lane county

February 20, 1985
WP 44750-12

The Honorable Thomas P. O'Neill, Jr., Speaker
United States House of Representatives
Capitol Building
Washington, DC 20515

Dear Speaker O'Neill:

Citizens in Lane County, Oregon have presented the Board of County Commissioners with information regarding the United States Environmental Protection Agency. On that basis, it appears that since 1979, the EPA has acted to suppress and delay the validity and test results of a major human health study covering a 1,600-square-mile area of western Oregon. Recently obtained documents from the study suggest the possibility of a public health emergency in western Oregon.

Documents recently obtained under the Freedom of Information Act demonstrate that EPA has been aware since 1980 that this study showed dioxin in over 60 percent of deer and elk tissue samples taken from forests in western Oregon, where an abnormal increase of birth deformities and reproductive problems in elk herds had been reported.

Worse, dioxin was also identified in human mothers' milk samples and numerous domestic water samples taken from the same area. The history of just one of EPA's sampling sites is revealing. In 1979, EPA researchers reported to Lane County that dioxin was found at levels of 17-20 parts per trillion (ppt) in a residential water supply, and EPA's contract epidemiologist advised the family that the water was unsafe. The family had been drinking the water for seven years, during which time they suffered chronic respiratory and gastrointestinal ailments, two miscarriages and a child born with defective lungs and liver and learning disabilities. The husband subsequently died of heart disease at age 38.

This water supply was sampled again in 1979, but because of an alleged "mixup" with samples from Dow Chemical, was reportedly not analyzed until 1983, and found negative. In August, 1984, EPA researchers again collected samples from this site. In December, EPA reported finding dioxin levels in five out of these six samples, at levels from 10 to 50 ppt. Despite EPA's emphatic position in the 2,4,5-T cancellation proceeding that no safe level of dioxin can be demonstrated, and despite the warning in 1979 that 17-20 ppt of dioxin in this water rendered it unsafe to drink, nevertheless, EPA announced in December 1984 that up to 50 ppt presented no health hazard.

The last known application of 2,4,5-T or silvex in the vicinity of this particular site occurred in 1976, yet the dioxin levels have apparently increased between 1979 and 1984. This is perhaps explained by additional documents obtained under FOIA, reporting (in 1980) that "dioxin contamination of pesticides and the environment is increasing", referring to a list of some

20 pesticides other than 2,4,5-T and silvex "that may contain dioxins, based on an analysis reflecting both the manufacturing processes and chemical structure of those pesticides."

The EPA study, known as the Alsea Study, correlated human involuntary abortions with the time, location and dosage of herbicide spraying in a 1,600-square-mile area representative of spray patterns in coastal forests from Washington to northern California, triggering EPA's emergency suspension of forestry and rights-of-way uses of 2,4,5-T and silvex in 1979. The study was vehemently attacked by Dow Chemical and other industry advocates, who challenged its lack of any evidence of dioxin exposure in the study population.

For four years, while industry proclaimed the study invalid in the scientific, medical and popular media, "EPA administrators and legal counsel" apparently ordered the scientists who conducted the study not to publish it or to defend it publicly in any manner. During this time, it is alleged that EPA suppressed--and in some cases misreported--results of laboratory analyses demonstrating widespread dioxin contamination in the study area mothers' milk, domestic water supplies, wildlife and in tissues of a baby born without a brain. At the very time the emergency suspension of 2,4,5-T and silvex was announced, EPA was delaying evidence of dioxin exposure that confirmed the validity of the Alsea Study. (EPA's "scientific" explanation for reporting that no dioxin was found in most of these samples is that the samples "may have been contaminated" with dioxin in the testing laboratory.)

After four years of fruitless attempts to obtain EPA test results, Oregon residents in August 1983, finally obtained results of some dioxin analyses directly from the testing laboratory. The analyses showed alarming levels of dioxin in a range of samples. Although these results were reported to EPA in 1980, the agency failed to warn residents of the presence of dioxin, and elected not to release the information in response to FOIA and discovery requests. After the testing laboratory released its results, EPA defused the resulting publicity by announcing that the laboratory analyses--completed and reported to EPA in 1980--erroneously included samples from Dow Chemical Company's Midland, Michigan facility; EPA has yet to provide satifactory evidence that such a mixup actually occurred.

The EPA's Alsea Study is significant because it is the only major study of dioxin contamination from use of herbicides (as opposed to manufacture or dumping) documenting human exposure to dioxin associated with human health impacts. Furthermore, the similarities of topography, climate and herbicide use patterns in Vietnam and Oregon rain forests make the Alsea Study especially significant to the Vietnam veterans' case against Agent Orange.

We have learned that an internal investigation was ordered and supervised by EPA Acting Administrator Lee Thomas. The results appear to suggest that EPA may have misled the Oregon federal court and, further, that EPA failed to inform either the public or the sample donors of its test results (a pattern repeated in Hemlock, Michigan; Hempstead, New York; Arkansas, Missouri, Louisiana and elsehwere). Shortly after the Oregon dioxin tests were revealed in 1983, EPA and Dow agreed to cancel all registrations for 2,4,5-T and silvex.

The best evidence available suggests that western Oregon residents continue to be exposed to increasing levels of dioxin in their water, soil and food, associated with abnormal increases in birth defects, involuntary abortions, cancers and reproductive disorders. Because of EPA's uncooperative and suspect behavior, we ask you to initiate a vigorous and thorough investigation of EPA's conduct of the Alsea Study and the 2,4,5-T cancellation proceedings and to authorize an independent study of dioxin exposure and human health in the Oregon coast range. We further ask that the study be subject to a citizen review board, with full public disclosure at all stages of design and execution.

For the entire duration of this study, we ask Congress to order a moratorium on the use in the coast range of all pesticides potentially capable of containing or breaking down into TCDD or structurally related compounds.

Sincerely,

Peter DeFazio, Chair
Lane County Board of Commissioners

PD:cb

LIST OF ATTACHMENTS

1 December 22, 1984: The U.S. Environmental Protection Agency reports results of 1984 sampling from the same Five Rivers, Oregon, water supply where dioxin was found in 1979, says less than one part per billion of dioxin is not a hazard.

2 February 14, 1983: Dioxin sampling results from Missouri were withheld from E.P.A.'s Dioxin experts, who charged that E.P.A.'s one-part-per-billion dioxin "safety" level was "extremely hazardous." It is important to note that this standard was for soil contamination at Times Beach, not for human drinking water supplies or for food.

*3 RISK ppt. March 28, 1979: In announcing its emergency suspension of forestry registrations for two dioxin-contaminated herbicides, E.P.A. discloses results of Dow Chemical Company's three-generation rat-TCDD study, says it found multigenerational reproductive effects from dioxin exposure at a chronic dose of one part per trillion in the diet per day.

4 March 6, 1984: An E.P.A. document received under the Freedom of Information Act says that one out of six human adipose tissue samples from the Five Rivers area was positive at 12 parts per trillion of dioxin. No records have been provided of where, when, or from whom these samples were collected.

5 January 13, 1982: A 1977 E.P.A. report was received under discovery in Merrell v. Block in response to a request for documents relating to E.P.A. human health studies in the area of the Siuslaw National Forest. Six human fat samples were positive at TCDD levels ranging from 4 to 64 ppt, a range similar to levels later found in Vietnam War veterans' fat samples. E.P.A. has provided no other information about these Oregon samples.

6 Laboratory reports on TCDD analyses of Oregon deer and elk fat introduced into E.P.A.'s 2,4,5-T cancellation proceedings show 50 per cent to 77.8 per cent of samples positive for TCDD at levels up to 68 parts per trillion.

7 January 17, 1985: A 1979 E.P.A. document was received under the Freedom of Information Act which states that the rationale for E.P.A.'s study of TCDD residues in Oregon and Washington deer and elk was that the Oregon elk herd had "an excess" of reproductive problems, including stillborns and birth deformities.

8 Several pages are excerpted from the same June 24, 1983 final E.P.A. report. All results were reported separately to E.P.A. during 1979 and 1980. The interim reports were obtained under FOIA during 1983 and 1984. The final report was recently received.

8 pp. 1-6: Table II human milk samples collected from the Pacific Northwest, including western Oregon. Most of the positive samples were confirmed by other laboratories; E.P.A. subsequently concluded that the samples were negative because they "may have been contaminated" in the laboratory.

