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Author	
Corporate Author	Versar New York, Inc., Springfield, Virginia
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SUMMARY REPORT:

MEASUREMENT OF RESIDUAL CONTAMINANTS IN THE AIR AND ON SURFACES IN FLOORS 2 THROUGH 18 OF THE BINGHAMTON STATE OFFICE BUILDING FOLLOWING COMPLETION OF THE PRELIMINARY CLEANUP AND MEASUREMENT OF THE EFFECT OF NORMAL HVAC OPERATIONS OF THE CONCENTRATION OF CONTAMINANTS IN THE AIR WITHIN AND ADJACENT TO THE BINGHAMTON STATE OFFICE BUILDING

Prepared for:

Office of General Services
State of New York
Albany, New York 12242

Prepared by:

Versar New York Inc.
6850 Versar Center
Springfield, Virginia 22151

August 12, 1985

1.0 INTRODUCTION

On February 5, 1981, an intense electrical fire in the basement of the Binghamton State Office Building (BSOB) caused coolant liquid to leak from a transformer into the fire. This coolant liquid consisted of a mixture of polychlorinated biphenyls (PCBs) and chlorinated benzenes. The heat of the fire vaporized the liquid and spread black soot throughout the basement and all 18 floors of the building. Tests of this soot performed shortly after the fire found that it contained several percent PCBs by weight and various polychlorinated dibenzofurans (PCDFs) at a concentration of up to several parts per million. The analysis of the soot also identified low levels of polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated biphenylenes (PCBPs). These chemicals were apparently created by the pyrolysis of the PCBs and chlorinated benzenes in the transformer liquid. The New York State Department of Health determined that the acute toxicity of the soot in guinea pigs was equivalent to a material containing 58 parts per million 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).

The initial cleanup of the BSOB was halted in late February 1981 when it was learned that TCDDs were present in the work environment. The cleaning was resumed in September 1981 after the necessary procedures and facilities were completed to assure adequate protection of the cleanup workers and the surrounding community during the subsequent extensive decontamination activities. Among the precautions taken was the sealing of existing ventilation openings and installation of an air pollution control system on the roof of the building to clean all air that was exhausted from the building through high efficiency particulate filters and activated carbon.

The BSOB consists of three essentially separate ventilation zones (see Figure 1). In September 1984, following completion of the cleaning of all areas above the basement, the stairwells, elevator shafts, ventilating chases, and other openings between floors 1 and 2 were sealed and the roof mounted exhaust fans on the air pollution control equipment were connected to a metal tube that drew air from the basement mechanical room. After these changes were made, entry to the upper portion of the building was possible only through the plaza level entrance on floor 2, and subsequent cleaning has been concentrated on the basement and subbasement.

A major test plan, "Measurement of Residual Contaminants in the Air and on Surfaces in Floors 2 through 18...." dated September 5, 1984, was approved by the State of New York [2]. This revision incorporated suggestions made by the Expert Advisory Panel on the BSOB following reviews of previous drafts. Three separate tests were defined with a number of purposes:

