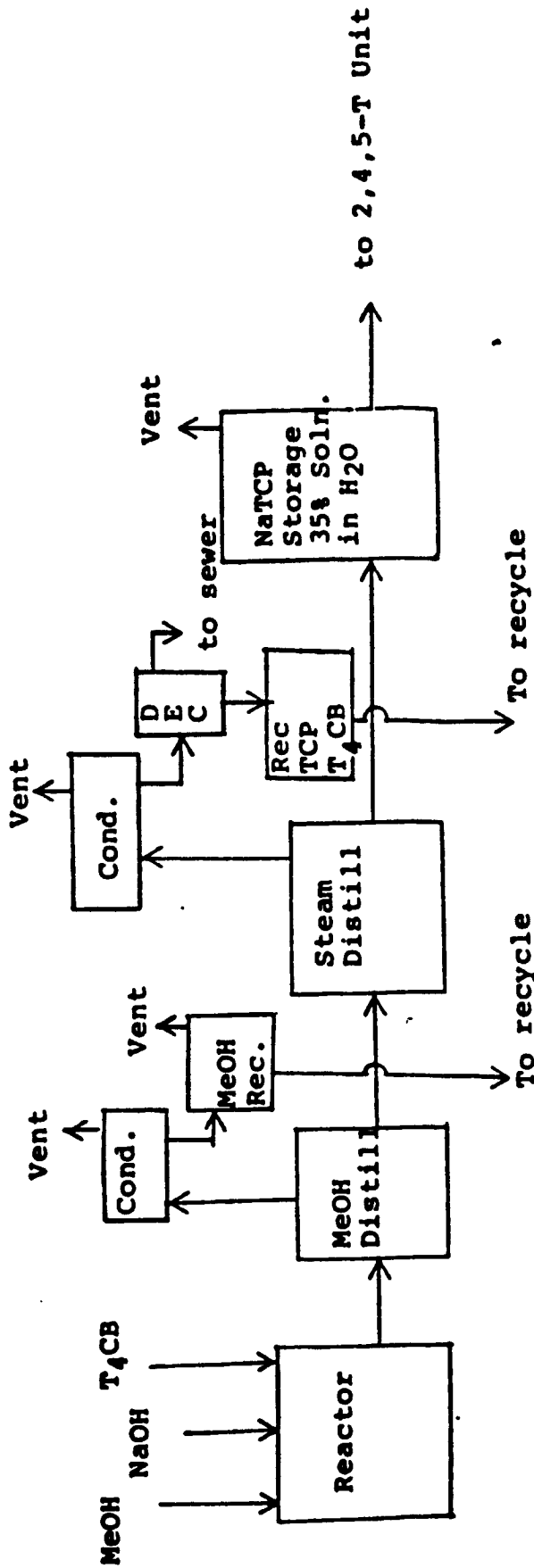
TABLE 3


2,3,7,8-T

RESULTS OF TESTING

80 LISTER AVENUE

	<u>Description</u>	<u>RESULTS</u> <u>(Parts per Billion)</u>
Sample 1.0	Surface Sample in Parking Lot at Plant Entrance	1.4
Sample 5.1	Northwest Property Corner Subsurface Sample	N.D.
Sample 6.1	Subsurface Soil Sample Between Dock and Process Building	57
Sample 7.1	Composite Sample 48" Deep Near Process Building	556
Sample 11.1	Southeast Property Line Subsurface Soil Sample	6
Sample 20.1	Composite Sample 18" Deep Near Process Building	531
Sample 21.1	Near Subsurface Sample Northwest Corner of Process Building	531



 Diamond Shamrock Environmental Control		Dr. By	Date	Scale	Drawing No.
		Appr. By	Date		Figure 6
Na 2,4,5-TCP Flowsheet 1954 - 1960 Steam Distillation Process					