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PRELIMINARY REPORT OF INERTZEN ENVIRONMENTAL
SURVEY AT BLOOMINGTON DISTRIBUTION APPARATUS PLANT

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PRELIMINARY REPORT OF INERTEEN ENVIRONMENTAL
SURVEY AT BLOOMINGTON DISTRIBUTION APPARATUS PLANT

I. Background

The initial sampling at Bloomington was done in mid-October, 1971 by personnel of the Westinghouse Ocean Research Laboratory and the Westinghouse Environmental Systems Department.

The Bloomington portion of the Inerteen Environmental Survey has as its main objectives to determine if Westinghouse activities in Bloomington have caused readily identifiable leakages of Inerteen (polychlorobiphenyl--PCB) to the environment, and if so, to identify the sources of the material so that suitable corrective actions can be taken.

As a result of previous discussions with plant personnel, at the time of sampling, certain potential trouble areas had been identified. Inerteen appeared to leave the Westinghouse property by five routes: 1) shipment in sealed units enroute to the customer; 2) washing into the sanitary sewer during cleaning of finished units; 3) transporting of impregnated solid waste to sanitary landfill; 4) leaching from spills external to the building; and 5) shipment of waste liquids to Monsanto for reclaiming. Routes 2, 3, and 4 appeared to be the potential sources of trouble.

II. Results and Discussion

1. Movement of Inerteen via the Sanitary Sewer.

Until very recently (the last six months), during the manufacturing process capacitor cans were coated on the outside with

Inerteen which was removed by a washing process draining directly into the plant's sanitary system. This waste went into the Bloomington sewage works south of town. Two sewage treatment plants are located about one mile apart with effluents into Clear Creek (it is unclear whether the Westinghouse effluent goes into only one of these plants or both). The possible movement of Inerteen into Clear Creek was disturbing because Clear Creek meanders southward 12-15 miles and empties into the Monroe Reservoir--a large recreation area and Bloomington's source of water. Figure 1 shows the locations of the samples taken from Clear Creek. These samples very definitely show substantial movement of Inerteen into Clear Creek (the chromatograms were identical to the Inerteen used in the plant). An important point to notice is the drop from 64.2 parts per million (ppm) in B2 to 2.81 ppm in B3 further downstream. A sample (B19A) taken further downstream in the Monroe Reservoir about one mile from the intake to the Bloomington water supply shows 0.80 ppm of a similar pattern. More importantly, the tissue of an adult, carnivorous fish taken from the reservoir exhibited only low levels of the type of PCB found in fish from fairly clean water.

It would appear that, although substantial amounts of Inerteen were added to Clear Creek from the Westinghouse plant, this creek has a high enough bacterial population and sediment load due to the inputs from the sewage treatment plants to serve as a fairly effective biological filter for removing the Inerteen before it reaches the Monroe Reservoir. The creek also appears to have a limited food-chain which does not include fish so that movement of Inerteen from the creek to humans seems rather unlikely.

