TITLE: Responses of Lactating Dairy Cows to Polychlorinated Biphenyls

OSURF PROJECT NO.: 715618/763767

TECHNICAL PROGRESS REPORT NO.: 6

REPORTING PERIOD: December 1, 1984 through February 28, 1985

SUBMITTED BY: Ohio State University, Ohio Agricultural Research and Development Center

PRINCIPAL INVESTIGATOR: L. B. Willett

DATE SUBMITTED: April 5, 1985

A. Description of Overall Progress:

General. During this experimental period, the project was continued following the protocols identified as PCB-F and PCB-C. As reported in Technical Progress Report No. 5, two cows (2976 and 2977) had calved during the previous reporting period. Five cows (2970, 2971, 2722, 2974, and 2979) calved, thus beginning the PCB-C protocol during this reporting period. Also during this reporting period, five cows and four calves completed all aspects of this study with necropsies performed on three cows and two calves. The aforementioned will be discussed in greater detail in other sections of this report.

Animals. Parturitions that occurred during this reporting period are summarized in Table 1. These parturitions are considered to be normal and without complications. The performance of the cows and growth of the calves appear to be adequate; however, data have not yet been summarized or analyzed. One cow, 2974, became critically ill on the 35th day of lactation. An acute coliform mastitis infection was isolated from the right front quarter of the mammary gland (note: The lower 2.5 centimeters of this teat was stepped on and cut off during her previous lactation, see Technical Progress Report No. 2.) Antibiotic therapy was administered to this cow; however, the severity of infection reduced milk production to the point that milking was discontinued on day 38. At the end of the experimental period (day 43, February 8, 1985), this animal was necropsied revealing that an undiagnosed case of pneumonia was also existing. Cow 2979 had a left displaced abomasum diagnosed shortly after parturition. This condition was surgically corrected and the animal recuperated rapidly. As set forth in the protocol, all PCB dosed animals and their calves were necropsied.

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Necropsies were conducted on the following dates: January 15, 1985 (2976, M-2888); February 8, 1985 (2974); February 19, 1985 (2973, 3101). The results of gross and histological examination of organs and tissues from these animals show no signs of chemical toxicity. The reproductive tract of cow 2973 was carefully examined to determine why this animal failed to conceive (see Technical Progress Report No.'s 4 and 5). A small cyst was found to be blocking the left oviduct; however, the right oviduct was patent. Two control cows, 2975 and 2978, are scheduled to calve during the next reporting period and the necropsies of cow 2979 and calf M2918 are scheduled for March 12, 1985.

Table 1. Parturitions occurring during this reporting period.

	NO.	CALF	CALF SEX	
12/11/84	2970	M2898	Male	Unassisted
12/21/84	2971	M2902	Male	Unassisted
12/28/84	2974	3101	Female	Manual Assistance
01/29/85	2722	M2916	Male	Unassisted
01/31/85	2979	M2918	Male	Unassisted

Laboratory Work

Laboratory work during this period consisted of analysis of the PCB content in feces, blood plasma and subcutaneous fat. Some preliminary analyses on the residue content of other tissues was also conducted. Holly Durst and Ruthie Wachtel have spent considerable portions of their time preparing for and conducting various aspects of the necropsies. Tissues collected during necropsies have been stored for residue analysis at a later date. After necropsy, personnel had to pack the carcasses of animals in 30-gallon fiber drums surrounded by dry ice and sealed in 55-gallon steel drums. These were shipped to Rollins, Inc. in Texas for incineration. During this reporting period, milk production and feed intake for the first lactation have been summarized and the net energy for lactation calculated. The results of this work indicates that there were no differences between PCB dosed and controlled animals. Health observations collected through out the first lactation have also been summarized. An abstract for portions of this work has been prepared and submitted for presentation at the American

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Society of Animal Science meetings in August, 1985. A copy of that abstract is included in the Appendix. The new spectrophotometer was received during February. It is currently being installed in preparation for the cytochrome P-450 analyses.

B. Current Problems:

Currently this project is relatively free of problems and is progressing on a timely basis.

C. Work During the Next Reporting Period:

Major emphasis during the next reporting period will be place on completing the animal work under the PCB-C protocol. During this period, the last of the animals will calve and the last PCB-dosed animal and her calf will be necropsied. Laboratory analyses receiving priority will be the blood, milk and feces collected during the PCB-C plus analysis of cytochrome P-450 from liver samples. Data summarization and analysis will take place as time permits. A paper entitled "Responses of lactating dairy cows to polychlorinated biphenyls" will be presented on March 19, 1985 at the Society of Toxicology meeting in San Diego, California. An abstract of that presentation was included with Technical Progress Report No. 5.

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