

Seveso – 30 Years After

A chronology of events

Alleviating the consequences of the accident: milestones between 1976 and 2006

Prehistory

1963

Roche acquires the fragrances and flavours firm Givaudan S.A. in Vernier, Geneva.

1965

Givaudan acquires a majority stake in Icmesa S.p.A. (*Industria Chimica Meda Società*) in Meda near Milan, Italy.

1969

Givaudan acquires the remaining share capital of Icmesa, which manufactures intermediates for further processing in the Group (fragrances, flavours, cosmetics and pharmaceuticals).

1969-1970

Icmesa starts trichlorophenol (TCP) production. Givaudan needs high-grade TCP for the production of hexachlorophene, a disinfectant used in medicinal soaps.

1970 to July 1976

Rising TCP production, all of which is delivered to Givaudan.

1976

Friday, 9 July

14.30 hours

Seveso/Icmesa. Dr Paolo Paoletti, director of production at Icmesa, discusses the production programme with the various foremen, including the one responsible for *Building B*. As usual in Building B, trichlorophenol (TCP) was to be produced. Trichlorophenol is an intermediate used in the production of the disinfectant hexachlorophene.

16.00 hours

The TCP reaction vessel is filled with the various starting materials.

Saturday, 10 July

02.30 hours

Icmesa. According to the temperature diagram the reaction is completed.

04.45 hours

The foreman in charge gives the order to interrupt a distillation which is not completed. The heating is turned off and the vessel contents mixed for a further 15 minutes. The last measured temperature is 158°C.

06.00 hours

The night shift is over. The workers leave the factory, and only the cleaning and maintenance crew remains behind.

12.37 hours

The rupture disk in the safety valve bursts as a result of excessive pressure, caused by an exothermic reaction in the TCP vessel.

A chemical mixture in the form of an aerosol cloud escapes into the air in a south-easterly direction. It is later learned that the mixture falls mainly on the communes of Seveso, Meda, Cesano Maderno and Desio.

13.00 hours

A foreman present at the plant telephones Dr Clemente Barni, the deputy head of production, who is on standby call that day.

13.10 hours

Dr Barni arrives at the Icmesa plant.

13.45 hours

A foreman turns on the cooling system, thereby stopping the escape of the mixture.

14.30 hours

Dr Barni inspects the area immediately surrounding the factory but notices nothing out of the ordinary.

17.45-18.30 hours

Dr Barni inspects the immediate surroundings of the factory and warns the inhabitants not to eat any local vegetables or fruit.

19.00 hours

The factory porter is instructed by Dr Barni to reach the *ufficiale sanitario*, the local health officer for Seveso and Meda, Professor Giuseppe Ghetti. He is absent, and it is not possible to find out who his deputy is.

20.30 hours

Dr Barni telephones the *carabinieri* of Meda and reports the incident. He inquires whether damage has been reported and requests that any such reports should be transmitted to Icmesa.

Sunday, 11 July

08.00-10.30 hours

Icmesa. Dr Paoletti and Dr Barni inspect the surroundings for signs of damage to plants.

10.30-11.25 hours

The Icmesa management tries unsuccessfully to reach the *ufficiale sanitario* or his deputy.

14.05 hours

Dr Paoletti reaches Herwig von Zwehl, the Technical Director of Icmesa, who had gone away for the weekend. They decide on the following procedure: they would first see the *ufficiale sanitario* or his deputy; then visit the mayor of Meda, Fabrizio Malgratti and the mayor of Seveso, Francesco Rocca; they would again contact the *carabinieri* and then collect samples for analysis from the vessel and in the surrounding area.

14.15 hours

Von Zwehl telephones Dr Jörg Sambeth, the Technical Director of Givaudan in Geneva, the parent company of Icmesa. They decide to send the samples the same evening by courier for examination in Switzerland.

15.00 hours

Dr Paoletti again unsuccessfully tries to reach the *ufficiale sanitario*.

16.10 hours

Dr Paoletti and Dr Barni visit the mayor of Seveso and request that the inhabitants of the presumably affected areas be warned not to eat or even touch fruit and vegetables. They also request an interview with the mayor of Meda.

