

GREENPEACE

**CONTAMINATION IN PAULÍNIA BY ALDRIN, DIELDRIN,
ENDRIN AND OTHER TOXIC CHEMICALS PRODUCED
AND DISPOSED OF BY
SHELL CHEMICALS OF BRAZIL**

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I. INTRODUCTION

During the first week of February 2001, Shell publicly admitted being responsible for the contamination of farms near the area where it produced pesticides in Paulínia, in the state of São Paulo, Brazil. The organochlorine pesticides endrin, dieldrin and aldrin were found in the groundwater under the farms located between the plant and the Atibaia River, one of the most important tributaries of the Piracicaba River, providing water to cities such as Americana and Sumaré.

The contamination caused by Shell in Paulínia is toxic, persistent and bioaccumulative, and can cause serious damage to environment and human health. For this reason, and due to the imminent contamination of the Atibaia River, Greenpeace demands that:

1. Shell provide a full inventory on the extent of the contamination of the affected area;
2. Shell fund comprehensive testing of vulnerable food supplies, such as milk, meat, fish and eggs.
3. Shell immediately decontaminates the affected area. The decontamination plan must be discussed with the community and approved by the authorities.
4. Shell adopt alternative technologies to incineration for the elimination of the waste generated by the remediation process^(1,2);
5. An epidemiological and clinical study be done with all people directly affected, including the people from the Recanto dos Pássaros neighbourhood, workers and former workers of the facility;
6. The company accepts the community's demands, including compensation and lifelong complete medical service for all people affected by the contamination generated by Shell.
7. The Federal Government commits to the elimination of POPs and its sources in a nation-wide program.

II. CHARACTERIZATION OF THE PROBLEM

The data on the contamination by DRINS (aldrin, dieldrin and endrin) was presented in a technical report done by CEIMIC ⁽³⁾ in January 2001 for Shell Chemicals of Brazil and supported by two other technical reports, one of them by the Adolfo Lutz Institute in São Paulo, March 2001. At the end of February 2001⁽⁴⁾, the Dutch environmental consulting company Haskoning/Iwaco, also hired by Shell, produced a new technical report including soil and deep water analyses totalling nine samples taken from farms near the facility. The levels of contamination by dieldrin were as high as 17 ppb (parts per billion) in soil and 0.47 ppb in water ⁽⁵⁾. The water contamination levels were higher than the levels allowed by Brazilian law (Administrative Rules 36/1990 and 1469/2000 - Ministry of Health - Highest Permissible Level: 0,03 ppb of dieldrin) ^(6,7). The analyses done before that were limited to deep waters.

CETESB (São Paulo State Environmental Protection Agency) is in the process of writing the report on the samples collected in December 2000 in deep water wells outside the

boundaries of the facility, but partial data released supports the contamination data presented by Shell.

III. HISTORY OF THE AREA / CONTAMINATION

1. Location and characterisation

In 1975, Shell began construction of an industrial plant for manufacturing pesticides, including the manufacture of endrin, aldrin and processing of dieldrin, three organochlorine pesticides. The facility started its activities in 1977⁽⁵⁾.

The plant is located in the city of Paulínia, 126 km away from the capital of the state of São Paulo and covers approximately 40 hectares (400.000 m²). The entire crescent-shaped western side of the facility is bordered by the Atibaia River, one of the most important tributaries of the Piracicaba River, providing water to cities such as Americana and Sumaré. Between the facility and the river there is an area of about 100 meters where the Recanto dos Pássaros neighbourhood, formerly Poço Fundo allotment, is located. The facility came to the area after there were already farms ^(8,9).

2. Brazilian Legislation - DRINS

The sale of these pesticides was stopped in Brazil in 1985 by means of the Administrative Rule No. 329, of September 2, 1985, of the Ministry of Agriculture⁽¹⁰⁾; ant and termite baits made of aldrin for use in reforestation were still allowed. However, the manufacture for export continued until 1990. In 1998, by means of the Administrative Rule No. 12 of the Ministry of Health, these products were completely prohibited ⁽¹¹⁾.

3. Leaks

Three leaks in the factory wastewater storage tank in the Opala facility were officially reported during the period of manufacture. In 1978, inspections showed the swelling of the internal cover of a brick tank; in 1982 this problem was reported again. In 1985, the leak was detected again and as a result the tank was made waterproof by a PVC (polyvinyl chloride) plastic film ⁽¹²⁾.

