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DECONTAMINATION OF THE BRIANZA AREA (SEVESSO, MEDA, CESANO MADERNO AND DUSTO) CONTAMINATED BY DIOXIN

by Prof. A. Giovanardi

Seveso
The poisonous cloud released by the reactor of the ICMESA factory on July 10, 1976 moved in the direction of the prevailing winds at the time of the accident (from NW-NW to SE-SSE), leaving behind decreasing quantities of dioxin due to sedimentation. The contaminated area assumed a triangular shape, the vertex corresponding to the factory, with higher contamination in the north than in the south. The whole area covers 3-4 square kilometers,

The Decontamination Commission began its work at the end of July, when the boundaries of the affected area had already been laid out and the most seriously exposed population (730 inhabitants) had been evacuated from the A area (approximately 115 ha), which had high to extremely high concentrations of dioxin. Moreover, it had already been decided to allow the residents of the B area (numbering about 4000) to remain in the area of approximately 250 ha, contingent upon adoption of a series of health norms and behavioral rules set out by the Medical-Epidemiological Commission.¹

The main points of the program developed by the Decontamination Commission and approved by the Regional Council on

¹ Similar norms and rules have been adopted in the vast so-called "respect area" surrounding the A and B areas. In this area, animal breeding is also under strict surveillance.

August 24, 1976 are as follows:

- Removal of all vegetation in the A and B areas, plus removal of a layer of topsoil in a limited part of the A area (12-15 ha) adjacent to the ICMBES factory, for the purpose of reducing the quantity of dioxin present in the environment and minimizing the risk of its spreading to other areas.
- Allocation of a 10 ha experimentation area within the A area to be used for testing decontamination procedures for buildings and their appurtenances (courtyards, gardens, etc.), streets, squares, and the ground, where the concentration of dioxin is not extremely high.
- The possibility of adopting whatever effective techniques may be developed through experimentation or otherwise acquired, at any point in the sequence of decontamination operations.

It is clear from the above that the program is open to new developments through its application, and that it may be modified and improved accordingly. In regard to the considerable difficulties encountered in this work, it may be well to remember that this is perhaps the first time that a stable and extremely toxic substances such as dioxin has escaped from an industrial area and has come into contact with a large population.

The removal of vegetation (mechanical mowing of low-growing vegetation, cutting down of bushes, hedges, etc., defoliation and pruning of forest trees, etc.) began in the southern part of the unevacuated B area, which was the least contaminated. The operations will gradually be extended to the

A area, first in the southern part and then in the north, around the ICMESA factory. The grass, foliage, branches, etc. will be collected using all possible precautions and transported in covered trucks to a special zone within the A area, located near the incinerator and the soil deposit. All buildings, equipment and services necessary for decontamination operations are being set up in this area, or in an adjacent, uncontaminated area, both of which are easily accessible from all parts of the affected territory.

The removal of vegetation should be completed within two months. According to the first data available, this operation should eliminate approximately 1/3 of the dioxin present in the environment.

As previously mentioned, the decontamination program includes the removal of a 10 cm. layer of topsoil in the area adjacent to the ICMESA factory, covering about 12-15 ha, where the concentration of dioxin reaches and even surpasses 2000 ug./sq.m. The soil will be removed and transported to the A area in such a way as to avoid dispersion of the dioxin. The accumulated soil will then be covered and placed on an impermeable bed in order to prevent the dioxin from spreading along the surface (carried by rain or wind) and infiltrating into the lower layers of the ground.¹

The collected material will be burned in a special incinerator, the specifications of which are still under study.

¹ The highly contaminated A area has been fenced off, as recommended by the Technical Commission of the Italian Health Department.

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In particular, the characteristics to be decided upon include the type of structure best suited to the kind of material to be burned; the temperature and duration of combustion necessary to guarantee complete destruction of dioxin while preventing its formation from the trichlorophenol present; the ease of analysis of the gaseous effluent during operation. The incinerator will be equipped with a post-combustion device.

It is clear that reclamation of the areas affected by the accident involves more than removing the highly contaminated vegetation and soil. The remaining ground, the buildings (houses, schools, factories, etc.), their appurtenances (courtyards, gardens, driveways, etc.), squares, streets and all open areas must also be decontaminated. The experimentation now going on should provide valid recommendations as to the choice of techniques to be used. At present, the level of contamination in each of the above-mentioned categories is being determined using procedures laid out in the decontamination program, which also includes guidelines for testing the effectiveness of decontamination methods through the analysis of samples before and after each operation.

In conclusion, we may say that the decontamination program outlined above consists of three main lines of action:

- a. the removal of vegetation in the entire affected area plus removal of a layer of topsoil in the most highly contaminated zone, adjacent to the ICMSA factory;
- b. the selection of decontamination methods and techniques for different environmental substrates through laboratory

and field experimentation (the latter to be carried out in a limited part of the A area);

- c. extensive application of the most suitable methods and techniques, as determined on the basis of the experimentation described above, for complete reclamation of the contaminated area.

A "Program for the Surveillance and Study of the Dioxin Contaminated Areas" is about to be commissioned, for application both during and following decontamination. An important part of the program will be the study of the fate of dioxin in the environment, that is, its dispersion by rain, wind, animals, etc. and its leaching into the soil.

The final choice of methods will certainly not be easy, given the basic premise behind the reclamation of this industrial Lombardy area: to preserve the environment from both a hygienic and an ecological standpoint.

Advice and assistance, wherever they come from, will therefore be gratefully accepted and considered in an effort to solve the numerous problems of the Seveso area.