17.00 hours

At the *carabinieri* station in Meda, two representatives of Icmesa meet with the mayor of Meda, the chief surveyor of the commune, the officer in charge of the Meda police station and a municipal policeman (*vigile urbano*). The Icmesa representatives request that the population be warned not to

eat or even touch fruit and vegetables. They also state that in all likelihood the aerosol mixture which escaped consists of sodium trichlorophenate, caustic soda and solvent, but possibly other toxic substances as well.

18.00 hours

Dr Barni, together with a *carabiniere* and a *vigile urbano*, go around the area of Meda and warn the inhabitants. It is not possible to do the same in Seveso as the mayor cannot find any *vigile*.

Monday, 12 July

05.30 hours

Icmesa. Dr Barni closes off Building B.

10.30 hours

Dr Uberti, the deputy of the *ufficiale sanitario* of Seveso, inspects the factory premises. *Givaudan Dübendorf*. Arrival of the first samples. The laboratories work round the clock and produce the first results on 14-15 July.

Tuesday, 13 July

Icmesa. Dr Paoletti and Alfio Marcolini, the commercial head of *Icmesa*, learn that some small animals have died.

Wednesday, 14 July

Icmesa. The first signs of skin inflammation occur in children.

23.00 hours

Dr Sambeth informs von Zwehl that the samples contain traces of dioxin (TCDD). The precise quantity of dioxin that escaped could not be determined after the accident. Estimates by experts vary from a few hundred grams to a few kilograms at most.

Thursday, 15 July

09.00 hours

Icmesa. Marcolini tries unsuccessfully to arrange a meeting with the mayors of Meda and Seveso.

11.15 hours

The factory doctor, Dr Ernesto Bergamaschini, examines the affected inhabitants and all *Icmesa* factory workers, first of all those who were involved in the TCP production process. He finds no signs of toxicity in the factory workers. In the neighbourhood families, however, he finds some cases of acute skin inflammation, particularly in two children. All those affected are hospitalized.

18.15 hours

A meeting is held at the communal offices of Seveso. The *Icmesa* representatives again ask the population not to eat or touch fruit or vegetables. Von Zwehl points out that the substance which escaped is highly toxic. The need for evacuation of the area is discussed. The mayor of Seveso issues Decree No. 43, declaring the area of San Pietro, to the south of the *Icmesa* premises, contaminated. Warning signs are to be put up and the danger zone fenced off. The mayor of Meda issues Decree No. 2 in which the area of San Pietro is declared to be contaminated. This zone includes area of the communes of Seveso and Meda. He also prohibits consumption of fruit or vegetables from this zone. *Switzerland*. Dr Sambeth and Dr Bruno Vaterlaus, head of research at *Givaudan* in *Dübendorf*, travel to Roche Basel to discuss the situation with the Technical Director, Reto Schett. Dr Giuseppe Reggiani, director of Clinical Research at Roche Basel, is instructed by the management of Roche to investigate the possible effects of the accident on the health of the *Icmesa* employees and the local population and to take all necessary measures to prevent or treat any damage to health.

Friday, 16 July

18.15 hours

The mayor of Seveso and his deputy, Dr Uberti, as well as eight further members of the communal executive meet. Dr Uberti reports that between 12 and 16 children have been hospitalized. The

evacuation recommended by Icmesa is postponed. Professor Ghetti, the *ufficiale sanitario*, is called back from his holidays for consultation on this question.

19.00 hours

Dr Barni and Dr Bergamaschini visit the families in the neighbourhood and recommend that they voluntarily evacuate their houses. The occupants of two houses are evacuated.

Saturday, 17 July

Icmesa. The management orders the factory to be closed as a precautionary measure. Dr Reggiani arrives and arranges for four of the twelve hospitalized children to be transferred from the local hospital to the *Niguarda* Hospital in Milan, which has special equipment. On Sunday, 18 July he gives the doctors in Milan and Desio all available documentation on the toxicology of TCDD.

19.30 hours

Icmesa. Discussion with representatives of the Italian health authorities (including Professor Ghetti and Dr Aldo Cavallaro, head of the provincial Laboratory for Hygiene and Prophylaxis). Von Zwehl announces that in the accident TCDD was released. The *ufficiale sanitario* questions the extent of the danger presented by this substance.