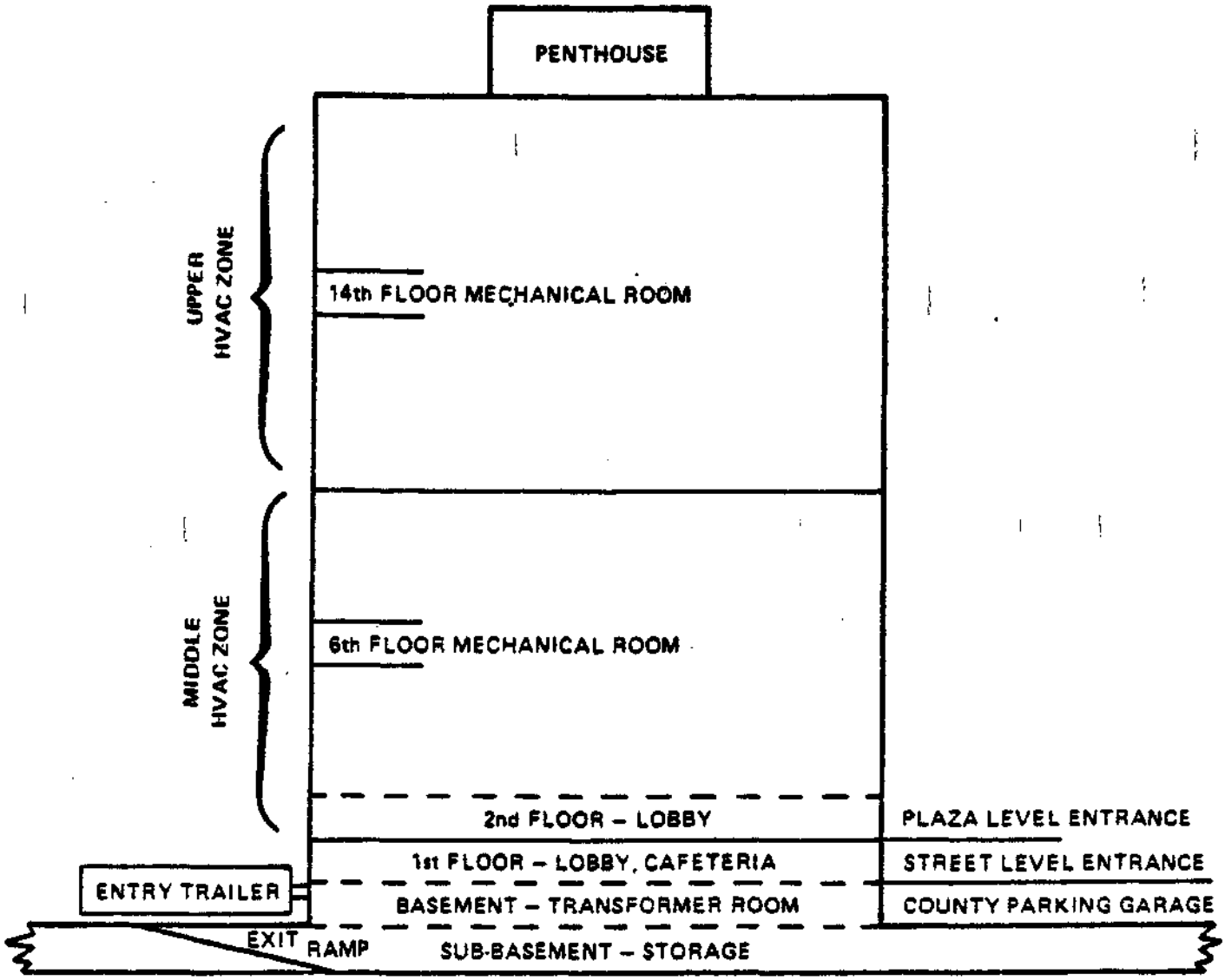


FIGURE 1. BINGHAMTON STATE OFFICE BUILDING

First Test

1. Determine the normal ambient levels of PCBs, PCDFs, and PCDDs in the air in Binghamton around the BSOB.

2. Determine whether the air in the portion of the building above floor 1 was clean enough that a person could safely work in the upper portion of the building without wearing an air purifying respirator, assuming that protective clothing continued to be worn to prevent skin contact with any remaining surface contaminants.

3. Collect wipe samples from various surfaces within floors 2 through 18 for PCB analysis to identify those surfaces which had the highest remaining levels of residual contaminants.

Samples were collected from September 14 to September 17, 1984, and the results of the analysis of the samples were summarized in the Versar test report "Summary of Results of the First Test..." dated January 25, 1985 [7].

Second Test

It had previously been the consensus of the Expert Advisory Panel that the release of untreated air from the BSOB would not be advisable until such a time that tests demonstrated that breathing the air would not result in a significant risk to a worker in the building. Air dispersion modeling indicated that air released from the building due to normal operations of the HVAC units on floors 6 and 14 would be significantly diluted, and that any potential exposure of people outside the building to contaminants would not be significant. The second test specified measurements of the levels of contaminants in the air around the building at the time normal HVAC operations were resumed as a check on the validity of these calculations.

Third Test

1. Test the quality of the air in the building after several weeks of normal operation of the HVAC system.

2. Measure the levels of PCDDs and PCDFs on those surfaces in floors 2 through 18 found to have the highest remaining levels of PCBs as necessary to assess the cleanliness of the surfaces in terms of overall toxic exposure potential.

The purpose of this summary report is to present the results of the tests in a systematic way to facilitate a decision as to the present cleanliness of floors 2 to 18 of the BSOB.

2.0 AIR QUALITY AROUND THE BINGHAMTON STATE OFFICE BUILDING

Air samples were collected on the roofs of the City Building, County Building, and YMCA adjacent to the BSOB before normal (untreated exhaust) ventilation was resumed using the HVAC units on floors 6 and 14 and at the time normal HVAC operations were started. The PCDD/PCDF air samples were collected using the high volume sampler developed by the New York State Department of Health which uses silica gel as an adsorbant for these contaminants, and which collects a sample of approximately 75 cubic meters.

