TFA INCORPORATED — ENVIRONMENTAL ENGINEERING SERVICES
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September 20, 1983

Givaudan Corporation
125 Delawanna Avenue
Clifton, New Jersey 07014

Attention: Mr. William Turetsky
Director of Safety &
Environmental Protection

RE: CHEMICAL SEWER INVESTIGATION

Gentlemen:

The following report has been prepared to summarize and list the data obtained in our investigation of the Chemical Sewer at your Clifton, New Jersey plant. The data includes information obtained in the inspection of manholes, sewers and connections, including the video inspection of the sewer system. All video tapes of the internal inspection are available for further reference. Convenient summaries of the investigations have been prepared and included in the various sections of the report. A map of the chemical sewer and its branches showing the results of the investigation in symbolic terms, is also included.

The investigation of the chemical sewer identified many reaches of the system as containing piping defects that may allow exfiltration of process waste from the chemical sewer and its branches during typical daily plant operation. Estimates of the potential of leakage from the various segments of the system have been prepared and are included in the report.

The potential for significant leakage at several locations is high. As such, we recommend that repairs to the piping system be undertaken in those locations where significant deterioration or breakage has occured. Although significant defects were found in the system, it is our opinion that repairs can be made to the sewer to continue its usefullness into the future while limiting (as much as possible) the amount of leakage occuring.

GIVAUDAN CORPORATION

CLIFTON, NEW JERSEY

CHEMICAL SEWER INVESTIGATION

CHEMICAL PLANT

SEPTEMBER 1983

CFM INCORPORATED
ENVIRONMENTAL ENGINEERING SERVICES
628 ROUTE 10, WHIPPANY, NEW JERSEY

CFM INCORPORATED

This report provides data upon the condition of the chemical sewer and its branches. A subsequent report will identify rehabilitati alternatives for the repair or replacement of the chemical sewer and its branches. Should you have any questions on the data obtained during this investigation, please advise.

Very truly yours,

CFM INCORPORATED

John J. Flood, P.E.

JJF:car
Attachments

GIVAUDAN CORPORATION
CLIFTON - NEW JERSEY
CHEMICAL SEWER INVESTIGATION

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1.0 INTRODUCTION

An investigation was undertaken of the chemical sewer and its various branches and connections at the Givaudan Corporation chemical plant in Clifton, New Jersey. The investigation was directed at obtaining specific information and data upon the condition of the chemical sewer and further upon the potential for exfiltration from the sewer. The investigative work was accomplished by experienced field personnel under an excelerated time schedule in order to accomplish as much of the work as possible during a plant shutdown in late July, 1983. The investigation included the inspection of each manhole and chamber providing access to the chemical sewer and its branches; an internal inspection of each reach of the chemical sewer and its branches utilizing closed circuit television equipment; hydrostatic testing of each reach of the chemical sewer and its branches to determine the potential for exfiltration and the inspection of each connection to the chemical sewer and its branches. All data and information obtained during the investigation are shown on individual report forms, copies of which are contained in the Appendix of this report. Summaries of all data obtained are included in the various sections of this report. Additionally, all video tapes obtained during the inspection are available for review. Copies of photographs obtained in each manhole are contained in the Appendix of this report.

The investigation indicated that many defects are present within the piping system and structures comprising the chemical sewer and its branches. Defects identified included misaligned and open joints in the piping system (that have a potential for exfiltration), as well as cracked and broken pipe in many locations. Some of the manhole structures were also found to be in poor condition. The results of the exfiltration hydrostatic test suggested a potential for leakage from the system. Although some leakage can be expected from all piping systems constructed of similar materials utilized in the chemical sewer, the leakage from this particular system was felt to be higher than normal. Many segments of the system, however, were found to be in reasonable condition.

An inspection of the connections to the chemical sewer and its branches found many locations where exfiltration could occur. Significant deterioration of discharge troughs, traps and connections were evident - providing locations where direct exfiltration could occur.

2.0 MANHOLE INSPECTION

An inspection was made of all manholes and structures on the chemical sewer and its branches. The inspection was undertaken by experienced personnel to determine the structural condition of the various manhole components, as well as pipe defects detectable from the manhole. All observations of the field personnel were recorded on manhole inspection reports, copies of which are included in the Appendix of this report. In addition to the structural condition of the manhole and piping system, the depth, construction material of the manhole and pipe size and materials were also recorded. Infiltration sources observed in manholes were identified and the rate of leakage estimated or quantified where possible. Potential inflow sources, mainly through the manhole cover and frame were also noted. The various manhole components inspected included the cover; the frame; the riser (the section between the manhole wall and the manhole frame); the channel; the benching and the wall joints. The incoming and outgoing pipes in each manhole were "lamped" (inspected using high intensity light) where possible and defects such as joint misalignment, broken pipe and leaking joints were noted. This inspection was limited to 10 - 20 feet from the manhole due to visual limitations.

The chemical sewer and branches contained 41 manholes

and 14 chambers or entrance structures. Each manhole or structure was identified by a specific number starting with the first manhole at the sewer connection to the City of Clifton sewer system and proceeding upstream. Branches to the chemical sewer were numbered from the connection manhole with a subscript.

Table No. 1 is a summary of the manhole inspections performed. Most of the manholes in the system were found to be in reasonable condition, expecially along the chemical sewer. Many of the pits contained on the branches to the chemical sewer were found to contain no channels (to carry the flow through the pit). Without these channels the base of the pits were eroded in many cases. Likewise, some of the manholes on the branch sewers were without benching or channels that affected the flow conditions in the manholes and the condition of the base. No attempt was made to hydrostatic test each manhole or pit, however, it was evident that some leakage must be occuring from some of the structures, especially in the branches.

TABLE 1

GIVAUDAN CORPORATION
CLIFTON - NEW JERSEY
CHEMICAL SEWER INVESTIGATION
SUMMARY OF MANHOLE INSPECTION

MANHOLE NUMBER	LOCATION	STRUCTURAL CONDITION			CONSTRUCTION MATERIAL	PIPE SIZE	DESCRIPTION OF DEFECTS
		FRAME/COVER	WALLS	BASE			
1	Chemical sewer	Wood-poor	Good	Good	Precast-Acid Brick	18"VCP	None evident
2	Chemical sewer	NOT INSPECTED DUE TO PRESENCE OF pH PROBE					None evident
3	Chemical sewer	Good	Good	ND	Block	18"VCP	None evident
4	Chemical sewer	None-Grate	Good	Good	Block	18"VCP	None evident
5	Chemical sewer	Good	Good	Good	Block	18"VCP	None evident
6	Chemical sewer	Wood	Good	ND	Precast	18"VCP	None evident
7	Chemical sewer @ Lime Tower	Wood	Good	ND	24"VCP	18"VCP	None evident
8	Chemical sewer @ Lime Tower	Good	Good	Good	Block	18"VCP	None evident
9	Chemical Sewer	NOT INSPECTED DUE TO PRESENCE OF pH PROBE				18"VCP	None evident
9-1	Branch-to Bldg. 95	Good	Good	None	Block-Acid Brick	12"VCP	No bench or channel
9-2	Branch-to Bldg. 95	Fair (shifted)	Worn	None	Block-Acid Brick	12"VCP	No bench or channel
9-3	Branch-to Bldg. 95			None	Block-Acid Brick	12"VCP	No bench or channel
10	Chemical sewer	Good	Good	Good	Block	18"VCP	Poor connection of side line
10-1	Branch-to Bldg. 79	NO MANHOLE - CLEAN OUT					
11	Chemical sewer	Good	Good	Worn	Block-Acid Brick	18"VCP	None evident

MANHOLE NUMBER	LOCATION	STRUCTURAL CONDITION			CONSTRUCTION MATERIAL	PIPE SIZE	DESCRIPTION OF DEFECTS
		FRAME/COVER	WALLS	BASE			
11-1	Branch-to Bldg. 68	Worn	Good	Worn	Block	18/15"VCP	No channel
11-2	Branch-to Bldg. 68	Good	Good	Fair	Brick	18/15"VCP	None evident
11-3	Branch-to Bldg. 68	Worn	Good	Good	Brick	15"VCP	None evident
11-5	Branch-to Bldg. 58	Worn	Worn	None	Brick	10/12"VCP	None evident
11-7	Branch-to Bldg. 75	Good	Worn	Good	Block	12"VCP	None evident
11-8	Branch-chemical sewer	Loose	Worn	Worn	Brick	10/15"VCP	Poor channel
11-10	Branch-chemical sewer	Good	Worn	Loose	Block	12"VCP	Poor channel
11-11	Branch-chemical sewer	Worn	Worn	Worn	Brick	12"VCP	None evident
11-13	Branch-chemical sewer	Worn	Worn	Fair	Brick-Acid Brick	18"VCP	None evident
11-14	Branch-chemical sewer	None	Good	Poor	Precast/Brick	10"VCP	Poor channel
11-15	Branch-chemical sewer	Worn	Worn	Poor	Precast/Brick	15"VCP	Poor channel & walls
11-16	Branch-chemical sewer	Worn	Worn	None	Brick	12"VCP	Poor channel & benching
11-18	Branch-chemical sewer	None	None	None	3x3 Concrete Pit	8"VCP	None evident
12	Chemical sewer	Good	Worn	Worn	Block	18"VCP	None evident
13	Chemical sewer	Good	Good	Worn	Block	18"VCP	None evident
13-1	Branch-chemical sewer	Good	Good	None	Block	12"VCP	No benching
13-2	Branch-chemical sewer	Worn	Worn	None		18"VCP	Poor benching & channel
13-3	Branch-chemical sewer	Worn	Loose	Worn	Brick	18"VCP	Poor channel
13-5	Branch-chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete	8"CIP	None evident
13-6	Branch-chemical sewer	DRAIN INLET - NOT MANHOLE			Concrete	-	Abandoned
13-7	Branch-chemical sewer	BRICK PIT - NOT MANHOLE			Brick	8"VCP	None evident
13-8	Branch-chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete	10"VCP	Poor channel
13-9	Branch-chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete	6"VCP	Poor channel - bulkhead
13-10	Branch-chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete	6"VCP	Poor channel - bulkhead
13-13	Branch-chemical sewer	Worn	Good	None	Block	6"VCP	No channel
13-14	Branch-chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete	Not Visible	Poor walls - surcharged
13-12	Branch-chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete	6"CIP	No channel

MANHOLE NUMBER	LOCATION	STRUCTURAL CONDITION			CONSTRUCTION MATERIAL	PIPE SIZE	DESCRIPTION OF DEFECTS
		FRAME/COVER	WALLS	BASE			
13-15	Branch-chemical sewer	Worn	Worn	None	Block	6"VCP	Poor channel - no benching
13-17	Branch-chemical sewer	Worn	None	None	24"VCP Pipe	6"VCP	Poor channel - no benching
14	Chemical sewer	Good	Good	Good	Block	24"VCP	None evident
15	Chemical sewer	Worn	Worn	Poor	Block	24"VCP	Poor channel
16	Chemical sewer	Worn	Worn	Poor	Block	24"VCP	Poor channel
17	Chemical sewer	Worn	Good	Poor	Block	18"VCP	Poor channel
17-1	Branch-chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete	8"VCP	No channel
18	Chemical sewer	Worn	Worn	Worn	Block	18"VCP	None evident
19	Chemical sewer	Worn	Broken	Worn	Brick	15"VCP	Poor walls & channel
20	Chemical sewer	None	Good	Poor	Brick	10"VCP	Poor channel
21	Chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete	8"VCP	Poor channel
22	Chemical sewer	CONCRETE PIT - NOT MANHOLE			Precast Concrete	8"VCP	Poor channel
23	Chemical sewer	CONCRETE PIT - NOT MANHOLE			Concrete Pit	10"VCP	Pit in poor condition
24	Chemical sewer	BRICK PIT - NOT MANHOLE			Brick Pit	10"VCP	Poor channel
25	Chemical sewer	PIT CANNOT BE INSPECTED DUE TO PRESENCE OF NOXIOUS GASES					

3.0 HYDROSTATIC TESTS

Each segment of the chemical sewer and its branches were tested, where possible, utilizing hydrostatic pressure to develop an estimate of potential exfiltration. The work was accomplished utilizing specially designed "plugs" that were installed in the sewer to isolate the reach and allow the development of a small pressure head in the sewer. Once developed the rate of water required to maintain the pressure head was measured over a short period of time. The measured rate was determined to be the exfiltration from the sewer reach under a small pressure head.

Some reaches could not be tested utilizing the above procedure in that pipe defects prevented the insertion of the necessary plugs. At these locations the pipe was filled with as much water as possible utilizing a temporary dam and again the leakage rate estabilshed but under a non-pressure head. The results of the hydrostatic tests are included in the Appendix of this report.

A summary of the results of the testing has been prepared as Table No. 2. The Table identifies the characteristics of the sewer reach being tested in terms not only of its length and diameter but also of the product of these two dimensions. A normal piping system constructed of vitrified tile pipe would be expected to leak through the joints of the pipeline (assuming the pipe is structually intact). The amount of leakage would

TABLE 2

GIVAUDAN CORPORATION
CLIFTON - NEW JERSEY
CHEMICAL SEWER INVESTIGATION
SUMMARY OF HYDROSTATIC TEST RESULTS

MANHOLE REACH FROM	TO	PIPE DIMENSIONS SIZE (Inches)	LENGTH (Feet)	INCH-FEET	MEASURED EXFILTRATION RATE (GPM)	UNIFIED EXFILTRATION RATE (GPD/In-Ft)	POTENTIAL DAILY EXFILTRATION (GPD)
A. CHEMICAL SEWER							
1	2	18	17	306	0	0	0
2	Pit 35	18	38	684	0	0	0
Pit 35	3	18	19	432	0	0	0
3	4	18	64	1422	5.4	5.5	1300
Pit 74	6	18	265	4590	8.6	2.7	2400
9	10	18	141	2538	8.6	4.9	2400
10	11	18	121	2178	> 60.0	39.7	5700
11	12	18	235	4230	20.3	6.9	1800
12	13	18	38	684	11.0	23.2	1700
13	14	24	42	1281	**COULD NOT TEST**		-
14	15	24	140	3360	20.0	8.6	1100
15	16	24	67	1608	6.0	5.4	400
16	17	18	48	864	20.0	33.3	800
17	18	18	122	2196	14.3	9.4	700
18	19	15	82	1302	27.8	30.7	4200
19	20	10	82	820	41.7	73.2	3900
20	21	10	43	430	1.6	5.4	300
21	22	8	48	384	> 60.0	>225.0	4800
22	23	8	250	2000	> 60.0	> 43.2	4000

MANHOLE REACH FROM	TO	PIPE DIMENSIONS SIZE (Inches)	LENGTH (Feet)	INCH-FEET	MEASURED EXFILTRATION RATE (GPM)	UNIFIED EXFILTRATION RATE (GPD/InFt)	POTENTIAL DAILY EXFILTRATION (GPD)
B. BRANCH SEWER (STARTING @ MANHOLE 9)							
9	9-1	12	158	1896	62.5	47.5	2100
9-1	9-2	12	45	540	11.1	29.6	1000
9-2	9-3	12	42	504	9.6	27.4	300
9-2	9-5	12	74	888	760.0	> 97.3	5200
9-3	9-4	8	43	344	COULD NOT TEST		-
C. BRANCH SEWER (STARTING @ MANHOLE 10)							
10	10-1	12	358	4296	2.0	0.7	200
D. BRANCH SEWER (STARTING @ MANHOLE 11)							
11	11-1	18	78	1404	16.7	17.1	1700
11-1	11-2	15	103	1545	29.4	27.4	2300
11-2	11-3	18	26	468	0	0	0
11-3	11-4	10	161	1610	> 60.0	> 53.7	2100
11-3	11-5	12	38	456	> 60.0	> 189.5	2400
11-5	11-6	10	163	1630	1.5	1.3	200
11-2	11-7	12	232	2784	8.8	4.6	1100
11-7	11-8	18	48	864	> 60.0	> 100.0	3000
11-8	11-9	10	154	1540	29.4	27.5	3800
11-7	11-10	12	72	864	4.9	8.2	400
11-10	11-11	12	34	408	8.6	30.4	700
11-11	11-12	10	164	1640	> 60.0	> 52.7	2600
11-11	11-13	18/15	63	1044	20.0	27.6	1700
11-13	11-14	10	46	460	10.0	31.3	900
11-13	11-15	12	66	792	COULD NOT TEST		-
11-15	11-16	12	22	264	COULD NOT TEST		-
11-16	11-18	8	83	664	23.8	51.6	2000

MANHOLE REACH FROM	TO	PIPE DIMENSIONS SIZE (Inches)	LENGTH (Feet)	INCH-FEET	MEASURED EXFILTRATION RATE (GPM)	UNIFIED EXFILTRATION RATE (GPD/In-Ft)	POTENTIAL DAILY EXFILTRATION (GPD)
E. BRANCH SEWER (STARTING @ MANHOLE 13)							
13	13-1	12	170	2040	6.5	4.6	300
13-2	13-3	18	26	468	COULD NOT TEST		-
13-3	13-4	8	57	456	5.4	17.1	200
13-4	13-5	8	14	112	0	0	0
13-4	13-7	8	54	392	1.0	3.7	100
13-7	13-8	8	25	296	> 60.0	> 291.9	2600
13-8	13-9	6	25	228	1.3	8.2	100
13-7	13-11	6	198	1296	25.0	27.8	1100
13-11	13-12	6	35	210	1.2	8.2	100
13-12	13-13	6	27	162	0.7	6.2	100
13-11	13-14	6	44	312	> 60.0	> 276.9	2600
13-14	13-15	6	59	354	10.7	43.5	400
F. BRANCH SEWER (STARTING @ MANHOLE 17)							
17	17-1	8	62	496	15.0	43.5	600
G. BRANCH SEWER (STARTING @ MANHOLE 19)							
19	19-1	10	128	1280	> 60.0	> 67.5	1500
H. BRANCH SEWER (STARTING @ MANHOLE 20)							
20	20-1	10	159	1590	> 60.0	> 54.3	1500

be proportional to the circumference of the pipeline and the number of joints contained therein. Both of these factors are considered in the product of the diameter of the pipeline and its length. As such, the developed dimension of the pipeline, (in terms of inch/feet) is a means of evaluated leakage from the various segments of the chemical sewer and its branches on a unified basis. Table No. 2 also contains the measured exfiltration determined from the hydrostatic test, as well as the developed unified exfiltration rate, based upon the diameter and length of the individual segments. Finally, the Table contains an estimate of potential exfiltration from each segment of the chemical sewer and its branches in terms of Gallons Per Day (GPD) of leakage. This estimate was developed utilizing the measured exfiltration rate and the anticipated depth of gravity flow in each sewer segment, as well as the results of the internal inspection performed on the pipeline. As such, consideration was given for the rate measured, relative to the anticipated depth of flow in the sewer during a typical daily production cycle and the condition of the pipeline. Segments with broken pipe in the lower quadrants of the pipeline were given particular consideration, since the potential for exfiltration at these locations is significantly greater then through joint openings. Nevertheless, a poorly jointed or misaligned pipeline can produce significant exfiltration.