8 pp. 7-8: Table III includes samples collected from the 1,600-square-mile study area surrounding Alsea in January, 1979. Preliminary, positive results of both these and the mothers' milk samples had been reported to E.P.A. by the time of its emergency suspension of 2,4,5-t registrations. Most of the positive results were confirmed by another laboratory, but again E.P.A. concluded that -- with the exception of one Lane County sample -- the samples were negative because they "may have been contaminated" in the laboratory. Dr. Eldon Savage, E.P.A. contract epidemiologist at Colorado State University, advised the donor of the reported positive sample that the household water supply was unsafe to drink with levels of 17-20 parts per trillion TCDD. (This is the same site that was again positive in the 1984 sampling.)

8 pp. 9-10: Table VII samples were collected in summer and fall of 1979 as part of the Alsea study. Most samples were from the Five Rivers area, within the Alsea study area. These results were reported to E.P.A. in 1980, but were not released to the public despite repeated attempts to obtain them through Congressional petitions, Freedom of Information Act requests, and discovery in Merrell v. Block. After this table (alone) was released by the Nebraska lab-

8 oratory in August, 1983, E.P.A. announced that the high-level sediment and sludge samples were not from Oregon, but were instead from Dow Chemical's Midland, Michigan manufacturing facility. Despite lengthy FOIA administrative proceedings and a lawsuit, E.P.A. has still not provided evidence supporting this announcement. The low levels of dioxin in the newts are significant because the animals were collected from the same water supply found positive for dioxin in Table III and again in 1984. The low levels of dioxin found in the products of conception (sample No. UN-188A) are significant because that sample was from a full-term baby born without a brain. E.P.A. later announced that both these samples were negative for dioxin. Not included on Table VII are results of domestic water samples taken at the same time, reporting dioxin levels in the water supply of a property where three women have suffered a total of seven miscarriages and two men have died of cancer. E.P.A. later reported this sample as negative also.

9 December 12, 1980: Oregon state officials reject a study proposed by the U.S. Centers for Disease Control examining possible relationships between herbicide spraying and the incidence of neural tube birth defects. That category of birth defects includes anencephaly, the type of birth defect suffered by the baby positive for TCDD in its tissues in Table VII.

10 Centers for Disease Control statistics on neural tube birth defects in Lane, Lincoln, Benton and Polk counties, showing significant increase in particular birth defects during 1970-78. These findings prompted the C.D.C. proposed study rejected by the state of Oregon.

11 An overview of the local medical community's concerns about the unusual incidence of neural tube birth defects in Lincoln and Benton counties is reproduced from The Medical Tribune series.

12 Fall, 1984: Under FOIA request, E.P.A. provides unpublished draft report, circa spring 1983, by Drs. Jack Griffith and Robert Duncan, the scientists who headed the Alsea study for E.P.A.. They note that they had been constrained by "E.P.A. administrators and legal counsel not to discuss their work in any

12 public forum," and describe the circumstances compelling them to prepare an accurate report because the E.P.A. Alsea study findings "have been seriously misrepresented to both the public and the scientific communities by proponents of the chemicals . . ."

13 April 4, 1980: E.P.A. document received in fall, 1984. Dr. Griffith writes to top civil service manager of E.P.A. pesticide program, expressing concern that E.P.A. restraints on study scientists, preventing them from defending their work against industry attacks, have allowed industry views to prevail even within E.P.A.. Dr. Griffith points out that the Alsea study report released by E.P.A. was "severely edited" -- in particular of all background information -- and reviews the reasons why the original, unedited report is valid. He emphasizes the significance of the study, which "would provide us with the only opportunity for a viable human link between 2,4,5-T and possible adverse health effects."

14 September 11, 1983: E.P.A. Office of General Counsel memo reviews agency responses to FOIA and discovery requests for results of Oregon dioxin analyses, concludes that "O.G.C. did not fully respond to Merrell's discovery requests and that the government made certain statements in its pleadings which were apparently incorrect."

15 Fall, 1984: E.P.A. releases a 1980 budget justification report from the head of Pesticide Programs to a Carter Administration appointee. Summarizing dioxin programs at E.P.A. in 1980, the document refers to a list of 20 pesticides other than 2,4,5-T and silvex "that may contain dioxins." (A FOIA request for this list is outstanding.) The report notes that the E.P.A. pesticide program's "dioxin monitoring requirements and responsibilities are increasing because dioxin contamination of pesticides and the environment are also increasing," and expresses concern about other substances which are structurally or toxicologically similar to dioxins.

Jerry --

The attached NCAP "History of 2,4,5-T" is a pretty good summary chronology through March 1981. Adding some pieces that are missing from it, and events that have happened since, you can fill in some gaps:

1979 Agent Orange veterans class action suit filed against Dow et al

February: preliminary analytical results from some Alsea area samples and NW mothers' milk are reported with many positive for dioxin, just before emergency suspension announced.

August Second round of Alsea area (Five Rivers) samples collected (continuing through January '80)

1980 August-December: analytical results of second round of Alsea area samples reported, with many positives, in particular tissues from a baby born without a brain in the study area containing 3 ppt dioxin.

1981 March: The same month EPA and Dow go into closed-door negotiations to settle the 2,4,5-T case, Dow settles a massive suit brought ten years before by residents of Globe, Arizona exposed to 2,4,5-T by the Forest Service, acknowledging that the outcome of the case could affect the Agent Orange vets' case.

May-July An EPA Region V report on dioxins is edited drastically by headquarters staff in D.C. (Hernandez) at Dow's request. Dow specifically asks that references to Alsea and Agent Orange be altered or deleted.

April-December: Paul Merrell sues Forest Service, BLM, & EPA, EPA refuses to answer discovery requests for records and results of Alsea/Five Rivers study.

1982 Dow/EPA continue closed-door negotiations, EPA joins Dow in successfully opposing an NCAP motion to refer questions of scientific fact (e.g., the Alsea Study) to a committee of the National Academy of Sciences.

Merrell continues -- unsuccessfully -- to obtain Alsea/Five Rivers Study documents under Freedom of Information Act (request filed in 1981).

1983 April: U.S. District Court rules in favor of Merrell, banning herbicide spraying in Alsea Study area until federal agencies complete safety studies and make them public.

Publication of A Bitter Fog: Herbicides and Human Rights.

EPA Acting Administrator John W. Hernandez resigns following congressional inquiry into his 1981

1983 (cont.) editing of Region V dioxin report (see above).

July: Mike Axline, U of O law professor representing Merrell on appeal, obtains results (Table VII) of some 1979 Alsea/Five Rivers samples directly from the analytical laboratory. High levels of dioxin (5800 ppt) in sludge and sediment, low levels in wildlife and baby born without brain.

August: Table VII introduced in court hearing (NCAP case) triggering national publicity. EPA defuses media attention by announcing the high level samples were not from Oregon, quietly acknowledging three days later that the samples had not been decoded yet. Ten days later, EPA announces the high level samples are from Dow Chemical Company's Midland, Mich. plant.

September-October: EPA prepares internal investigation to "explain" what happened to Alsea/Five Rivers Study; EPA and Dow agree to end negotiations on 2,4,5-T and cancel all registrations -- according to the "grapevine" within EPA, this was the direct result of Table VII being released.

1984 August: EPA returns to Five Rivers, collects sediment samples from a single site, the only water supply previously tested which is no longer used for drinking.

November: Mike Axline files Freedom of Information Act suit against EPA (Van Strum v. Ruckelshaus) on request for documents relating to Alsea/Five Rivers Study, lists over 25 categories of documents EPA has failed to provide.

December: EPA announces 5 out of 6 August 84 samples positive for dioxin at levels "up to 50 parts per trillion."

1985 February: EPA releases "Five Rivers Update" report, showing up to 78 ppt dioxin at August '84 site. Judge Weinstein denies Agent Orange vets' claims against the government, finding no evidence of "adverse human reproductive effects associated with exposure to phenoxy herbicides."

Tests find dioxin at Five Rivers

EUGENE (AP) — Tests done for the Environmental Protection Agency show dioxin contamination in the Five Rivers area southwest of Corvallis but officials and environmentalists are at odds over whether the level is safe.

Samples were taken in August to determine whether herbicide spraying had contaminated rivers and streams in the area with the potentially cancer-causing chemical.

EPA spokesman Bob Jacobson told KVAL-TV in Eugene that results of testing by the Centers for Disease Control in Atlanta show dioxin levels up to 50 parts per trillion.

Renate Kimbrough, a toxicologist at the CDC, told the television station the levels found by the testing are not considered dangerous.

"We found that anything below one part per billion would not give people a sufficient dose (to cause harm)," she said.