PCB samples were collected at the same times and locations using a modified high volume air sampler that used urethane foam as the adsorbant material and collects a sample of approximately 500 cubic meters of air.

The First Test air samples were collected over a period from September 14 to 17, 1984. Duplicate PCDD/PCDF samples were collected on the roof of the county building. The PCDD/PCDF samplers were extracted by the NYSDOH laboratory, which sent an aliquot of the combined extracts from the County Building sample to Prof. Rappe at the University of Umea (Sweden) for confirmatory analysis. Analysis of the samples by NYSDOH for PCDFs and PCDDs did not detect any of these chemicals [6]. However, poor recovery of the internal standard from the samples collected at the City Building and the YMCA resulted in higher than expected limits of detection. Prof. Rappe reported the possible presence of 2,3,7,8-TCDF in the aliquot of extract from the County Building samplers, but at a level near his detection limit and below the detection limit achieved by NYSDOH. Since the results obtained by Prof. Rappe were not corrected for the recovery of the internal standard, no accurate estimates could be made of the levels of these contaminants that might have been present in the air.

Because of the problems with the analysis of the ambient PCDD/PCDF air samples from the First Test, it was decided to repeat this ambient sampling before normal HVAC operations were resumed. This change to the planned test sequence was documented in the Test Plan Modification dated February 14, 1985 [8]. This Test Plan Modification also reflected the decision of the New York State Department of Health Laboratories to analyze the air samples only for tetra and penta CDFs in an attempt to achieve the detection limit at which Prof. Rappe reported the possible presence of 2,3,7,8-TCDF in the ambient air sample from the First Test. In accordance with this Test Plan Modification, duplicate PCDD/PCDF air samples and PCB samples were collected on the roofs of the City Building, the County Building, and the YMCA on February 15 - 18, 1985. Duplicate PCDD/PCDF air samples and PCB samples were again collected on February 22 - 25, starting when the HVAC units on floors 6 and 14 were returned to normal operating conditions, releasing untreated air from louvers on these floors.

The results of the analysis of the ambient air samples for PCBs were reported in a Test Report dated May 17, 1985 [12]. The quantities of PCB-1254 (the type of PCB released in the BSOB) found in the ambient air at the three tested locations were as summarized in Table 1.

TABLE 1

PCBs in Ambient Air (micrograms per cubic meter) Before and After Normal HVAC Operations Started in the BSOB on February 22, 1985.

Location	September 14-17, 1984	February 15-18,1985	February 22-25,1985
YMCA	0.003	0.0012	<0.0003
County Bldg.	0.002	0.0012	0.0009
City Bldg.	0.002	0.0013	<0.0003

The results of the analysis of the six February ambient air samples for tetra and penta CDFs were reported by NYSDOH in their report dated July 17, 1985 [17]. No 2,3,7,8-TCDF was detected in any of the samples at a maximum detection limit of 0.15 picograms per cubic meter. No 2,3,4,7,8-penta CDF or 1,2,3,4,8-penta CDF was detected at a maximum detection limit of 0.5 picograms per cubic meter. Prof. Rappe verbally reported that his laboratory did not identify the presence of toxic contaminants at a detection limit of one picogram per cubic meter [16].

The analysis of samples of ambient air taken before normal HVAC operations were started and immediately after the HVAC systems on floors 6 and 14 were returned to normal operating conditions indicates that the release of untreated air from the Binghamton State Office Building did not result in measurable or significant contamination of the air around the BSOB.

3.0 AIR QUALITY IN FLOORS 2 THROUGH 18

In accordance with recommendations from the Expert Advisory Panel on the Binghamton State Office Building, release of untreated air from the BSOB would be advisable only after the quality of the air in the building was demonstrated to sufficiently clean that it would be safe for reconstruction workers to breath the air in the building. It was the consensus of the Panel that a dioxin equivalent level of not more than 14 picograms per cubic meter in the air in the building would be required before entry without respirators would be advisable, assuming that precautions continued to be taken to prevent skin contamination.