4. Incineration

In the western part of the plant was a liquid incinerator for the incineration of industrial wastes. This incinerator received three warnings from CETESB for not operating within acceptable standards ⁽¹³⁾. Incinerators are known to be, as is shown by vast international literature, a source of contaminants such as dioxins and furans. The figure attached to this report, provided by CSD-Geoklock ⁽¹⁴⁾, shows the incineration plant completely surrounded by sample sites that were contaminated by drins.

5. Sale of the area

In 1993, Shell began the process of selling its pesticide manufacturing facilities to American Cyanamid Co ⁽¹⁵⁾. The contract required environmental auditing to be done, in order to measure and value the environmental impacts at the time of the sale ⁽⁵⁾. This auditing, identified Shell as the only party responsible for the contamination of the area; this responsibility would not be transferred to Cyanamid.

6. Self Indictment and Term of Agreement

On September 14, 1994, Shell Chemicals of Brazil reported to the Public Prosecutor's Office of the City of Paulínia by means of a self-indictment the soil and deep water contamination, which, according to company data, were restricted to the industrial area ⁽¹⁶⁾.

In August, 1995, the company signed with the Public Ministry the Conduct Adjustment Term (TAC), in this case named Term of Agreement ⁽¹⁷⁾.

The company was required to install in its facility an aquifer quality recovery system (AQRS) composed of a hydraulic barrier, a contaminant extraction subsystem and a water treatment unit, for containing and removing solvent contamination diagnosed in the areas named "Opala" and "Parque dos Tanques", located in the north-eastern part of the plant ⁽¹⁷⁾.

According to the agreement mentioned above Shell would also monitor the areas in the extreme west of the plant described as "Incinerator" and "Formulation" due to the discovery of drins in soil ⁽¹⁷⁾. The company was required to monitor soil and deep waters for a period of three years with the purpose of confirming the company's hypothesis that the contaminants found in soil would not migrate to the aquifer ⁽¹⁵⁾.

7. Technical Reports on Contamination

In April 1996, Shell ordered a technical report on the contamination of the groundwater outside the perimeter of the facility. The sampling in 5 farms was done by ERM - Environmental Resources Management Inc.⁽¹⁸⁾, Lancaster Laboratories, in the United States⁽¹⁹⁾, and Adolfo Lutz Institute, in São Paulo ⁽²⁰⁾ did the chemical analyses. However, the results of the two laboratories differ. The Adolfo Lutz Institute did not detect organic materials, including dieldrin and endrin, which were detected by Lancaster Laboratory in concentrations up to 0.25 ppb and 0.35 ppb respectively.

Shell sent to community members and owners of farms in the region in 1996 only the report done by the Adolfo Lutz Institute, which did not diagnose the presence of drins in the groundwater ⁽²¹⁾. The report done by the American laboratory was sent to the Public Ministry on January 31, 2000, approximately 4 years after it was written. However, Shell claims that this report is not scientifically sound⁽⁵⁾, although the groundwater contamination was found in 3 other reports done in 2000 and 2001 ^(3,4,5).

In March 2000, Greenpeace, invited by community members, participated in a meeting between CETESB and the inhabitants and owners of farms in Recanto dos Pássaros.

Without knowing about the contamination, the community asked for new analyses of wells and cisterns, since, according to community members, they had a "chemical" odour. As a result of this meeting, new water samples were collected from farms in the region. The samples were sent to the laboratories CEIMIC, TASQA and CETESB ⁽²²⁾. Dieldrin was detected at 0.17 ppb and 0.22 ppb concentrations by the laboratories TASQA and CEIMIC respectively in lot number 365. CETESB's results showed dieldrin at 0.005 ppb only in the farm number 2347.

Because of these results, new samples were collected outside the area of the facility in December 2000. These samples were sent to the Adolfo Lutz Institute ⁽⁴⁾, CEIMIC and CETESB. The data resulting from the analyses done by CEIMIC ⁽³⁾ forced Shell to publicly admit on January 31, 2001 that the contamination by drins had extrapolated the perimeter of the facility and had reached the wells in the nearby farms at concentrations of dieldrin up to 0.48 ppb.