'We found that anything below one part per billion would not give people a sufficient dose (to cause harm).'

But Five Rivers resident Paul Merrell says a University of Oregon molecular biologist found that as little as one part per trillion could cause long-term genetic damage.

Merrell says the EPA commissioned the late George Streisinger to evaluate a Dow Chemical Co. study of dioxin.

"His (Streisinger's) conclusion was that he found genetic defects over several generations at the lowest amount tested, one part per trillion," Merrell said. "George calculated that if there was to be no effect the concentration would have to be in the parts per quadrillion range."

Merrell says he does not consider water from the streams in the Five Rivers area safe to drink, although they are used as drinking water sources. He says the so-called "safe" levels are set arbitrarily, and he charges that political pressures play a role in setting levels.

Merrell's wife, Carol Van Strum, author of a book about the herbicide controversy, told KVAL on Friday that "they (the EPA) have known the water had dioxin in it for a long time. They knew that dioxin was present in wildlife in this area since 1974, but they've never taken any action on it."

A researcher 'found genetic defects over several generations at the lowest amount tested, one part per trillion.'

Jacobson said the EPA will decide in a few weeks whether any action is needed.

COMMUNITY/NORTHWEST Section B
Saturday, December 22, 1984

Corvallis Gazette-Times, Dec. 22, 1984

Eagle pitch at 18 earns Aoki victory; details in Sports

The Oregonian

Forecast: cloudy; high, 55; low, 40; report on Page A2

VOL. 133 — NO. 38,261 NORTHWEST FINAL MONDAY, FEBRUARY 14, 1983 54 PAGES 25 CENTS O

Lavelle accused of withholding data on dioxin

Agency officials level further charges of pro-industry bias

By GREGORY GORDON

WASHINGTON (UPI) — Several of the Environmental Protection Agency's top dioxin experts were denied access for months to sampling results from Missouri sites contaminated with the highly toxic chemical, agency officials said Sunday.

At the same time, it was learned that a former chief of scientific support in an EPA hazardous waste enforcement section has been given little to do for the past six months. One source said he has spent much of the time "reading newspapers."

The official, Lamar Miller, had disagreements with ousted assistant EPA administrator Rita Lavelle over the handling of negotiations with private companies from which the government sought cleanup damages, sources said.

"His position was that we made our best offer to responsible parties, and if they turned it down, we'd sue them," one source said. "Rita's position was that we made our best offer, and if they didn't like it, why, she'd change her offer. Rita had a philosophy that failing to get a settlement was a fa lure."

Three EP/. officials told United Press International that Lavelle, who was fired last Monday by President Reagan, restricted access of most members of a special working group on chlorinated dioxins to the Missouri dioxin data.

The sources said such data was routinely provided in the past to the entire group, which includes a cross-section of some of the agency's top scientists, engineers and health experts.

The Missouri sites, including the entire town of Times Beach, Mo., and a residential area in the St. Louis suburb of Imperial, have become one of the most pressing problems for the embattled agency, under fire from several congressional committees.

EPA officials, who asked to remain anonymous, expressed concern that some experts were shut out of the information stream at a time when agency experts needed all information possible — even unconfirmed sampling results — to help them propose cleanup actions and determine the danger to citizens.

The group had no role in setting the agency's controversial action plan that would leave dioxin levels in Missouri soils a: 1 part per billion, a level the group has in the past considered extremely hazardous, one group member said.

It was disclosed last fall that Lavelle's staff considered a cleanup level as high as 100 parts per billion, or 10,000 to 100,000 times higher than the level following the cleanup at Love Canal.

Lavelle, facing several investigations, has been sharply criticized by lawmakers, environmental groups and EPA employees for being too cozy with industry and agreeing to inadequate cleanup actions.

Speaking publicly for the first time since her firing Saturday, Lavelle denied in an interview that the dioxin group had been provided less than full access to sampling data.

"That's preposterous," she said. "We had our cancer assessment experts in. I had so many experts in on Missouri . . . that's preposterous. I had every expert that knew anything about dioxins involved in that case, it was so monumental and continues to be." She said hundreds of samples taken in recent months were not provided to the group because they "hadn't been totally collected yet."

One member of the dioxin working group said Lavelle "just didn't want anybody here at headquarters to know about the data" taken by EPA's Kansas City regional office.

Another said top EPA officials "just haven't used the working group like they should." The source noted that most members of the group were not invited to a dioxin meeting in September, when data was presented that began to reveal the mounting dimensions of the problem at Missouri horse arenas and in Imperial.

"They wanted to hold the data back," the official said. "They didn't want it leaked."

RITA LAVELLE

Decision and Emergency Order Suspending
Registrations for the Forest,
Rights-of-way, and Pasture Uses of
2,4,5-Trichlorophenoxyacetic Acid
(2,4,5-T)

I. INTRODUCTION

During the past ten months, the Agency has been gathering information about 2,4,5-T through its Rebuttable Presumption Against Registration (RPAR) process in order to decide whether registration of this pesticide should be continued (43 FR 17116, April 21, 1978). This review was prompted by studies showing that 2,4,5-T and/or its dioxin contaminant, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) */, caused reproductive and oncogenic effects in test animals. During the public debate initiated by the 2,4,5-T RPAR, the Agency received reports that women living in the vicinity of Alsea, Oregon, had miscarriages shortly after 2,4,5-T was sprayed in the forest areas where they reside. The Agency investigated the circumstances surrounding these reported

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*/ Current methods for manufacturing 2,4,5-T produce TCDD as a by-product of the manufacturing process. Although 2,4,5-T manufacturers attempt to remove this contaminant, TCDD cannot be completely removed. An EPA contract laboratory has measured the TCDD content in 16 recently produced commercial samples of technical grade 2,4,5-T from five different manufacturers. The contractor reported that the TCDD content in these samples ranged from not detectable to 0.025 ppm (limit of detection: 0.01 ppm) [excluding higher values that the contractor reported as doubtful]. Therefore, because TCDD is present as a low-level contaminant in commercial samples of 2,4,5-T, references in this document to "2,4,5-T" or the "pesticide product" mean 2,4,5-T that is contaminated with TCDD.

Bittmann report no teratogenic effects at 0.5 ug/kg in NMRI mice. Courtney and Moore reported that TCDD had no effect on fetal weight or embryonic mortality at 0.5 ug/kg in CD rats, and Sparschu et al. reported no effect at 0.03 ug/kg in Sprague-Dawley rats.

Dow Chemical Company, a 2,4,5-T registrant, has recently completed a study of the effects of TCDD on reproduction in Sprague-Dawley rats exposed to low dose-levels of this chemical for three generations. The registrant concluded that "impairment of reproduction was clearly evident among rats ingesting 0.01 or 0.1 ug TCDD/kg per day. Significant decreases were observed in fertility, litter size, gestation survival, post-natal survival, and postnatal body weight." In addition, exposure to 0.001 ug TCDD/kg per day, the lowest level tested in this study, resulted in statistically significant increases in the percentage of pups dead at birth and/or dying before the end of three weeks of life in some generations.*/

*/ Dow Chemical Company has claimed that the results of this study are "trade secret" or "confidential." An injunction issued on April 4, 1978, in the case of Dow Chemical Co. v. Costle, Civil Action No. 76-10087, U.S. District Court for the Eastern District of Michigan (Northern Division), arguably precludes EPA from disclosing the data from this study at the present time. Although the relevant provisions of FIFRA have since been amended to allow disclosure of data such as this [see, e.g., FIFRA Sections 10(d) and 10(g)], the injunction has not yet been modified. EPA intends to promptly request the Court to modify the injunction, but until this has been done the Agency will not publicly disclose the data from the study. The summary presented in the text of this Order does not, in EPA's opinion, constitute disclosure of the allegedly "trade secret" data submitted by Dow and would not cause any harm to Dow's legitimate competitive interests. The data from the study may be made available to any party in a suspension or cancellation proceeding under an appropriate protective arrangement.

Although the experimental protocols and strains differ for the several studies cited, in each case TCDD significantly increased the incidence of resorbed embryos or stillborn animals relative to the rate observed in control animals not exposed to TCDD. The regular occurrence of embryonic death in studies by different investigators in primates and in different rodent strains indicates that exposure to TCDD during mammalian gestation may result in the death of the embryos and related maternal reproductive failure.