The Test Plan specified that air samples would be collected for PCBs and PCDDs/PCDFs in the building during the First Test to determine whether the air was sufficiently clean that workers could enter the building without respirators. PCDD/PCDF and PCB air samples were collected in the return air plenums of the mechanical rooms on floors 6 and 14. The air entering these plenums returns from all of the areas served by each of the HVAC systems, and so measurements taken at these locations are a good

indication of the average air within each HVAC zone. The PCDD/PCDF air samples were collected over a period of 64 hours. Three PCB samples were collected at each location during this period, each PCB sample being collected over a period of about 21 hours. In addition, PCB air samples were taken adjacent to the barriers between floors 1 and 2 to check on the adequacy of the partitions in preventing a spread of contamination from the lower to the upper portions of the building.

The results of the analysis of PCB air samples were summarized in the Versar report dated January 25, 1985 [7]. The maximum PCB concentration in the air in the dead air spaces in the elevator shaft and stairwell between floors 1 and 2 on clean side of the partition was 1 microgram per cubic meter. The PCB levels in the air passing through the HVAC units on floors 6 and 14 ranged from 0.2 to 0.9 micrograms per cubic meter (average = 0.32 on floor 6 and 0.7 on floor 14).

The results of the analysis of the PCDD/PCDF air samples by NYSDOH and Prof. Rappe were summarized in an undated NYSDOH report [6]. The report calculated the average dioxin equivalent air quality based on measured tetra, penta, and hexa CDFs and 2,3,6,7-TCBP to be 8.5 picograms per cubic meter, and concluded that the average air quality would be below 11 picograms per cubic meter even if all of the non-detected dioxins and penta-CBPs were present at the detection limits achieved in these tests.

Based on these results, the Office of General Services submitted to the New York State Department of Environmental Conservation a formal Notice of Determination of Non-significance for the planned resumption of normal operations of the HVAC systems, with the resultant release of untreated air from the BSOB [9]. This action was taken on February 22, 1985.

The Test Plan for the Third Test sampling to determine the quality of the air in the BSOB after the resumption of normal HVAC operations was modified on March 29, 1985, to add 63 PCB air samples from throughout the building to check on the relative homogeneity of the air while PCB and PCDD/PCDF air samples were being collected in the return air plenums of the HVAC mechanical rooms on floors 6 and 14 [10]. These air samples were collected over the period March 29 - April 1, 1985. The results of the PCB analysis of these samples is presented in Table 2. The only measurable levels of PCBs at a detection limit of about 0.16 ug/m³ were in the men's restrooms. After the building is renovated, air will be constantly exhausted from the restrooms by a separate exhaust system in order to control odors. This will reduce the levels of PCBs in the air.

The results of the analysis of these samples for CDFs was reported by NYSDOH in their report dated July 17, 1985 [4]. The samples from the HVAC air return plenums contained measurable amounts of 2,3,7,8-TCDF and 2,3,7,8,X-Penta CDFs, but no hexa CDFs, PCDDs, or PCBPs. The NYSDOH calculated the dioxin equivalent concentration in the air in the building five weeks after normal HVAC operations were started to be <4.1 picograms per cubic meter vs <11 picograms per cubic meter in November, 1984.

TABLE 2

PCB ANALYSIS OF AIR SAMPLES COLLECTED IN THE BSOB
MARCH 29 - APRIL 1, 1985

Floor	Location	PCBs ug/m³
2	Elevator Lobby	ND
2	NE Floor 2 #1	ND
2	NE Floor 2 #2	ND
2	NE Floor 2 #3	ND
2	West stairvell	ND
2	West elevator shaft	ND
2	East elevator shaft	0.34
2	Men's room	ND
2	East stairvell	ND
3	Elevator lobby	ND
3	Women's room	ND
3	Northeast corner	ND
4	Elevator lobby	ND
4	Men's room	0.43
4	Northeast corner	ND
5	Elevator lobby	ND
5	Women's room	ND
5	Northeast corner	ND
6	Elevator lobby	ND
6	Men's room	0.31
6	Northeast corner	ND
7	Elevator lobby	ND
7	Women's room	ND
7	Northeast corner	ND
8	Elevator lobby	ND
8	Men's room	ND
8	Northeast corner	ND
9	Elevator lobby	ND
9	Women's room	ND
9	Northeast corner	ND
10	Elevator lobby	ND
10	Men's room	ND
10	East Stairvell	ND
10	West Stairvell	ND
10	Northeast corner	ND