New samples were collected by the Dutch environmental consulting company Haskoning/Iwaco in the middle of February, resulting in another technical report with soil and groundwater analysis in nine sites located in the farms near the industrial site. The levels of contamination by dieldrin are as high as 17 ppb (parts per billion) in soil and 0.47 ppb in water. The first data on soil contamination in the area outside the site were presented ⁽⁵⁾.

During the two consecutive weekends of February 10 and 17, members of Greenpeace went to the community to talk to more than 50 people about the dangers, health impacts, and accumulation in human tissues and in the environment of drins.

The community started to get more active and organised around this issue. On February 17 they began camping in front of the entrance to the plant, bought by BASF S.A. in December 2000. The community members remain in vigil to this date. People have sent more than one thousand electronic messages in solidarity from all over the world through Greenpeace's website.

In the end of March, the Justice Department listened to the testimony of a former company employee, who confirmed the existence of four clandestine landfills inside the plant, three of them without engineering or isolation projects. He accused Shell of dumping ashes from its incinerator and wastes from its manufacturing process in these landfills. He also confirmed that Shell's incinerator sold its services to third parties, for example to DuPont. He also reported that drums with toxic wastes were buried in other areas inside the plant.

After these accusations, a document done at the request of Cyanamid by ERM Consultoria on November 4, 1993, in which these cases were already reported, was "rediscovered", which proves that Shell's management already knew about the existence of these clandestine landfills. The document was attached to the Public Prosecutor process ⁽¹³⁾.

On March 26 2001, people from Recanto dos Pássaros, at their own expense, underwent examinations at Clínica Ohswald, in Campinas (State of São Paulo). The results of the tests

of eleven people, including two children 8 and 12 years old, indicated the presence of heavy metals such as arsenic, lead and titanium, in their blood ⁽²³⁾.

After trying several times to get a Conduct Adjustment Term signed for investigating the health of community members, workers and former workers of the plant, the Public Ministry and the government of the city of Paulínia began collecting blood samples and doing clinical analyses on April 23 ⁽²⁴⁾.

Studies were designed by the Health Surveillance Secretariat, São Paulo State University (UNESP) and São Paulo University Medical School (USP) to quantify contamination by dioxins, other organochlorines and heavy metals in the local population. The government of Paulínia, through a municipal decree, will pay for the analyses.

IV. ANALYTICAL RESULTS

Several analytical reports were produced over the last 6 years. On the next few pages, there are summaries of the data available in the public process available at the Office of the Attorney General in Paulínia.

Table 1: analytical results of groundwater samples collected by ERM - Environmental Resources Management Inc. (April 24, 1996) and analysed by Lancaster Laboratories (USA) (19).

Organic Chemicals	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Standard*
ppb -(µg/l)									
Heptachlor	---	---	---	---	---	---	<0.03	---	0.03
Dieldrin	<0.06	<0.06	<0.06	n. a.	<0.10	<0.06	0.25	---	0.03
Endrin	<0.06	---	---	---	---	---	0.35	---	0.6
p,p'-DDD	---	---	---	---	---	---	---	<0.06	2.0
Benzene	---	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	5.0
1,2-dichloroethan	0.8	2.1	---	---	---	---	---	---	10.0
1,1-dichloroethan	<0.5	<0.5	---	---	<0.5	---	---	---	30.0
Chlorobenzen	---	---	---	---	---	---	---	<0.5	20.0
Metals ppm (mg/l)									
Aluminium	<0.2	<0.2	<0.2	<0.2	1.03	36.4	4.43	1.03	---
Barium	<0.10	0.11	0.11	0.10	0.79	0.36	0.30	<0.10	0.005
Copper	---	<0.025	---	---	---	<0.025	<0.025	<0.025	2.0
Iron	<0.10	<0.10	<0.10	0.75	0.12	79.8	7.3	3.29	---
Manganese	0.031	0.176	0.020	0.575	0.236	0.731	0.099	0.113	---
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.001
Silver	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	---
Zinc	0.025	0.025	0.0025	0.025	0.028	1.24	0.068	0.074	---
Arsenic	---	---	---	---	---	---	---	0.068	0.01
Cadmium	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	---
Chromium	<0.003	<0.003	<0.003	<0.003	<0.003	0.107	0.0214	0.0038	0.05
Lead	<0.003	---	---	---	<0.003	0.0251	0.0075	<0.003	0.01
Cyanide	<0.005	<0.005	0.018	<0.005	<0.005	<0.005	<0.005	0.008	0.07
Fluoride	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	1.5

Standard* = Administrative Rule 1469/ 12 - 29 - 2000 - Ministry of Health - Brazil

N.B.: The same samples were analysed by the Adolfo Lutz Institute in April 1996 does not show contamination by organic chemicals (20).