(ii) Skeletal Anomalies

Skeletal defects appear in six studies involving four different mouse strains. Courtney and Moore report the following incidences of cleft palate in the indicated strains exposed to 3 ug/kg TCDD: 71% (5/7) in litters of C57BL/6 mice, compared to none (0/23) in the controls; 22% (2/9) in litters of DBA/2 mice compared to none (0/23) in the controls; and 30% (3/10) for CD-1 mice, compared to none (0/9) in the controls. Neubert and Dillmann, also using 3 ug TCDD/kg, reported 29% (7/24) of the viable litters had fetuses with cleft palate for NMRI mice compared to 6% (10/160) of the control litters. Smith et al. reported cleft palate in 71% (10/14) of CF-1 mouse litters at 3 ug/kg, compared to none (0/34) in the controls.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE March 6, 1984 Research Triangle Park, N. C. 27711

SUBJECT Analysis for 2378-TCDD in Human Adipose Tissue Samples Associated with the Five Rivers, Oregon Study (EMSL-RTP I.D. No. 2)

FROM Robert Harless, Research Chemist Robert Harless
Advanced Analysis Techniques Branch, EMD/EMSL (MD-67)

TO Dr. Norbert Jawarska, Director
Environmental Research Laboratory - Duluth and
HQ Liaison for National Dioxin Study

Eight extracts of human adipose tissue were received 3/2/84 from the ECL located in Bay St. Louis, Mississippi. The extracts were subjected to a previously described HRGC-HRMS method of analysis for quantitative determination of 2378-TCDD and TCDD isomers. A 25m SP-2340 fused silica capillary column was used for the analytical determinations.

Analytical results generated for the extracts are shown in Table 1. Evaluation of pertinent data indicates:

- 2378-TCDD was detected in one extract (maybe QA sample?).
- TCDD isomers were not detected in any of the extracts.
- Method efficiency was adequate.
- With one exception (D-697), the extracts were relatively free of chlorinated contamination.
- Small sample size and 5 ng $^{13}C_{12}$-TCDD fortification level prohibits achieving 1 to 10 ppt minimum limits of detection for D-697 extract. Trace level amounts of PCBs and other chlorinated contamination were detected in this extract. However, the contamination does not interfere with analysis for 2378-TCDD. In order to achieve 1 to 10 ppt minimum limits of detection for a 0.1 gram sample, the $^{13}C_{12}$-TCDD fortification level should be no more than 0.1 to 0.5 ng.
- All D-697 extract was used for analysis. However, 20 to 40 percent of each of the other extracts is stored for reference.

Please call me if you have any questions.

Attachment

cc: A. Dupuy
D. McDaniels
M. Dellarco
J. Clements
R. Lewis

Table 1

Analytical Results for 2378-TCDD in Human Adipose Tissue (Five Rivers Oregon Study)

Sample I.D.	Sample Weight (grams)	$^{13}C_{12}$-TCDD Fortification Level (ng)	Method Efficiency % Recovery of $^{13}C_{12}$-TCDD	2378-TCDD Detected and Minimum Limit of Detection (ppt)
D-685	10	5	98	ND (0.8)
D-686	10	5	77	ND (0.8)
D-687	10	5	96	ND (1.0)
D-688	10	5	94	ND (1.0)
D-697	0.088	5	96	ND (53.0)
D-698	1.43	5	90	ND (4.3)
D-699	10	5	80	ND (0.7)
D-700	10	5	92	12 (0.9)

ppt = part per trillion. ND = not detected at specified detection limit.

NOTE - None of the other 21-TCDD isomers were detected in these extracts at equivalent detection limits.

THE UNIVERSITY OF NEBRASKA-LINCOLN
LINCOLN, NEBRASKA 68588

DEPARTMENT OF CHEMISTRY

Tyra Franke

CONFIDENTIAL

September 29, 1977

Ms. Pat Ott
Office of Pesticide Program
WH 568
U. S. Environmental Protection Agency (CM-2)
Washington, D. C. 20460

Dear Pat:

Enclosed is a report of our analysis for TCDD in samples coded G-17 through G-60. The report contains the sample identity, the weight of sample taken for work-up, the concentration of TCDD, and the detection limit. There are a few comments I would like to make on these results.

1. All data--concentration of TCDD, detection limit, and percent recovery--were obtained by GC/MS. The conditions used for both the GC and the MS have been previously reported (see my letter of August 11, 1977) except for the following. We injected the extract with the column at 250°. This temperature was held for four minutes and then increased to 305° at a rate of 25° per minute and held there for seven minutes. The retention time was 5 minutes.

We made this change to decrease the "tailing" of the TCDD peak, to improve the separation of TCDD and the various PCB's, and to purge the column of higher boiling contaminants.

2. Most of the samples were highly contaminated with PCB's and DDE. This was especially true for the human adipose extracts. In fact, after completing the normal clean-up and analyzing three extracts, we found we were unable to obtain low detection limits because of the high concentration of the contaminants. Therefore, the alumina liquid chromatography step was repeated, and the majority of the interferences were removed. The percent recoveries could be better, but the additional sample handling had a definite effect.

To check whether the contaminants were present initially in the sample or were introduced in the work-up, we analyzed four samples of supermarket beef fat and three samples of Nebraska soil. No unusual concentrations of PCB or DDE were found. Accordingly, the contaminants were present initially. We estimate that the amounts of PCB were 100 to 1000 times greater than normal in some of the extracts following the prescribed clean-up.

3. We found low detection limits for all the analyses except three (average detection limits excluding these three was 6 ± 3 parts per trillion). G-22 showed a large PCB interference at m/e 322. The percent recovery on G-10 was very low (5%), and the amount of sample for G-24 was limited.

The analyses are a classic example of the detection limit exceeding the sensitivity of the method. Our analyses could have been done at a level lower than 1 part per trillion considering sensitivity only. However, the detection limit was raised because of two factors: (i) the concentration of native TCDD in our Cl-37 spike was sufficient to detect, and (ii) a PCB interference at m/e 322 was found in most cases which "tailed" into the region for the exact mass of native TCDD.

4. Please note that results for samples G-40 and G-49 are not reported. Various instrumental problems occurred during these runs. They will be run again along with our next batch of samples.

5. Sample G-6, which we reported as a positive, was worked-up again, but no TCDD-Cl-37 internal standard could be detected. We think we forgot to spike the extract. Therefore, this sample will be analyzed once again.

I hope these results are acceptable to you. Please advise us on any additional work that should be done with these samples. I would recommend that we repeat the analysis with those samples which showed positive.

Finally, we are in need of more samples as well as additional Cl-37 internal standard. I would appreciate it if you would arrange a shipment in the very near future.

Sincerely yours,

Michael L. Gross
Associate Professor

MLG:sac

Enclosures

cc Dr. Tung Sun
Dr. P. A. Lyon
Mr. Dave Hilker
Mr. Stan Wojinski
Mr. Richard Reising

REPORT

GAS CHROMATOGRAPHY/HIGH RESOLUTION MASS SPECTROMETRY ANALYSIS

OF TCDD IN HUMAN SAMPLES

*****

SAMPLE ID #	SAMPLE DESCRIPTION	WEIGHT TAKEN	PERCENT RECOVERY	CONCENTRATION TCDD (pptr)	DETECTION LIMIT(pptr)	COMMENTS
17	Human Adipose	4.1280	55	ND	11	
18	Human Adipose	9.7851	60	4	3	
19	Human Adipose	10.8344	5	ND	30	Low percent recovery
20	Human Adipose	6.2253	60	35	7	
21	Human Adipose	9.6309	50	ND	2	
22	Human Adipose	9.3597	55	ND	43	Large PCB contaminat at m/e 322
23	Human Adipose	6.9082	60	ND	2	
24	Human Adipose	1.7275	50	ND	17	
25	Human Adipose	6.5791	60	ND	4	
26	Human Adipose	6.4527	60	ND	6	
27	Human Adipose	9.6724	65	ND	1	
28	Human Adipose	7.1945	85	ND	2	
29	Human Liver	5.2531	50	ND	7	
30	Human Liver	5.8124	50	ND	9	
31	Human Liver	7.6131	65	ND	3	
32	Human Liver	6.2248	95	ND	6	
33	Human Liver	10.2896	55	ND	3	
34	Human Liver	6.0702	60	ND	6	
35	Human Liver	9.2360	55	ND	3	
36	Human Liver	7.6546	50	ND	2	
37	Human Adipose	6.4564	50	ND	4	
38	Human Liver	9.4527	10	24	9	Low percent recovery
39	Human Adipose	3.8805	55	ND	3	
40	Human Adipose	5.6639				GC/MS Malfunction