11	Elevator lobby	ND
11	Women's room	ND
11	Northeast corner	ND
12	Elevator lobby	ND
12	Men's room	ND
12	Northeast corner	ND
13	Elevator lobby	ND
13	Women's room	ND
13	Northeast corner	ND
14	Elevator lobby	ND
14	Men's room	0.37
14	Northeast corner	ND
15	Elevator lobby	ND
15	Women's room	ND
15	Northeast corner	ND
16	Elevator lobby	ND
16	Men's room	ND
16	Northeast corner	ND
17	Elevator lobby	ND
17	Women's room	ND
17	Northeast corner	ND
18	Elevator lobby	ND
18	Men's room	0.37
18	East stairwell	ND
18	West stairwell	ND
18	Northeast corner #1	ND
18	Northeast corner #2	ND
18	Northeast corner #3	ND
14	HVAC #A-8	ND
14	HVAC #A-9	ND
14	HVAC #A-10	ND
6	HVAC #A-1	ND
6	HVAC #A-2	ND
6	HVAC #A-3	ND
6	HVAC #A-4	ND
6	HVAC #A-5	ND
6	HVAC #A-6	ND

ND: None detected at detection limit of 0.2 ug/tube, approximately 0.16 ug/m^3.

4.0 CLEANLINESS OF SURFACES ON FLOORS 2 THROUGH 18

First Test

The first test collected 48 wipe samples that were analyzed for PCBs in order to identify those surfaces that might have the highest levels of residual PCDDs and PCDFs. Wipe samples were also collected from 18 of the locations for analysis for PCDDs and PCDFs by Battelle. The purpose of these samples was to establish the ratio of PCBs to total "dioxin equivalent" toxicity so as to determine whether PCB levels could be used to identify locations having elevated levels of PCDDs and PCDFs. Two duplicate wipe samples were also analyzed for tetra through hexa CDFs by the NYSDOH laboratory.

The results of all of these analyses were reported in a formal test report [7]. The average value of all 48 wipe samples was 16.6 ug/m^2. Wipe samples have been collected by NIOSH from a number of buildings which have not had known sources of PCBs, and the levels that have been found have usually averaged about 10 ug/m^2 with occasional samples as high as 50 ug/m^2 not being unusual [1]. Only three wipe samples from the BSOB were found to have levels above 50 ug/m^2. These samples were collected from the top of a ceiling light fixture in the 17th floor elevator lobby where the plaster ceiling made access difficult (100 ug/m^2), a stair tread in the east stairwell between floors 17 and 18 (120 ug/m^2), and a sample from the floor in the 17th floor elevator lobby (150 ug/m^2). Since it was reasonable that these elevated levels were an indication of possible quality control problems with the cleaning of the ceiling light fixtures and stair treads, all of the light fixtures in the core area of floors 2 through 18 were subsequently recleaned, and the stair treads in both stairwells were also recleaned. The floor sample from the 17th floor elevator lobby was from a deposit of mastic that remained on floors throughout the building after the vinyl tile was removed. This tile will be replaced before the building is occupied, and the mastic will therefore not be accessible to skin contact. A test application of new tile has been installed in the building, and is being tested periodically to determine whether the measured PCB levels increase with time due to PCBs penetrating through the tile.

An analysis of the eighteen samples for PCDDs and PCDFs by Battelle found that the levels of PCDDs were generally low to undetected, with all 2,3,7,8-TCDD levels at or below one nanogram per square meter. The calculated contamination levels for the 18 PCDD/PCDF wipe samples in terms of "dioxin equivalents" ranged from .01 to 81.7 ng/m^2, the highest levels being found in the samples collected from the ceiling lighting fixtures in the core (81.7 ng/m^2), and from the stair treads between floors 17 and 18 (31 ng/m^2) and between floors 7 and 8 (30.1 ng/m^2). The only other significant level was found in the sample taken from the coated surface of the men's room exhaust chase on floor 17 (16.6 ng/m^2) [4]. The surface of this chase was subsequently painted with epoxy paint. The tetra and penta CDFs contributed 95% to 98% of the calculated dioxin equivalent levels.

A linear regression analysis of the log transformed PCB and dioxin equivalent data found a correlation coefficient of 0.77. If this relationship were used to predict the expected dioxin equivalent levels from the measured PCB levels, the predicted dioxin equivalent levels would be within an order of magnitude (from 0.1 to 10x) of the measured levels 92% of the time [5].

Third Test

Based on information obtained from the First Test samples and suggestions made by members of the Expert Advisory Panel following a review of these results, certain changes were made to the test plan for the Third Test as documented in the Test Plan Modification - Third Test dated March 29, 1985 [10]. These changes specified that the wipe sampling was to be conducted in two phases: the first phase was to collect 85 wipe samples from types of surfaces found to have high levels of PCBs during the First Test that were subsequently recleaned and from surfaces not previously tested such as the stone floor and walls in the second floor plaza lobby. Aliquots of the extract from eleven of the samples were also to be analyzed by Battelle for PCBs as a check on the analytical methodology. Following analysis of the 85 samples for PCBs, the 10 locations found to have the highest PCB levels were to be wipe sampled to determine the levels of PCDFs.