A summary of the potential daily exfiltration for the principle chemical sewer and each of its branches is shown hereafter.

SUMMARY OF POTENTIAL DAILY EXFILTRATION

BRANCH	GALLONS PER DAY	PRECENT OF TOTAL
Chemical sewer (main branch)	35,500	44.4
Branch starting @ MH-9	8,600	10.7
Branch starting @ MH-10	200	0.2
Branch starting @ MH-11	24,900	31.0
Branch starting @ MH-13	7,600	9.4
Branch starting @ MH-17	600	0.7
Branch starting @ MH-19	1,500	1.8
Branch starting @ MH-20	1,500	1.8
TOTAL FOR CHEMICAL SEWER	80,400	

The total estimated potential daily exfiltration was determined to be about 80,000 GPD. Of this total about 44% was thought to occur along the chemical sewer with the remaining 56% in the branches of the chemical sewer. Of the 7 branches to the chemical sewer, the principle branch (starting at manhole No. 11) was thought to produce the greatest amount of leakage (over 31% of the total). It is important to note, however, that the estimate of potential daily exfiltration was developed utilizing the results of an hydrostatic test performed under a low head condition. For the most part, this condition is not prevalent

in the system and as such, the estimated daily exfiltration of 80,000 GPD should be considered only as an order of magnitude estimate. Of importance, however, is the location where the majority of leakage is occuring, namely along the main branch of the chemical sewer and the branch starting at manhole No. 11. These two piping systems were estimated to contribute over 75% of the exfiltration in the system while comprising only 65% of the total length of the system.

Plate "A" shows the results of the hydrostatic test procedure utilizing the developed unified exfiltration rate. A convenient symbol is included in the evaluation of each reach, based upon an estimate of minor, moderate and significant leakage. Most of the significant leakage was found to occur in the branches of the system rather then in the main chemical sewer.

4.0 BUILDING CONNECTION INVESTIGATION

An investigation of the building connections to the chemical sewer and its branches was undertaken to determine the potential for exfiltration from these connections. The original intention of the investigation of the building connections was to estimate leakage that could occur in each connection. This work was to be accomplished with the use of a "packer" assembly during the internal inspection of the chemical sewer or its branches. The "packer" will provide a seal of one end of the connection and allow the introduction of test water to the other end.

During the internal inspection of the chemical sewer and its branches it was found that the introduction of the Packer assembly could not be accomplished in many cases. As such, the sealing of one end of the connection was not possible.

As an alternative to this testing procedure a visual inspection of each of the connections was undertaken. The results of this inspection are shown on the following summary that includes a describtion of the connection by the field personnel performing the inspection. Connections were identified utilizing the building number and a letter subscript from the first connection at the downstream end of the building to the last connection at the upstream end. Plate "A" shows the number sequence utilized, for future reference.

Many of the connections were found to be in poor condition with open joints and cracks that could allow exfiltration.

No estimate, however, has been prepared of the amount of exfiltration that could occur at each connection. The summary of the inspection includes a determination of possible exfiltration for those connections that appeared to be in poor condition. Copies of the inspection description are included in the Appendix of the report.

GIVAUDAN CORPORATION

CLIFTON - NEW JERSEY

CHEMICAL SEWER INVESTIGATION

SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS		DESCRIPTION OF DEFECTS		POSSIBLE EXFILTRATION
		TROUGH SIZE	CONNECTION SIZE	TROUGH	CONNECTION	
9-4A, B, C, D	93	12" concrete	8" VTP	Worn	(see II)	CND
9-6A	94	12" concrete	8" VTP	Slightly worn	(see II)	CND
9-5A, B, C, D, E	95	None	4" VTP	None	CNI	CND
9-7A	95	None	4" VTP	None	CNI	CND
9-7B	95	None	4" Steel	None	CNI	CND
10-A	79	12" lead lined	CNI	Openings	CNI	CND
10-B	79	12" V.C.	CNI	Misaligned, cracks	CNI	Possible
10-C	80	12" V.C.	CNI	Misaligned, joints open	CNI	Possible
10-D	80	12" V.C.	CNI	Joints open, cracks	CNI	Possible
10-E	81	10" V.C.	CND	Grating prevented inspection	Cracks & breaks	Possible
10-F	81	12" V.C.	CNI	Fair condition	CNI	CND
10-G	82	12" V.C.	CND	Joints open, cracks @ invert	Appears good	Observed

CND - COULD NOT DETERMINE

CNI - COULD NOT INSPECT

II - INTERNAL INSPECTION

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CLIFTON - NEW JERSEY

CHEMICAL SEWER INVESTIGATION

SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS		DESCRIPTION OF DEFECTS		POSSIBLE EXFILTRATION
		TROUGH SIZE	CONNECTION SIZE	TROUGH	CONNECTION	
10-H	82	12" V.C.	CND	Joints open, cracks @ invert	Worn	Possible
10-I	83B	None	2-4" V.C.	None	Broken pipe observed	Possible
10-J, K	83A	None	CNI	None	CNI	CND
11-3A, B, C, D	68	COULD NOT LOCATE DUE TO EQUIPMENT & ACID SPILLS ON FLOOR				CND
11-5A	58	8" V.C.	CND	Inactive good	CNI	CND
11-5B	58	8" V.C.	CND	Some cracks joints good	Some cracks	Possible @ connection
11-5C	59	8" V.C.	CNI	Some cracks	CNI	CND
11-5D	59	8" V.C.	CND	Cracks at invert	Poor connection	Possible @ connection
11-5E	60	8" V.C.	CND	Good condition	Poor alignment	Possible @ connection
11-5F	60	8" V.C.	CND	Some joints open	CNI	CND
11-5G	61	8" V.C.	CND	Some cracks	Slightly worn	CND
11-5H	61	8" V.C.	CND	Joints open, broken pipe	Cracks in drain	Possible
11-5I	62	8" V.C.	CND	Good condition	Good condition	CND

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CHEMICAL SEWER INVESTIGATION

SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS		DESCRIPTION OF DEFECTS		POSSIBLE EXFILTRATION
		TROUGH SIZE	CONNECTION SIZE	TROUGH	CONNECTION	
11-5J	62	8" V.C.	CND	Limited access - inspenction difficult		CND
11-5K	63	8" V.C.	CND	Debris in drain	Good condition	CND
11-5L	63	8" V.C.	CND	Joints open, cracks	Good condition	Possible @ trough
11-5M	64B	None	2-C.O.	None	No visible defects	CND
11-9A	52	8" V.C.	CND	Joints open, cracks	CNI	CND
11-9B	52	8" V.C.	CND	Good condition	CNI	CND
11-9C	53	8" V.C.	CND	Good condition	CNI	CND
11-9D	53	8" V.C.	CND	Good condition	CNI	CND
11-9E	54	8" V.C.	CND	Minor cracks	Good condition	CND
11-9F	54	8" V.C.	CND	Joints open	Worn	Possible
11-9G	55					

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SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS TROUGH SIZE	CONNECTION SIZE	DESCRIPTION OF DEFECTS TROUGH	CONNECTION	POSSIBLE EXFILTRATION
11-9H	55					
11-9I	56	8" V.C.	CND	Joints open, cracks	Drains clogged	Possible
11-9J	56	8" V.C.	CND	Joints open, cracks	Drains clogged	Possible
11-9K	57	8" V.C.	CND	Joints open, cracks	CND	Possible
11-9L	57	8" V.C.	CND	Joints open, cracks	CND	Possible
11-8A	65	None	6" VCP	None	Open joint observed	Possible
11-11A	92	12" concrete	CND	Not in use	CND	CND
11-11B	42	12" V.C.	CND	Joints open, cracks	CND	Possible
11-11C	42	12" V.C.	CND	Joints open, cracks	Crack in drain	Possible
11-11D	43	12" V.C.	CND	Joints open	CNI	Possible
11-11E	43	12" V.C.	CND	Joints open	CNI	Possible
11-11F	44	12" V.C.	CND	Joints open, cracks	None evident	CND
11-11G	44	12" V.C.	CND	Joints open, cracks	None evident	CND

GIVAUDAN CORPORATION

CLIFTON - NEW JERSEY

CHEMICAL SEWER INVESTIGATION

SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS TROUGH SIZE	CONNECTION SIZE	DESCRIPTION OF DEFECTS TROUGH	CONNECTION	POSSIBLE EXFILTRATION
11-11H	45	12" V.C.	CND	Joints slightly open	Some cracks	Possible
11-11I	45	12" V.C.	CND	Joints slightly open	None	Possible
11-11J	46	12" V.C.	CND	Misaligned, slightly open	Joints open, crack	Porrible
11-11K	46	12" V.C.	CND	Misaligned slightly open	Joints open crack	Possible
11-11L	47	12" C.I.	CND	Good-some sealing needed	None evident	CND -
11-11M	47	12" C.I.	CND	Good-some sealing needed	CND	CND
11-11N	75	12" C.I.	CND	Inactive drain	CND	CND
11-10A, B	200	None	6" VTP	None	Poor Alignment, open	Possible
11-14A, B, C, D, E F. G	36A	8" V.C.	CND	None evident	-	CND

GIVAUDAN CORPORATION
CLIFTON - NEW JERSEY
CHEMICAL SEWER INVESTIGATION
SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS		DESCRIPTION OF DEFECTS		POSSIBLE EXFILTRATION
		TROUGH SIZE	CONNECTION SIZE	TROUGH	CONNECTION	
11-14H	36B	6" concrete	CND	Slightly worn	CND	CND
11-14I	36B	None	CNI	-	Beneath floor	CND
11-14J	36B	8" V.C.	CND	Joint open slightly	CND	CND
11-16A	35	Drain inlet	4" VTP	-	Pipe misaligned	Possible
11-17A	35C	-	8" VTP	None	Joints open	Possible
11-13A	Cooling tower	None	Could not inspect	-	-	CND
11-19A	36B	None	CNI	None	Connection under floor	CND
13-1A	72	None	4" CIP	None	No visible defects	CND
13-2A	26	None	6" VTP	None	Broken pipe	Possible
13-3A	200	None	4" VTP	None	Slightly misaligned	CND
13-2B	200	None	CNI	Steam in manhole	CNI	CND
13-9A	89	10" concrete	CNI	slightly worn	CNI	CND

GIVAUDAN CORPORATION

CLIFTON - NEW JERSEY

CHEMICAL SEWER INVESTIGATION

SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS		DESCRIPTION OF DEFECTS		POSSIBLE EXFILTRATION
		TROUGH SIZE	CONNECTION SIZE	TROUGH	CONNECTION	
13-10A	89	10" concrete	CNI	slightly worn	CNI	CND
13-12A	7	None	4" CIP	None	None evident	CND
13-13A	7	None	6" CIP	None	None evident	CND
13-13B	7	None	CNI	None	CNI	CND
13-14A	7A	None	CNI	PIT SURCHARGED - COULD NOT INSPECT		CND
13-14B, C	7A	Concrete	6" VTP	Slightly worn	CND	CND
13-14D, E	7A	None	CND	Cleanouts surcharged	CNI	CND
13-15A, B, C, D	27	None	6" VTP	None	Misaligned joints on all	CND
13-17A	7	None	4" CIP	None	Fair condition	CND
13-17B	7	None	6" CIP	None	None evident	CND
16A, B, E, F, G	26	None	CND	COMPLETE INSPECTION NOT POSSIBLE - PIPE SECTION MISSING		Possible
16C, D	26	None	3" steel	None	Leaking connection to floor	Possible
18A	72	None	10" VTP	None	Could not inspect due to fumes	CND

GIVAUDAN CORPORATION

CLIFTON - NEW JERSEY

CHEMICAL SEWER INVESTIGATION

SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS		DESCRIPTION OF DEFECTS		POSSIBLE EXFILTRATION
		TROUGH SIZE	CONNECTION SIZE	TROUGH	CONNECTION	
19A	28	8" V.C.	CND	Good condition	Misaligned	CND
19B	28	8" Concrete	CND	Worn	Poor condition	Possible @ connection
19C	29	8" V.C.	CND	Joints open errosion	Fair	Possible in trough
19D	29	8" V.C.	CND	Worn	Worn	Possible
19E	30	8" V.C.	CND	Cracks @ invert	None evident	Possible in trough
19F	30	Plastic liner	CND	Flow spill over liner	CNI	Possible in trough
19G	31	8" concrete	CND	Worn	CNI	CND
19H	31	8" concrete	CND	Worn	CNI	CND
19I	32E	None	6" CIP	None	No visible defects	CND
20A	22	CND	CND	Boiling water being discharged	CNI	CND
20B	22	CND	CND	Boiling water being discharged	CNI	CND
20C	22	8" V.C.	CND	Some cracks	Poor condition	Possible

GIVAUDAN CORPORATION

CLIFTON - NEW JERSEY

CHEMICAL SEWER INVESTIGATION

SUMMARY OF BUILDING CONNECTION INVESTIGATION

CONNECTION DESIGNATION	BUILDING SERVING	CONNECTION DIMENSIONS		DESCRIPTION OF DEFECTS		POSSIBLE EXFILTRATION
		TROUGH SIZE	CONNECTION SIZE	TROUGH	CONNECTION	
20D	23	8" V.C.	CND	Joints open	Poor condition	Possible
20E	23	Concrete	CND	None evident	Poor condition	Possible
20F	24	4" concrete	CND	Hole near connection	CNI	Possible
20G	24	4" concrete	CND	Poor - errosion evident	Cracked pipe	Possible
20H	25	concrete	CND	Poor- errosion evident	Cracked pipe	Possible
20I	25	V.T./concrete	CND	Break in trough	Worn	Possible
20J	76	Covered CNI	CND	Not in use	CNI	CND
20K	76	Covered CNI	CND	Not in use	CNI	CND
21A	22	3" C.I.P.	4" VTP	Spills from CIP-directly to soil	Joints open	Possible
24A	9	None	CND	None	None evident	CND

5.0 INTERNAL INSPECTION

An internal inspection was made of most of sewer reaches comprising the chemical sewer and its branches. The inspection included first the cleaning of each reach utilizing an hydraulic jet or other appropriate equipment. The subsequent internal inspection of the sewer by a small portable television camera provided a view of the interior of the sewer that was permanently recorded on video tape for future reference and review. Both the cleaning and internal inspection of the sewers was undertaken by Robinson Pipe Cleaning Co., a contractor skilled in this type of work. At several locations in the system, the contractor was unable to televise the sewer due to colapsed pipe, significant blockages or other factors that effected the internal inspection. The length of various size pipe cleaned and inspected is summarized on the Table No. 3, that also includes the length of sewers not televised. Approximately 85 percent of the total system (not including minor connections) was inspected, including the majority of the principal sewer.

Individual field logs or records were prepared for all sewer reaches inspected. The logs identified the location of the sewer, its size, material of construction, length, as well as the location of other pertinent features observed during the video inspection. These features normally include the location of joints, both leaking and non-leaking, circumferencial

TABLE 3
GIVAUDAN CORPORATION
CHEMICAL SEWER DIMENSIONS
(Based Upon Internal Inspection Results)

PIPE SIZE (Dia./Mat.)	SEWERS INSPECTED		SEWERS NOT INSPECTED		% of System
	Reaches	Length (ft)	Reaches	Length (ft)	
24" VTP	4	312	-	-	5.2
18" VTP	15	1286	2	317	26.6
15" VTP	2	185	-	-	3.1
12" VTP	12	1211	-	-	20.1
10" VTP	9	1100	-	-	18.2
8" VTP	10	615	5	419	17.1
6" VTP/CIP	6	425	4	160	9.7
TOTAL	58	5134	11	896	100.0

TOTAL SYSTEM — 69 Reaches
6030 LF - Sewer

cracks, longitudinal cracks, broken pipe, building connections, pipe sections out of alignment, open joints, low spots (where water or sediment is trapped) and other visible defects. The equipment utilized permitted a simultaneous vocal interpretation and account of the internal inspection on the video recording tapes. The record included references to length of pipe reviewed (for the accurate location of each condition observed) as well as conditions encountered. As such, internal inspection provided a detailed record of the conditions of the interior of the sewer from manhole to manhole. The video tapes are maintained on file for future reference.

The internal inspection provided detailed information necessary to determine the condition of the pipeline as it may relate to the potential for exfiltration from the sewer. The visual inspection will also be useful in estimating rehabilitation cost for the sewers inspected. The results of the internal inspection have been included in the Appendix of this report both in a summary form as a field log and as a graphical representation, included in this section.

The investigation involved the inspection of over six thousand feet of the chemical sewer and its branches. A summary of the internal inspection, including specific data on the internal condition of the pipeline is shown on Table 4. The location of poorly aligned joints, cracks and all broken pipe was of immediate concern in this project since the potential for exfiltration is high at locations where

these defects are found. Plate "A" included in the rear of this report shows the chemical sewer system and identifies (in summary format) the results of the internal inspection and hydrostatic testing described hereafter. A code has been included on the Plate to show reaches where visible defects were found to be significant. In evaluation of the 58 segments of sewer inspected (comprising about 5,134 lineal feet of sewer) it was apparent that the majority of the sewers (over 93%) exhibited some type of defect, while over 25% of the total sewers were found to be in poor condition either as severly eroded pipe or broken pipe.

A direct correlation between the condition of the pipeline and the hydrostatic test results could not be made in many sewers, due to the presence of broken pipe. The evaluation shown on Plate "A" of the condition of the pipeline was based solely upon the visual inspection and not by the hydrostatic test. As such, the viewers experienced opinion of the pipe condition became the basis for the evaluation shown.