REPORT--Gas Chromatography/High Resolution Mass Spectrometry Analysis of TCDD in Human Samples

SAMPLE ID #	SAMPLE DESCRIPTION	WEIGHT TAKEN	PERCENT RECOVERY	CONCENTRATION TCDD (pptr)	DETECTION LIMIT(pptr)	COMMENTS
41	Human Adipose	5.5058	55	ND	5	
42	Human Liver	3.5538	60	ND	6	
43	Human Adipose	5.4404	55	ND	4	
44	Human Adipose	5.6241	55	ND	5	
45	Human Liver	2.9099	60	ND	8	
46	Human Adipose	3.1839	60	ND	6	
47	Human Adipose	3.3663	80	ND	5	
48	Human Liver	4.3566	65	ND	6	
49	Human Liver	4.3083				GC/MS Malfunction
50	Human Liver	3.2096	50	ND	6	
51	Human Adipose	2.3975	50	64	9	
52	Human Adipose	6.0590	50	ND	7	
53	Human Adipose	5.3701	68	ND	3	
54	Human Adipose	9.4785	50	ND	4	
55	Human Adipose	9.1319	50	ND	5	
56	Human Liver	2.6606	50	ND	12	
57	Human Adipose	7.1199	60	ND	9	
58	Human Adipose	8.2333	60	7	5	
59	Human Adipose	4.7415	55	ND	11	
60	Human Adipose	9.7420	50	19	8	

--Submitted By: Michael L. Gross
Department of Chemistry
University of Nebraska
Lincoln, NE 68588
September 29, 1977

DRAFT

1/23

Acession #: 9

Title of Project: DMP Deer and Elk Study

Status of Project: in progress

Location of Sampling: Oregon and Washington

Herbicide Use: forest

Sample Media: deer and elk adipose tissue

Range of Limit of Detection: RTP: 0.8 - 6.0 ppt
WSU: 8.0 - 34.0 ppt

Average Limit of Detection: RTP: 2.7 ppt
WSU: 14.8 ppt

# of Samples Collected: deer: 6
elk : 9

# of Samples Analyzed: 15

# of Samples Suspected Positive: : deer: 3 of 6, 50.0%
elk: 7 of 9, 77.8%

Comments:

It is important to note that four samples were analyzed below 50% recovery of the 37Cl TCDD standard and therefore require re-extraction and re-analysis according to standard DMP procedures. These samples are # OR-D-1, WA-D-4, WA-D-8, and WA-E-7. Nevertheless, the data indicate the presence of 2,3,7,8 TCDD residues in both deer and elk.

Also it is important to note that RTP reported the presence of other minor isomers in addition to the major 2,3,7,8 TCDD isomer (based on the DMP analytical criteria).

The result of this study indicates that additional sampling may be useful in providing more information about the extent of dioxin contamination associated with the use of 2,4,5-T and silvex in this geographic area.

Preliminary Data

DRAFT 1/23

Adipose Sample Description	Toxicant Analysis Center Sample #	ppt[c] Native TCDD Added to Sample	RTP #	Research Triangle Park TCDD Detected (ppt)[c]	TCDD Detection Limit (ppt)[c]	37CL[d] % Recovery	WSU #[f]	Wright State University TCDD Detected (ppt)[c]	TCDD Detection Limit (ppt)[c]	37CL % Recovery
deer	OR-D-5		124[e]	12	2	89	1[g]	31	21	46
deer	WA-D-1		125	ND	2	50	2	ND	21	46
deer	OR-D-1		126	ND	4	34	3[g]	ND	34	29
deer	Control	7	127	9	2	78	4	14	13	51
deer	WA-D-4		128	ND	3	36	NA			
deer	OR-D-6		129[e]	7	2	84	5	14	13	59
deer	WA-D-8		130	7	4	31	6[g]	ND	24	33
Method Blank[a]		0	131	ND	3	50	7	ND	8	105
elk	WA-E-2		132[e]	9	2	67	NA			
elk	OR-E-11		133	ND	2	71	8	ND	8	97
elk	WA-E-6		134[e]	54	0.8	100	9	68	10	79
deer	Control	21	135[e]	34	6	50	10[g]	41	8	150
elk	OR-E-7		136	24	3	50	11	29	8	102
elk	OR-E-9		137[e]	5	2	100+	12[g]	ND	8	98
elk	WA-E-5		138	12	3	57	13[g]	ND	19	43
elk	OR-E-8		139[e]	4	1	87	14[g]	ND	10	84
Standard Solution[b]		14	140	23	2	100+	15	17	11	76
elk	WA-E-4		141[e]	21	2	76	16[g]	21	11	70
elk	WA-E-7		142	ND	4	36	17[g]	ND	25	32

(a) Method Blank: extraction procedure using solvent only.

(b) Standard Solution: a standard solution containing 2,3,7,8-tetrachloro-dibenzo-p-dioxin

(c) ppt: parts per trillion

(d) corrected for recovery loss

(e) two other isomers in addition to 2,3,7,8-tetrachloro-dibenzo-p-dioxin the major isomer, were observed

(f) WSU analyses reported here are the average of two runs

(g) evidence of PCB contamination in sample

ND: Not Detected

NA: Not analyzed by WSU due to limited amount of sample

NB: Sample wt. for all samples was 5g.; 37CL TCDD addition to each sample is 5 nanograms (ng) except Control Sample RTP-135/WSU-10 which contained 1.33 ng.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
HEALTH EFFECTS RESEARCH LABORATORY
RESEARCH TRIANGLE PARK
NORTH CAROLINA 27711

DATE: December 17, 1979

SUBJECT: Results of Capillary Column GC/HRMS Analyses Performed on Extracts of Deer and Elk Adipose Tissue for 2,3,7,8-TCDD Residues

FROM: Robert Harless
HERL, ETD, ACB (MD-69)

TO: Mike Dellarco, Dioxin Project Manager
Special Pesticide Review Division (TS-791)
Office of Toxic Substances
401 M Street, SW
US EPA
Washington, DC 20460

THRU: Dr. R. G. Lewis, Chief
Analytical Chemistry Branch (MD-69)
HERL, ETD

Per your request, these samples were not analyzed until the most high priority samples, "Vertac", etc. were analyzed.

This shipment of sample extracts was received from the EPA Pesticide Monitoring Laboratory, Bay-St. Louis, Mississippi, 9-6-79, and was assigned the identification number ACB-108. The sample extracts were subjected to a previously described capillary column GC/HRMS multiple ion monitoring method of analysis for 2,3,7,8-TCDD residues utilizing a Varian 311A mass spectrometer interfaced with an SE-30 WCOT glass capillary column.

The criteria utilized for confirmation of 2,3,7,8-TCDD were:

1. Capillary column GC/HRMS retention time of 2,3,7,8-TCDD.
2. Co-injection of sample fortified with ^{37}Cl-TCDD and 2,3,7,8-TCDD standard.
3. Molecular ion chlorine isotope ratio (m/e 320 and m/e 322).
4. Capillary column GC/HRMS simultaneous multiple ion monitoring response (m/e 320, m/e 322, and m/e 328) for TCDD.
5. M/e 320 and m/e 322 MS response greater than 2.5 mm noise level.

The capillary column GC/HRMS retention time of 2,3,7,8-TCDD was 15 minutes ± 15 seconds. The MS mass resolution (8,500) was sufficient to resolve TCDD from contamination. The masses monitored during these analyses were:

1. m/e 318.9793 PFK reference
2. m/e 319.8965 TCDD
3. m/e 321.8935 TCDD
4. m/e 327.8847 ^{37}Cl-TCDD

Results

The results are shown in Table 1. The recovery of ^{37}Cl-TCDD was below 50% for specific sample extracts. Therefore, the results should not be reported. These specific samples should be subjected to analytical clean-up and GC/HRMS analysis again to confirm the reported results. TCDD isomers (3) were detected in RTP-124, 129, 132, 134, 135, 137, 139, and 141. The isomer having exact GC/HRMS retention time as 2,3,7,8-TCDD was the major isomer detected (high concentration). No problems were encountered in these analyses.

Summary

2,3,7,8-TCDD and two (2) TCDD isomers were detected in deer and elk adipose tissue samples.