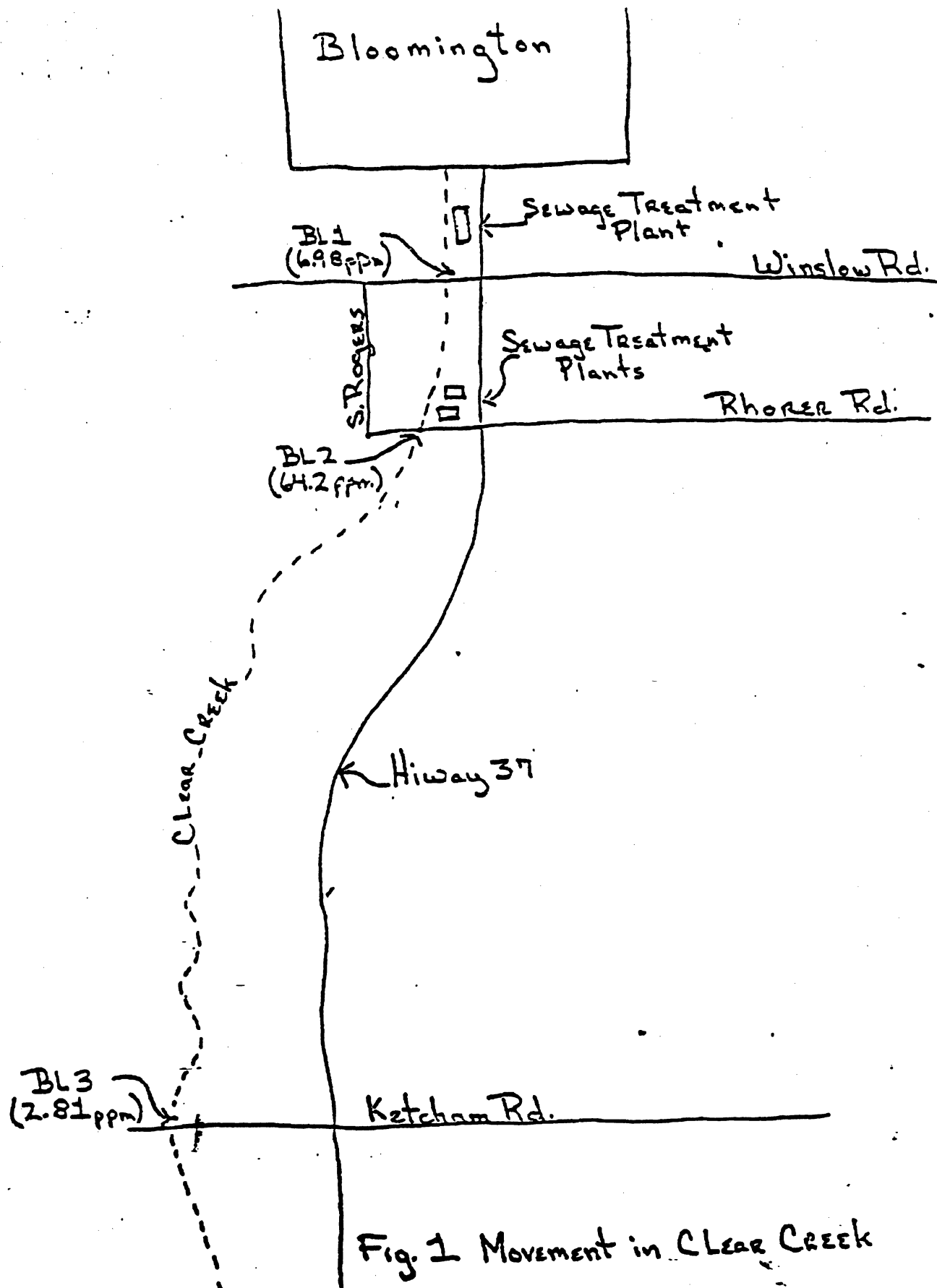


Fig. 1 Movement in Clear Creek

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Although the level of PCB's is about 50 times above the anticipated background for a clean lake, the fish sample does not reflect this fact. The manner in which the PCB moves into the reservoir from Clear Creek may prevent it from moving up the food-chain. Additional samples should probably be taken, however, to strengthen this point.

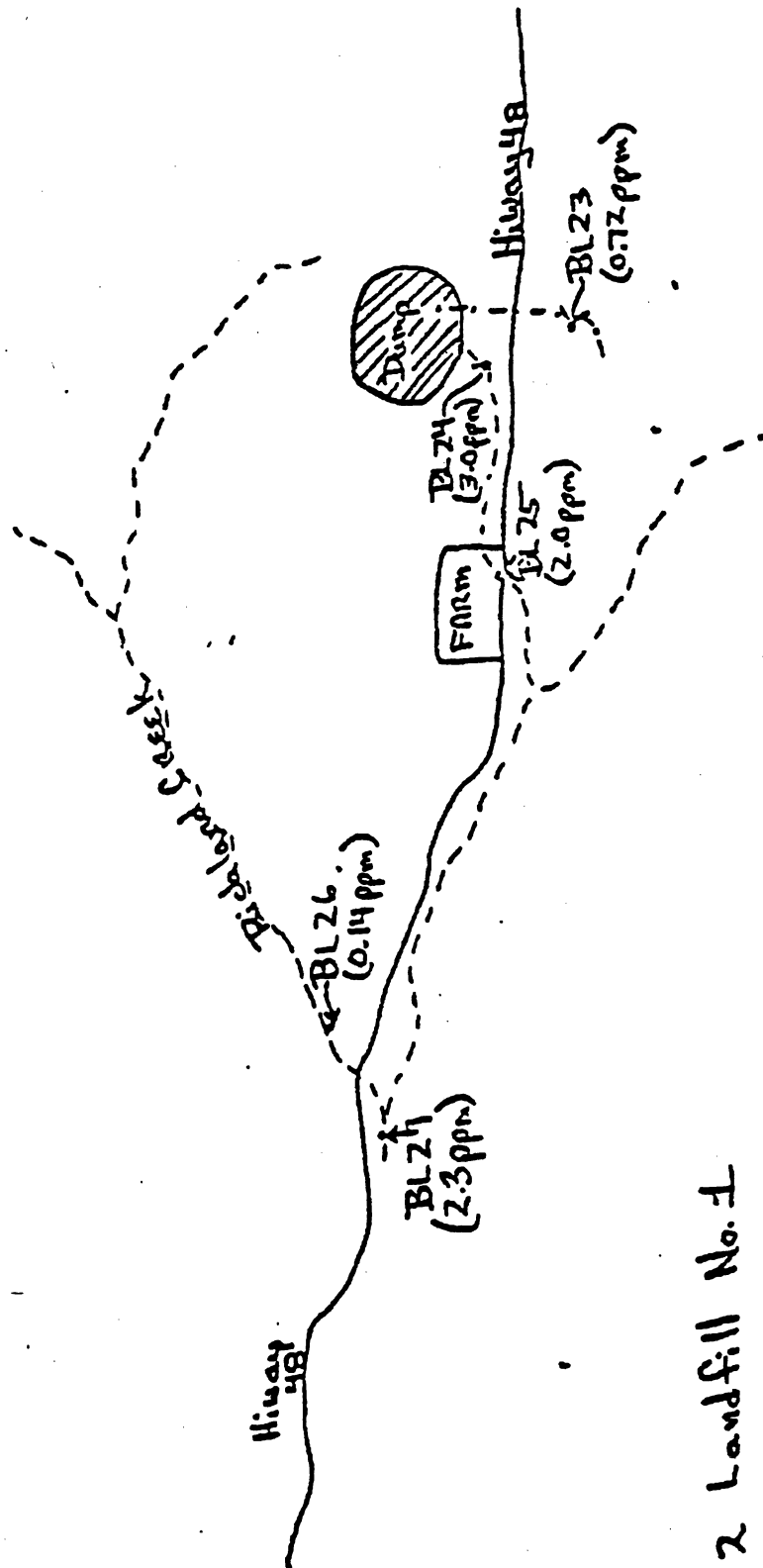
2. Movement of Inerteen from Sanitary Landfills.