Sunday, 18 July

10.00 hours

Seveso. The mayor of Seveso has called a further meeting in which the Icmesa representatives, Dr Cavallaro, Professor Ghetti, the district judge Salvatore Adamo and representatives of the works council participate. Professor Ghetti and Dr Cavallaro decide to travel to Givaudan in Dübendorf to have the results of the analysis directly confirmed by the chemists and to familiarize themselves with the methods of detecting TCDD.

16.00 hours

The factory is officially closed and the entrance to Building B sealed.

Monday, 19 July

Milan. Professor Ghetti and Dr Cavallaro receive documentation on the methods used for detecting TCDD.

Tuesday, 20 July

Dübendorf. The Givaudan chemists confirm for Professor Ghetti and Dr Cavallaro that TCDD was found in the samples. They receive a map showing the places where dioxin was found.

Wednesday, 21 July

Icmesa. During a meeting on the premises of Icmesa with Rocca and the works council members, von Zwehl is arrested. In the courthouse of Desio he meets Dr Paoletti who has also been arrested for causing an accident. They are questioned by the district judge Adamo. *Milan*. Professor Ghetti and Dr Cavallaro inform the prefect of Milan and the provincial health officer that the initial analyses have revealed relatively high amounts of TCDD. The prefect calls a meeting of the health board of the Region of Lombardy, to which experts from the Ministry of Health in Rome and the *Istituto Superiore di Sanità* are invited. Part of the area of the communes of Cesano Maderno and Desio are also found to be contaminated. Measures similar to those for Meda and Seveso are taken. *Basel*. Dr Reggiani contacts experts from the firms Coalite (Great Britain), BASF (West Germany), Philips-Duphar (Holland), Chemie Linz (Austria) and Dow Chemicals (USA), which have all had dioxin accidents. All the experts recommend evacuation of the population. Although the extent of the contaminated area is not yet known, Dr Reggiani decides to recommend to the Italian authorities that the inhabitants should be evacuated and travels to Milan for this purpose.

Friday, 23 July

Milan. The specialists invited the previous day by the prefect of Milan to a meeting are of the opinion that no further protective measures are necessary. Vittoria Rivolta, the Minister of Health of the Region, declares on television that the measures taken are sufficient. Dr Reggiani, who has already spoken with the mayor of Seveso in order to have the population evacuated, tries the same morning to speak at the meeting at the prefect's office in Milan to recommend this urgent measure. He is turned down because he cannot prove that he is an official emissary of Givaudan and Roche. *Seveso.* Towards the evening, Dr Reggiani succeeds in speaking to Rivolta in the communal offices of Seveso. He tries to persuade him of the necessity of evacuating the population. Rivolta then declares his willingness to call another meeting the next day.

Saturday, 24 July

Milan/Evacuation. In place of Dr Reggiani, who has returned to Switzerland on learning that he is being sought by the Italian police, Dr Vaterlaus appears with an authorization from Givaudan. He gives the authorities a map with details of the contaminated area southeast of the Icmesa premises. In the accompanying letter Dr Guy Waldvogel, Director of Givaudan SA and member of the Board of Directors of Icmesa, strongly urges that the contaminated area should be evacuated. The same evening Dr Cavallaro confirms that the responsible Italian laboratory has found traces of dioxin in soil samples. Evacuation has become unavoidable. *Medical monitoring.* Givaudan recommends to the Italian authorities that the medical supervision of patients should be continued even after symptoms have regressed and should be extended to all persons living in the contaminated areas.

Sunday, 25 July

Seveso. The evacuation is prepared and the population informed. The area to be evacuated is fenced off. Dr Cavallaro travels to Zurich with Professor Franco Pocchiari, head of the *Istituto Superiore di Sanità* and other representatives of the health authorities to discuss matters with European dioxin experts and representatives from Givaudan.

Monday, 26 July

Evacuation. To start with, 208 people from 37 houses leave the contaminated area. In order not to take the poison with them, they are allowed to take only those personal effects which were in closed containers at the time of the accident. Before they arrive at their provisional quarters in the Hotel Leonardo da Vinci in Bruzzano, they are examined by a doctor. On the basis of new analyses, Zone A is extended. *Animal deaths/ slaughter.* Approximately 3300 animals perish, mostly poultry and rabbits. Emergency slaughtering is decreed to prevent TCDD from entering the food chain. By 1978 some 77,000 animals will have been slaughtered.