CC: Dr. William Durham, Director
Environmental Toxicology Division (MD-66)

Dr. Nancy Wilson, Chief
Chemical Characterization Section (MD-69)

TABLE 1 ACB #108

ANALYTICAL RESULTS FOR 2,3,7,8-TCDD RESIDUES

Sample ID	Sample Weight (g)	^{37}Cl-TCDD Fortification Level (ng)	^{37}Cl-TCDD % Recovery	TCDD Detection Limit (ppt)*	TCDD Detected (ppt) *	Comments
RTP-124	5	5	89	2	12	Deer Adipose
RTP-125	5	5	50	2	ND	" "
RTP-126	5	5	34	4	ND	" "
RTP-127	5	5	78	2	9	" "
RTP-128	5	5	36	3	ND	" "
RTP-129	5	5	84	2	9	" "
RTP-130	5	5	31	4	7	" "
RTP-131	5	5	50	3	ND	" "
RTP-132	4	4	67	2	9	Elk Adipose
RTP-133	5	5	71	2	ND	" "
RTP-134	5	5	100	0.8	54	" "
RTP-135	5	1.33	50	6	34	" "
RTP-136	5	5	50	3	24	" "
RTP-137	5	5	100+	3	5	" "
RTP-138	5	5	57	3	12	" "
RTP-139	5	5	87	1	4	" "
RTP-140	5	5	100+	2	23	" "
RTP-141	5	5	76	2	21	" "
RTP-142	5	5	36	4	ND	" "

ND = not detected ppt = parts per trillion * = corrected for recovery losses

Wright State University

Dayton, Ohio 45431

November 29, 1979

Mr. W. T. Hollaway
U.S. Environmental Protection Agency
Office of Toxic Substances
Special Pesticide Review Div. (TS-791)
Crystal Mall #2
1921 Jefferson Davis Highway, Rm. 728
Arlington, Virginia 22202

Dear Mr. Hollaway:

Attached is a table showing the results of analyses of the remaining samples in the batch of 17 which we have been analyzing. Results for the first nine samples were reported in our recent Quarterly Report. We are proceeding as rapidly as possible with the MS-30 modifications to permit isomer-specific TCDD determinations, and will provide you with a status report on those developments in the near future.

Sincerely,

Thomas O. Tiernan, Ph.D.
Professor of Chemistry and
Director of the Brehm Laboratory

TOT/aam
Attachment

TABLE 1

RESULTS OF GC-HIGH RESOLUTION MS ANALYSES OF SAMPLE EXTRACTS PROVIDED BY EPA FOR TETRACHLORODIBENZO-p-DIOXIN (TCDD) BY WRIGHT STATE UNIVERSITY

EPA Sample No.	Run 1 Native TCDD Detected (parts-per-trillion) m/e 320	m/e 322	Average	Run 2 Native TCDD Detected (parts-per-trillion) m/e 320	m/e 322	Average	Average Native TCDD (ppt)	Average M.D.C. (ppt)	Average % Recovery	Notes
WSU-10	31	43	37	48	43	45	41	8	150	a.,b.
WSU-11	25	23	24	35	32	34	29	8	102	--
WSU-12	0	0	0	0	0	0	0	8	98	a.
WSU-13	0	0	0	0	0	0	0	19	43	a.
WSU-14	0	0	0	0	0	0	0	10	84	a.
WSU-15	15	20	18	14	16	15	17	11	76	--
WSU-16	18	26	22	17	20	19	21	11	70	a.
WSU-17	0	0	0	0	0	0	0	25	32	a.

a. PCB contamination of sample is evident.

b. This sample was supposedly spiked with only 1.33 ng total ^{37}Cl-TCDD. The indicated recovery however indicates a possible error in spiking.

QUANTITATION OF PARTS-PER-TRILLION LEVELS OF 2,3,7,8-TETRACHLORODIBENZO-p-DIOXIN IN EPA FURNISHED EXTRACTS OF BIOLOGICAL MATERIALS

EPA Cooperative Agreement No. CR806846-01

Submitted by

Brehm Laboratory
Wright State University
Dayton, Ohio 45435

Thomas O. Tiernan, Joseph G. Solch, Garrett VanNess,
Michael L. Taylor, and Thomas Mazer

Quarterly Report

September 23, 1979

Submitted to

William T. Hollaway
Coordinator - Dioxin Implementation Plan
U.S. Environmental Protection Agency
Office of Toxic Substances
Special Pesticide Review Division (TS-791)
Crystal Mall #2
1921 Jefferson Davis Highway, Rm. 728
Arlington, Virginia 22202

I. INTRODUCTION

Analyses of EPA-furnished extracts of deer and elk adipose for tetrachlorodibenzo-p-dioxin content were accomplished by Wright State University during the third quarter of the program being conducted under EPA Cooperative Agreement No. CR806846-01. Results of these analyses are reported herein and other pertinent topics are discussed.

II. EXPERIMENTAL PROCEDURES

The experimental procedures applied for the analyses reported herein are essentially the same as those described previously in the Quarterly Report of March 23, 1979.

III. RESULTS AND CONCLUSIONS

The results of analyses of nine extracts of deer and elk adipose are listed in Table 1. Since these extracts were based on five gram samples, whereas the Cooperative Agreement specified that ten gram samples would be extracted by EPA, it was not possible to achieve the specified detection sensitivity for TCDD. However, the minimum detectable TCDD levels in most of the samples are quite reasonable, being 13 parts-per-trillion (ppt) or less for five of the nine samples. In all cases where higher detection limits were imposed, the recoveries, based on the ^{37}Cl-TCDD internal standard, were extremely poor. It is noteworthy that recoveries were less than 50% for four of the nine samples, and were in the acceptable range for only three samples. This suggests that the EPA extraction and cleanup methodology is not really adequate for these types of samples, and that improvements are desirable. Three of the nine samples analyzed exhibited very large

apparent polychlorinated biphenyl (PCB) interferences, and the recoveries for these samples were the lowest observed in this set, as shown in Table 1.

IV. PROJECT STATUS AND PLANS

In order to be consistent with the Cooperative Agreement schedule, Wright State would have been required to analyze twenty-one (21) sample extracts during the present third quarter reporting period. As noted in the previous Quarterly Report submitted to EPA, Wright State analyzed nine (9) samples in excess of the requirements during the previous quarter, which reduces the normal sample analysis load (30 samples/quarter) to twenty-one (21), as just mentioned. However, EPA supplied Wright State with only seventeen (17) sample extracts during the present reporting period, and these were not received until September 20, 1979, only three days before the end of the third quarter of the Cooperative Agreement. In view of this late shipment of samples, it was not possible to complete analyses of all seventeen (17) extracts prior to the end of the reporting period. Analyses of nine of the seventeen were completed and are reported herein, as noted above.

It must be emphasized that EPA has not provided Wright State with the numbers of samples specified in the Cooperative Agreement for the present quarter, and that the sample shipment which was made was not timely. It is urged that attempts be made to rectify this situation in the coming quarter, and that the appropriate number of samples be shipped as soon as possible. Wright State should receive a minimum of thirty-four samples from EPA for analyses during the fourth quarter (prior to December 23, 1979) in order to satisfy the projected schedule.

During this reporting period, authorization was received from EPA (letter of September 13, 1979 from W. T. Hollaway) to accomplish an internal budget-transfer of funds for the Cooperative Agreement. Accordingly, $8000 was transferred from the equipment line to the supply line of expenditures for the Agreement, as authorized.

Also during this reporting period, Dr. T. O. Tiernan attended the National Meeting of the American Chemical Society in Washington, D.C., where he participated in a Symposium on the Chemistry of Chlorinated Dibenzodioxins and Dibenzofurans. Dr. Tiernan also visited Mr. Hollaway and Mr. DeLarco, at their EPA offices during this trip, to discuss the status of the Cooperative Agreement and future plans. In the course of these discussions, Dr. Tiernan reviewed some recent data obtained by Wright State, relevant to the detection of TCDD in combustion samples. Preliminary data showing separation and determination of TCDD isomers using capillary-column gas chromatography in conjunction with low-resolution mass spectrometry were presented by Dr. Tiernan, and the detection of TCDD in fireplace soot by Wright State was noted. Dr. Tiernan further emphasized the desirability of proceeding with the proposed modifications to our MS-30 Mass Spectrometer to incorporate capillary-column GC, in view of these findings and the reports by Dow Chemical of TCDD in combustion samples.