TABLE 4

GIVAUDAN CORPORATION
CLIFTON - NEW JERSEY
CHEMICAL SEWER INVESTIGATION
SUMMARY OF INTERNAL INSPECTION

MANHOLE REACH FROM	TO	PIPE DIMENSIONS SIZE (Inches)	LENGTH (Feet)	MATERIAL	DEFECTS OBSERVED JOINTS OUT OF ALIGNMENT (Number)	CRACKED PIPE Location Number	BROKEN PIPE Location Number	DESCRIPTION OF PIPE CONDITION PIPE	JOINTS	OTHER
A. CHEMICAL SEWER										
1	2	18	17	VTP	1	0	0	Good	Misaligned	None
2	Pit 35	18	38	VTP	4	0	0	Good	Misaligned	None
Pit 35	3	18	19	VTP	0	0	0	Good	Misaligned	None
3	4	18	64	VTP	3	0	0	Good	Misaligned	None
Pit 74	6	18	265	VTP	10	3	0	Good	Misaligned	None
9	10	18	141	VTP	1	1	0	Good	Good	Crack @ MH 9
10	11	18	121	VTP	4	3	0	Fair	Good	None
11	12	18	235	VTP	11	2	0	Fair	Misaligned	Break in pipe - deposits
12	13	18	38	VTP	8	1	0	Good	Misaligned	None
13	14	24/21	42	VTP	6	0	0	Good(24")	Misaligned	Poor condition @ 21"
14	15	24	140	VTP	4	0	0	Fair	Fair	Pipe walls are eroded
15	16	24	67	VTP	1	2	1	Good	Fair	Pipe invert cracked
16	17	18	48	VTP	1	0	0	Good	Good	None
17	18	18	122	VTP	3	4	0	Good	Fair	None
18	19	15	82	VTP	14	0	0	Good	Poor	Joints Open

MANHOLE NAME	REACH TO	PIPE DIMENSIONS SIZE (Inches)	LENGTH (Feet)	MATERIAL	DEFECTS OBSERVED JOINTS OUT OF ALIGNMENT (Number)	CRACKED PIPE Location Number	BROKEN PIPE Location Number	DESCRIPTION OF PIPE CONDITION PIPE	JOINTS	OTHER
19	20	10	82	VTP	4	3	0	Good	Good	None
20	21	10	43	VTP	2	3	0	Good	Poor	None
21	22	8	17	VTP	PIPE IS COLLAPSED - INSPECTION NOT POSSIBLE					
22	23	8	250	VTP	27	36	1	Fair	Poor	Pipe is broken
B. BRANCH SEWER (STARTING @ MANHOLE 9)										
9	9-1	12	158	VTP	1	0	1	Good	Misaligned	Broken pipe
9-1	9-2	12	45	VTP	1	2	2	Fair	Open	Broken pipe
9-2	9-3	12	42	VIP	6	2	0	Good	Misaligned	None
9-3	9-4	8	43	VTP	2	0	0	Good	Good	Entire pipe was not inspected
9-3	9-6	8	10	VTP	2	0	0	Good	Open	Entire pipe was not inspected
9-2	9-5	12	74	VTP	4	15	1	Fair	Fair	Pipe broken
C. BRANCH SEWER (STARTING @ MANHOLE 10)										
10	10-1	12	358	VTP	3	3	0	Fair	Fair	Deposits
D. BRANCH SEWER (STARTING @ MANHOLE 11)										
11	11-1	18	78	VTP	6	0	0	Good	Misaligned	None
11-1	11-2	15	103	VTP	7	0	0	Good	Misaligned	None
11-2	11-3	18	26	VTP	6	0	0	Fair	Misaligned	None
11-3	11-4	10	161	VTP	8	1	1	Fair	Misaligned	Broken pipe
11-5	11-6	10	163	VTP	7	2	0	Good	Misaligned	None
11-3	11-5	12	38	VTP	7	0	0	Good	Open	None

MANHOLE NAME	REACH TO	PIPE DIMENSIONS SIZE (Inches)	LENGTH (Feet)	MATERIAL	DEFECTS OBSERVED JOINTS OUT OF ALIGNMENT (Number)	CRACKED PIPE Location Number	BROKEN PIPE Location Number	DESCRIPTION OF PIPE CONDITION PIPE	JOINTS	OTHER
11-2	11-7	12	232	VTP	13	5	0	Fair	Fair	None
11-7	11-8	18	48	VTP	13	0	1	Fair	Badly Misaligned	Broken pipe
11-8	11-9	10	154	VTP	27	3	0	Good	Misaligned	Deposits
11-7	11-10	12	72	VTP	9	0	0	Good	Misaligned	None
11-10	11-11	12	34	VTP	4	1	0	Fair	Poor	Deposits
11-11	11-12	10	164	VTP	29	9	2	Fair	Poor	Broken pipe
11-11	11-13	18/12	63	VTP	7	3	2	Fair	Poor	Broken pipe
11-13	11-14	10	46	VTP	10	1	0	Fair	Poor	None
11-13	11-15	12	66	VTP	9	4	0	Fair	Poor	None
11-15	11-16	12	22	VTP	4	2	1	Fair	Poor	Broken pipe
11-16	11-18	8	83	VTP	15	5	0	Good	Misaligned	None
E. BRANCH SEWER (STARTING @ MANHOLE 13)										
13	13-1	12	170	VTP	29	2	0	Fair	Misaligned	None
13-2	13-3	18	26	VTP	5	7	2	Fair	Fair	Broken pipe
13-3	13-4	8	57	VTP	6	1	0	Fair	Fair	None
13-4	13-7	8	54	VTP	7	1	0	Good	Fair	Bend in pipe
13-4	13-5	8	14	CIP	0	0	0	Good	Good	None
13-7	13-8	8	25	VTP	2	1	0	Poor	Poor	Poor condition
13-8	13-9	6	36	VTP/CIP	2	2	0	Poor	Poor	Heavy errosion
13-7	13-11	6	216	VTP/CIP	1	2	0	Poor	Poor	Heavy errosion
13-11	13-14	6	52	VTP/CIP	10	4	1	Poor	Poor	Broken pipe
13-11	13-12	6	35	CIP	0	0	0	Poor	Good	None
13-12	13-13	6	27	CIP	0	0	0	Poor	Good	Heavy errosion
13-14	13-15	6	59	VTP	4	5	0	Poor	Poor	Poor condition

MANHOLE NAME	REACH TO	PIPE DIMENSIONS SIZE (Inches)	LENGTH (Feet)	MATERIAL	DEFECTS OBSERVED JOINTS OUT OF ALIGNMENT (Number)	CRACKED PIPE (Location Number)	BROKEN PIPE (Location Number)	DESCRIPTION OF PIPE CONDITION PIPE	JOINTS	OTHER
F. BRANCH SEWER (STARTING @ MANHOLE 17)										
17	17-1	8	62	VTP	14	1	0	Good	Fair	None
G. BRANCH SEWER (STARTING @ MANHOLE 19)										
19	19-1	10	128	VTP	14	7	2	Fair	Poor	Broken pipe
H. BRANCH SEWER (STARTING @ MANHOLE 20)										
20	20-1	10	159	VTP	7	5	1	Fair	Fair	Broken pipe

SEWERS THAT COULD NOT BE INSPECTED

CHEMICAL SEWER

8	9	-	Sewer Surcharged
23	24	-	Dangerous sewer atmosphere
24	25	-	Dangerous sewer atmosphere

BRANCH SEWERS

11-10	11-19	-	Bend in sewer - equipment could not pass
11-15	11-17	-	Bend in sewer - equipment could not pass
11-16	11-20	-	Could not install equipment through cleanout
13	13-2	-	Significant blockage under building - so prevented inspection & cleaning
13-2	Bldg. 26	-	Bend in sewer - equipment could not pass
13-9	13-10	-	Bend in sewer - equipment could not pass
13-13	13-16	-	Equipment could not be installed in manhole
13-14	13-14A	-	Equipment could not be installed in trough

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
John J. Trela, Ph.D., Director
401 East State St.
CN 028
Trenton, N.J. 08625
609 - 633 - 1408

IN THE MATTER OF	:	AMENDED
	:	ADMINISTRATIVE
GIVAUDAN CORPORATION	:	CONSENT ORDER
	:	TCDD

The following FINDINGS are made and ORDER is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (the "Department" or "NJDEP") by Executive Order No. 40B (1983), signed by Governor Thomas H. Kean on June 17, 1983, N.J.S.A. App. A:9-45, N.J.S.A. 13:1D-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq., and duly delegated to the Assistant Director of Hazardous Waste Management pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1. Givaudan Corporation (hereinafter "Givaudan") owns and operates an office, manufacturing, packaging, storage, shipment and research complex on 31.43 acres on Delawanna Avenue, Clifton, New Jersey (hereinafter "the Givaudan Plant"). The Givaudan Plant includes a chemical manufacturing facility located to the south of Delawanna Avenue, at 125 Delawanna Avenue (Block 73-3, Lot 2) (hereinafter "the Site").

2. Givaudan is an existing hazardous waste facility pursuant to N.J.A.C. 7:26-12.3, EPA ID No. NJD002156354.

3. Givaudan is required to investigate and remediate 2,3,7,8-Tetrachlorodibenzo-p-dioxin (hereinafter "TCDD" or "dioxin") in or on the soil at the site pursuant to an Administrative Consent Order (hereinafter "TCDD ACO") executed with the Department on March 5, 1987.

4. Givaudan plans to renovate a portion of the Contaminated Process Area, as defined by the TCDD ACO. This specific portion of the Contaminated Process Area is located north of building 68 where sample #G-11 was collected. The renovations would include the removal of a wall and underlying footings adjacent to this area of contamination (hereinafter "Sample Area #G-11") which is within the Contaminated Process Area. This

BBA000120 - D

will necessitate removal of dioxin contaminated soil within Sample Area #G-11.

5. On August 31, 1987, Givaudan submitted a proposal and request (hereinafter "the proposal"), set forth in Appendix A-1, which is attached hereto and made a part hereof, that the Department grant permission under the TCDD ACO for Givaudan to conduct a limited excavation and remediation of dioxin contaminated soil (hereinafter "contaminated soil") of Sample Area #G-11 as described in Appendix A-1 and identified in Drawing A9565 (Rev. #2) of that Appendix.

6. Based upon these Findings, the Department has determined it is necessary to amend the TCDD ACO.

ORDER

NOW, THEREFORE, IT IS HEREBY ORDERED AND AGREED THAT:

7. Givaudan may perform the limited excavation and remediation of the contaminated soil within Sample Area #G-11, provided that Givaudan complies with the provisions of this Amended TCDD ACO.

8. Paragraph 36 of the TCDD ACO shall be amended to read as follows: Except for the limited excavation and remedial action in Sample Area #G-11 allowed pursuant to this Amended TCDD ACO, Givaudan shall continue to maintain all areas of the Site where analytical results have indicated the presence of TCDD contamination in concentrations of 1 ppb or more in a closed and secured condition, with physical access thereto restricted.

9. Paragraph 37 of the TCDD ACO shall be amended to read as follows: Except for the limited excavation and remedial action in Sample Area #G-11, Givaudan shall not engage in any demolition, excavation, movement or disturbance of soil, or placing, movement or removal of construction materials or construction equipment in the Contaminated Process and Non-Process Areas without prior written permission from the Department.

10. The contaminated soil excavated from Sample Area #G-11 shall be addressed in accordance with paragraph 42 of the TCDD ACO. The draft work plan to conduct a feasibility study of remedial action alternatives for TCDD contamination in the Contaminated Process and Contaminated Non-Process Areas (hereinafter, the "TCDD Work Plan"), based on the scope of Work set forth in Appendix A shall also address the excavated contaminated soil secured in the execution of Appendix A-1.

11. Excavation in the contaminated process area will be conducted in Sample Area #G-11 to a depth of three (3) feet. The contaminated soil will be containerized as it is excavated. Post-excavation sampling will be conducted to determine the level of TCDD in the soil from within the excavated area. Three (3) discrete samples will be taken from within the excavated area and analyzed to determine the level of TCDD in the newly uncovered soil.

12. The excavated area will be cordoned off and easily identifiable to plant personnel subsequent to the excavation until the results of the analysis have been obtained and submitted to the Department confirming the absence of TCDD or the presence of TCDD at levels less than 1 ppb.

13. If the analysis, set forth in paragraph 11, detects levels of TCDD in excess of the 1 ppb action level, additional excavation may be necessary as determined by NJDEP.

14. If the analysis, referred to in paragraph 11, indicates levels of TCDD 1 ppb or less, the boundary of the contaminated process area will be redefined as outlined in Appendix A-1.

15. All contaminated soil shall be secured in containers meeting the standards specified in N.J.A.C. 7:26-7.2 and such containers shall be securely sealed so that there is no escape of the contaminated soil.

16. All the containers containing the contaminated soil shall be secured in such a manner as to prevent their exposure to wind, rain or other forms of precipitation. Measures shall be undertaken to keep these containers dry at all times and to prevent precipitation from accumulating on or near the containers.

17. Within sixty (60) days of the execution of this Amended Administrative Consent Order, Givaudan's contingency plan and emergency procedures document, dated May 30, 1986, shall be amended to include the storage area and the containers utilized for the storage of the dioxin contaminated soil. Additionally, the contaminated areas of the process and non-process areas must also be identified in the amended contingency plan and emergency procedures document.

18. All containers containing the contaminated soil shall be handled and maintained in accordance with N.J.A.C. 7:26-9.4 (d) 1-6.

19. Written logs, which include the necessary procedures to detect cracks, leaks, and disturbances of the containers and/or storage area shall be maintained monthly. Immediately notify the Department at (609) 292-5560 during business hours or (609) 292-7172 at all other times should there be a disturbance of the containers and/or storage area. Verbal notification will be followed by written notification detailing the circumstances of the incident and outline measures that will be taken to prevent their reoccurrence.

20. Givaudan is required to maintain the containers and storage area in accordance with paragraphs 15 through 19 above. If the area utilized for storage of the containers of contaminated soil become disturbed in any way, Givaudan is required to perform remedial measures as necessary to secure the area and the contents of the containers in a manner consistent with paragraphs 15 through 18 within thirty (30) calendar days after the disturbance.

21. NJDEP has deemed that the temporary storage of this contaminated soil is necessary until appropriate treatment and/or disposal technologies become available. Givaudan may store the contaminated soil excavated from Sample Area #G-11 as required by this Amended Administrative Consent Order until a remedial action is chosen by the Department pursuant to the Remedial Action Plan or until such time dioxin treatment technology becomes available that is acceptable to the Department.

Force Majeure

22. If any event occurs which Givaudan believes will or may cause delay in the achievement of any provision of this Amended Administrative Consent Order, Givaudan shall notify the Department in writing within seven (7) calendar days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length of the delay, the precise cause or causes of the delay, any measures taken or to be taken to minimize the delay. Givaudan shall take all necessary action to prevent or minimize such delay.

23. If the Department finds that: (a) Givaudan has complied with the notice requirements of the preceding paragraph and; (b) that any delay or anticipated delay has been or will be caused by fire, flood, strike or other circumstances beyond the control of Givaudan, the Department shall extend the time for performance hereunder for a period no longer than the delay resulting from such circumstances. If the Department determines that either Givaudan has not complied with the notice requirements of the preceding paragraph, or the event causing the delay is not beyond the control of Givaudan, failure to comply with the provisions of this Amended Administrative Consent Order shall constitute a breach of the requirements of this Amended Administrative Consent Order. The burden of proving that any delay is caused by circumstances beyond the control of Givaudan and the length of any such delay attributable to those circumstances shall rest with Givaudan. Increases in the cost or expenses incurred by Givaudan in fulfilling the requirements of this Amended Administrative Consent Order shall not be basis for an extension of time. Delay in an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements.

General Provisions

24. This Amended Administrative Consent Order shall be binding on Givaudan, its principals, directors, officers, agents, successors, assignees and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

25. Givaudan shall perform all work conducted pursuant to this Amended Administrative Consent Order in accordance with prevailing professional standards.

26. Givaudan shall conform all actions pursuant to this Amended Administrative Consent Order with all applicable Federal, State, and local

laws and regulations. Givaudan shall be responsible for obtaining all necessary permits, licenses and other authorizations.

27. All appendices referenced in this Administrative Consent Order, as well as all other reports and documents required under the terms of this Amended Administrative Consent Order are, upon approval by the Department, incorporated into this Amended Administrative Consent Order by reference and made a part hereof.

28. Givaudan shall make available to the Department all data and information, including raw sampling and monitoring data, concerning pollution at and/or emanating from the site.

29. Givaudan shall make available to the Department all technical records and contractual documents maintained or created by Givaudan or its contractors in connection with this Amended Administrative Consent Order.

30. Givaudan shall preserve, during the pendency of this Amended Administrative Consent Order and for a minimum of six (6) years after its termination, all data, records and documents in their possession or in the possession of their divisions, employees, agents, accountants, contractors, or attorneys which relate in any way to the implementation of work under this Amended Administrative Consent Order, despite any document retention policy to the contrary. After this six year period, Givaudan shall notify the Department within twenty-eight (28) days prior to the destruction of any such documents. If the Department requests in writing that some or all of the documents be preserved for a longer time period, Givaudan shall comply with that request. Upon request by the Department, Givaudan shall make available to the Department such records or copies of any such records.

31. No obligations imposed by this Amended Administrative Consent Order are intended to constitute a debt, claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Amended Administrative Consent Order shall constitute continuing regulatory obligations imposed pursuant to the police powers of the State Of New Jersey intended to protect human health of the environment.

32. In addition to the Department's statutory and regulatory rights to enter and inspect, Givaudan shall allow the Department and its authorized representatives access to the site at all times for the purpose of monitoring Givaudan's compliance with this Amended Administrative Consent Order.

33. The Department reserves the right to require Givaudan to take additional actions should the Department determine that such actions are necessary to protect human health or the environment. Nothing in this Amended Administrative Consent Order shall constitute a waiver of any statutory right of the Department pertaining to any of the laws of the State of New Jersey should the Department determine that such measures are necessary.

34. Givaudan shall not construe any informal advice, guidance, suggestions, or comments by the Department, or by persons acting on behalf

of the Department, as relieving Givaudan of its obligation to obtain written approvals as may be required herein, unless such advice, suggestions, guidance, or comments by the Department shall be submitted in writing to Givaudan pursuant to paragraph 54 of the TCDD ACO. except for minor modifications during field activities, including minor schedule adjustments, which Givaudan shall confirm in writing to the Department.

35. No modification or waiver of this Amended Administrative Consent Order shall be valid except by written amendment to this Amended Administrative Consent Order duly executed by Givaudan and the Department.

36. Givaudan hereby consents to and agrees to comply with this Amended Administrative Consent Order which shall be fully enforceable as an Order in the New Jersey Superior Court upon the filing of a summary action for compliance pursuant to Executive Order No. 40 (1983) signed by Governor Thomas H. Kean on June 2, 1983, N.J.S.A. App. A:9-45, N.J.S.A. 13:1D-1 et seq., the Water Pollution Control Act N.J.S.A. 58:10A-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq.

37. Givaudan agrees not to contest the authority or jurisdiction of the Department to issue this Amended Administrative Consent Order and also agrees not to contest the terms of this Amended Administrative Consent Order in any action to enforce its provisions.