Wednesday, 28 July

The health authorities of the Region of Lombardy create four committees to deal with the following problems: medical monitoring of the population, analysis, decontamination of the site and veterinary medicine. A further 19 persons are evacuated. A total of 40 houses have had to be abandoned.

Friday, 30 July

Zone plan. The contaminated area is divided into three zones. Zone A has the highest degree of contamination (more than 50 micrograms per square metre). The contamination is less severe in Zone B (5-50 micrograms per square metre), while in Zone R no TCDD or only slight traces (less than 5 micrograms per square metre) are found. Zone A is further divided into 7 subzones according to the severity of contamination. The number of people affected in Zone A is 736 (they are all evacuated), in Zone B about 4700 and in Zone R about 31,800.

July - August

Health. 1600 people of all age groups are examined at the outpatient clinic in Seveso. 447 of them are suffering from acute skin lesions, presumably caused by the escape of chemicals. The patients recover within two to three weeks. The first cases of chloracne are recorded at the end of August.

Monday, 2 August

Evacuation/monitoring of health. New analyses make it imperative to evacuate a further 500 people from 90 houses in Zone A. After a medical examination, they are housed in the AGIP motel in Assago near Milan. A total of 736 persons have now been evacuated. The health authorities decide that children and pregnant women should leave Zone B during the day to minimize the danger of contact with TCDD. *Abortion.* The regional health authorities permit pregnant women in the contaminated zones to decide freely whether they wish to continue their pregnancy to the full term.

Tuesday, 3 August

Advice centre for pregnant women. In Seveso an advice centre for pregnant women is set up. At this point, the doctors are unable to tell the women with any certainty whether TCDD is teratogenic or not.

August

Abortion. In view of the risk of giving birth to a deformed child, some women decide to have an abortion.

Wednesday, 4 August

Cimmino Commission. The Italian government sets up a technical-scientific commission reporting to the Ministry of Health. Its task is to work out and propose decontamination measures for the affected area. This commission will later be known as the Cimmino Commission, after its chairman, Professor Aldo Cimmino.

Thursday, 5 August

Lombardy. The government of the Region of Lombardy issues Decree No. 25 on 'Regional measures to aid the affected population'. A committee is created, under the chairmanship of the Regional Health Minister, to coordinate all activities in the Seveso area.

Tuesday, 10 August

Rome. The Italian government grants a loan of 40 billion lire to the Region of Lombardy to finance reclamation of the contaminated area as well as medical and welfare payments.

Wednesday, 11 August

Basel. Dr Adolf W. Jann, Chairman of the Board of Directors of Roche, and Dr Waldvogel give a press conference. The Roche Group commits itself to covering the costs of the damage.

Friday, 13 August

Milan. The government of the Region of Lombardy sets up the Giovanardi Commission (named after its chairman, Augusto Giovanardi, the former Director of the Milan Institute of Hygiene). This commission is to implement the proposals of the Cimmino Commission.

Tuesday, 24 August

Decontamination proposal. Givaudan submits an initial decontamination plan worked out by the British engineering firm Cremer & Warner.

September

Milan. After closing the factory, Icmesa opens an office in the centre of Milan to ensure efficient contact with the regional authorities. *Seveso, Zone A.* In spite of the guards, people are continually entering the off-limits Zone A. The area is thus sealed off with more stable, higher fences. *Lombardy.* The Region grants Givaudan authorization to decontaminate houses in Zones A6 and A7.

Autumn

The Region of Lombardy studies the possibility of constructing a high-temperature incinerator in the heavily contaminated zone in order to destroy the contaminated earth and buildings. The project meets with the opposition of the local population.

Tuesday, 23 November

An agreement reached between the Region of Lombardy and Givaudan governs the use, removal and disposal of chemicals and raw materials from the factory.