Three widely separated sanitary landfills have been used for Inerteen disposal and, because each represents a very different situation, they will be discussed separately.

2.1 Sanitary Landfill Number 1.

During the approximate period 1957-1967, both solid and liquid Inerteen wastes were removed from the plant by an independent contractor for disposal in a sanitary landfill located on a side-hill adjacent to Highway 48 about three miles west of the plant. Although at that time this procedure was an accepted practice, the results have been rather unfortunate.

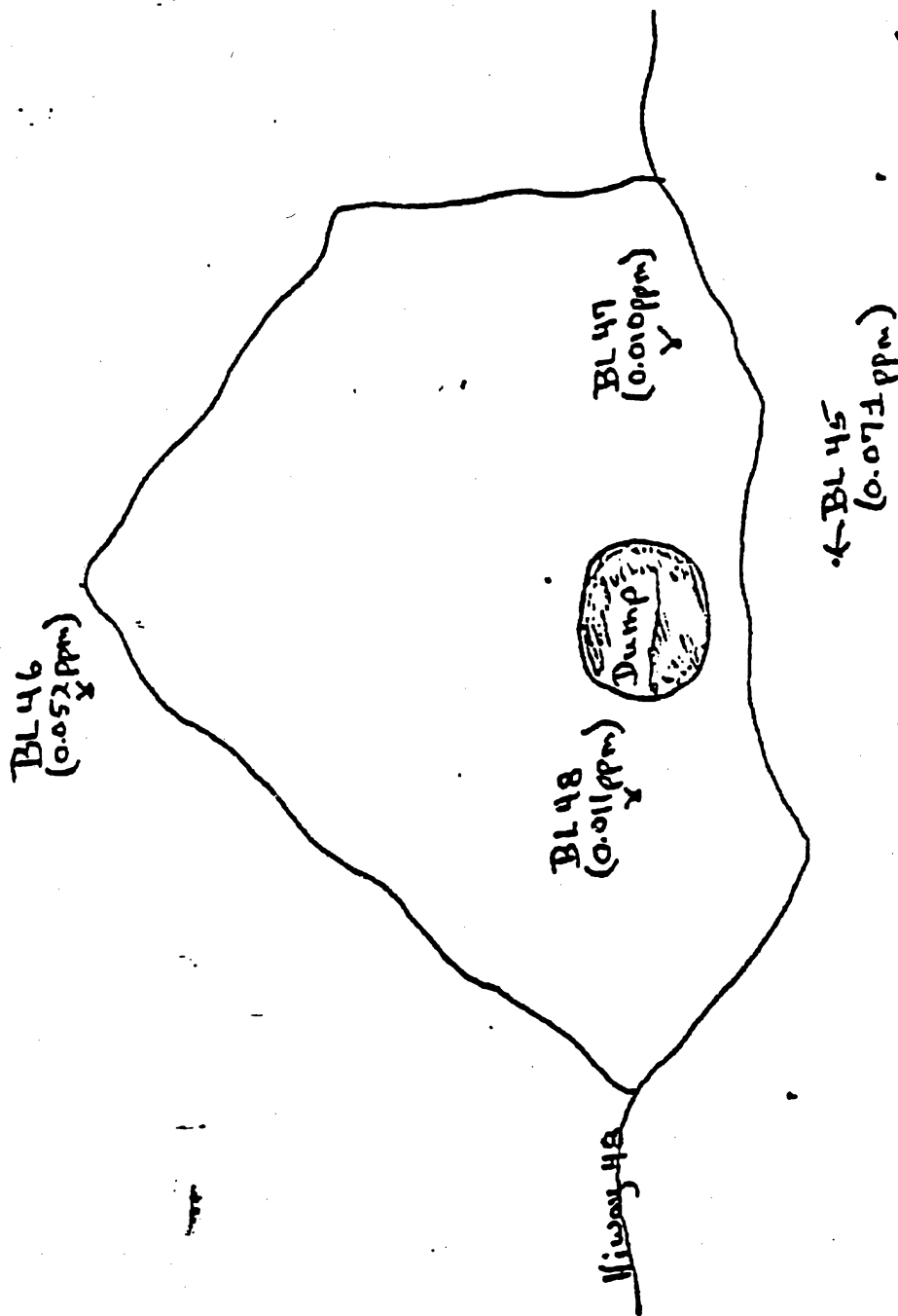
Figure 2 shows the locations of some of the samples taken from this landfill area. Samples B24 and B25 were taken from a gully which collects any leachates from the landfill, passes through an animal farm and joins Richland Creek. Judging from the 3.0 ppm just below the landfill, the 2.0 ppm on the edge of the farm and 2.3 ppm in the downstream position of Richland Creek, substantial Inerteen leaches from the landfill. The samples showed a complex pattern of PCB residues, probably due to biological degradation. A fish (Fish 1A) seined from Richland Creek contained 3.8 ppm of a similar PCB residue pattern.