38. Givaudan shall give written notice of this Amended Administrative Consent Order to any successor in interest prior to transfer of ownership of Givaudan's facilities which are the subject of this Amended Administrative Consent Order, and shall simultaneously verify to the Department that such notice has been given.

39. The requirements of this Amended Administrative Consent Order shall be deemed satisfied upon the receipt by Givaudan of written notice from the Department that Givaudan has demonstrated, to the satisfaction of the Department, that all the terms of this Amended Administrative Consent Order have been completed.

40. All terms and conditions of the TCDD ACO not inconsistent with this amendment shall remain in full force and effect.

Hearing Waiver

41. When this Amended Administrative Consent Order becomes effective, Givaudan Corporation waives its right to a hearing on the matters contained herein above pursuant to N.J.S.A. 52:14B-1 et seq.

42. This Amended Administrative Consent Order shall take effect upon the signature of both parties.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE: 2-16-88 BY: Ronald T. Corcory

Ronald T. Corcory
Assistant Director for Enforcement
Division of Hazardous Waste Management

GIVAUDAN CORPORATION

DATE: 2-9-88 BY:

NAME R.J. Christmann

TITLE Exec V.P. Gen Mgr.

NAME M. Marucci

TITLE Sr. V.P. R&D

Approved as to Form
R. Jewers Date 2-9-88

APPENDIX A-1

GIVAUDAN PROPOSAL
AUGUST 31, 1987

GIVAUDAN

GIVAUDAN CORPORATION
Delawanna Avenue
Clifton, New Jersey 07015-5034
Phone: (201) 365-8000
Cable: Givaudanco, Clifton
Telex: 219259 (Headquarters)
Telex: 133501 (Plant)
Facsimile:. (201) 777-9304

August 31, 1987

Mr. Joseph Karpa, Case Manager
State of New Jersey
Dept. of Environmental Protection
Div. of Hazardous Waste Management
401 East State Street
CN 028
Trenton, N. J. 08625

Dear Mr. Karpa:

Thank you for taking the time to visit the Givaudan Corporation on August 19, 1987. As you will recall, Givaudan is in the midst of major modernization in order to have a modern, environmentally sound, manufacturing facility.

Paragraph 28 of the T.C.D.D. Administrative Consent Order states that, "... The department agreed that the site is released from the restrictions of the Administrative Consent Order with the exceptions of (a) the contaminated process area and the contaminated non-process area, ...". In compliance with this paragraph, all work to date, has been outside the contaminated process and contaminated non-process areas, (identified by Drawings #A9565, Rev. 1 and #9566, Rev. 1). In order to continue with the above mentioned modernization, it is planned to construct a new building on the southern border of the presently defined contaminated process area. As part of this construction, it will be necessary to install new footings necessitating the movement of soil in this area.

Therefore, the Givaudan Corporation is requesting permission, under the T.C.D.D. Administrative Consent Order, to perform the above work.

Enclosed is a copy of Drawing #A9565, Rev. #2, where the area is identified. In examining this print, please note that a sample, taken from the area north of Bldg. 68 (#G-11), (red shaded area), was found to have a T.C.D.D. level of 2.2 p.p.b. The areas northwest of Bldg. 68 and north of Bldg. 68A (green shaded areas) have been found to contain less than 1.0 p.p.b. T.C.D.D.

Based on these facts, the following is proposed:

1) The area north of Bldg. 68 (shaded in red, containing sample #G-11), will be excavated to a depth of 3 feet. (Based on all previous sampling at the Givaudan site, there is no indication that dioxin has migrated to this depth).

2) Employees engaged in the excavation will be required to wear "Level C" protection. The area to be excavated will be moistened to control dusting. The majority of the excavation will be performed utilizing a backhoe and shovels. The soil obtained from the excavation will be placed in sealed open-head 55-gallon drums and temporarily stored in the contaminated non-process area. It is anticipated that the excavation of the red shaded area will require the storage of approximately 144 cubic yards of contaminated soil requiring the use of approximately 200 drums. Upon reaching a depth of 3 feet, a composite sample will be taken and forwarded to California Analytical Labs. for T.C.D.D. analysis to insure that the excavated area contains <1 p.p.b. T.C.D.D.

   Upon completion of the excavation, all utensils and backhoe bucket will be decontaminated using a soap and water wash followed by a distilled water wash, acetone rinse and hexane rinse. All clothing and disposable utensils will be placed in an open-head 55-gal. drum and stored in Bldg. 54 pending disposal. No additional work will be performed on the north side of Building 68 which would disturb any soil prior to approval by the N.J.D.E.P.

3) Following the completion of the above, the boundaries of the contaminated process area would be altered as defined by the dashed line on Drawing A9565, Rev. 2.

Your prompt review and approval of the above proposal will be appreciated since construction in this area of the Givaudan plant site is critical in order to maintain the construction schedule.

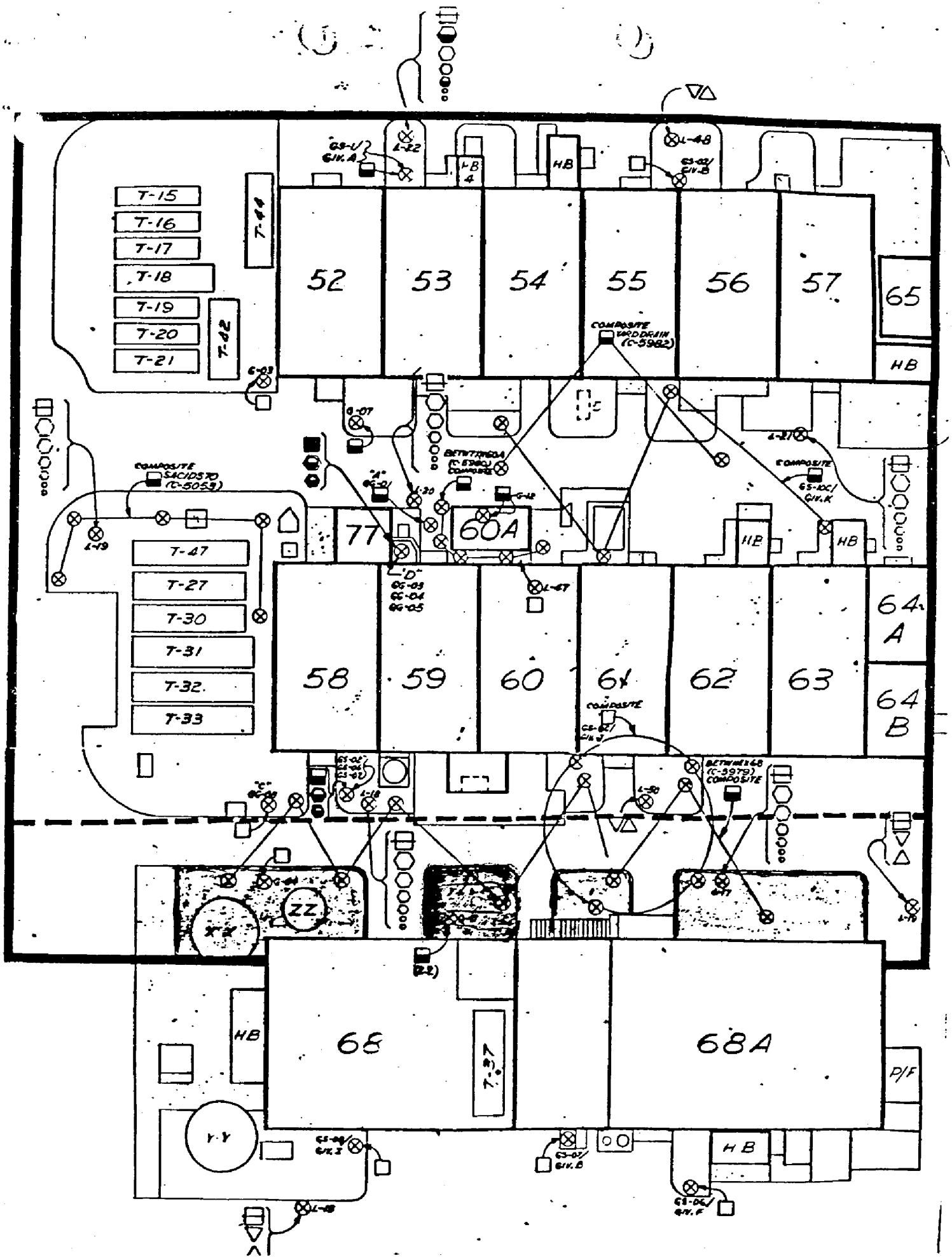
Thank you in advance for your cooperation.

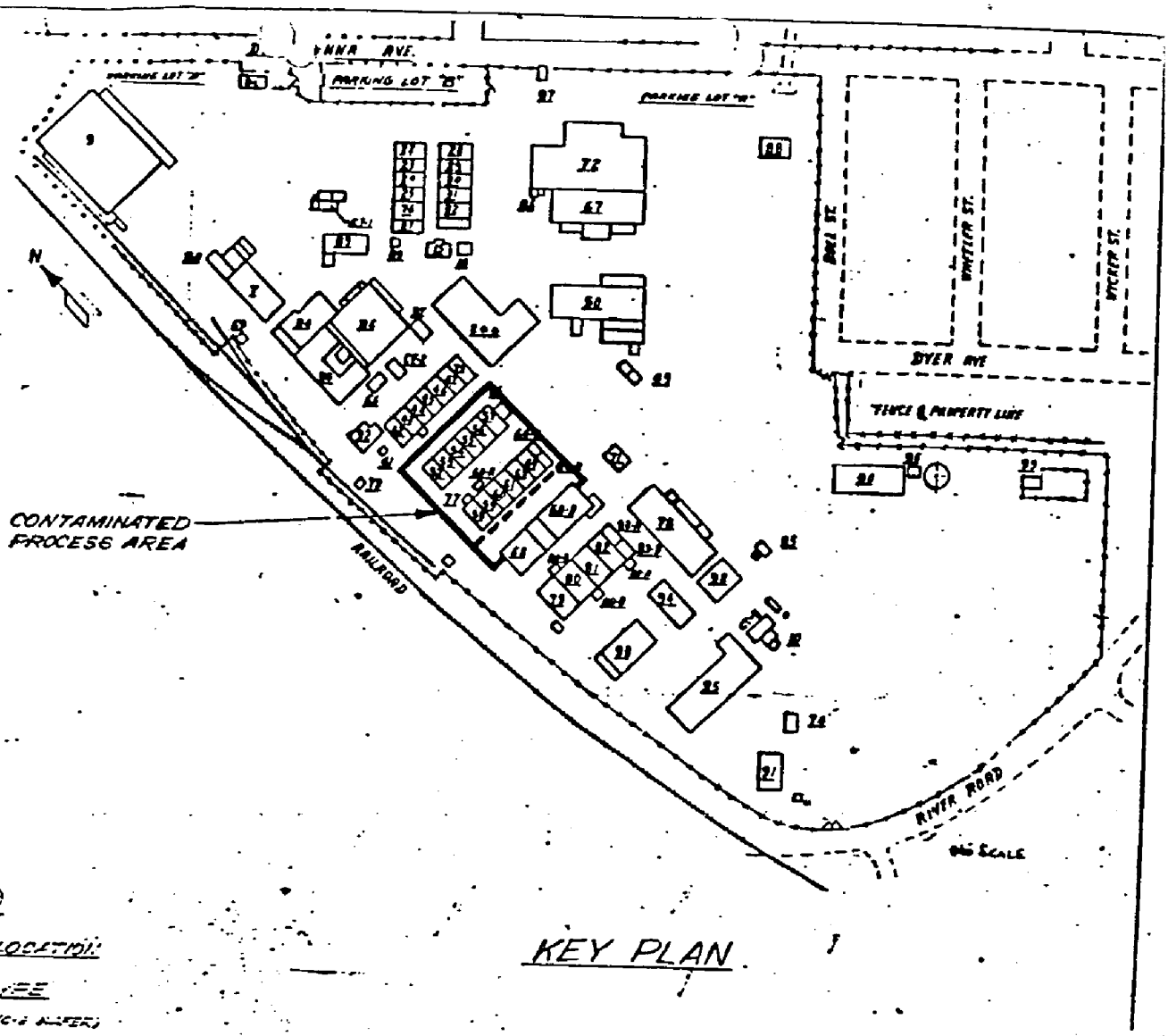
Sincerely,

GIVAUDAN CORPORATION

L. A. Levy
Director, Quality Assurance

LAL/rd
ACORL-KA.AU7





KEY PLAN

LEGEND

⊗ SAMPLE LOCATION

SAMPLE TYPE

- 0-6" WAFER
- 6-12" WAFER
- 10-15" WAFER
- 22-24" WAFER
- 28-30" WAFER
- 34-36" WAFER

- SURFACE
- COMPOSITE (4-6, 10-12, 16-18" WAFERS)
- COMPOSITE (22-24, 28-30, 34-36" WAFERS)

▽△ DEPTH COMPOSITE

CORE COMPOSITES

- 6" — 0-6"
- 12" — 6-12"
- 24" — 12-18"

NO SAMPLE

NOT ANALYZED

L IN LEVELS ppb

- >10
- 7-10
- 1-<7
- <1.

DRWG NO	DESCRIPTION	DRWG NO	DESCRIPTION

REFERENCE DRAWINGS

NO	BY	DATE	DESCRIPTION	PLT MGR	PROD	SAFETY
2	C.D.	7-8-87				
1	C.D.	5-12-87				

REVISIONS

CONTAMINATED PROCESS AREA SAMPLING & ANALYSIS STATUS 1984

DEPT ENVIR.	GIVAUDAN CORPORATION CLIFTON, NEW JERSEY				
BLDG					
DATE 12-13-84	DRAWN BY ERH	APP'D	JOB NOS	DRAWING NO. A-9565 (REV. 2)	REV. 2
SCALE 1"=20'-0"	CHECKED	FILE			

PVSC

March 21, 1978

TO: A. Goldberg

FROM: F. P. D'Ascensio

SUBJECT: pH Control System, Givaudan, Clifton

On March 20, 1978, T. Mack and I visited Givaudan in order to review their pH control system. This visit was caused by a failure of a Clifton sanitary sewer line on March 17, 1978. Givaudan is the largest contributor of this line and improper pH control by Givaudan most likely was the major cause of the failure. We were also concerned because Givaudan had replaced this section of line at the end of July, 1977.

A conference was held in John Lampert's office. Also present were George Talarico, Robert Watters and William Suydam. Mr. Watters stated that for about the past two (2) months the use of lime by the pH control system was only half the normal usage. Since manufacturing operations had not been reduced, it appeared that the pH control system was not being run properly. I requested that Givaudan furnish P.V.S.C. with copies of the daily pH recorder charts beginning on March 27th. I also requested that Givaudan examine the entire system and propose a better, more reliable one.

When we inspected the lime station we observed that the pH was three (3) and no lime was entering the sewer line. (The feeder chute was clogged.) The chute was unclogged and the lime began to enter the line. However, there were large swings in pH shown on the recorder chart which indicated that the controller was not operating properly. I informed Mr. Talarico that the instrument would have to be checked.

Finally, we discussed several alternatives, such as using slaked lime instead of powdered lime, installing an equalization tank, changing the pH controller, etc. Givaudan will propose corrective measures and a timetable by April 7, 1978.

Respectfully Submitted,

Frank P. D'Ascensio

FPD:dhb

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
TRENTON, NEW JERSEY 08625

March 29, 1978

800-705

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. G. Talarico
Director, Regulatory Affairs
Givaudan Corporation
100 Delawanna Avenue
Clifton, New Jersey 07014

Re: Sewer Line Break at River Road
and Third River Bridge
Clifton, New Jersey

Dear Mr. Talarico:

On March 15 and on March 21, 1978 two separate ruptures in the above mentioned sewer line occurred. As a result of this sewer line failure, an as yet undetermined amount of pollutants entired the Third River in violation of N.J.S.A. 58:10A-1 et. seq., N.J.S.A. 58:10-23.11 and N.J.S.A. 23:5-28.

Givaudan Corporation is, therefore, directed to:

(1) Submit to this Department a written report detailing the exact circumstances of each incident. This report should include but not necessarily be limited to the following information; the reasons for the sewer line failures, the quantity of materials discharged to the Third River, the nature of material discharged to the Third River, the interim corrective measures undertaken and the long term solution to this problem. This report shall be submitted within five (5) days of receipt of this letter.

(2) Maintain the pH of the plant discharge to the sanitary sewerage system between the limits 5-9 standard units and provide the Department with records substantiating such control of said discharge.

(3) Inspect the exposed section of the pipe underneath the Third River bridge every four (4) hours daily, including weekends until the new pipe is installed.

The Givaudan Corporation is directed to comply with items (2) and (3) upon receipt of this letter. Immediately after learning that a break has occurred in this line, Givaudan Corporation must notify the office of Hazardous Substance Control (609) 292-5560-Day, (609) 292-7172-Dight, U. S. Spill Notification Center (800) 424-8802 and the Passaic-Hackensack Basin (201) 648-2200 as well as initiate all measures necessary to cease discharging until repairs have been made.

Givaudan Corporation is also requested to provide this office with a statement regarding the ownership of the pipe in which the break occurred.

Any questions you have on the above should be directed to either Mr. G. Martusevich or this writer at (201) 648-2200.

Very truly yours,

Robert J. Reed
Supervisor of Field Operations
Passaic-Hackensack Basin
Water Pollution Control
Monitoring, Surveillance
and Enforcement Element

E106:G19

cc: Mr. C. Snyder, V.P. Manufacturing, Givaudan Corporation
City Engineer, City of Clifton
Mr. Frank D'Ascensio, Passaic Valley Sewerage Commissioners

Violation and Elimination - Givaudan Corporation, 100 Delawanna Avenue, Clifton, N. J.

July 14, 1977 (W. Fiore)

On July 18, 1977, while making routine checks on River Road, Clifton, where it crosses Third River, Inspector Fiore observed a white water mark in the street at a storm sewer catch basin. Further investigation revealed what appeared to have been an overflow from a sanitary sewer on the Givaudan property.

When he spoke to Mr. Sirdan, Acting Plant Manager, he was informed that on July 14, at 9:40 A.M. Givaudan found a blockage in their sanitary sewer which caused an overflow,and waste entered Third River from the catch basin. The blockage was cleared by 11:00 A.M. and the overflow ceased. Employees then washed down the residue, which contained lime used in pretreating their sanitary waste. Inspector Fiore informed Mr. Sirdan to notify PVSC any time they have a similar type of problem.