The 85 PCB wipe samples specified in the amended test plan and the eleven samples for duplicate analyses were collected on March 29, along with 5 additional samples from areas selected by Mat Gillen who observing the sampling on behalf of the Public Employees Federation. The results of the PCB analysis of all 101 wipe samples were included in the Test Plan Amendment dated May 28 which covered the collection of wipe samples for PCDF analysis [13, attachment A]. The average PCB level of these 101 samples was 7.8 micrograms per square meter. The results of the duplicate analysis of 11 samples by both Versar and Battelle were not significantly different (correlation coefficient = 0.997) [15].

Only two PCB wipe samples were above 50 ug/m^2: stair tread from west stairwell on floor 2, 110 ug/m^2 as measured by Versar, 106 as measured by Battelle; stone floor from floor 2 plaza lobby, 62 ug/m^2 measured by Versar, 74 ug/m^2 measured by Battelle. However, eight of the 10 highest measurements were from stair treads and landings in the stairwells. In order to provide additional assurance as to the cleanliness of the building, OGS had the stairwell treads and landings and the stone floor on floor 2 recleaned, and had the stair treads painted with epoxy paint. (The stair landings, like most of the floors in the building, will be eventually covered by new vinyl tile.) These surfaces were retested for PCBs as specified in the Test Plan Modification dated May 3, 1985 [11]. Thirteen wipe samples were collected from landings and stair treads on May 5, and the results from this retest were also included in the May 28 Test Plan

Amendment [13, attachment B]. None of these samples showed PCB levels above 4 ug/m^2.

Based on the results of the March 29 sampling and the May 3 resampling of recleaned stairways, it was possible to select surfaces for PCDF sampling which met the criteria of representing the 10 highest PCB levels without having all of the samples being taken in the stairwells. The wipe sampling for PCDFs was defined in the May 28 Test Plan Amendment [13], which included 11 locations selected by OGS and an additional 6 locations suggested by Dr. Terry Miller. All samples were to be analyzed by Battelle, for tetra and total penta dibenzofurans, and aliquots of the extract from two wipe samples were to be sent to the New York State Department of Health Laboratory for confirmatory analysis. PCB wipe samples from the same locations were analyzed for PCBs by Versar. These samples were collected on May 28, and the results of the Battelle analyses were summarized in the Battelle Final Report dated July 19, 1985 [18].

The PCDF results, the PCB measurements, and the calculated dioxin equivalent contamination levels based on the levels of 2,3,7,8-TCDF and total penta-CDFs are summarized in Table 3. The highest dioxin equivalent levels were found on the top of ceiling light fixtures from floors 12 and 16 (12.6 and 14 ng/m^2), from the concrete floor in the elevator lobby on floor 7 (12.5 ng/m^2), and from the stone floor on floor 2 (13.8 and 12.8 ng/m^2). The First Test wipe samples, which were analyzed for tetra through hexa CDDs and CDFs, showed that 95% to 98% of the dioxin equivalent level was the result of the presence of tetra and penta CDFs. Assuming that PCBPs might contribute an additional 10% to the toxicity, the contaminant levels calculated from the Test Three data may underestimate the total surface contamination by up to 15%, so the maximum contaminant level might actually be 16.4 ng/m^2 rather than 14 ng/m^2.

The two samples that were also analyzed by the New York State Department of Health Laboratories were from the stone floor in the floor 2 lobby and from the vinyl wall in the elevator lobby on floor 12. The comparable analytical data from the two laboratories are summarized in Table 4. A linear regression analysis of the log transformed PCB and dioxin equivalent data is shown in Figure 2. The NYSDOH analysis was performed using low resolution mass spectrometry, but did quantify the specific isomers of penta-CDFs that were chlorinated at the 2, 3, 7, and 8 positions. Both laboratories found about the same levels of 2,3,7,8-TCDF. Although NYSDOH found higher levels of total penta CDFs in both samples, the percentage of the penta-CDFs that was chlorinated at the 2, 3, 7, and 8 positions was significantly lower than the assumed 50% used to calculate the dioxin equivalents from the Battelle data, so the final calculated dioxin equivalent levels were essentially identical for the two laboratories.