FF 2 Landfill No. 1

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 Fig. 3 Aerial Fallout from Landfill No. 1

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Two of the samples were rather confusing: an upstream sample on Richland Creek (B26) contained 0.14 ppm Inerteen (about 10 times what one would expect from "background" environmental fallout) and a soil sample (B23) taken on a side-hill across from the landfill contained 0.72 ppm. One possible explanation was aerial fallout from the landfill, and, when inquiries yielded the information that the landfill operator had been cited on several occasions for open burning, additional samples were taken on the hillsides surrounding the landfill in June, 1972.

Figure 3 presents data from these samples taken around the landfill. Although none of the samples is alarmingly high, the samples north and south of the landfill show levels about five times higher than would be expected if aerial fallout had not taken place. Runoff from the slightly contaminated land north of the landfill could easily account for the high value of the upstream sample in Richland Creek. One can imagine a number of explanations for B23 being more than ten times higher than the later soil samples--a good possibility being that at one time the landfill operator sold waste Inerteen to the farmer to oil the road and carry-over contaminated the field next to the road.

The most disturbing aspect of the leaching from this landfill is that the gully runs directly through a farm where animals (pigs and cattle) are being raised. Several years ago, the farmer brought suit against the landfill operator claiming that materials leaching from the landfill were interfering with the reproduction of his cattle. He claimed that his cows

were having fewer calves and that the calves were smaller and less vigorous. The state of Indiana analyzed leachates from the landfill but did not find anything to support the charge (they probably did not look for PCB's). Whether or not PCB's could be causing the farmer's problem is difficult to say without actually sampling his animals, but experiments with laboratory animals have shown that PCB's do interfere with reproduction in the manner described above.

The leaching from this landfill could easily be getting into the human food-chain. Clearly in the case of the farm just below the landfill, PCB's could be contaminating the pigs and cattle. In addition, Richland Creek meanders through many farms where cattle undoubtedly drink from it. Dairy cattle exposed to very low levels of PCB's will produce milk with levels several thousand-fold increased over the amount ingested (contamination of milk is particularly serious because of the very large quantities ingested by small children, and the possibility that the milk ingested may come from the same contaminated source over long periods of time).

2.2 Sanitary Landfill Number 2.

During the approximate period 1968-1972 disposing of liquid Inerteen waste in sanitary landfill number 1 was discontinued and a new landfill (operated by a different independent contractor) was started for disposal of Inerteen contaminated solid waste only. This landfill is located about 20 miles northwest of the plant in a rather remote area.