The sampling sites are respectively:

Site 1 - Sítio Santa Rita, Av. Roberto Simonsen 2347;

Site 2 - Sítio Beija Flor, Av. Roberto Simonsen 2221;

Site 3 - Sítio do Paulinho , Av. Roberto Simonsen 2237;

Site 4 - Recanto Rio Branco, Av. Roberto Simonsen 495;

Site 5 - Chácara Sto. Antonio Claret, Av. Roberto Simonsen 2179;

Site 6 - Lot owned by Shell;

Site 7 - Monitoring Well MW 15;

Site 8 - Atibaia River.

The data on Table 1 show, that as early as April 1996, dieldrin concentrations in well waters were higher than the 0.03 ppb allowed by Administrative Rule 36 /1990 and by Administrative Rule 1469/2000 of the Ministry of Health (6,7). Shell only sent the report done by the Adolfo Lutz Institute (1996) to members of the neighbourhood, omitting the data found by Lancaster Laboratory.

Table 2 - Groundwater analyses. Samples collected in March 13 and 14, 2000. Analysed by the laboratories TASQA, CEIMIC and CETESB(22).

	TASQA Sites				CEIMIC Sites				CETESB Sites				TAS QA	CEI MIC	CET ESB	MPV
	395	495	2101	2347	395	495	2101	2347	395	495	2101	2347	Detection Limit			
µg/l	<Q.L	<Q.L	<Q.L	<Q.L	N.D.	N.D.	N.D.	N.D.	N.A.	N.A.	N.A.	N.A.	1.0	0.3	---	0.3
1-1 dichloroethan	<Q.L	<Q.L	<Q.L	<Q.L	N.D.	N.D.	N.D.	N.D.	N.A.	N.A.	N.A.	N.A.	0.01	0.2	0.005	0.2
Endrin	<Q.L	<Q.L	<Q.L	<Q.L	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	5.0	---	---	0.1
Phenol	0.17	<Q.L	<Q.L	<Q.L	0.22	N.D.	N.D.	N.D.	N.A.	N.D.	N.D.	0.005	0.01	0.03	0.005	0.03
Dieldrin	<Q.L	<Q.L	<Q.L	<Q.L	N.D.	N.D.	N.D.	N.D.	N.A.	N.A.	N.A.	N.A.	0.01	0.2	---	
Endrin Ket.	<Q.L	<Q.L	<Q.L	<Q.L	N.D.	N.D.	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	0.01	0.03	0.005	0.03
Aldrin	<Q.L	<Q.L	<Q.L	<Q.L	N.A.	N.A.	N.A.	N.A.	N.A.	N.D.	N.D.	N.D.	10.0	---	1.0	10
Benzene	<Q.L	<Q.L	<Q.L	<Q.L	N.A.	N.A.	N.A.	N.A.	N.A.	N.D.	N.D.	N.D.	10.0	---	1.0	
Toluene	<Q.L	<Q.L	<Q.L	<Q.L	N.D.	N.D.	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	10.0	5.0	1.0	
Xylene	<Q.L	<Q.L	<Q.L	<Q.L	N.A.	N.A.	N.A.	N.A.	N.A.	N.D.	N.D.	N.D.	0.01	---	---	
Organochlorine	<Q.L	<Q.L	<Q.L	<Q.L	N.A.	N.A.	N.A.	N.A.	N.A.	N.D.	N.D.	N.D.				

N.B.: There was no indication of which legislation for the MPV (Maximum Permissible Value) was used as standard.

<Q.L: less than the quantitation limit (value of the quantitation limit was not given in the report).

N.D: Not Detected

N.A.: Not Analysed

The sites mentioned correspond respectively to the lands of:

P-365: Clóvis Rodrigues

P-495: Mônica C. Sebre

P-2101: Ciamar I Rodrigues

P-2347: Floripedes Glagliardes

On this table it is possible to note again the presence of dieldrin above the permissible levels (0.03 ppb) (6,7), in two results on Mr. Clóvis Rodrigues' land.