TABLE 3

ANALYTICAL RESULTS FOR PCBS AND DIOXIN EQUIVALENTS FOR WIPE SAMPLES COLLECTED MAY 29, 1985 IN THE BSOB

SAMPLE #	ng/m2			ug/m2	
	2,3,7,8-TCDF	TOTAL PENTA-CDFs	DIOXIN EQUIV	PCBs	
2791	3.70	11.90	3.22	23	STAIR TREAD, FLOOR 2; WEST STAIR WELL
2794	7.70	22.30	6.28	4	STAIR NOSING, FLOOR 18
2795	13.00	57.80	13.97	5	CEILING LIGHT, FLOOR 16 NE
2796	12.00	51.70	12.62	5	CEILING LIGHT, FLOOR 10 CORE
2797	18.70	32.30	12.45	31	CONCRETE FLOOR, FLOOR 7 CORE
2800	4.40	3.80	2.10	16	INSIDE OF MEN'S ROOM DOOR, FLOOR 3
2801	1.70	4.10	1.25	8	VINYL WALL, FLOOR 9 CORE
2802	1.20	2.60	0.83	<0.5	INSIDE WOMEN'S ROOM DOOR, FLOOR 15
2810	0.30	0.00	0.10	<0.5	FIELD BLANK
2792/3	15.50	51.50	13.75	26	STONE FLOOR, FLOOR 2 CORE
2792/30	11.90	53.00	12.80		DUPLICATE ANALYSIS 2792/3
2798/9	1.00	1.50	0.58	6	VINYL WALL, FLOOR 16 CORE
2806	0.90	1.00	0.47	2	STAIRWAY LANDING, FLOOR 12 WEST STAIRWELL
2804	2.50	0.00	0.83	2	STAIR TREAD, FLOOR 14 EAST STAIRWELL
2803	0.00	1.40	0.23	2	COLUMN ENCLOSURE, FLOOR 6 NE PERIMETER
2808	2.40	2.30	1.18	4	STAIRWAY LANDING, FLOOR 8 EAST STAIRWELL
2809	0.70	0.00	0.23	2	STAIRWAY LANDING, FLOOR 5 WEST STAIRWELL
2805	2.80	0.00	0.93	2	STAIR TREAD, FLOOR 13 EAST STAIRWELL
2807	1.10	1.90	0.68	<0.5	STAIR TREAD, FLOOR 11 WEST STAIRWELL
2813	0.60	0.00	0.20	<0.5	LABORATORY BLANK
2811	0.40	0.00	0.13	<0.5	FIELD BLANK

20.4

12

X 25ng/m²

TABLE 4

Comparison of Battelle and NYSDOH analysis of PCDF wipe samples

Isomer or Class	NYSDOH	Battelle
Vinyl Wall Sample		
2,3,7,8-TCDF	0.9 ng/m²	1.0 ng/m²
Total TCDFs	5.7 ng/m²	8.0 ng/m²
1,2,3,7,8-Penta CDF	0.38 ng/m²	0.39 ng/m²
Total Penta CDFs	1.3 ng/m²	1.5 ng/m²
Stone Floor Sample		
2,3,7,8-TCDF	17. ng/m²	15.5 ng/m²
Total TCDFs	98. ng/m²	63. ng/m²
1,2,3,7,8-Penta CDF	18.8 ng/m²	16.3 ng/m²
Total Penta CDFs	95. ng/m²	52. ng/m²