1977

January

Lombardy. The regional government approves five *programmi operativi* (action plans): 1. Analysis of the contamination of soil, water and vegetation as well as measures to decontaminate and reclaim the soil and buildings. 2. Aid and medical monitoring programmes in the health sector. 3. Aid in the social and educational fields. 4. Reclaiming public buildings and facilities such as athletic grounds; and restoration, where possible, of the area to its state before the accident. 5. Aid for the trade and industry in the affected area which suffered damage as a result of the accident.

February

Milan/Compensation. The Milan office of Icmesa pays the first compensation payments to private individuals, farmers, tradesmen and businessmen.

May

Decontamination. The decontamination work on the houses and gardens of Zones A6 and A7 are completed on time. The insides of the buildings are cleaned with equipment for sucking up dust and water and the outsides with a special soap solution. The contaminated waste water is collected in special containers. In the gardens plants are removed and the surface soil is cleared away. The success of the decontamination work is assessed by means of wipe tests.

June

Seveso. The *Ufficio Speciale for Seveso*, a special bureau of the Region of Lombardy, subsequently with at times as many as 100 employees, is opened. It is responsible for putting the five action plans into practice and for coordinating all measures. Antonio Spallino is named head of this special bureau.

17 June

Health monitoring. A programme of systematic epidemiological health monitoring of 220,000 people is launched.

10 July

Seveso. First anniversary of the accident. In the meantime 7000 soil analyses have been made. A high, 4000 metre long fence now surrounds subzones A1-A5, while subzones A6 and A7 are sealed off by a smaller fence. The soil of subzones A6 and A7 is decontaminated. 112 houses, including gardens and yards, in subzones A6 and A7 are decontaminated. This also applies to schools and factories.

September

Comitato Internazionale dei Garanti. The International Steering Committee is founded to assess the toxicological and epidemiological data and findings of the health monitoring programme. The committee has renowned experts from all over the world.

14 September

Commission of investigation. The *Commissione Parlamentare d'Inchiesta* (parliamentary committee of investigation) is set up to determine the causes of the escape of toxic substances on 10 July 1976 at Icmesa and the potential risk to health and the environment by the industry. The committee consists of 15 members of parliament and 15 senators and is chaired by Dr Bruno Orsini.

15-16 October

Return. The first evacuated families return to their decontaminated houses. By year end a total of 511 persons can reoccupy their homes. Those houses in Zone A which are heavily contaminated are to be demolished and new houses built in another residential area of Seveso.

November

The decontamination work begins in Zone B.

1978

Spring

Seveso. The programme for reclaiming farm land in zone B is started. The fields are ploughed and feed crops planted. The harvest is to be analysed and then destroyed. The dioxin content of the soil is also to be monitored.

2 June

Rome. The special loan of the Italian Republic is raised from 40 to 115 billion lire.

July

Icmesa. Removal of all chemical substances from the Icmesa premises is complete.

25 July

Report of investigation. The parliamentary commission of investigation publishes an extensive report in which both Icmesa and the local and regional authorities are criticized.

September

Milan. Settlement of claims for damages with private individuals is continued. Most cases are settled amicably out of court.

1979

Spring

Spring planting. On the basis of the previous year's positive analysis results with feed crops planted in Zone B, cereals and garden produce are planted for experimental purposes.

June/July and October/November

Rome. In Rome official discussions are held between representatives of the Region of Lombardy and Givaudan to consider the possibility of settling claims for damages by negotiation.

November

Seveso. The head of the *Ufficio Speciale*, Antonio Spallino, is succeeded by Senator Luigi Noè.

1980

January

Meda. The important feeder road from Meda to the Milan-Como motorway is decontaminated and opened to traffic.

February

Special disposal site. The Cimmino Commission approves the construction of a special disposal site in Zone A, a carefully planned and sealed basin with a volume of 85,000 cubic metres. The contaminated material from subzone A1 (vegetation, debris and earth) will be placed in it.

March

Lombardy/Geneva. Initial basic agreement is reached between the Region of Lombardy and Givaudan/Icmesa on a negotiated settlement of claims.

Spring/summer

Seveso. Decontamination work in subzone A1 is begun.

October

Seveso. One third of Zone R, or about 417 hectares, is released for agricultural use and horticulture.