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
RICHARD T. DEWLING, Ph.D., P.E.
COMMISSIONER
CN 402
TRENTON, N.J. 08625
609-292-2885

IN THE MATTER OF :
GIVAUDAN CORPORATION :
:

ADMINISTRATIVE
CONSENT ORDER
GROUND WATER

The following FINDINGS are made and ORDER is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter the "Department") by N.J.S.A. 13:1D-1 et seq., by the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., by the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and by the Spill Compensation and Control Act, N.J.S.A. 58:10-23 et seq.

FINDINGS

1. Givaudan Corporation (hereinafter "Givaudan") owns and operates an office, manufacturing, packaging, storage, shipment and research complex on 31.43 acres on Delawanna Avenue, Clifton, New Jersey (hereinafter the "Givaudan Plant") which currently has approximately 685 employees and has been assessed by Clifton for 1984 real estate tax purposes at $9,597,700. The Givaudan Plant includes a chemical manufacturing facility located to the south of Delawanna Avenue, at 125 Delawanna Avenue (Block 73-3, Lot 2) (hereinafter the "Site").

2. The Site is bordered on the northeast by Delawanna Avenue, on the southwest by New Jersey State Route 3, on the northwest by CONRAIL commuter and freight railroad lines, and on the southeast by a small, medium-density housing community which is located on a bluff overlooking the Site. The Passaic River, which forms the boundary between Passaic and Bergen Counties in the area of the Site, is approximately one-third of a mile to the southeast of the Site and is believed to be tidally influenced in the area of the Site. The Site is located in an area of Clifton which has been industrialized for many years.

3. The Site is believed to have been an active industrial site since approximately 1905. The bulk of the Site was owned by Antoine Cheris prior to its purchase by Givaudan in 1913. The remainder of the Site was purchased by Givaudan in 1926 from National Anode Corporation and in 1931 from Capes-Viscose Corporation.

4. Since approximately 1913, Givaudan has manufactured a variety of aromatic chemicals at the Site.

BBF000010

K-1

ATTACHMENT ____

5. Since approximately 1950, Givaudan has continuously extracted ground water at the Site at the rate of approximately 1 million gallons per week. The extracted water has been utilized for non-contact cooling water and has been discharged to the facilities of the Passaic Valley Sewerage Commission, a publicly owned treatment works.

6. In April, 1985, Givaudan completed installation of a new, state-of-the-art chemical process sewer system with secondary containment. The new system consists of a series of pipes constructed within concrete trenches which serve to contain any potential leaks. Gratings over the trenches permit physical inspection to detect leaks. The new system is designed to prevent the future risk of ground water contamination from leaking chemical sewers.

7. Although the ground water underlying the Site has been sampled for contamination on various occasions in the past, the nature and extent, if any, of ground water contamination underlying the Site and the surrounding area, from the operations of Givaudan or otherwise, remains to be delineated.

8. Past sampling of ground water underlying the Site has disclosed the presence of various contaminants including 1,2-dichloroethane, 1,1,2-trichloroethane, toluene and benzene.

9. Concurrently with the issuance of this Administrative Consent Order, the Department has also issued, with the consent of Givaudan, another administrative consent order, entitled "In the Matter of Givaudan Corporation Administrative Consent Order-TCDD" (hereinafter the "TCDD Consent Order"), covering the investigation, delineation and remediation of 2,3,7,8-Tetrachlorodibenzo-p-dioxin contamination at the Site.

ORDER

NOW, THEREFORE, IT IS HEREBY ORDERED AND AGREED THAT:

I.

Ground Water Remedial Investigation and Feasibility Study

10. Within sixty (60) days after the effective date of this Administrative Consent Order, Givaudan shall submit to the Department for its review and approval, ~~a detailed draft work plan (hereinafter the "RI Work Plan")~~, to conduct a ground water remedial investigation (hereinafter "RI") based on the scope of work set forth in Appendix A, Section I, which is attached hereto and made a part hereof.

11. Within fifteen (15) days after receipt of the Department's written comments on the ~~draft RI Work Plan~~, Givaudan shall modify the draft Work Plan as necessary to conform to the Department's comments and shall submit the modified RI Work Plan to the Department.

ATTACHMENT K-4

12. Within one hundred eighty (180) days after receipt of the Department's written approval of the Work Plan, Givaudan shall conduct and complete the RI and submit a draft ground water investigation report (hereinafter the "Investigation Report") to the Department for its review and approval, provided, however, that the parties agree that Givaudan shall not be required to install any new wells in a known or suspected TCDD contaminated area until the TCDD is removed.

13. Within fifteen (15) days after receipt of the Department's written comments on the draft Investigation Report, Givaudan shall modify the draft Investigation Report as necessary to conform to the Department's comments and shall submit the modified Investigation Report to the Department for its approval, or initiate such additional investigations as may be found necessary by the Department, in accordance with a schedule established by the Department.

14. Within thirty (30) days after the approval by the Department of the Investigation Report, Givaudan shall submit to the Department for its review and approval, a draft work plan to conduct a feasibility study of remedial action alternatives for contamination at and/or emanating from the Site (hereinafter, the "FS Work Plan"), based on the scope of work set forth in Appendix A, Section II, which is attached hereto and made a part of hereof.

15. Within fifteen (15) days after receipt of the Department's written comments on the draft FS Work Plan, Givaudan shall modify the draft FS Work Plan as necessary to conform to the Department's comments and shall submit the modified FS Work Plan to the Department for its approval.

16. Within sixty (60) days after receipt of the Department's written approval of the FS Work Plan, Givaudan shall prepare and submit a draft ground water FS report pursuant to the FS Work Plan, to the Department for review and approval.

17. Within thirty (30) days after receipt of the Department's written comments on the draft FS report, Givaudan shall modify the draft FS report as necessary to conform to the Department's comments and shall submit the modified FS report to the Department for approval.

18. Within sixty (60) days after receipt of the Department's written selection of a ground water remedial action alternative, Givaudan shall submit to the Department for its review and approval, a detailed draft ground water remedial action plan (hereinafter the "Remedial Action Plan"), including a complete cost estimate and an implementation schedule to implement the selected alternative, pursuant to the Work Plan.

19. Within thirty (30) days after receipt of the Department's written comments on the draft Remedial Action Plan, Givaudan shall modify the draft Remedial Action Plan as necessary to conform to the Department's comments and shall submit the modified Remedial Action Plan to the Department for its approval.

ATTACHMENT E-3

20. Upon receipt of the Department's final written approval of the Remedial Action Plan, Givaudan shall implement the Remedial Action Plan in accordance with the approved time schedule.

II

Project Coordination

21. All documents required by the terms of this Administrative Consent Order to be submitted by Givaudan to the Department, and all comments or approvals to be provided by the Department to Givaudan pursuant to the terms of this Administrative Consent Order, as well as all non-routine correspondence, including correspondence relating to force majeure issues, shall be sent by certified mail, return receipt requested, or shall be hand delivered and duly receipted by the recipient.

22. All correspondence, reports, work plans and other writings submitted to the Department by Givaudan with respect to this Administrative Consent Order shall be sent unless otherwise instructed by the Department to:

Karen Jentis, Chief
Bureau of Case Management
Division of Hazardous Waste Management
CN-028
Trenton, New Jersey 08625

23. Written communications from the Department to Givaudan with respect to this Administrative Consent Order shall be sent to:

Dr. H. A. Brandman
Vice-President-Manufacturing
Givaudan Corporation
125 Delawanna Avenue
Clifton, New Jersey 07014

A copy of all such written communications shall be sent to:

William H. Hyatt, Jr., Esq.
Pitney, Hardin, Kipp & Szuch
163 Madison Avenue
CN 1945
Morristown, New Jersey 07960-1945

24. Within seven (7) days after the effective date of this Administrative Consent Order, Givaudan shall provide the Department with the name, title, address and telephone number of its designated Facility Coordinator, who shall be responsible for oversight on behalf of Givaudan of the implementation of this Administrative Consent Order, including all activities required herein. Givaudan shall have the right to change its Facility Coordinator at any time, provided Givaudan shall notify the Department in writing at least five (5) working days prior to any such change. If such advance notice is not feasible, notice shall be given to the Department by the best means and as far in advance as possible under the circumstances.

ATTACHMENT K-41

25. Givaudan shall allow the Department and its authorized representatives access to the Site at all times for the purpose of monitoring compliance with the terms of this Administrative Consent Order.

III

Financial Requirements

A. Insurance

26. Givaudan shall use its best efforts to secure and maintain in force during the pendency of this Administrative Consent Order, a comprehensive general liability insurance policy with coverage as broad as the standard coverage form currently in use in the State of New Jersey which shall not be circumscribed by the endorsements limiting the breadth of coverage. The policy shall include an endorsement (broad form) for contractual liability, an endorsement for completed operations liability, an endorsement of Broad Form Property Damage Coverage and an endorsement for independent contractors coverage. Givaudan shall use its best efforts to have its underwriter(s) add and maintain the State of New Jersey as an additional insured through completion of the Remedial Action Plan to be implemented pursuant to this Administrative Consent Order. The policy shall be specifically endorsed to eliminate any exclusions for explosion, collapse and underground hazards (x,c,u). Limits of liability shall be not less than Six Million Dollars ($6,000,000.00) per occurrence and annual aggregate for bodily injury and for property damage combined.

27. If Givaudan is able to obtain the insurance policy described in paragraph 26 above, as soon thereafter as the insurance policy can be obtained by Givaudan, Givaudan shall provide the Department with a current certificate of insurance certifying coverage. The certificate shall contain a provision that the insurance shall not be cancelled for any reason except after thirty (30) days written notice to the Department.

28. If Givaudan is not able to obtain, or maintain the insurance policy described in paragrah 27 above, Givaudan shall indemnify the State to the same extent that the insurance coverage would have provided the State as an additional insured.

B. Financial Assurance

29. Within thirty (30) days after the effective date of this Administrative Consent Order, Givaudan shall obtain and provide to the Department an irrevocable, conditional letter of credit in the amount of One Million Dollars ($1,000,000) (hereinafter, the "Letter of Credit") to secure performance of all its obligations under this Administrative Consent Order and under the TCDD Consent Order. The Letter of Credit shall be issued by a New Jersey bank or financial insitution or by such other bank or financial institution as shall be approved by the Department. Subject to the provisions of paragraphs 32 and 33 of this Administrative Consent Order, Givaudan shall maintain the Letter of Credit continuously in full force and effect until the requirements of this Administrative Consent Order and the TCDD Consent Order have been completed.

ATTACHMENT K-5

30. The amount of the Letter of Credit has been determined by estimating the cost of implementing the requirements of this Administrative Consent Order and the requirements of the TCDD Consent Order.

31. The Letter of Credit shall be conditioned that in the event the Department determines that Givaudan has failed to perform any of its obligations under this Administrative Consent Order or the TCDD Consent Order, the Department may draw on the Letter of Credit; provided, however, that before any such draw can be made, the Department shall notify Givaudan in writing of the obligation(s) with which Givaudan has failed to comply, and Givaudan shall have a reasonable time, not to exceed thirty (30) days, to perform any such obligation(s).

32. If the combined estimated costs of implementing the Remedial Action Plans described in this Administrative Consent Order and the TCDD Consent Order at any time exceeds the amount of the Letter of Credit, Givaudan shall promptly cause the amount of the Letter of Credit to be increased so that the amount of the Letter of Credit is equal to the combined estimated costs of implementing the Remedial Action Plans described in this Administrative Consent Order and the TCDD Consent Order.

33. If the combined estimated costs of implementing the Remedial Action Plans described in this Administrative Consent Order and the TCDD Consent Order are at any time less than the amount of the Letter of Credit, Givaudan may apply to the Department for permission to reduce the amount of the Letter of Credit so that it is equal to the combined estimated costs of implementing the Remedial Action Plans described in this Administrative Consent Order and the TCDD Consent Order.

34. At any time during the performance of its obligations hereunder, Givaudan may apply to the Department for approval to reduce the amount of the Letter of Credit to reflect the remaining estimated combined costs of performing its obligations under this Administrative Consent Order and the TCDD Consent Order; or to substitute other financial assurance in a form and manner acceptable to the Department.

C. Oversight Cost Reimbursement

35. Subject to the limitations and reservations of rights contained in this paragraph, Givaudan agrees to reimburse the Department for the Department's reasonable oversight costs incurred in connection with this Administrative Consent Order and the Ground Water Consent Order, by submitting to the Department, within 30 days after receipt by Givaudan of an itemized accounting of such costs, a certified check, drawn to the order of the Treasurer, State of New Jersey in the full amount of such costs. Givaudan agrees to reimburse the Department for all such oversight costs up to $100,000.00. The Department reserves its right to seek recovery from Givaudan of such oversight costs in excess of $100,000 and Givaudan reserves its right to contest its obligation to reimburse the Department for any such oversight costs in excess of $100,000.00.

ATTACHMENT K-6

IV

Force Majeure

36. If any event occurs which Givaudan believes will or may cause delay in the achievement of any deadline prescribed by this Administrative Consent Order, Givaudan shall notify the Department in writing within seven (7) days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length of the delay, the precise cause or causes of the delay, any measures taken or to be taken to minimize the delay and the time required to take any such measures to minimize the delay. Givaudan shall adopt all necessary measures to prevent or minimize any such delay. Givaudan's failure to comply with the notice requirements of this paragraph shall render this force majeure provision void as to the particular incident involved.

37. If the Department finds that any delay or anticipated delay has been or will be caused by fire, flood, riot, strike or other circumstances reasonably beyond the control of Givaudan, the Department shall extend the time for performance hereunder for a period no longer than the delay resulting from such circumstances. If, however, the event causing the delay is found by the Department not to be beyond the control of Givaudan, failure to comply with the provisions of this Administrative Consent Order shall not be excused as provided herein and shall constitute a breach of the requirements of this Administrative Consent Order. The burden of proving that any delay is caused by circumstances beyond the control of Givaudan and the length of any such delay attributable to those circumstances shall rest with Givaudan. Increases in the cost or expenses incurred by Givaudan in fulfilling the requirements of this Administrative Consent Order shall not be a basis for an extension of time. A delay by Givaudan in completing an interim requirement of this Administrative Consent Order shall not automatically extend the time for performance by Givaudan of the remaining requirements of this Administrative Consent Order. If the performance by Givaudan of its obligations under the TCDD Consent Order interferes with the performance by Givaudan of its obligations under this Administrative Consent Order, that interference shall be considered to be an event of force majeure and the provisions of this paragraph shall be applicable.

V

Reservation of Rights

38. This Administrative Consent Order shall be fully enforceable in the New Jersey Superior Court upon the filing of a summary action for compliance pursuant to N.J.S.A. 13:1D-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq.

39. This Administrative Consent Order may be enforced in the same manner as an Administrative Order issued by the Department pursuant to these same statutory authorities.

ATTACHMENT K-7

40. Nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of the Department pertaining to any of the laws of the State of New Jersey, should the Department determine that additional remedial actions are necessary to protect the public health or the environment.

41. In consenting to this Administrative Consent Order and/or by complying with its provisions and requirements, whether directly or through an agent or contractor, Givaudan neither admits nor denies the Findings made herein and admits no liability or responsibility to the Department or to any other party, entity or person. This Administrative Consent Order shall not constitute or be used as evidence of any admission of law or fact against Givaudan.

VI

General Provisions

42. The provisions of this Administrative Consent Order shall be binding on Givaudan, its principals, agents, employees, successors, assigns, tenants and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

43. No obligations imposed by this Administrative Consent Order (with the exception of paragraph 35) are intended to constitute a debt, claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. A obligations imposed by this Administrative Consent Order shall constitute continuing regulatory obligations imposed pursuant to the police powers of the State of New Jersey, intended to protect the public health and the environment.

44. Compliance with the terms of this Administrative Consent Order shall not excuse Givaudan from compliance with all applicable federal and state permits, statutes and regulations while carrying out the obligations imposed by this Administrative Consent Order.

45. Givaudan shall make available to the Department all data and information, including raw sampling and monitoring data, generated pursuant to this Administrative Consent Order.

46. Givaudan shall not construe any informal advice, guidance, suggestions, or comments by the Department, or by persons acting on behalf of the Department, as relieving Givaudan of its obligation to obtain written approvals as may be required herein, unless such advice, guidance, suggestions, or comments by the Department shall be submitted in writing to Givaudan pursuant to paragraph 21.

47. No modification or waiver of this Administrative Consent Order shall be valid except by written amendment to this Administrative Consent Order duly executed by Givaudan and the Department.

48. When this Administrative Consent Order becomes effective, Givaudan waives its right to a hearing on the matters contained herein, pursuant to N.J.S.A. 52:14B-1 et seq. and N.J.S.A. 58:10A-1 et seq.

ATTACHMENT K-8

49. The requirements of this Administrative Consent Order shall be deemed satisfied upon the receipt by Givaudan of written notice from the Department that Givaudan has demonstrated, to the satisfaction of the Department, that all the terms of this Administrative Consent Order have been completed.

50. This Administrative Consent Order shall take effect upon the signature of both parties.

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

3/5/87
DATE

Richard T. Dowling
Commissioner

Witness:

Michael L Catania

GIVAUDAN CORPORATION

3/5/87 GFS
DATE

By _____

Witness:

NAME H A Brandman

TITLE V.P. - Operations

NAME _____

TITLE SR. VICE PRESIDENT

Approved as to Form
RJ Jennings Date 2/25/87

ATTACHMENT K-9

APPENDIX A

SCOPE OF WORK

REMEDIAL INVESTIGATION

AND

FEASIBILITY STUDY

ATTACHMENT K-10

I. REMEDIAL INVESTIGATION

A. Objectives

1. determine the nature and horizontal and vertical extent of soil, surface water and ground water contamination at and/or emanating from the Site.

2. determine migration paths of contaminants through soil, ground water, surface water, sediment and local potable wells to determine type, extent and physical states of contamination

3. determine impact of the contamination on human health and the environment

4. collect, present and discuss all data necessary to adequately support the development of the feasibility study and the selection of a remedial action alternative that will adequately mitigate the adverse impacts of the contamination on human health and the environment

B. Contents of Remdial Investigation Work Plan

1. a detailed schedule for all remedial investigation activities set fort in this Administrative Consent Order and in this Scope of Work, and a detailed description of how Givaudan will accomplish these tasks.