TeQD - Equivalents
NYS = 1.44 ng/m²
EPA = 0.44 ng/m²

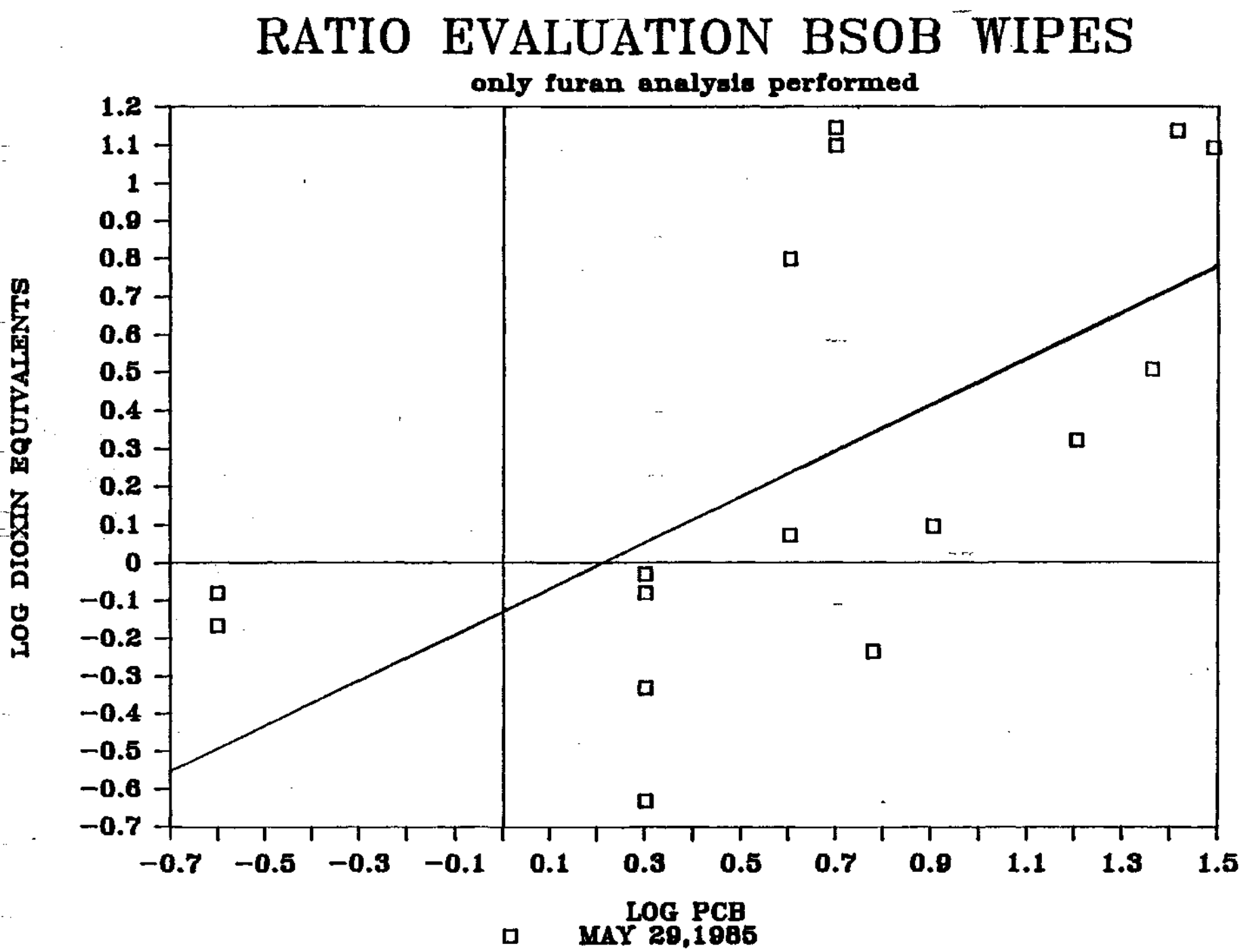
5. CONCLUSIONS

The release of untreated air from the Binghamton State Office Building when the HVAC units on floors 6 and 14 were returned to normal operating conditions did not cause any measurable contamination of the ambient air around the building. The initial contamination level of the air being vented from the building was <11 picograms dioxin equivalents per cubic meter.

The air in floors 2 through 18 of the BSOB on April 1 (five weeks after the HVAC units started normal operations) contained <4.1 picograms dioxin equivalents per cubic meter. The air in floors two through 18 did not contain measurable levels of PCBs at a detection limit of about 0.16 ug/m³, except in one elevator shaft and in the men's restrooms where the levels of PCBs were up to 0.43 ug/m³.

Surfaces in the BSOB in late May generally had contamination levels of less than one nanogram dioxin equivalents per square meter except for the tops of ceiling lighting fixtures, the concrete floor on floor 7, and the stone floor on the floor 2 plaza entry. The maximum levels of dioxin equivalent contamination calculated from measurements of 2,3,7,8-TCDF and total penta-CDFs did not exceed 14 nanograms per square meter on any of the samples. Adjusting for the possible presence and contribution of PCDDs, hexa-CDFs, and PCBPs, the total dioxin equivalent contaminant level of the highest sample might have been as high as 16.4 nanograms per square meter.

FIGURE 2


RATIO EVALUATION BSOB WIPES
only furan analysis performed
LOG DIOXIN EQUIVALENTS
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.7 -0.5 -0.3 -0.1 0.1 0.3 0.5 0.7 0.9 1.1 1.3 1.5
LOG PCB
MAY 29,1985

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