The data in Figure 4 show that Inerteen is leaching from

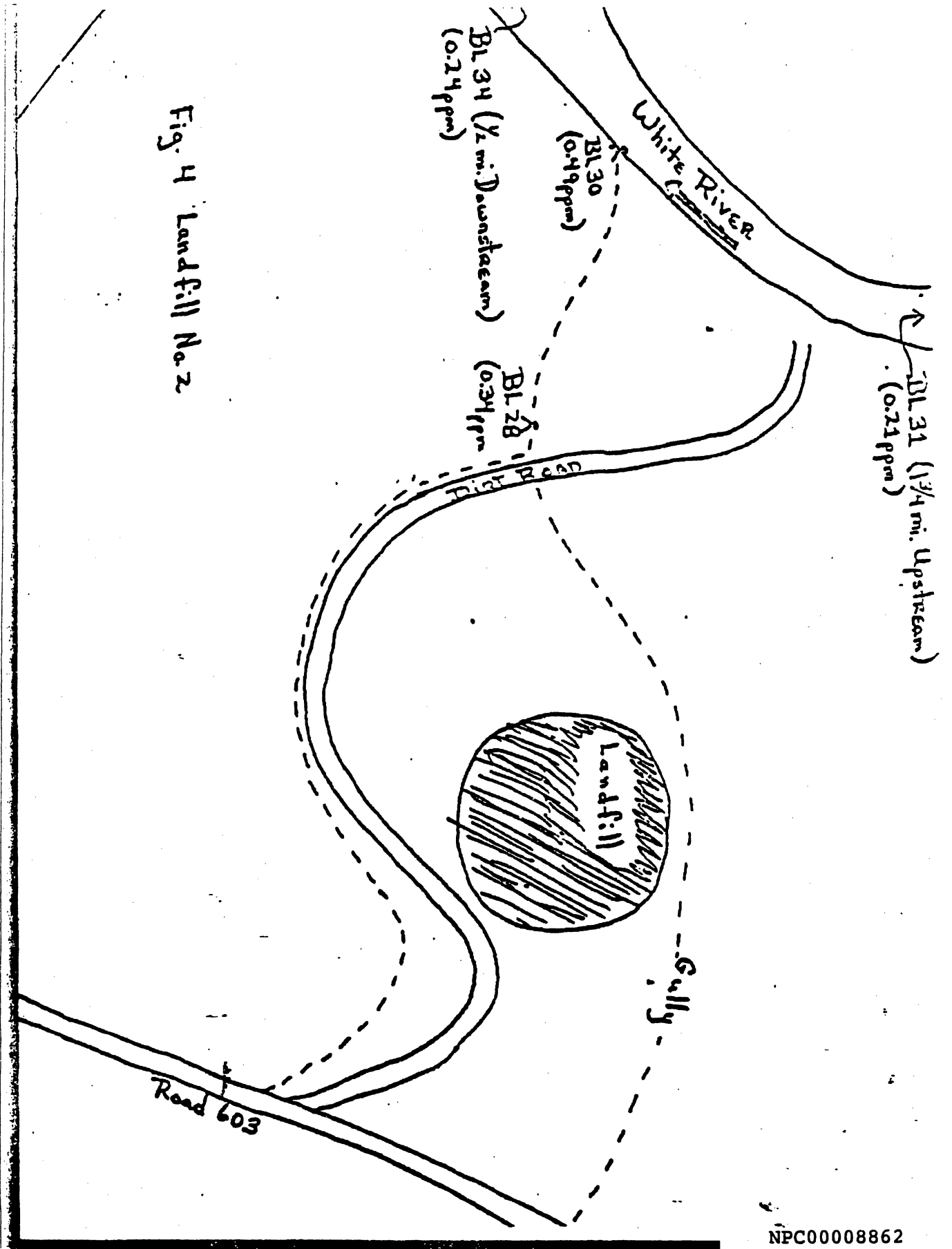


Fig. 4 Landfill No. 2

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this landfill also. B30 was taken from a pile of spoil which had washed down the gully and into the edge of the White River. When one compares the upstream sample on the White River (B31, .21 ppm) with the downstream sample (B34, .24 ppm) it becomes clear that, although material is leaching from the landfill, the river is already pretty well contaminated before it passes by the landfill area (as will be discussed later, however, the material could be emanating from the Westinghouse plant).

At first analysis, the data presented here seemed to clearly indicate that Inerteen contaminated solid waste could not be contained in sanitary landfill as had been asserted by the Monsanto Chemical Company. This landfill appeared to be an ideal test site (unintentionally of course): the landfill seemed well attended, it reportedly had received only Inerteen contaminated solid waste, and it was bounded by gullies sloping down toward a common junction. As it turned out, however, the case was not so simple. The landfill operator was removing capacitor cans from the plant which had not been emptied, and apparently the landfill was only properly covered-over when somebody had arranged to come out for an inspection. The conditions were bad enough that a game warden complained about the oily materials getting into the river from the landfill. Obviously, the data do not accurately reflect upon disposal of Inerteen contaminated solid waste in a sanitary landfill.

2.3 Sanitary Landfill Number 3.

During 1972 a third landfill site was used for disposal of solid waste contaminated with Inerteen. Prior to using the

site, baseline samples were taken around the area for PCB analysis. These samples all showed traces of very "weathered" PCB residues in the .010-.015 ppm range--typical of areas throughout the country which have only received PCB's from atmospheric fallout.

3. Movement of Inerteen from the Plant.

At the time of sampling the most likely area for movement from the plant appeared to be from the north side of the building where the tank cars delivered the material. All of the drainage from the plant grounds seemed to move northward toward Stout Creek.

The data presented in Figure 5 show the Inerteen levels around the plant. As was expected, all samples contained Inerteen and the area where the tank car comes in is quite high. The B16 sample seemed higher than would be expected if this culvert receives drainages only from the other ditches around the plant.