2. a Site history, including disposal practices and location of all known contaminant sources

3. a health and safety plan, for on-site personnel to minimize their personal injury, illness and potential environmental impairment associated with the site investigation, including:

- listing of personnel protective equipment (including respiratory protection) and guidelines for their use, including manufacturer, model, duration of safety period, and any required certification documentation

- listing of safety equipment (including manufacturer, expiration date and model) to be used, such as: fire extinguishers, portable eye wash stations, air monitoring equipment, gamma survey instrument, etc. (equipment shall meet OSHA standards or other acceptable industrial standards)

- contingency plans for emergency procedures, spill prevention/response, and evacuation plans

- on-site monitoring for personnel safety (OVA, HNU)

- criteria for selecting proper level of protection

ATTACHMENT K-11

4. a field sampling plan

   a. specify number and type of samples required to accurately determine the nature and horizontal and vertical extant of soil, surface water and ground water contamination at on and/or emanating from the Site

   b. locate sampling points on a map of the Site

   c. explain the type of data which will be collected and intentions for use of data

   d. specify location (on site map) and depths of proposed soil borings, piezometers, monitoring wells and other sampling points

   e. specify soil, sediment, surface water and ground water analyses including test parameters

   f. document all field sampling collection and analyses with appropriate chain-of-custody procedures

5. a quality assurance/quality control plan

   a. in order to ascertain the reliability of monitoring data for both laboratory and field investigations

   b. include all appropriate information in "Interim Guidelines and Specifications for Preparing Quality Assurance Project Management Plan" (USEPA), "Quality Assurance Project Management Plan" (NJDEP) and Appendix C which is attached hereto and incorporated herein

6. a equipment decontamination plan

   a. drilling equipment, paying particular attention to down hole tools, back of drilling rig and drilling rods

   b. sampling equipment

   c. personnel

C. Site Investigation

1. Soil

   a. obtain drilling permits pursuant to N.J.S.A. 58:4A

   b. install soil borings under direct supervision of a New Jersey licensed well driller and a qualified geologist

ATTACHMENT K-12

c. decontaminate soil boring and sampling equipment between individual samples and borings according to approved decontamination plan

d. classify soil according to a standard approved system, e.g., Burmeister, Unified

e. analyze particle size in laboratory on representative samples to confirm field identification

f. analyze soil samples to determine presence of contaminants in soil according to approved sampling plan

2. Ground Water

a. have a qualified hydrogeologist with substantial experience in ground water pollution investigations oversee all site activities

b. obtain well permits pursuant to N.J.S.A. 58:4A-14 and N.J.A.C. 7:8-3.11

c. drill all wells under the direct supervision of a New Jersey licensed well driller and a qualified hydrogeologist (see Note 1 below)

d. install wells in accordance with monitor well specifications in Appendix B

e. measure static water level monthly

NOTE 1: Improperly constructed monitor wells can compound a contamination problem. Therefore, particular attention shall be given to the details of these specifications. The Department has the authority to shut down a drilling operation which is not adhering to the approved procedures. Data derived from improperly constructed wells shall not be accepted by the Department.

f. collect split spoon samples, during drilling through overburden, according to ASTM Standard Penetration Methods, ASTM D1 586-67, either continuously or at five-foot intervals, at changes in soil strata, and at all zones which show obvious signs of contamination

g. retain all soil samples for future reference and/or analysis

h. survey all well casings to the nearest hundreth (0.01) foot above mean sea level

i. decontaminate drilling equipment between wells according to the approved decontamination plan

ATTACHMENT K-D

3. Surface water and sediment

a. collect the following types of samples:

i. leachate into any surface waters on or adjacent to the Site

ii. instream water and sediment

iii. upstream and downstream of the Site

b. conduct surface water and sediment sampling to determine:

i. levels of pollution in the surface water and sediment

ii. the degree of pollutant migration by surface runoff, leachate and ground water seepage.

iii. rate of pollution due to ground water discharge

iv. the ground water/surface water interaction at the Site.

D. Remedial Investigation Report

1. all data collected pursuant to the approved sampling plan (see Note 2 below)

a. results of all analyses

b. details of soil borings

c. stratigraphic logs and as-built construction diagrams for each soil boring and monitor well

d. well casing elevations

e. monthly static water level elevations measured to the nearest hundreth (0.01) foot in each monitor well

2. Maps

a. site map

- property boundaries
- structures and improvements
- surface water bodies
- adjacent land use
- topography indicating two foot contours

ATTACHMENT E-1

b. sample locations

- monitor well locations and elevations
- sample collection locations
- soil boring locations

c. ground water contours

d. contaminant plume(s)

3. discussion of data

a. direction and rate of ground water flow in the aquifer(s), both horizontally and vertically

b. levels of surface water and ground water contamination as compared to surface water and ground water quality standards, where pertinent, or background levels (for the purpose of this discussion, "background levels" are defined as representative results of ground water analyses up gradient of the site or beyond a hydrologic boundary)

c. nature and extent of ground water contamination in the aquifer(s), both horizontally and vertically

d. contaminant behavior, stability, biological and chemical degradation, mobility

e. projected rate of contamination movement

f. identification of contamination sources

4. recommendations for additional investigations

5. assessment of impact of contamination on human health and the environment

NOTE 2: The Department may require additional investigation activities based on its review of remedial investigation report

II. FEASIBILITY STUDY

A. Objectives

1. identify and evaluate all potentially viable remedial action alternatives for the contamination at and/or emanating from the Site

2. recommend the remedial action alternative best suited to:

ATTACHMENT K-15

a. achieve and maintain applicable surface water and ground water quality standards; and

b. return the site to background conditions

B. Identification of Remedial Alternatives

1. develop alternatives to incorporate remedial technologies, response objectives and criteria, and other appropriate considerations into a comprehensive, site-specific approach

2. consider all appropriate remedial alternatives

3. screen all potentially viable remedial action alternatives to narrow the list of potential alternatives for further detailed analysis, according to the following:

   a. environmental and public health impacts

   b. engineering feasibility and reliability

   c. cost, including operation and maintenance costs

4. evaluate the limited number of alternatives that remain after the initial screening according to the following:

   a. describe appropriate treatment and disposal technologies, as well as any permanent facilities required

   b. specify engineering considerations required to implement the alternative (e.g., treatability study, pilot treatment facility, additional studies needed to proceed with final remedial design)

   c. describe environmental and public health impacts and propose methods for mitigating any adverse effects

   d. operation and maintenance/monitoring requirements of the completed remedy

   e. off-site disposal needs and transportation plans

   f. temporary storage requirements

   g. requirements for health and safety plans during remedial implementation (including both on-site and off-site health and safety considerations)

   h. describe how the alternative could be phased into individual operable units including how various components of the remedy could be implemented individually, or in groups resulting in a functional phase of the overall remedy

ATTACHMENT K-16

i. describe how the alternative could be segmented into areas to allow implementation of differing phases of the alternative

j. a review, provided by the Department of any off-site storage, treatment or disposal facility to ensure compliance with applicable hazardous waste regulatory requirements

k. describe which federal, state and local permits would be necessary for each alternative identified and the information necessary for the development of each of the permits

l. time required for implementation, including interim dates of significance

C. Evaluation of Alternatives

1. evaluate and present the alternative remedies identified in Part B above and recommend the most environmentally sound alternative(s)

a. develop a health and environmental assessment

i. evaluate each alternative considering environmental fate, exposure and associated health and environmental effects

ii. analyze mitigating adverse effects, and physical or legal constraints

b. develop a cost evaluation for each remedial action alternative, and for each phase or segment of the alternative

i. present the cost as a present-worth cost

ii. include total cost of implementing the alternative including the annual operation and maintenance costs of the alternative for the full duration of the alternative

c. evaluate each alternative in accordance with the criteria established in Part A above

i. apply the evaluation criteria uniformly to each alternative

ii. identify a number of remedial alternatives that are comparable

iii. identify the most appropriate alternative, given the specific constraints of the project

iv. prepare a trade-off matrix that enables identification of now comparable techniques including

ATTACHMENT K-17

- level of cleanup achievable
- time to achieve cleanup
- feasibility
- implementability
- reliability
- ability to minimize adverse impacts during action
- ability to minimize off-site impacts caused by action
- remoteness of activities
- useability of ground water
- useability of surface water
- useability of site

d. recommend the alternative that is the most environmentally sound resulting from Sections II. C.1.b. and C.1.c.

i. prepare rationale for recommending the selected alternative stating the advantages over other alternatives considered

ii. a conceptual design of the recommended alternative should be included, providing, as a minimum, the following information:

- the selected engineering approach with implementation schedule
- any special implementation requirements
- applicable design criteria
- preliminary site layouts
- budget cost estimates including
- operation and maintenance requirements
- safety plan, including costs

ATTACHMENT K-18

3-8

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ROBERT E. HUGHEY, COMMISSIONER
CN 402
TRENTON, N.J. 08625
609 - 292 - 2885

ADMINISTRATIVE ORDER NO. EO 40B-1

WHEREAS, Governor Thomas H. Kean has issued Executive Order No. 40B declaring that a state of emergency exists arising from the potential dioxin contamination of the premises at 125 Delawanna Avenue, in the City of Clifton, New Jersey; and

WHEREAS, by said Executive Order the Governor has authorized and directed me to take such emergency measures as I may determine to be necessary in order to fully and adequately protect the health, safety and welfare of the citizens of this State from any actual or potential threat or danger which may exist as a result thereof; and

WHEREAS, preliminary test results have indicated detectable levels of dioxin present at portions of the site of the Givaudan Corporation at 125 Delawanna Avenue, in the City of Clifton, New Jersey and:

WHEREAS, it is necessary to take additional measures to protect the public health, safety and welfare while further information is obtained;

NOW, THEREFORE, pursuant to the powers vested in me by Executive Order No. , I hereby Order and Direct that the Givaudan Corporation immediately implement the following measures, at its expense; under the supervision and direction of this Department and the U. S. Environmental Protection Agency:

(1) All areas where preliminary test results have indicated the presence of dioxin at or in excess of one (1) part per billion shall be closed and secured, with physical access thereto restricted. All such areas should be covered by a permeable ground cover installed by a contractor approved by representatives of the Department and the U. S. Environmental Protection Agency in such manner and location as may be directed by those representatives.

(2) All hexachlorophene production shall be suspended until further notice by the Department. Those areas of the facility which are associated with the hexachlorophene production process, as determined by the Department, shall be closed and secured with physical access thereto restricted. No hexachlorophene shall be moved into or from these areas or any other area of the 125 Delawanna site.

(3) Commencing June 18, 1983, on-site sampling of interior and exterior areas of the 125 Delawanna Avenue facility shall be conducted by a contractor approved by representatives of the Department and the U. S. Environmental Protection Agency, in such manner and location as may be directed by those representatives.

(4) No hazardous or chemical waste shall be removed from the 125 Delawanna Avenue site until further notice by the Department. No materials or substances containing Trichlorophenol shall be moved onto, about or from the 125 Delawanna Avenue site until further notice by the Department.

(5) No demolition, excavation, movement or disturbance of soil, or placing, movement or removal of construction materials or equipment shall occur and 125 Delawanna Avenue site until further notice by the Department.

(6) All medical and personnel records, reports and other information shall be provided as requested by the Commissioner of the N. J. Department of Health.

(7) Appropriate health screening and evaluation programs, including but not limited to employee medical examinations, shall be implemented as directed by the Commissioner of the N. J. Department of Health.

(8) Any other precautionary or remedial action ~~shall be~~ implemented as may be directed by this Department, the N. J. Department of Health, or the U. S. Environmental Protection Agency.

This Order shall take effect immediately.

WITNESS: Michael A. Catania

ROBERT E. HUGHEY
Commissioner

6/17/83
DATED

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

GENERAL NOTICE LETTER
URGENT LEGAL MATTER
PROMPT REPLY NECESSARY
CERTIFIED MAIL-RETURN RECEIPT REQUESTED

J. Colin O'Neill, President
Fragrances North America
1775 Windsor Road
Teaneck, NJ 07666

RE: Diamond Alkali Superfund Site
Notice of Potential Liability for
Response Actions in the Lower Passaic River Study Area, New Jersey

Dear Mr. O'Neill:

The United States Environmental Protection Agency ("EPA") is charged with responding to the release and/or threatened release of hazardous substances, pollutants, and contaminants into the environment and with enforcement responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §9601 et seq. Accordingly, EPA is seeking your cooperation in an innovative approach to environmental remediation and restoration activities for the Lower Passaic River.

EPA has documented the release or threatened release of hazardous substances, pollutants and contaminants into the six-mile stretch of the river, known as the Passaic River Study Area, which is part of the Diamond Alkali Superfund Site ("Site") located in Newark, New Jersey. Based on the results of previous CERCLA remedial investigation activities and other environmental studies, including a reconnaissance study of the Passaic River conducted by the United States Army Corps of Engineers ("USACE"), EPA has further determined that contaminated sediments and other potential sources of hazardous substances exist along the entire 17-mile tidal reach of the Lower Passaic River. Thus, EPA has decided to expand the area of study to include the entire Lower Passaic River and its tributaries from Dundee Dam to Newark Bay ("Lower Passaic River Study Area").

By this letter, EPA is notifying Givaudan Fragrances Corporation ("Givaudan") of its potential liability relating to the Site pursuant to Section 107(a) of CERCLA, 42 U.S.C. §9607(a). Under CERCLA, potentially responsible parties ("PRPs") include current and past owners of a facility, as well as persons who arranged for the disposal or treatment of hazardous substances at the Site,

or the transport of hazardous substances to the Site.

In recognition of our complementary roles, EPA has formed a partnership with USACE and the New Jersey Department of Transportation-Office of Maritime Resources ("OMR") ["the governmental partnership"] to identify and to address water quality improvement, remediation, and restoration opportunities in the 17-mile Lower Passaic River. This governmental partnership is consistent with a national Memorandum of Understanding ("MOU") executed on July 2, 2002 between EPA and USACE. This MOU calls for the two agencies to cooperate, where appropriate, on environmental remediation and restoration of degraded urban rivers and related resources. In agreeing to implement the MOU, the EPA and USACE will use their existing statutory and regulatory authorities in a coordinated manner. These authorities for EPA include CERCLA, the Clean Water Act, and the Resource Conservation and Recovery Act. The USACE's authority stems from the Water Resources Development Act ("WRDA"). WRDA allows for the use of some federal funds to pay for a portion of the USACE's approved projects related to ecosystem restoration.

For the first phase of the Lower Passaic River Restoration Project, the governmental partners are proceeding with an integrated five- to seven-year study to determine an appropriate remediation and restoration plan for the river. The study will involve investigation of environmental impacts and pollution sources, as well as evaluation of alternative actions, leading to recommendations of environmental remediation and restoration activities. This study is being conducted by EPA under the authority of CERCLA and by USACE and OMR, as local sponsor, under WRDA. EPA, USACE, and OMR are attempting to coordinate with the New Jersey Department of Environmental Protection and the Federal and State Natural Resource Trustee agencies. EPA, USACE, and OMR estimate that the study will cost approximately $20 million, with the WRDA and CERCLA shares being about $10 million each. EPA is seeking its share of the costs of the study from PRPs.

Based on information that EPA evaluated during the course of its investigation of the Site, EPA believes that hazardous substances were being released from Givaudan's facility located at 125 Delawanna Avenue in Clifton, New Jersey, into the Lower Passaic River Study Area. Hazardous substances, pollutants and contaminants released from the facility into the river present a risk to the environment and the humans who may ingest contaminated fish and shellfish. Therefore, Givaudan may be potentially liable for response costs which the government may incur relating to the study of the Lower Passaic River. In addition, responsible parties may be required to pay damages for injury to, destruction of, or loss of natural resources, including the cost of assessing such damages.

EPA is aware that the financial ability of some PRPs to contribute toward the payment of response costs at the Site may be substantially limited. If you believe, and can document, that you fall within that category, please inform Ms. Reddy and Mr. Hyatt at the addresses located towards the end of this letter. You will be asked to submit financial records including business and, possibly, personal federal income tax returns as well as audited financial statements to substantiate such a claim.

Please note that, because EPA has a potential claim against you, you must include EPA as a creditor if you file for bankruptcy. You are also requested to preserve and retain any documents now in your Company's or its agents' possession or control, that relate in any manner to your facility or the Site or to the liability of any person under CERCLA for response actions or response costs at or in connection with the facility or the Site, regardless of any corporate document retention policy to the contrary.

Enclosed is a list of the other PRPs who have received Notice letters. This list represents EPA's findings on the identities of PRPs to date. We are continuing efforts to locate additional PRPs who have released hazardous substances, directly or indirectly, into the Lower Passaic River Study Area. Exclusion from the list does not constitute a final determination by EPA concerning the liability of any party for the release or threat of release of hazardous substances at the Site. Be advised that notice of your potential liability at the Site may be forwarded to all parties on this list.

We request that you become a "cooperating party" for the Lower Passaic River Restoration Project. As a cooperating party, you, along with many other such parties, will be expected to fund EPA's share of the study costs. Upon completion of the study, it is expected that CERCLA and WRDA processes will be used to identify the required remediation and restoration programs, as well as the assignment of remediation and restoration costs. At this time, the commitments of the cooperating parties will apply only to the study. For those who choose not to cooperate, EPA may apply the CERCLA enforcement process, pursuant to Sections 106(a) and 107(a) of CERCLA, 42 U.S.C. §9606(a) and §9607(a) and other laws.

You may become a cooperating party by participating in the Cooperating Parties Group ("Group") that has already formed to provide EPA's funding for the Lower Passaic River Restoration Project. This cooperative response is embodied in an Administrative Order on Consent ("AOC"), copy enclosed. Notice of the AOC was published in the Federal Register on May 19, 2004, and the effective date of the AOC was June 22, 2004. We strongly encourage you to contact the Group to discuss your participation. You may do so by contacting:

William H. Hyatt, Esq.
Common Counsel for the Lower Passaic River Study Area Cooperating Parties Group
Kirkpatrick & Lockhart LLP
One Newark Center, 10th Floor
Newark, New Jersey 07102
(973) 848-4045
whyatt@kl.com

Written notification should be provided to EPA and Mr. Hyatt documenting your intention to join the Group and settle with EPA no later than 30 calendar days from your receipt of this letter. It is EPA's intent to amend the AOC at a later date to reflect the settlement negotiations. EPA's written notification should be mailed to:

Kedari Reddy, Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency
290 Broadway - 17th Floor
New York, New York 10007-1866

Pursuant to CERCLA Section 113(k), EPA must establish an administrative record that contains documents that form the basis of EPA's decision on the selection of a response action for a site. The administrative record files, which contain the documents related to the response action selected for this Site are located at EPA's Region 2 office (290 Broadway, New York, NY) on the 18th floor. You may call the Records Center at (212) 637-4308 to make an appointment to view the administrative record for the Diamond Alkali Site, Passaic River.