TABLE 1

RESULTS OF GC-HIGH RESOLUTION MS ANALYSES OF
EPA-SUPPLIED SAMPLE EXTRACTS BY WRIGHT STATE UNIVERSITY

EPA Sample No.	Run 1 Native TCDD Detected (parts-per-trillion) m/e 320	m/e 322	Average	Run 2 Native TCDD Detected (parts-per-trillion) m/e 320	m/e 322	Average	Average Native TCDD (ppt)	Average Minimum Detectable Concentration (ppt)	Average % Recovery
WSU-1[a.] (deer adipose)	30	25	28	46	21	34	31	21	46
WSU-2 (deer adipose)	0	0	0	0	0	0	0	21	46
WSU-3[a.] (deer adipose)	0	0	0	0	0	0	0	34	29
WSU-4 (deer adipose)	14	14	14	14	13	14	14	13	51
WSU-5 (deer adipose)	14	11	13	16	14	15	14	13	59
WSU-6[a.] (deer adipose)	0	0	0	0	0	0	0	24	33
WSU-7 (deer adipose)	0	0	0	0	0	0	0	8	105
WSU-8 (elk adipose)	0	0	0	0	0	0	0	8	97
WSU-9 (elk adipose)	72	64	68	65	70	68	68	10	79

a. PCB contamination of samples is evident.

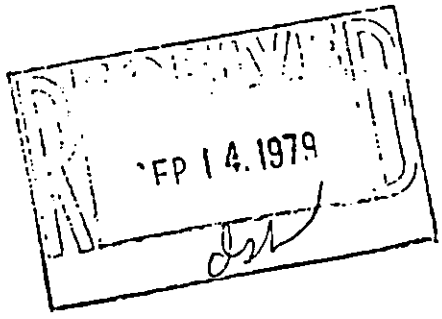
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: September 6, 1979

SUBJECT: Decoding of Sample Extracts Shipped to RTP and Univ. of Nebraska for TCDD Analysis on 9/5/79

FROM: Aubry E. Dupuy, Jr., Ph.D., Chemist
Pesticides Monitoring Laboratory

TO: Michael Dellarco
EPA/SPRD



I. Samples Shipped to RTP

Sample Shipment Number	Sample Description	Sample Wt.(g)	Fortification Level (ppt native TCDD)	Fortification Level (ng ^{37}Cl-TCDD)
RTP-124	Region X deer adipose OR-D-5	5	-	5
RTP-125	" WA-D-1	5	-	5
RTP-126	" OR-D-1	5	-	5
RTP-127	Control deer adipose	5	7	5
RTP-128	Region X deer adipose WA-D-4	5	-	5
RTP-129	" OR-D-6	5	-	5
RTP-130	" WA-D-8	5	-	5
RTP-131	Method blank	5	-	5
RTP-132	Region X elk adipose WA-E-2	4	-	4
RTP-133	" OR-E-11	5	-	5
RTP-134	" WA-E-6	5	-	5
RTP-135	Control deer adipose	5	21	1.33
RTP-136	Region X elk adipose OR-E-7	5	-	5
RTP-137	" OR-E-9	5	-	5
RTP-138	" WA-E-5	5	-	5
RTP-139	" OR-E-8	5	-	5
RTP-140	Standard solution	5	14	5
RTP-141	Region X elk adipose WA-E-4	5	-	5
RTP-142	" WA-E-7	5	-	5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: September 21, 1979

SUBJECT: Decoding of Sample Extracts Shipped to Wright State University for TCDD Analysis on 9/19/79

FROM: Aubry E. Dupuy, Jr., Chemist
Pesticides Monitoring Laboratory

TO: Michael Dellarco
EPA/SPRD

Please refer to the memo decoding the RTP shipment that I sent to you on September 6, 1979. The RTP equivalent numbers (split samples) are as follows:

Sample Shipment Number (Wright State Univ.)	Shipment Number Equivalent (RTP)
WSU-1	
WSU-2	RTP-124
WSU-3	RTP-125
WSU-4	RTP-126
WSU-5	RTP-127
WSU-6	RTP-129
WSU-7	RTP-130
WSU-8	RTP-131
WSU-9	RTP-133
WSU-10	RTP-134
WSU-11	RTP-135
WSU-12	RTP-136
WSU-13	RTP-137
WSU-14	RTP-138
WSU-15	RTP-139
WSU-16	RTP-140
WSU-17	RTP-141
	RTP-142

Due to limited sample material, samples RTP-128 (deer adipose WA-D-4) and sample RTP-132 (elk adipose WA-E-2) was sent to RTP only.

cc: Dr. Han Tai, Manager
Pesticides Monitoring Laboratory

1320-6 (Rev. 3-76)

Rationale and Study Design for Proposed TCDD Analysis of Region X Elk and Deer Adipose Tissue samples.

1. Reasons why such a study is needed:

   A. Because of so many variables, mother's milk TCDD levels alone do not provide much valuable information about TCDD in the environment. Utilizing human subjects presents great diversity in terms of diet, mobility in the environment, medication, and exposure history. Because of the nature of the TCDD molecule, it should be more concentrated in adipose tissue than elsewhere. Milk with its butterfat content would thus not be an unreasonable sample type, but adipose tissue would be much better. The difficulties of obtaining adipose biopsies from a selected population of humans are obvious.

   B. A TCDD monitoring study of carefully selected samples of elk and deer will provide the following advantages:

      Elk and deer live in discrete forest areas all of their lives. The herds are closely monitored by professional wildlife biologists. Exposure information from past spraying histories of the areas can be obtained. This localized nature of the herds enhances research design.

      Elk and deer are browsers and grazers, eating only vegetation from the forest areas they inhabit. Their diet thus reflects their environment (in terms of residues of any environmental contaminants) far more accurately than does a typical diet of an "exposed" human.

      Elk and deer are consumed by large numbers of people. Knowledge of possible contaminants in these animals is thus of public health importance. In California, State agencies have interpreted the precautions on the 2,4,5-T label to apply to both deer (California does not have appreciable elk populations) and livestock. The state thus opposes 2,4,5-T spraying 2 weeks prior to and during the deer season.

      Elk and deer herds in Region X coastal forests often consist of sufficient quantities of older animals to allow for sampling them preferentially as indicators of any bioaccumulation in an "exposed" environment over a several year timeframe. As explained later, several of our elk samples are from animals in the 10 to 13 year age class.

1/14/85

were labeled as to: species, date sampled, sex, age, site and date of kill, name, address and telephone of donating hunter, name, address and telephone of biologist making the collection, and miscellaneous comments by the sampling officer. They were then frozen and taken to a central site where they were then picked up by EPA Region X. Labels were made of paper and affixed to the bottles with strong twine.

Colecting dates were as follow: Oregon deer, 11-5-77; Oregon elk, 12-3-77; Washington deer, 10-22 and 10-23-77; and Washington elk, 10-31-77 through 11-21-77.

At present, the samples are stored frozen at the EPA Region X Laboratory in Seattle. They are labelled and sealed since their collection, and can be shipped at once whenever a suitable analytical laboratory can be found and utilized.

E. Sample data are as follow:

Oregon elk totalled 15. All of these animals were taken from the Coos Bay to Rosenburg area. Specifically, all of the animals came from the Millacoma and Coos River drainages, stretching across predominantly Weyerhaeuser land castward from the vicinity of Allegany. The elk herd is monitored closely by game biologists, and has been experiencing an excess of reproductive problems, including stillborns and teratisms during recent years. Ages range from 2 to 13 years (mean: 7.5 years). Mean size of fat sample is 43.5 grams. All are female, because only cows are sacrificed and studied from this herd annually by the game biologists.

Oregon deer totalled 10. All were taken from hunters at check stations in the Tillamook area. Age ranged from 1.5 to 5.0 years (mean: 2.8 years). Mean size of fat sample is 58.8 grams. Seven males and three females were sampled.

Washington deer totalled 9. They were taken in the general area stretching from Aberdeen toward the Pacific Coast. Mean sample size was 22.3 grams. Ages ranged from 0.5 to 5 years (mean: 1.9 years). Seven males and two females were sampled.

Region X began this study in the Fall of 1977 as a corollary to the mother's milk sampling study for TCDD, for reasons already outlined at the beginning of this paper. We have informed OSPR of this effort since its inception and have requested assistance numerous times in the analysis of the samples for TCDD, chiefly through Mr. Reising of OSPR. We have received no response whatsoever from OSPR.

Final Report for Cooperative Agreement
No. CR-806847. "Ultratrace Analysis
of Tetrachlorodibenzodioxin (TCDD) in
Environmental Samples" by the
University of Nebraska-Lincoln and the
U.S. Environmental Protection Agency.
June 24, 1983

Table II. Analysis of Extracts of Human Milk for TCDD: Real Samples.