19 December

Rome. In Rome, the agreement on the settlement of claims which had been reached between the Region of Lombardy and the Italian Republic on the one hand and Givaudan/Icmesa on the other is signed in the presence of the Italian Prime Minister, the President of the Region of Lombardy and representatives of Givaudan/Icmesa.

1981

July

Desio/Compensation. An out-of-court settlement is reached with the commune of Desio, according to which Givaudan pays the commune 1.45 billion lire.

September

Cesano Maderno/Compensation. Givaudan also reaches an agreement with the commune of Cesano Maderno for an indemnification of 2.85 billion lire.

October

Building B. At the request of the *Ufficio Speciale*, Givaudan commissions the Italian Atomic Energy Commission (ENEA) to work out a plan to dispose of Building B (where the accident took place).

November

Zone R. With a few exceptions, all parts of Zone R are approved for agricultural use.

1982

Spring

Disposal. Before the reaction vessel in Building B can be emptied, the residues must be disposed of. No viable solution can be found in Italy or in Switzerland. The negotiations subsequently conducted in various European countries are not successful. No one wants to dispose of the waste from Seveso, even though special waste disposal sites and high-temperature incinerators are available. In the spring of 1982 the Italian authorities recommend the firm Mannesmann Italiana, which had worked for the Italian Republic in the past. Mannesmann Italiana then submits a disposal plan, in which the company undertakes to ensure transport and disposal of all waste containing dioxin from the reaction vessel in a suitable and authorized site and to obtain all necessary Italian and foreign permits. On account of the origin of the residue, Mannesmann Italiana makes it a condition that the disposal site should be kept secret from Givaudan.

May

Seveso. Construction has begun of a second special disposal site for contaminated material from subzones A2-A5. Total capacity: 160,000 cubic metres.

June

Meda/Compensation. An out-of-court settlement is reached with the commune of Meda. Givaudan pays an indemnification of 1.3 billion lire.

29 June

Disposal tender. Mannesmann Italiana submits a written tender to Givaudan/Icmesa in which it affirms that it will ensure disposal at an authorized and supervised disposal site. At the request of Icmesa, it also declares its willingness to have the correct completion of the disposal certified by a notary public.

20 July

Tender accepted. On 20 July Givaudan accepts in writing the tender of Mannesmann Italiana.

July - September

Icmesa/Emptying the reaction vessel. When the official permits have been obtained, volunteers from Roche Basel begin the extensive task of emptying the vessel in a carefully planned operation conducted under strict safety precautions. By the evening of 9 September, 41 barrels are ready for transport.

10 September

Transport of the barrels. The contaminated residue from the reaction vessel, packed in 41 barrels, leave the Icmesa premises. The truck has an official escort as far as the Italian border at Ventimiglia by the Italian authorities.

14 October

Milan. Giuseppe Guzzetti, President of the Region of Lombardy, informs the *Consiglio Regionale* that 41 barrels with residue from the TCP reaction vessel have been collected from the Icmesa factory premises and have left Italy.

13 December

Notary's sworn statement. A notary public in Milan provides the Region of Lombardy and Givaudan with a sworn statement to the effect that the barrels have been disposed of at an unnamed, approved and supervised disposal site.

1983

23 February

Search for the barrels. The French Swiss television programme *A bon entendeur* reconstructs on film the journey of the 41 barrels to St-Quentin in France. After that, all trace of them is lost. Various hypotheses on the whereabouts of the barrels are put forward.

9 March

Letter of confirmation. In its letter dated 9 March 1983 to Icmesa, Mannesmann Italiana again declares that the barrels have been disposed of at an approved and supervised site.

25 March

France. The magazine *Science et Vie* publishes an article on the whereabouts of the barrels, mobilizing the French authorities and public opinion. Various sites are suggested.

March

Paris/Bonn. The French Minister of the Environment, Huguette Bouchardeau, writes to the West German Minister of the Interior, Friedrich Zimmermann, because she suspects that the barrels are in the Federal Republic of Germany. The search for the barrels is then taken up at German disposal sites.

30 March

St-Quentin. Bernard Paringaux, head of the disposal company Spelidec in Marseille and the second subcontractor of Mannesmann Italiana, who had arranged the transport of the barrels, is arrested in St-Quentin. He refuses to make any statement on the whereabouts of the barrels.