As you may be aware, on January 11, 2002, President Bush signed into law the Superfund Small Business Liability Relief and Brownfields Revitalization Act. This Act contains several exemptions and defenses to CERCLA liability, which we suggest that all parties evaluate. You may obtain a copy of the law via the Internet at http://www.epa.gov/swerosps/bf/sblrbra.htm and review EPA guidances regarding these exemptions at http://www.epa.gov/compliance/resources/policies/cleanup/superfund.

If you wish to discuss this further please contact Ms. Elizabeth Butler, Remedial Project Manager, at (212) 637-4396 or Ms. Kedari Reddy, Assistant Regional Counsel, at (212) 637-3106. Please note that all communications from attorneys should be directed to Ms. Reddy.

Sincerely yours,

John S. Frisco

for George Pavlou, Director
Emergency and Remedial Response Division

Enclosures

cc: Gail Allyn, Esq.
Pitney Hardin, LLP

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
RICHARD T. DEWLING, Ph.D., P.E.
COMMISSIONER
CN 402
TRENTON, N.J. 08625
609-292-2885

IN THE MATTER OF	:	ADMINISTRATIVE
GIVAUDAN CORPORATION	:	CONSENT ORDER
	:	TCDD

The following FINDINGS are made and ORDER is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter the "Department") by Executive Order No. 40B (1983), signed by Governor Thomas H. Kean on June 17, 1983, N.J.S.A. App. A:9-45, N.J.S.A. 13:1D-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq.

FINDINGS

1. Givaudan Corporation (hereinafter "Givaudan") owns and operates an office, manufacturing, packaging, storage, shipment and research complex on 31.43 acres on Delawanna Avenue, Clifton, New Jersey (hereinafter "the Givaudan Plant") which currently has approximately 685 employees and has been assessed by Clifton for 1984 real estate tax purposes at $9,597,700. The Givaudan Plant includes a chemical manufacturing facility located to the south of Delawanna Avenue, at 125 Delawanna Avenue (Block 73-3, Lot 2) (hereinafter "the Site").

2. Givaudan manufactures a variety of aromatic chemicals at the Site and, until on or about April, 1984, manufactured hexachlorophene, an antibacterial agent used in hospitals, at the Site using, as a raw material, 2,4,5-Trichlorophenol (hereinafter "TCP") which was pre-purified. During 1947 and 1948, Givaudan also manufactured TCP at the Site.

3. On June 3, 1983, Givaudan agreed, at the request of the Department, to conduct a sampling program designed to ascertain the presence or absence of 2,3,7,8-Tetrachlorodibenzo- p-dioxin (hereinafter "TCDD") in or on the soils, waters, equipment and/or structures at the Site.

4. Between June 12 and 17, 1983 Givaudan conducted the sampling program described in paragraph 3, under the supervision of the Department.

5. On June 17, 1983, when the results of analyses of the 22 samples taken during the sampling program described in paragraph 3 became known to Givaudan, Givaudan reported to the Department that the analyses of 15 out of 22 samples taken indicated the presence of TCDD in detectable concentrations. Of

BBA000120-B

those 15 samples, 6 showed concentrations of less than 1 ppb, 8 showed concentrations of between 1 ppb and 7 ppb, and one showed a TCDD concentration in excess of 7 ppb. All samples whose analysis indicated the presence of TCDD in concentrations over 1.0 ppb were taken in the area of the Site where hexachlorophene had been manufactured (hereinafter, the "Contaminated Process Area").

6. On June 17, 1983, the Governor issued Executive Order No. 40B, extending the coverage of Executive Order No. 40 to the Site, and the Department issued Administrative Order No. EO 40B-1 (hereinafter, "the Administrative Order"), which directed, among other things, (a) that the area where TCDD contamination in concentrations equal to or in excess of 1.0 ppb had been found to be secured and covered with a tarpaulin, (b) that hexachlorophene manufacturing temporarily cease, (c) that there be no movement of waste materials or hexachlorophene from the Site without the permission of the Department, (d) that additional samples be taken on and off the Site to determine the presence or absence of TCDD contamination, (e) that demolition and construction operations on the Site temporarily cease and (f) that Givaudan supply the Commissioner of Health with certain information so that an appropriate health screening of Givaudan's employees could be conducted.

7. On June 18, 1983, a Field Investigation Team of the United States Environmental Protection Agency (hereinafter "EPA") conducted a sampling program in the area surrounding the Site. No TCDD was detected in any of the samples taken during this sampling program.

8. On June 18 and 25, 1983, Givaudan, under the supervision of the Department, conducted TCDD sampling at the Site. Of the 41 samples taken, 25 showed TCDD contamination in detectable concentrations. Of those 25 samples, 13 showed TCDD concentrations of less than 1 ppb, 11 showed TCDD concentrations of between 1 ppb and 7 ppb, and only 1 sample had TCDD present in excess of 7 ppb.

9. On July 9, 1983, Givaudan, under the supervision of the Department, conducted a TCDD sampling program including sweep and wipe sampling of the interiors of buildings on portions of the Site where hexachlorophene or TCP were being or had been manufactured. Of the 31 samples analyzed, TCDD was present in detectable concentrations in 20 samples. Of those 20 samples, 9 chip samples showed TCDD concentrations of less than 1 ppb, 4 showed TCDD concentrations of between 1 ppb and 7 ppb, one chip sample had TCDD present in excess of 7 ppb (in Building 54 where TCP is believed to have been manufactured over 35 years ago), and 6 wipe samples showed TCDD concentrations of between 1 and 7 nanograms per square foot.

10. Between July 1 and September 30, 1983, the Department of Health conducted health screenings of Givaudan's employees and found no indications of adverse health effects from any exposure those employees might have had to TCDD contamination.

11. On July 26, 1983, Givaudan provided the Department with detailed information regarding (a) the history of chemical production processes at the Site, including the production of TCP and hexachlorophene, (b) the history of operations at the Site, including by predecessor owners or operators, (c) a summary of the solid and hazardous waste and waste water disposal practices and

facilities of Givaudan, (d) the identification of all suppliers of TCP ever used or stored at the Site, (e) a summary of analytical tests performed to determine the presence or absence of TCDD contamination in TCP produced at the facility or purchased from other sources, (f) a summary of analytical testing for TCDD contamination in hexachlorophene produced by Givaudan, and (g) a summary of demolition activities which had occurred at the Site, including a description of activities formerly conducted in demolished buildings and related information.

12. On August 5, 1983, the Department requested Givaudan to submit an occupational hygiene plan to the Department of Health to prevent or minimize TCDD emissions from the hexachlorophene process buildings and on August 15, 1983, Givaudan submitted such a plan to the Department of Health.

13. On August 11, 1983, Givaudan, under the supervision of the Department, resampled Buildings 58, 59 and 60 for TCDD contamination. All samples analyzed had less than 1 ppb of TCDD.

14. On August 18, 1983, Givaudan was authorized by the Department to resume hexachlorophene production under certain conditions and Givaudan resumed hexachlorophene production in accordance with those conditions.

15. On September 8, 1983, EPA conducted additional off-site perimeter sampling for TCDD contamination. No TCDD contamination was detected.

16. On September 12, 1983, Givaudan, with the approval of the Department, conducted (a) a biased, systematic sampling program in the area of the Site around the storm water lagoon, and (b) a random sampling program around the remainder of the Site. The purpose of the random sampling program was to divide the areas of the Site other than the Contaminated Process Area into non-process areas which were to be considered contaminated by TCDD (hereinafter the "Contaminated Non-Process Area") and process and non-process areas which were to be considered not contaminated by TCDD (hereinafter the "Non-Contaminated Area").

17. On September 19, October 17 and December 1, 1983, Givaudan, under the supervision of the Department, conducted a resampling program for TCDD contamination in Buildings 58, 59 and 60. All samples analyzed had less than 1 ppb of TCDD.

18. On March 16, 1984, Givaudan submitted to the Department a proposed "TCDD Remedial Action Plan", prepared by Environmental Resources Management, Inc. (hereinafter "ERM") detailing measures Givaudan proposed to take to prevent human and environmental exposure to on-Site soils contaminated with TCDD in the Contaminated Process Area and the Contaminated Non-Process Area.

19. On April 16, 1984, Givaudan and the Department met to discuss Givaudans's "TCDD Remedial Action Plan" and Givaudan requested relief from the Administrative Order so that construction could begin on a modern, environmentally sound chemical process sewer system at the Site. On May 1, 1984, the Department submitted written comments to Givaudan on its proposed "TCDD Remedial Action Plan".

20. On May 1, 1984, the Department approved Givaudan's recommendation of a phased approach to conducting an investigation of the Site for TCDD contamination in which Phase I would address the Contaminated Process Area and Phase II would address the Contaminated Non-Process Area.

21. On May 31, 1984, Givaudan submitted to the Department a revised "Site Investigation Plan" in response to the Department's comments on Givaudan's "TCDD Remedial Action Plan". Included in Givaudan's "Site Investigation Plan" was a detailed plan for the taking of samples to determine the presence or absence of TCDD along the route of the planned chemical process sewer, located entirely outside the Contaminated Process and Contaminated Non-Process Areas.

22. On or about June 29, 1984, the Department approved those portions of the "Site Investigation Plan" which contained a plan for sampling to determine the presence or absence of TCDD (a) along the route of the planned chemical process sewer, all of which was outside the Contaminated Process and Contaminated Non-Process Areas, and (b) in the Contaminated Process and Contaminated Non-Process Areas.

23. Between July 17 and 30, 1984, the sampling program described in the preceding paragraph was executed under the supervision of the Department. At the request of the Department, split samples were taken and analyzed, at Givaudan's expense, at a separate, Department-approved laboratory to assure the accuracy of the sampling results. No TCDD contamination was detected in the samples taken along the route of the planned chemical process sewer. Of the 41 samples taken in the Contaminated Process Area, all but 1 sample had less than 1 ppb of TCDD contamination. The remaining sample had less than 6 ppb of TCDD contamination. Of the 83 samples taken in the Contaminated Non-Process Area, all but 10 had less than 7 ppb of TCDD contamination. At the request of the Department, Givaudan took 3 additional samples at the site of a filled-in former trench which was visible in an aerial photograph taken in 1950. No TCDD contamination was detected.

24. On August 17, 1984, the Department granted Givaudan permission, subject to certain conditions, to construct the new planned chemical process sewer.

25. On September 24, 1984, Givaudan requested that the Department grant relief from the Administrative Order so that Givaudan could initiate certain specific construction activities outside the Contaminated Process and Contaminated Non-Process Areas, including (a) removal of a number of storage tanks, (b) construction of a 14-foot diameter concrete pad, and (c) construction of a gravel roadway. On December 5, 1984, the Department granted permission to Givaudan to proceed with removal of the storage tanks and construction of the 14-foot diameter concrete pad, but required Givaudan to conduct additional sampling along the route of the proposed roadway before commencing construction.

26. On December 13, 1984, Givaudan requested relief from the Department from the Administrative Order so that certain curbing could be removed and the entrance to the Site from Delawanna Avenue could be enlarged and a security fence constructed at the entrance. On January 16, 1985, the Department granted Givaudan permission to proceed with the construction at the entrance to the Site.

27. On February 8, 1985, Givaudan requested relief from the Department from the Administrative Order so that additional construction projects outside the Contaminated Process and Contaminated Non-Process Areas could be commenced, including (a) demolition of two buildings located at the north end of the Site, and (b) construction of footings for a series of overhead pipe supports designed to service the renovated Site.

28. On May 17, 1985, the Department granted Givaudan permission for the construction of footings for a series of overhead pipe supports designed to service the renovated Site and approved Givaudan's proposed sampling plan to determine the presence or absence of TCDD contamination in buildings throughout the Non-Contaminated Area. The Department agreed that the Site is released from the restrictions of the Administrative Order with the exceptions of (a) the Contaminated Process Area and the Contaminated Non-Process Area, and (b) buildings located in the Non-Contaminated Area, which will be released from the restrictions of the Administrative Order upon successful completion of the sampling program and the finding that there has been no migration of TCDD contamination outside the Contaminated Process and Non-Process Areas.

29. On June 15, 1985, Givaudan, with the approval and under the supervision of the Department, conducted a chip sampling program at and around Building Nos. 44, 46/47, 51, 68, 68A and the Power Station Wall at the Site to determine whether there had been any migration of TCDD outside the defined boundaries of the Contaminated Process and Non-Process Areas.

30. During the course of the TCDD sampling program conducted by Givaudan and EPA through July 30, 1985, a total of 402 samples were analyzed for TCDD contamination. All samples analyzed as having TCDD contamination in concentrations of 1 ppb or more were located in the Contaminated Process or Contaminated Non-Process Areas. 26 samples were taken and analyzed by EPA in the area surrounding the Site, all of which were analyzed as containing no TCDD contamination in concentrations of 1 ppb or more. 329 samples were taken and analyzed by Givaudan outside the buildings located on the Site, 255 of which were analyzed as containing no TCDD contamination in concentrations of 1 ppb or more, 51 of which were analyzed as having TCDD contamination in concentrations between 1 ppb and 7 ppb, and 23 of which were analyzed as having TCDD contamination in excess of 7 ppb. 47 samples were taken and analyzed at various locations inside the buildings located on the Site, 6 of which were analyzed as having TCDD contamination in concentrations of 1 nanogram per square foot or more (none of which were analyzed as having TCDD contamination in concentrations in excess of 7 nanograms per square foot) and 41 of which were analyzed as having no TCDD contamination in concentrations of 1 nanogram per square foot or less.

31. Pursuant to New Jersey Pollutant Discharge Elimination System Permit No. NJ-0099414, effective October 1, 1982, Givaudan has discharged industrial waste water into the facilities of the Passaic Valley Sewerage Authority and has analyzed that waste water discharge for TCDD contamination on a monthly basis at a detection level at or below 1 ppb. No TCDD contamination has been detected in any of the industrial waste water discharge from the Site.

32. As a result of the investigation conducted by Givaudan under the supervision of the Department, in conjunction with EPA and the Department of Health, to determine the location and extent of TCDD contamination and the effect, if any, upon employees of Givaudan and other persons of possible exposure to that contamination, (a) the location and extent of TCDD contamination in the Contaminated Process Area has been delineated, (b) the delineation of TCDD contamination in the Contaminated Non-Process Area remains to be completed, (c) the Non-Contaminated Areas have been determined to have less than 1 ppb of TCDD contamination, (d) at this time there is no evidence that TCDD contamination has migrated off the Site, and (e) at this time there is no evidence that Givaudan employees or other persons have suffered adverse health effects from exposure to the TCDD contamination found on the Site.

33. Based on current available literature, scientists from the Center for Environmental Health of the Centers for Disease Control of the United States Public Health Service (hereinafter, "CDC") and from the United States Department of Agriculture have concluded that: (a) 1 ppb of TCDD in residential soil is a reasonable level at which to begin consideration of action to limit human exposure to contaminated soil; (b) environmental situations may vary widely, and whether a particular level of TCDD contamination in soil should give rise to concern has to be evaluated on a case-by-case basis.

34. Since the level of human exposure can be expected to be lower in non-residential areas and since other measures may be employed to restrict access and human exposure thereby controlled, the CDC and the Department have determined: (a) that soil in industrial areas contaminated with concentrations of 7 ppb or greater of TCDD should be removed and properly disposed unless removal of contaminated soil is not feasible; and (b) that when soil contaminated with concentrations of less than 7 ppb, but greater than 1 ppb, are to remain at the site, the area shall be capped, a regular monitoring program implemented, and permanent land use controls imposed.

35. Concurrently with the issuance of this Administrative Consent Order, the Department has also issued, with the consent of Givaudan, another administrative consent order, entitled "In the Matter of Givaudan Corporation - Administrative Consent Order Ground Water" (hereinafter, the "Ground Water Consent Order"), covering the investigation, delineation and remediation of ground water contamination, if any, at and/or originating from the Site.

ORDER

NOW, THEREFORE, IT IS HEREBY ORDERED AND AGREED THAT:

I.

Physical Condition of the Site

36. Givaudan shall continue to maintain all areas of the Site where analytical results have indicated the presence of TCDD contamination in concentrations of 1 ppb or more in a closed and secured condition, with physical access thereto restricted. All such areas shall be covered by a permeable ground cover

installed by a contractor approved by representatives of the Department and EPA in such manner and location as may be directed by those representatives.

37. Givaudan shall not engage in any demolition, excavation, movement or disturbance of soil, or placing, movement or removal of construction materials or construction equipment in the Contaminated Process and Non-Process Areas without prior written permission from the Department.

II

Delineation of TCDD Contamination
In the Contaminated Non-Process Area

38. Within thirty (30) days after the effective date of this Administrative Consent Order, Givaudan shall submit to the Department for its review and approval, a detailed draft TCDD field sampling plan (hereinafter, the "FSP") to complete the delineation of TCDD contamination in the Contaminated Non-Process Area.

39. Within fifteen (15) days after receipt of the Department's written comments on the draft FSP, Givaudan shall modify the draft FSP as necessary to conform to the Department's comments and shall submit the modified FSP to the Department for its approval.

40. Within ninety (90) days after receiving the Department's written approval of the modified FSP, Givaudan shall conduct and complete the work described in the modified FSP and shall submit to the Department for its review and approval, a draft TCDD investigation report (hereinafter, the "Investigation Report") detailing the results, recommendations and all analytical data, developed in implementing the FSP.

41. Within fifteen (15) days after receipt of the Department's written comments on the Investigation Report, Givaudan shall modify the Investigation Report as necessary to conform to the Department's comments and shall submit the modified Investigation Report to the Department for its approval, or shall initiate such additional investigations as may be found necessary by the Department, in accordance with a schedule to be established by the Department.

III.

Feasibility Study of TCDD Contamination in the
Contaminated Process and Contaminated Non-Process Areas

42. Within thirty (30) days after the approval by the Department of the Investigation Report, Givaudan shall submit to the Department for its review and approval, a draft work plan to conduct a feasibility study of remedial action alternatives for TCDD contamination in the Contaminated Process and Contaminated Non-Process Areas (hereinafter, the "TCDD Work Plan"), based on the scope of work set forth in Appendix A, which is attached hereto and made a part hereof.

43. Within fifteen (15) days after receipt of the Department's written comments on the draft TCDD Work Plan, Givaudan shall modify the draft TCDD Work Plan as necessary to conform to the Department's comments and shall submit the modified TCDD Work Plan to the Department for its approval.

44. Within seventy-five (75) days after receipt of the Department's written approval of the modified TCDD Work Plan, Givaudan shall conduct and complete the work described in the TCDD Work Plan and shall prepare and submit to the Department for its review and approval a draft TCDD feasibility study (hereinafter, the "Feasibility Study").