The TASQA Laboratory only presented one result of dieldrin contamination.

Table 3 - Results Found by the Adolfo Lutz Institute - Organochlorine pesticides residues in water samples collected in duplicate on 12/20/2000 by CEIMIC in Paulínia - São Paulo – Brazil (4).

Sites	OR13235 PM. 08	OR13233 PM.09	OR13240 PM.11	OR13241 PM.12	OR13238 PM.13	OR13237 PM.14	OR13234 PM.15	OR13236 PM.16	OR13237 PM.17	Limit Detection
Compound s	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
α-HCH		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.005
β-HCH		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.01
γ-HCH		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.005
Aldrin		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.01
Dieldrin		0.33	0.36	N.D.		N.D.	N.D.	N.D.	N.D.	0.01
Endrin		0.02	0.08	N.D.		N.D.	N.D.	N.D.	N.D.	0.01
Heptachlor		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.01
Heptachlor epoxide		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.01
op'DDE		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.02
pp'DDE		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.02
op'DDT		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.02
pp'DDT		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.02
op'DDD		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.02
pp'DDD		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.02
Mirex		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.02
Endosulfan		N.D.	N.D.	N.D.		N.D.	N.D.	N.D.	N.D.	0.1

N.D.: Not detected

Broken bottles = MP 08 and PM 13

The results of the last analyses done in December 2000 by the Adolfo Lutz Institute also shows dieldrin at concentrations higher than the allowed by the legislation (0.03ppb) (6,7).

On the websites below the following data can be found:

Results tables done by CEIMINC - samples collected in December 2000. This information is available in PDF format, or in Appendix 1 in the printed copy(3).

<http://www.greenpeace.org.br/toxicos/pdf/cisp-agua.pdf>

Map of the contamination spots inside and outside of the Shell Paulínia site, done by CSD-Geoklock in February 2001 based on the data analysed by CEIMIC (dec/2000). This information is available in PDF format, or in Appendix 2 in the printed copy(14).

<http://www.greenpeace.org.br/toxicos/pdf/compostos1.pdf>

V. HEALTH IMPACTS

Shell was the only manufacturer of endrin, dieldrin and aldrin in Brazil. These chemicals are absorbed by skin and are associated to cancer and reproductive, endocrinological and immunological dysfunction. Today they are short-listed by the United Nations Environment Program (UNEP) as three of the 12 Persistent Organic Pollutants to be banned by the POPs convention will be signed in Stockholm, Sweden in May 2001.

1. Aldrin

Aldrin is readily metabolised to dieldrin in both plants and animals. As a result, aldrin residues are rarely found in foods and animals. It is toxic to humans. The lethal dose of aldrin for an adult man has been estimated to be 5g, equivalent to 83-mg/kg-body weight. (Ritter *et al.* 1995) ⁽²⁵⁾. People have died as a result of people eating grain treated with aldrin (Smith 1991) ⁽²⁶⁾.

Signs and symptoms of aldrin intoxication may include: headache, dizziness, nausea, general malaise, and vomiting, followed by muscle twitching, myoclonic jerks, and convulsions (Ritter *et al.* 1995).

2. Dieldrin

Occupational exposure can cause headaches, nausea, vomiting, general malaise, dizziness, convulsions and coma. These exposures are generally not fatal, though individuals who have eaten large quantities, either accidentally or intentionally, have died (Smith 1991) ⁽²⁶⁾.

The lethal dose for adults was estimated to be about 10 mg/kg body weight/day (WHO, 1996) ⁽²⁷⁾. The central nervous system is the main target organ.

Inadequate evidence for the carcinogenicity in humans and limited evidence in animals led IARC to classify all three drins Group 3 (Not classifiable as to carcinogenicity to humans). However, the last IARC evaluation took place in 1987 and since then, other research has been carried out. For example, a study in women in Denmark (Høyer *et al.*, 1998) ⁽²⁸⁾ has shown that exposure to dieldrin is associated to an increased risk of breast cancer and to a greater malignancy of the disease. The women with the highest dieldrin levels in blood had a two-fold greater incidence of breast cancer than women with the lowest levels. This study showed a dose-response relationship, that is, as the level of dieldrin in blood increases, so does the chance of developing breast cancer. It has also be shown to affect survival (Høyer *et al.*, 2000)^(29,30). More studies need to be done to clarify this issue.