The most surprising samples were those at the south side of the building--B10 at 6,300 ppm is 20-fold higher than the highest sediment sample which we had analyzed prior to this program. The material from the south side of the building appears to move southward into a small gully.

Figure 6 shows samples taken off the plant grounds in the drainage leading to Stout Creek. Obviously a considerable amount of Inerteen leaves the plant grounds and moves into Stout Creek. B22 shows 23.1 ppm in Stout Creek, more than two miles from the plant.

Figure 7 shows movement of the Inerteen into the Beanblossom Creek and on into the White River. A fish sample at the junction of

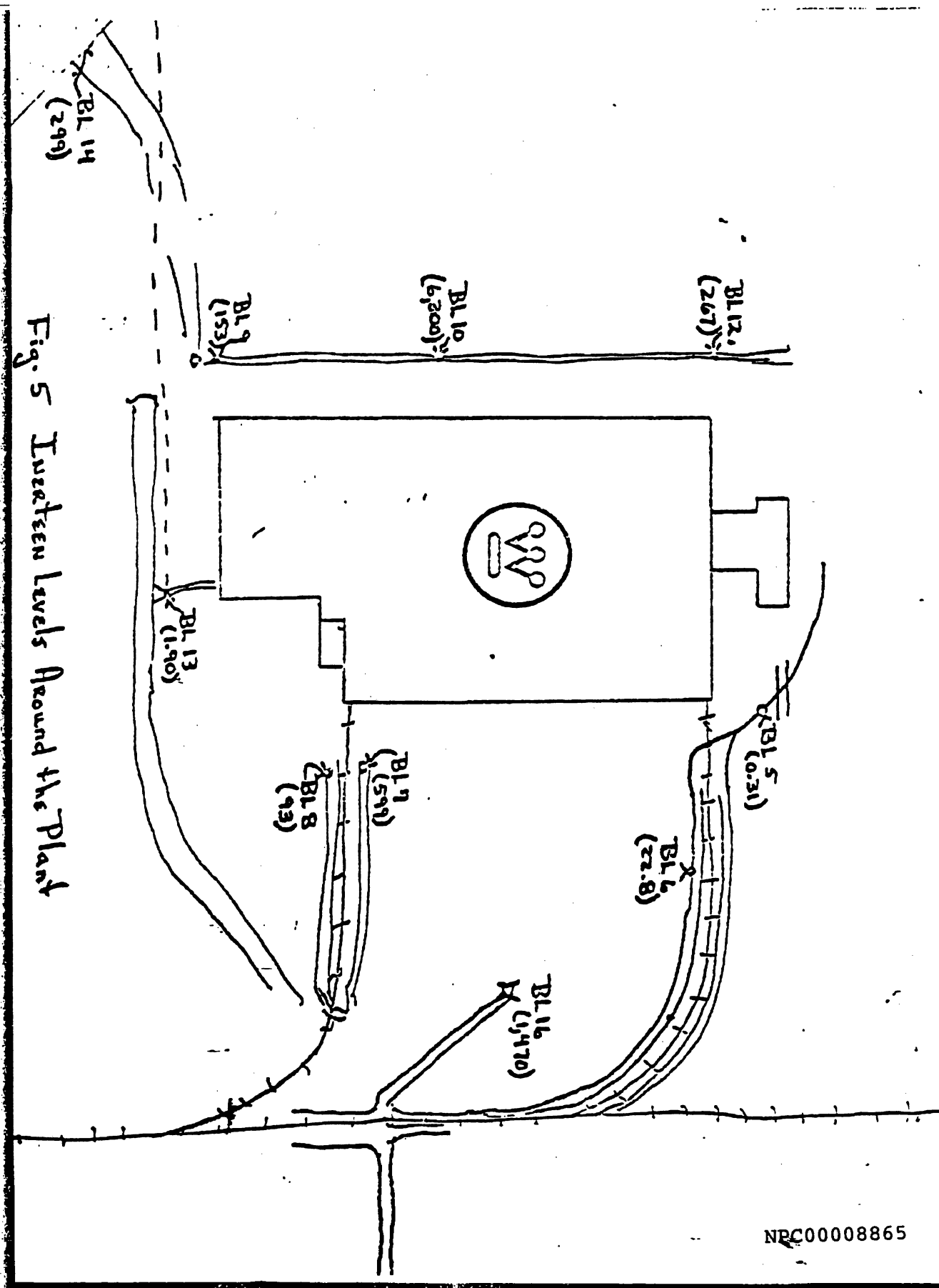
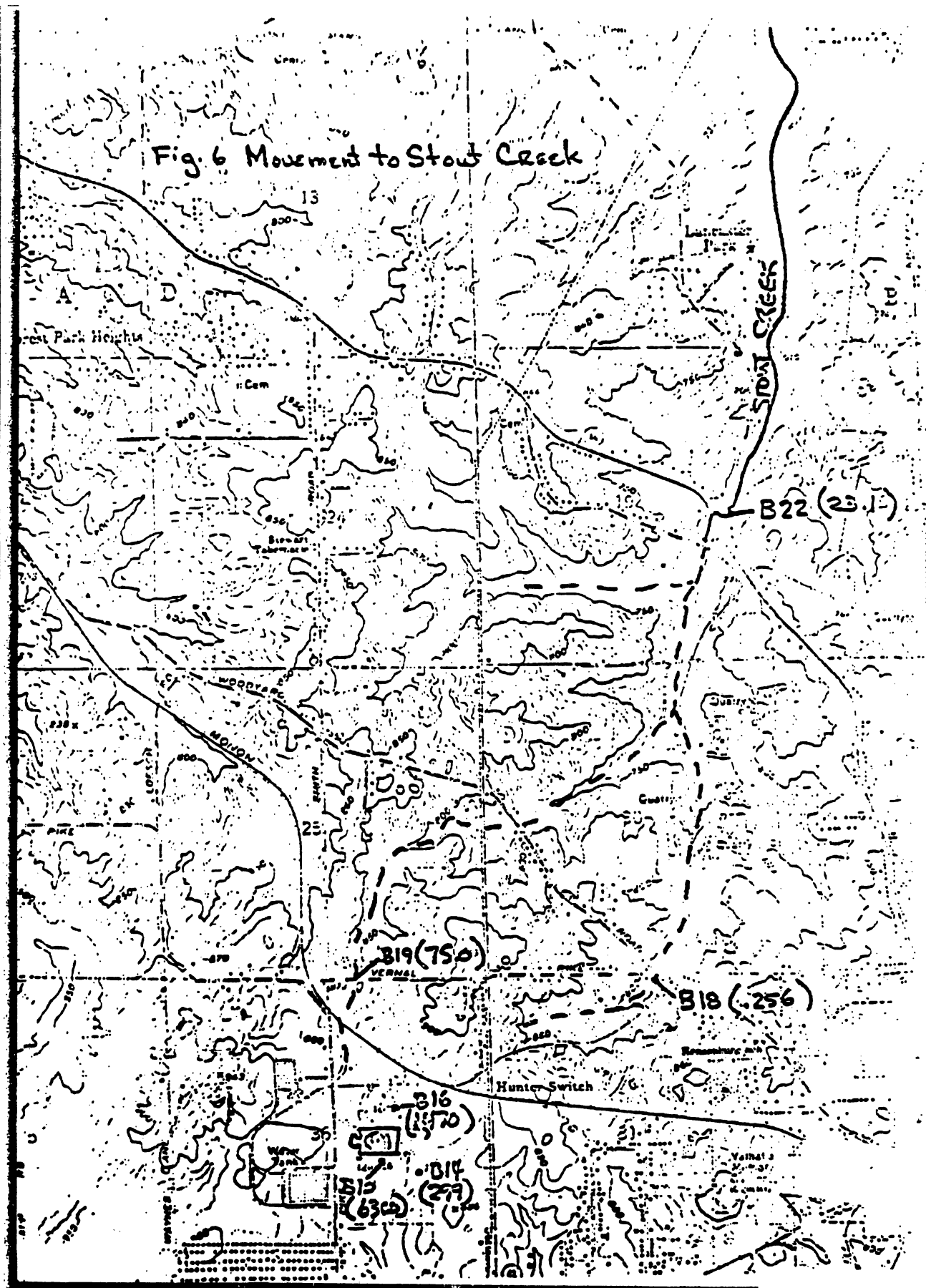