45. Within thirty (30) days after receipt of the Department's written comments on the draft Feasibility Study, Givaudan shall modify the draft Feasibility Study as necessary to conform to the Department's comments and shall submit the modified Feasibility Study to the Department for public hearing and approval.

46. At such time and place as the Department may establish, and upon reasonable notice to Givaudan, the Department shall conduct a public hearing with respect to the Feasibility Study. After taking into consideration any comments received at the public hearing, the Department, after consultation with Givaudan, shall select a remedial action alternative for the Site from among the remedial action alternatives described in the Feasibility Study.

IV

The Remedial Action Plan For the Contaminated Process and Contaminated Non-Process Areas

47. Within sixty (60) days after receipt of the Department's written selection of a remedial action alternative for the Site, Givaudan shall submit to the Department for its review and approval, a detailed draft TCDD remedial action plan (hereinafter, the "Remedial Action Plan"), including a complete cost estimate for the work to be performed and a detailed schedule to implement the selected alternative.

48. Within thirty (30) days after receipt of the Department's written comments on the draft Remedial Action Plan, Givaudan shall modify the draft Remedial Action Plan as necessary to conform to the Department's comments and shall submit the modified Remedial Action Plan to the Department for its approval.

49. Upon receipt of the Department's written approval of the Remedial Action Plan, Givaudan shall conduct and complete the work described in the Remedial Action Plan in accordance with the approved schedule contained therein.

50. If the results of the Remedial Action Plan indicate that TCDD is migrating into the environment at concentration levels which constitute a significant risk to public health or the environment (a condition which is not now believed to be the case), then within ten (10) days after the discovery of any such condition, Givaudan shall submit to the Department for its review and approval, a draft amendment to the Remedial Action Plan (hereinafter the

"Remedial Action Plan Amendment"), including a complete cost estimate and an implementation schedule to correct the adverse impacts of the migration and to prevent the migration from reoccurring in the future.

51. Within ten (10) days after receipt of the Department's written comments on the draft Remedial Action Plan Amendment, Givaudan shall modify the draft Remedial Action Plan Amendment as necessary to conform to the Department's comments and shall submit the modified Remedial Action Plan Amendment to the Department for approval.

52. Upon receipt of the Department's written approval of the Remedial Action Plan Amendment, Givaudan shall conduct and complete the work described in the Remedial Action Plan Amendment in accordance with the approved schedule contained therein.

53. Prior to the preparation and implementation of any such Remedial Action Plan Amendment, and subject to the approval of the Department, Givaudan shall take such interim measures as are necessary to control or minimize the migration of TCDD contamination into the environment.

V

Project Coordination

54. All documents required by the terms of this Administrative Consent Order to be submitted by Givaudan to the Department, and all comments or approvals to be provided by the Department to Givaudan pursuant to the terms of this Administrative Consent Order, as well as all non-routine correspondence, including correspondence relating to force majeure issues, shall be sent by certified mail, return receipt requested, or shall be hand delivered and duly receipted by the recipient.

55. All correspondence, reports, work plans and other writings submitted to the Department by Givaudan with respect to this Administrative Consent Order shall be sent, unless otherwise instructed by the Department, to:

Karen Jentis, Chief
Bureau of Case Management
Division of Hazardous Waste Management
CN 028
Trenton, New Jersey 08625

56. Written communications from the Department to Givaudan with respect to this Administrative Consent Order shall be sent to:

Dr. H. A. Brandman
Vice-President-Manufacturing
Givaudan Corporation
125 Delawanna Avenue
Clifton, New Jersey 07014

A copy of all such written communications shall be sent to:

William H. Hyatt, Jr., Esq.
Pitney, Hardin, Kipp & Szuch
163 Madison Avenue
CN 1945
Morristown, New Jersey 07960-1945

57. Within seven (7) days after the effective date of this Administrative Consent Order, Givaudan shall provide the Department with the name, title, address and telephone number of its designated Facility Coordinator, who shall be responsible for oversight on behalf of Givaudan of the implementation of this Administrative Consent Order, including all activities required herein. Givaudan shall have the right to change its Facility Coordinator at any time, provided Givaudan shall notify the Department in writing at least five (5) working days prior to any such change. If such advance notice is not feasible, notice shall be given to the Department by the best means and as far in advance as possible under the circumstances.

58. Givaudan shall allow the Department and its authorized representatives access to the Site at all times for the purpose of monitoring compliance with the terms of this Administrative Consent Order.

VI

Financial Requirements

A. Insurance

59. Givaudan shall use its best efforts to secure and maintain in force during the pendency of this Administrative Consent Order, a comprehensive general liability insurance policy with coverage as broad as the standard coverage form currently in use in the State of New Jersey which shall not be circumscribed by the endorsements limiting the breadth of coverage. The policy shall include an endorsement (broad form) for contractual liability, an endorsement for completed operations liability, an endorsement of Broad Form Property Damage Coverage and an endorsement for independent contractors coverage. Givaudan shall use its best efforts to have its underwriter(s) add and maintain the State of New Jersey as an additional insured through completion of the Remedial Action Plan to be implemented pursuant to this Administrative Consent Order. The policy shall be specifically endorsed to eliminate any exclusions for explosion, collapse and underground hazards (x,c,u). Limits of liability shall be not less than Six Million Dollars ($6,000,000.00) per occurrence and annual aggregate for bodily injury and for property damage combined.

60. If Givaudan is able to obtain the insurance policy described in paragraph 59 above, as soon thereafter as that insurance policy described in the preceding paragraph can be obtained by Givaudan, Givaudan shall provide the Department with a current certificate of insurance certifying coverage. The certificate shall contain a provision that the insurance shall not be cancelled for any reason except after thirty (30) days written notice to the Department.

61. If Givaudan is not able to obtain or maintain the insurance policy described in paragraph 59 above, Givaudan shall indemnify the State to the same extent that the insurance coverage would have provided the State as an additional insured.

B. Financial Assurance

62. Within thirty (30) days after the effective date of this Administrative Consent Order, Givaudan shall obtain and provide to the Department an irrevocable, conditional letter of credit in the amount of One Million Dollars ($1,000,000) (hereinafter, the "Letter of Credit") to secure performance of all its obligations under this Administrative Consent Order and under the Ground Water Consent Order. The Letter of Credit shall be issued by a New Jersey bank or financial institution, or by such other bank or financial institution as shall be approved by the Department. Subject to the provisions of paragraph 64 and 65 of this Administrative Consent Order, Givaudan shall maintain the Letter of Credit continuously in full force and effect until the requirements of this Administrative Consent Order and the Ground Water Consent Order have been completed.

63. The amount of the Letter of Credit has been determined by estimating the costs of implementing the requirements of this Administrative Consent Order and the requirements of the Ground Water Consent Order.

64. The Letter of Credit shall be conditioned that in the event the Department determines that Givaudan has failed to perform any of its obligations under this Administrative Consent Order or the Ground Water Consent Order, the Department may draw on the Letter of Credit; provided, however, that before any such draw can be made, the Department shall notify Givaudan in writing of the obligation(s) with which Givaudan has failed to comply, and Givaudan shall have a reasonable time, not to exceed thirty (30) days, to perform any such obligation(s).

65. If the combined estimated costs of implementing the Remedial Action Plans described in this Administrative Consent Order and the Ground Water Consent Order at any time exceeds the amount of the Letter of Credit, Givaudan shall promptly cause the amount of the Letter of Credit to be increased so that the amount of the Letter of Credit is equal to the combined estimated costs of implementing the Remedial Action Plans described in this Administrative Consent Order and the Ground Water Consent Order.

66. At any time during the performance of its obligations hereunder, Givaudan may apply to the Department for approval to reduce the amount of the Letter of Credit to reflect the remaining estimated combined costs of performing its obligations under this Administrative Consent Order and the Ground Water Consent Order, or to substitute other financial assurance in a form and manner acceptable to the Department.

67. Givaudan shall increase the amount of the Letter of Credit, or other approved financial assurance, within fifteen (15) days of its receipt of a written notice from the Department, to reflect increases in the estimated cost of implementing the approved remedial action alternative.

C. Reimbursement of Costs.

68. Within thirty (30) days after the effective date of this Administrative Consent Order, Givaudan shall issue a certified check to the Department in the amount of Thirteen Thousand One Hundred Sixty-Six Dollars and Thirty-Three Cents ($13,166.33). Payment by Givaudan of this sum shall represent reimbursement in full and complete satisfaction of any claims the Department may have against Givaudan for expenses incurred up until the effective date of this Administrative Consent Order as a result of the Department's investigation and remediation of TCDD contamination at the Givaudan Plant or the Site.

69. Subject to the limitations and reservations of rights contained in this paragraph, Givaudan agrees to reimburse the Department for the Department's reasonable oversight costs incurred in connection with this Administrative Consent Order and the Ground Water Consent Order, by submitting to the Department, within 30 days after receipt by Givaudan of an itemized accounting of such costs, a certified check, drawn to the order of the Treasurer, State of New Jersey, in the full amount of such costs. Givaudan agrees to reimburse the Department for all such oversight costs up to $100,000.00. The Department reserves its right to seek recovery from Givaudan of such oversight costs in excess of $100,000 and Givaudan reserves its right to contest its obligation to reimburse the Department for any such oversight costs in excess of $100,000.00.

VII

Force Majeure

70. If any event occurs which Givaudan believes will or may cause delay in the achievement of any deadline prescribed by this Administrative Consent Order, Givaudan shall notify the Department in writing within seven (7) days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length of the delay, the precise cause or causes of the delay, any measures taken or to be taken to minimize the delay and the time required to take any such measures to minimize the delay. Givaudan shall adopt all necessary measures to prevent or minimize any such delay. Givaudan's failure to comply with the notice requirements of this paragraph shall render this force majeure provision void as to the particular incident involved.

71. If the Department finds that any delay or anticipated delay has been or will be caused by fire, flood, riot, strike or other circumstances reasonably beyond the control of Givaudan, the Department shall extend the time for performance hereunder for a period no longer than the delay resulting from such circumstances. If, however, the event causing the delay is found by the Department not to be beyond the control of Givaudan, failure to comply with the provisions of this Administrative Consent Order shall not be excused as provided herein and shall constitute a breach of the requirements of this Administrative Consent Order. The burden of proving that any delay is caused by circumstances beyond the control of Givaudan and the length of any such delay attributable to those circumstancees shall rest with Givaudan. Increases in the cost or expenses incurred by Givaudan in fulfilling the requirements of this Administrative Consent Order shall not be a basis for an extension of time. A delay by Givaudan

in completing an interim requirement of this Administrative Consent Order shall not automatically extend the time for performance by Givaudan of the remaining requirements of this Administrative Consent Order.

VIII
Reservation of Rights

72. This Administrative Consent Order shall be fully enforceable in the New Jersey Superior Court upon the filing of a summary action for compliance pursuant to Executive Order No. 40 (1983) signed by Governor Thomas H. Kean on June 2, 1983, N.J.S.A. App. A:9-45, N.J.S.A. 13:1D-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq.

73. This Administrative Consent Order may be enforced in the same manner as an Administrative Order issued by the Department pursuant to these same statutory authorities.

74. Nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of the Department pertaining to any of the laws of the State of New Jersey, should the Department determine that additional remedial actions are necessary to protect the public health or the environment.

75. In consenting to this Administrative Consent Order and/or by complying with its provisions and requirements, whether directly or through an agent or contractor, Givaudan neither admits nor denies the Findings made herein and admits no liability or responsibility to the Department or to any other party, entity or person. This Administrative Consent Order shall not constitute or be used as evidence of any admission of law or fact against Givaudan.

IX
General Provisions

76. This Administrative Consent Order shall supersede the Administrative Order.

77. The provisions of this Administrative Consent Order shall be binding on Givaudan, its principals, agents, employees, successors, assigns, tenants and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

78. No obligations imposed by this Administrative Consent Order (with the exception of paragraphs 68 and 69) are intended to constitute a debt, claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Administrative Consent Order shall constitute continuing regulatory obligations imposed pursuant to the police powers of the State of New Jersey, intended to protect the public health and the environment.

79. Compliance with the terms of this Administrative Consent Order shall not excuse Givaudan from compliance with any applicable federal and state permits, statutes and regulations while carrying out the obligations imposed by this Administrative Consent Order.

80. Givaudan shall make available to the Department all data and information, including raw sampling and monitoring data, generated pursuant to this Administrative Consent Order.

81. Givaudan shall not construe any informal advice, guidance, suggestions, or comments by the Department, or by persons acting on behalf of the Department, as relieving Givaudan of its obligation to obtain written approvals as may be required herein, unless such advice, guidance, suggestions, or comments by the Department shall be submitted in writing to Givaudan pursuant to paragraph 54, except for minor modifications during field activities, including minor scheduling adjustments, which Givaudan shall confirm in writing to the Department.

82. No modification or waiver of this Administrative Consent Order shall be valid except by written amendment to this Administrative Consent Order duly executed by Givaudan and the Department.

83. When this Administrative Consent Order becomes effective, Givaudan waives its right to a hearing on the matters contained herein, pursuant to N.J.S.A. 52:14B-1 et seq. and N.J.S.A. 58:10A-1 et seq.

84. The requirements of this Administrative Consent Order shall be deemed satisfied upon the receipt by Givaudan of written notice from the Department that Givaudan has demonstrated, to the satisfaction of the Department, that all the terms of this Administrative Consent Order have been completed.

85. This Administrative Consent Order shall take effect upon the signature of both parties.

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

3/5/87
DATE

Richard T. Dewling
Commissioner

Approved as to Form
Date 2/25/87

Witness:
Michael F Catanese

3/5/87
DATE

GIVAUDAN CORPORATION

Witness:

NAME H A Brandman

TITLE V.P. - Operations

NAME

TITLE SR. VICE PRESIDENT

APPENDIX A

FEASIBILITY STUDY

A. Objectives

1. identify and evaluate all potentially viable remedial action alternatives for the TCDD contamination on and/or emanating from the Site

2. recommend the remedial action alternative best suited to remove all concentrations of TCDD on and/or emanating from the Site so that the levels remaining following removal do not exceed 7 parts per billion, provided, however, that the recommended remedial action alternative shall ensure that the potential for human exposure to, or migration into the environment of TCDD at levels of 1 part per billion, or greater, is eliminated to the maximum extent technically practicable;

3. The Feasibility Study shall propose remedial action alternatives for remediation of the TCDD contamination located in the Contaminated Process and Contaminated Non-Process Areas. For material contaminated with TCDD in concentrations of less than 7 ppb, the remedial action alternatives may include containment of the contaminated material in place or elsewhere on the Site, provided that any such proposed remedial action alternative (a) precludes the likelihood of significant future exposure to the contaminated material, (b) ensures that erosion will not eventually uncover the contaminated material and (c) ensures that further use of the Site will be monitored to prevent disturbances of the contaminated material which might cause an unacceptable human exposure at a future date. Unless the exception of the following sentence applies, the remedial action alternatives shall provide for the removal from the Site and proper disposal of material contaminated with TCDD in concentrations of 7 ppb or greater. If the Feasibility Study concludes, and the Department agrees, that the removal of material contaminated with TCDD in concentrations of 7 ppb or greater from the Site is not practicable, then the draft Feasibility Study shall recommend the remedial action alternative deemed best suited to contain the TCDD contamination on-Site in such a manner that the potential for human contact with the TCDD contamination or for migration of the TCDD contamination into the environment is and will be eliminated to the maximum extent technically practicable. Furthermore, if the recommended remedial alternative requires concentrations of TCDD greater than 1 ppb to remain on site, then the alternative shall include capping, regular monitoring, and the imposition of permanent land use controls.

B. Identification of Remedial Alternatives

1. develop alternatives to incorporate remedial technologies, response objectives and criteria, and other appropriate considerations into a comprehensive, site-specific approach

2. consider all appropriate remedial alternatives including but not limited to on-site remediation, containment, and no-action options

3. screen all potentially viable remedial action alternatives to narrow the list of potential alternatives for further detailed analysis, according to the following:

   a. environmental and public health impacts

   b. engineering feasibility and reliability

   c. cost, including operation and maintenance costs

4. evaluate the limited number of alternatives that remain after the initial screening according to the following:

   a. describe appropriate treatment and disposal technologies, as well as any permanent facilities required

   b. specify engineering considerations required to implement the alternative (e.g., treatability study, pilot treatment facility, additional studies needed to proceed with final remedial design)

   c. describe environmental and public health impacts and propose methods for mitigating any adverse effects

   d. operation and maintenance/monitoring requirements of the completed remedy

   e. off-site disposal needs and transportation plans

   f. temporary storage requirements

   g. requirements for health and safety plans during remedial implementation (including both on-site and off-site health and safety considerations)

   h. describe how the alternative could be phased into individual operable units including how various components of the remedy could be implemented individually, or in groups resulting in a functional phase of the overall remedy

   i. describe how the alternative could be segmented into areas to allow implementation of differing phases of the alternative

j. a review, provided by the Department of any off-site storage, treatment or disposal facility to ensure compliance with applicable hazardous waste regulatory requirements

k. describe which federal, state and local permits would be necessary for each alternative identified and the information necessary for the development of each of the permits

l. time required for implementation, including interim dates of significance

C. Evaluation of Alternatives

1. evaluate and present the alternative remedies identified in Part B above and recommend the most environmentally sound alternative(s)

a. develop a health and environmental assessment

i. evaluate each alternative considering environmental fate, exposure and associated health and environmental effects

ii. analyze mitigating adverse effects, and physical or legal constraints

b. develop a detailed cost summary for each remedial action alternative, and for each phase or segment of the alternative

i. present the cost as a present-worth cost

ii. include total cost of implementing the alternative including the annual operation and maintenance costs of the alternative for the full duration of the alternative

c. evaluate each alternative in accordance with the criteria established in Part A above

i. apply the evaluation criteria uniformly to each alternative

ii. identify a number of remedial alternatives that are comparable

iii. identify the most appropriate alternative, given the specific constraints of the project

iv. prepare a trade-off matrix that enables identification of now comparable techniques including

- level of cleanup achievable

- time to achieve cleanup

- feasibility
- implementability
- reliability
- ability to minimize adverse impacts during action
- ability to minimize off-site impacts caused by action
- remoteness of activities
- useability of ground water
- useability of surface water
- useability of site

d. recommend the alternative that is the most environmentally sound resulting from Sections II. C.1.b. and C.1.c.

i. prepare rationale for recommending the selected alternative stating the advantages over other alternatives considered

ii. a conceptual design of the recommended alternative should be included, providing, as a minimum, the following information:

- the selected engineering approach with implementation schedule
- any special implementation requirements
- applicable design criteria
- preliminary site layouts
- estimates of all costs, including operation and maintenance requirements
- safety plan