3. Endrin

The main source of exposure to endrin to the general population is residues in food; however, contemporary intake is generally below the acceptable daily intake of 0.0002 mg/kg body weight recommended by the Joint FAO/WHO Meeting on Pesticide Residues (JMPR). Recent food surveys have generally not included endrin; hence recent monitoring data are not available.

Consumption of bread made with endrin-contaminated flour has caused severe and sometimes fatal poisoning. Symptoms include severe convulsions, coma, high temperature, and lung congestion. In the longer term, headaches, dizziness, weakness, lethargy, and anorexia have been reported. Finally, less severe poisoning has been reported to cause dizziness, weakness in the legs, nausea, temporary deafness, disorientation and aggressive behaviour (Smith 1991)⁽²⁶⁾.

VI. HISTORY OF THE COMPANY

Royal Dutch/Shell Group of Companies has companies operating in more than one hundred countries and employs 135 thousand people. One of the biggest companies in the world, Shell's annual revenues is above the 100 billion-dollar mark⁽³¹⁾.

The company has a history of aggression to people and to environment. Below are some cases that show part of the company's behaviour.

In May 1988, seven workers died after an explosion in Norco, a Shell refinery in Louisiana. Shell has paid at least 24 million dollars in damage claims⁽³²⁾.

In April 1988 a spill of 440,000 gallons of crude oil at Shell's Martinez, California refinery polluted over 100 acres of wetlands and 11 miles of shoreline, killing hundreds of animals and costing the company \$20 million in penalties and \$12 million in cleanup bills⁽³³⁾.

In 1989, a Shell refinery in the United Kingdom spilled 10,000 gallons of crude oil into the Mersey River. Shell was fined \$1.6 million and paid another \$2.24 million for cleanup costs⁽³⁴⁾.

In the fall of 1989, a Shell tanker spilled enough oil near the island of St. Lucia in the Caribbean to cover Bannes Bay for two weeks. The company refused to indicate publicly how it planned to prevent such accidents in the future⁽³⁵⁾.

For over two decades, Shell supplied a pesticide containing dibromochloropropane (DBCP) to Standard Fruit Company for use in banana plantations in Costa Rica. Shell had known since the 1950's that DBCP causes sterility in male laboratory animals, but did not include this information on product labels. Even after the US EPA determined that DBCP caused sterility in humans and banned production, Shell continued to market the chemical. After suffering exposure to DBCP, between 500 and 2000 banana workers in Costa Rica became sterile⁽³⁶⁾.

Shell has over a 25-year period systematically polluted a huge underground reserve of potential drinking water in an aquifer near the city of Diyarbakir in Southeast Turkey. Over two million people live in the area and suffered from the effects of the pumping of 487.5 million barrels of production water contaminated with crude oil, solvents and other chemicals into the Midyat aquifer between 1973 and 1994⁽³⁷⁾.

The Malir pesticide stockpile, one of the largest storage sites for obsolete and date-expired pesticides in Pakistan, is situated less than 150 meters from a school and is close to residential areas. It contains dieldrin, endosulfan, heptachlor and benzene hexachloride. Companies such as Shell, Dow Chemicals, Velsicol, Hoechst and Diamond Shamrock exported all of these pesticides to Pakistan since the 1970s. The storage conditions at the dump can be described as abysmal at best and, although these pesticides were exported, the manufacturers are still responsible for them and for their negligent management⁽³⁸⁾.

In Burkina Faso there are total of 54 tonnes of obsolete pesticides stored in 11 different locations. Companies identified are, among others: Atlas, Bayer, Calliope/Callivoire, Ciba Geigy, HOECHST, ICI, Rhone P.,Roussel, Shell, Saphyto, Sochim, Sofaco. (FAO 1999). In Mauritania, Shell has removed its dieldrin stockpiles, which were incinerated. The company contributed 37.5% of the costs. The same happened in Niger⁽³⁸⁾.

The Shell case in Nigeria⁽³⁹⁾

Since Shell began drilling in Nigeria's Niger Delta, it has wreaked environmental havoc on the land of the Ogoni, the predominant native group in Nigeria.