7 April

Kloten. Representatives of Roche and Givaudan learn from Mannesmann Italiana that the transport and disposal contract, contrary to the agreement, had been passed on to two subcontractors, Wadir in Geneva and Spelidec in Marseille, and that the final disposal site is not known to Mannesmann Italiana.

21 April

St-Quentin. The examining magistrate of St-Quentin in northern France questions two representatives of the Roche management on the whereabouts of the barrels. They confirm that they know nothing of the matter.

22 April

Basel. In a press release Roche appeals to any persons knowing the whereabouts of the barrels to give information and break their silence. It also undertakes, at its own expense and in cooperation with governments and authorities, to dispose of the barrels, once they are found, at a supervised disposal site or to destroy them in an authorized incinerator.

19 May

Northern France. The 41 barrels are found in an unused abattoir in Anguilmcourt-le-Sart, a village in northern France. The barrels are transferred the very same evening to a military base near Sissonne.

1 June

Berne/Basel. The Executive Council of Basel-City and the Swiss Federal Council grant the authorization for transfer of the dioxin barrels to a secure temporary storage site on the Roche premises in Basel.

4 June

Basel. The 41 barrels arrive in the early morning by truck in Basel and are placed in a prepared protected room at Roche Basel.

May/June

Basel. Ciba-Geigy AG declares its willingness to incinerate the residue in its recently renovated high-temperature incinerator provided the necessary preliminary tests are positive.

15 July

Berne/Basel. On 15 July 1983 the authorities of the Swiss Confederation and of the Canton of Basel-City announce the organizational measures and the division of responsibility for the work involved in destruction of the waste.

July 1983 - March 1984

Planning. Plans für the safe incineration of the dioxin waste are worked out. The proposed solutions are approved by the advisory board and by the federal and cantonal authorities.

September

Seveso/Compensation. Givaudan also settles out of court with the commune of Seveso. The indemnification amounts to 15 billion Lire.

24 September

Criminal proceedings. The Criminal Court of Monza sentences five former employees of Icmesa and Givaudan to periods of imprisonment ranging from 2 1/2 to 5 years. The five accused all appeal against the conviction, claiming that the accident could not have been foreseen.

1984

February

Health. In its final report, the International Steering Committee points out that, with the exception of chloracne (a total of 193 patients), no ill effects can be attributed to TCDD.

April

Zone A. Decontamination of the most heavily contaminated area, Zone A, is completed. The second special disposal basin is covered and sealed. The Region of Lombardy has a park laid out over it.
Basel/Incineration test. In the high-temperature incinerator of Ciba-Geigy initial experiments are made with a test substance which has chemical and physical properties similar to those of TCDD, but is less toxic.

26 April

Identification of the barrels. In order to ensure that the barrels which were found are really those which left the Icmesa premises on 10 September 1982, they must be identified. Under the supervision of a notary public from Basel and of representatives of the Swiss Confederation, the Canton of Basel-City and the *Ufficio Speciale*, the inner barrels are removed from the outer barrels and provisionally identified.

May

Zone B. Zone B is authorized for construction, but not yet for agriculture or small livestock.

16 October

Identification of the barrels. In the presence of the Basel notary public and representatives of the Confederation, the Canton of Basel-City and the *Ufficio Speciale*, the inner barrels and their contents

are identified. The weight and the inscription on the inner barrels are checked. The contents of the barrels are analysed and compared with samples from earlier analyses. On the basis of the findings, it is certain that these barrels are in fact those containing reaction residue from Icmesa.

27 November

Test incineration. The first test incineration of about 10 kilograms of dioxin-contaminated waste is carried out.

1985

19 March

Test incineration. On the basis of the positive analysis results of the first test incineration of dioxin-contaminated residue, a second incineration test, involving 360 kilograms, is approved. This takes place on 19 March 1985.

14 May

Criminal proceedings. The Court of Appeal in Milan finds three of the five accused not guilty. Two of the accused are given conditional sentences of two and one and a half years respectively. They are found guilty of having caused an accident by negligence. The two accused file a precautionary appeal to the Supreme Court in Rome.