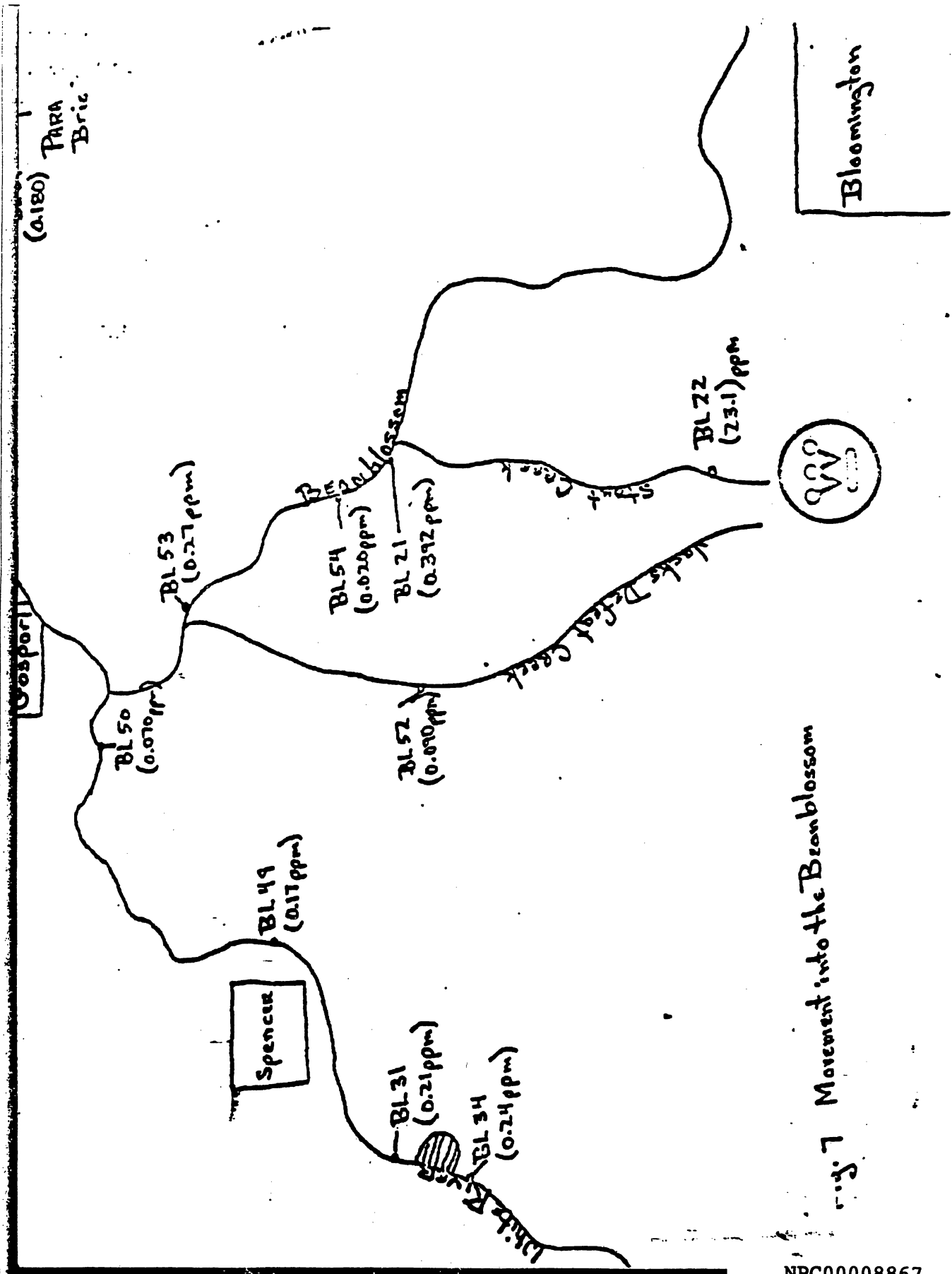
Fig. 5 Twelve Levels Around the Plant

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Fig. 6 Movement to Stout Creek



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Stout Creek and Beanblossom Creek showed 5.0 ppm PCB, mostly of the Inerteen formulation (the FDA limit for human consumption in fish is 5.0 ppm).

The samples on the White River indicate that considerable PCB material is being brought down river from some unknown source which cannot be from Westinghouse operations. It is not possible to determine magnitude of the contribution from Westinghouse compared to the amount from the unknown without undertaking a detailed water monitoring program.

Three fish samples taken from a commercial fisherman downstream on the White River (near the Worthington Bridge) indicate that fish from this portion of the river exceed FDA limit for human consumption of 5.0 ppm. Table 1 below presents these data.

Table 1

	<u>1242 ppm</u>	<u>1254 ppm</u>	<u>Total PCB</u>
Fish 8	2.9	1.4	4.3
Fish 9	7.1	1.5	8.6
Fish 10	4.5	2.7	7.2

These fish are very definitely transmitting PCB's to humans because we bought dressed filets prepared for cooking. It would be very difficult to pinpoint the sources of the material in the fish, but discovery of these high levels by a regulatory agency could lead to an investigation which would almost certainly discover the leakage of material to the environment from the Bloomington plant.

BIOLOGICAL LANDFILL - FOR 12/12/92

PCPB (parts per billion)

SAMPLE #	12/12	12/18	12/54	Total						
1	trace	0**	0	trace						
2	38	14	0	52						
3	trace	0	0	trace						
4	90	0	0	90						
5	45	0	0	45						
6	13	0	21	34						
7	10	0	0	10						
8	55	0	16	71						
9	41	0	11	52						
10	26	0	0	26						
11	10	0	11	21						
	% (n) = 3	10	5							

NOTE: THE RESULTS IN ALL OF THESE TRACES WERE VERY UNRELIABLE IN REPRESENTATION OF TRUE NUMBERS. THE BEST SEVERAL QUALITATIVE. THE TRACES WERE QUANTIFIED BY BEST-FITTING THE TRACES TO A CONTINUOUS PCB FORMULATION (e.g. AROCLOR 1242, 1248 or 1254).

JEH/12/18/92

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