Nigeria accounts for 14% of Shell's global oil production. At the same time, 40% of Shell's oil spills worldwide between 1976 and 1991 have occurred in this country (Cayford, 1996)⁽⁴⁰⁾. In the Niger Delta there were 2,976 oil spills during these years (Ellis, 1994)⁽⁴¹⁾.

In the 1970s spillage totalled more than four times that of the 1989 Exxon Valdez tragedy (Watts, 1997)⁽⁴²⁾. Shell has contaminated farmlands and water sources, besides releasing gases meters away from the houses where the Ogoni live. Shell thus promotes acid rain, mass killing of fish and the suffering of people due to health problems from water and air pollution.

A short-lived World Bank investigation found levels of hydrocarbon pollution in water in Ogoni land more than sixty times US limits (Project Underground, 1996)⁽⁴³⁾ and a 1997 Project Underground survey found petroleum hydrocarbons in one Ogoni village's water source to be 360 times the levels allowed in the European Community, where Shell originates (Project Underground, 1997)⁽⁴⁴⁾.

Owens Wiwa, a physician, has observed higher rates of certain diseases like bronchial asthma, other respiratory diseases, gastroenteritis and cancer among the people in the area as a result of the oil industry (NEST, 1991)⁽⁴⁵⁾.

Responding to claims for environmental justice, Nigerian military forces have used terrorism as a means of intimidating and stopping the environmental demands. Since the Rivers State Internal Security Task Force began working, it has been held responsible for the deaths of more than two thousand Ogonis and for the destruction of 27 villages. Nine pacifist leaders were hanged after trials in military courts. Two witnesses that accused them later admitted that Shell and the military had bribed them with promises of money and jobs at Shell. Shell admitted having given money to the Nigerian military, who brutally tried to silence the voices which claimed justice.

In March 2001 the US Supreme Court approved a lawsuit filed against the company. The attorneys defending Shell and its subsidiary Shell Transport & Trading argued that the US could not authorise a lawsuit for crimes which happened in other countries, even if they involved international law. Relatives of Ken Saro-Wiwa and John Kpuinen, leaders of the protests against oil drilling in Ogoni land, Nigeria, presented the case in 1996 at a New York federal court. As a result of the protests against Shell, the military government that ruled Nigeria repeatedly tortured the two activists. Saro-Wiwa and Kpuinen were hanged in 1995, after being found guilty of murder.

In Brazil, Shell contaminated an area in Vila Carioca, in the city of São Paulo. For an extended period of time, the company buried fuel storage tank sludge in the area. The groundwater and the soil have been contaminated by high concentrations of aromatic hydrocarbons and heavy metals. Today the area is going through a remedial process monitored by CETESB.

VII. CONCLUSIONS

In the face of the information presented and of the data provided by this report, Greenpeace concludes that Shell Chemicals of Brazil has acted in a manner which is at the very least irresponsible, if not criminal, during the operation of the pesticide manufacturing plant in Paulínia. It is clear that industrial processes, especially incineration, were not monitored and waste disposal was done in a completely unacceptable manner.

The company has shown an extreme unwillingness to determine the extent of the problem and a lack of responsibility in regards to the environment and the health of local residents, claiming that the contamination levels found do not cause health problems. For this reason the environmental liability of the area as well as the health impacts caused by the plant's operation have not yet been determined.

In the face of these conclusions, and facing the imminent contamination of the Atibaia River, Greenpeace demands that

- 1.** Shell provide a full inventory on the extent of the contamination of the affected area;
- 2.** Shell fund comprehensive testing of vulnerable food supplies, such as milk, meat, fish and eggs.
- 3.** Shell immediately decontaminates the affected area. The decontamination plan must be discussed with the community and approved by the authorities.
- 4.** Shell adopt alternative technologies to incineration for the elimination of the waste generated by the remediation process;
- 5.** An epidemiological and clinical study be done with all people directly affected, including the people from the Recanto dos Pássaros neighbourhood, workers and former workers of the facility;
- 6.** The company accepts the community's demands, including compensation and lifelong complete medical service for all people affected by the contamination generated by Shell.

7. The Federal Government commit to the elimination of POPs and its sources in a nation-wide program

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