7 June

Basel/Press conference. The impending incineration of the main batch of dioxin residue is announced at a press conference. The authorities also announce that a 42nd barrel will arrive from Icmesa, containing waste from the demolition of the building where the accident occurred. Its contents will be incinerated with those of the other 41 barrels.

17-21 June

Main incineration. As the results of the second test are also positive, the incineration of the main batch can be carried out as planned. Ongoing analysis of flue gases ensures that no TCDD escapes into the atmosphere during incineration.

18-21 November

In the Ciba-Geigy high temperature incinerator material with trace contamination is burned. This consists of analytical material, tools, protective suits and other material used in repacking die residue.

25 November

Berne/Basel. The federal and cantonal authorities announce in a press release that the material has been burned in the Ciba-Geigy high-temperature incinerator and promise that a final report on the waste disposal will be published in the second quarter of 1986. *Icmesa site.* In 1985 the remaining buildings on the Icmesa premises are demolished. Subsequent use of the land is still under discussion. Parts of the premises have been given to the Region of Lombardy, while negotiations continue on another part, on which the commune of Meda would like to set up athletic facilities. A third part will be reintegrated in the construction zone and sold to third parties.

1986

22 May

The Region of Lombardy sets up a foundation to study the relations between man and his environment. This foundation is based on the agreement of 19 December 1980 between the Region of Lombardy and the Republic of Italy on the one hand and Givaudan/Icmesa on the other. As part

of this agreement, Givaudan and Icmesa undertake to donate all property in Zone A plus a start-up capital of 500 million lire to the foundation to be set up by the Region of Lombardy.

23 May

The Supreme Court in Rome, the highest court of Italy, confirms the judgment of the Court of Appeal in Milan against the two remaining accused, even though the prosecuting attorney had called for their acquittal. This marks the end of the criminal proceedings in the Seveso case. In civil law, the Supreme Court confirms the disqualification - decided earlier by the Court of Appeal – of the trade union as a legitimate party in any civil suit. Further claims in civil law may be asserted for a limited period of time.

11 June

The final report of the expert committee on the incineration of the dioxin-contaminated waste from Seveso in the Ciba-Geigy incinerator is presented to the public at a press conference in Basel.

1993

October

A Euro-MP and a German TV journalist demand that the investigations into the accident at Icmesa should be re-opened. It is alleged that the dioxin-contaminated waste from Seveso has been landfilled in the Schönberg landfill in the German state of Mecklenburg-Vorpommern. Roche counters these unfounded allegations by issuing full documentation. As expected, no new facts are unearthed by the additional inquiries. The 41 barrels with the dioxin-contaminated waste from the reaction vessel were definitely identified and properly disposed of in Basel in 1985 under the supervision of an independent expert committee and the surveillance of the government of Switzerland.

30 November

A group of Roche experts presents all the facts at an open session of the environmental committee of the *Landtag* in Schwerin before representatives of the parliament and government of Mecklenburg-Vorpommern and then at a media conference. In particular, they provided evidence for the incineration of the 41 barrels containing reaction vessel waste in Basel and for landfilling of the contaminated plant parts and rubble in basins in Seveso.

1994

January

In mid-January the parliamentary commission in Schwerin that had been set up to investigate the "Schönberg landfill" conducts a hearing lasting several days. Roche accepts the invitation to participate in order to completely clarify matters. Further documents and film material are submitted. On January 14, Heinz Holliger, an eyewitness to the identification and disposal that took place in Seveso and Basel, testifies before the commission and confirms his testimony upon oath. No evidence to support the claims and allegations of the Euro-MP and German TV journalist is presented.

Autumn

The Schwerin parliamentary commission is dissolved at the end of the legislative period in the autumn of 1994. The "Schönberg landfill" commission set up by the new parliament is concerned solely with issues relating to the change of ownership after the dissolution of the GDR and to environmental liability. For Roche this marks the end of the "Schönberg" episode. The allegations are rejected both by the environmental committee of the Mecklenburg-Vorpommern Landtag and by the parliamentary commission.

2000

May

At a general meeting, the shareholders of Roche Holding Ltd vote to spin off Givaudan. The new independent company is based in Vernier (Geneva Canton, Switzerland).

Today

Civil litigation. A few civil suits for damages are still pending against Givaudan (none involving personal injury claims).

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