Sample No.	Sample Type	Ngs Spike	Conc (ppt)	Det limit	% Recovery	Isotope Ratio	Data Report
MMG-1	MILK	10	-	-	25		1-II
MMG-1	MILK	10	ND	6	50		1-III
MMG-1	MILK	10	ND	2	40		3-X
MMG-2	MILK	10	ND	4	60		1-II
MMG-3	MILK	10	ND	3	55		1-II
MMG-4	MILK	10	12	1	65		1-II
MMG-5	MILK	10	ND	4	50		1-II
MMG-6	MILK	10	ND	4	45		1-II
MMG-7	MILK	10	ND	2	45		1-II
MMG-8	MILK	10	ND	2	65		1-II
MMG-9	MILK	10	ND	4	70		1-II
MMG-10	MILK	10	ND	2	75		1-II
MMG-11	MILK	10	ND	2	70		1-II
MMG-12	MILK	10	11	1	55		1-II
MMG-12	MILK	2.5	10	1			2-II
MMG-13	MILK	10	ND	4	55		1-II
MMG-14	MILK	10	ND	2	45		1-II
MMG-15	MILK	10	ND	3	45		1-II
MMG-16	MILK	10	2.5	1	45		1-II
MMG-16	MILK	2.5	ND	3			2-II
MMG-16	MILK	10	ND	2	40		3-X
MMG-17	MILK	10	ND	3	50		1-II
MMG-18	MILK	10	ND	2	45		1-II
MMG-19	MILK	10	18	4	30		1-II
MMG-20	MILK	10	ND	3	50		1-II
MMG-21	MILK	10	ND	6	45		1-II
MMG-22	MILK	10	ND	3	50		1-II
MMG-23	MILK	10	ND	2	55		1-II
MMG-24	MILK	10	ND	4	60		1-II
MMG-26	MILK	10	ND	2	50		2-III
MMG-27	MILK	10	ND	2	55		2-III
MMG-28	MILK	10	ND	2	55		2-III
MMG-29	MILK	10	12	1	75		2-III
MMG-30	MILK	10	4	2	30		2-III
MMG-31	MILK	10	ND	1	100		2-III
MMG-32	MILK	10	ND	1	50		2-III
MMG-32	MILK		2.0	.3		.64	3-XI
MMG-33	MILK	10	ND	1	100		2-III
MMG-34	MILK	10	1.0	.8	100		2-III
MMG-34	MILK		ND	6		-	3-XI
MMG-35	MILK	10	ND	2	95		2-III
MMG-36	MILK	10	ND	1	100		2-III
MMG-37	MILK	10	ND	1	75		2-III
MMG-38	MILK	10	11	2	55		2-III
MMG-38	MILK		3.5	.3		.82	3-XI
MMG-39	MILK	2.5	ND	3	70		2-IB
MMG-39	MILK	2.5	ND	1			2-II
MMG-40	MILK	2.5	ND	2	70		2-IB

MMG-41	MILK	2.5	ND	2	55		2-IB
MMG-42	MILK	2.5	2.3	2	55		2-IB
MMG-42	MILK	2.5	ND	1			2-II
MMG-42	MILK	2.5	ND	2	75		3-X
MMG-43	MILK	2.5	ND	1	75		2-IB
MMG-44	MILK	2.5	ND	2	80		2-IB
MMG-45	MILK	2.5	ND	1	50		2-IB
MMG-46	MILK	2.5	ND	2	85		2-IB
MMG-47	MILK	2.5	ND	1	85		2-IB
MMG-48	MILK	2.5	ND	2	90		2-IB
MMG-49	MILK	2.5	ND	2	60		2-IB
MMG-50	MILK	2.5	3.5	1	80		2-IB
MMG-50	MILK	2.5	4.0	2			2-II
MMG-50	MILK		.6	.1		.89	3-XI
MMG-51	MILK	2.5	ND	2	40		2-IB
MMG-52	MILK	2.5	ND	3	75		2-IB
MMG-52	MILK	2.5	ND	2			2-II
MMG-53	MILK	2.5	ND	2	60		2-IB
MMG-54	MILK	2.5	ND	2	90		2-IB
MMG-55	MILK	2.5	ND	3	65		2-IB
MMG-55	MILK	2.5	ND	2			2-II
MMG-56	MILK	2.5	ND	3	75		2-IB
MMG-56	MILK	2.5	ND	1			2-II
MMG-57	MILK	2.5	ND	2	75		2-IB
MMG-57	MILK		ND	1.0	65		4-II
MMG-58	MILK	2.5	ND	3	80		2-IB
MMG-59	MILK	2.5	ND	3	80		2-IB
MMG-59	MILK	2.5	2.7	1			2-II
MMG-59	MILK	2.5	ND	1	70		3-X
MMG-59	MILK		ND	3.0	40		4-II
MMG-60	MILK	2.5	7.0	1	75		2-IB
MMG-61	MILK	2.5	ND	2	70		2-IB
MMG-62	MILK	2.5	ND	2	70		2-IB
MMG-63	MILK	2.5	ND	2	75		2-IB
MMG-64	MILK	2.5	ND	2	65		2-III
MMG-65	MILK	2.5	ND	2	95		2-III
MMG-66	MILK	2.5	2.0	1.6	95		2-III
MMG-67	MILK	2.5	ND	3	80		2-IVA
MMG-68	MILK	2.5	ND	3	65		2-IVA
MMG-68	MILK	2.5	ND	4	45		2-IVA
MMG-69	MILK	2.5	ND	5	45		2-IVA
MMG-69	MILK	2.5	ND	2	60		3-X
MMG-70	MILK	2.5	ND	3	55		2-IVA
MMG-71	MILK	2.5	ND	2	60		2-III
MMG-72	MILK	2.5	ND	1	85		2-III
MMG-72	MILK	2.5	ND	1	55		3-X
MMG-73	MILK	2.5	ND	1	90		2-III
MMG-74	MILK	2.5	ND	2	75		2-III
MMG-75	MILK	2.5	ND	2	90		2-III
MMG-76	MILK	2.5	ND	2	90		2-III
MMG-77	MILK	2.5	ND	3	65		2-III
MMG-77	MILK	2.5	2.3	1	65		3-X
MMG-78	MILK	2.5	ND	2	70		2-IVA
MMG-79	MILK	2.5	ND	4	75		2-IVA

MMG-80	MILK	2.5	ND	3	85		2-IVA
MMG-82	MILK	2.5	ND	3	60		2-IVA
MMG-83	MILK	2.5	ND	3	85		2-IVA
MMG-81	MILK	2.5	ND	2	95		2-III
MMG-84	MILK	2.5	ND	2	65		2-III
MMG-85	MILK	2.5	1.5	1.5	75		2-IVA
MMG-86	MILK	2.5	ND	3	65		2-IVA
MMG-86	MILK	2.5	ND	1	55		3-X
MMG-87	MILK	2.5	ND	5	65		2-IVA
MMG-87	MILK	2.5	ND	.8	50		3-X
MMG-88	MILK	2.5	ND	3	80		2-IVA
MMG-89	MILK	10	ND	.8	55		3-VIA
MMG-89	MILK	10	ND	1	45		3-VIA
MMG-90	MILK	10	ND	1	55		3-VIA
MMG-91	MILK	10	ND	.9	50		3-VIA
MMG-92	MILK	10	3.1	2	30		3-VIA
MMG-92	MILK		4.0	.3	.83		3-VIB
MMG-93	MILK	10	2.5	1	40		3-VIA
MMG-93	MILK		4.0	.5	.78		3-VIB
MMG-94	MILK	10	1.6	.7	55		3-VIA
MMG-94	MILK		ND	.7	-		3-VIB
MMG-95	MILK	10	ND	2	35		3-VIA
MMG-96	MILK	10	ND	1	55		3-VIA
MMG-97	MILK	10	ND	.9	55		3-VIA
MMG-98	MILK	10	5.0	1	30		3-VIA
MMG-98	MILK		6.0	.4	.78		3-VIB
MMG-99	MILK	10	1.1	.7	60		3-VIA
MMG-99	MILK		ND	.6	-		3-VIB
MMG-100	MILK	10	ND	.8	50		3-VIA
MMG-100	MILK		ND,ND	.5,.5	-		3-VIB
MMG-101	MILK	10	ND	1	60		3-VIA
MMG-102	MILK	10	ND	.8	65		3-VIA
MMG-103	MILK		ND	.8	-		3-VIB
MMG-103	MILK	10	ND	.8	60		3-VIA
MMG-104	MILK	10	ND	.7	60		3-VIA
MMG-105	MILK	10	ND	.9	50		3-VIA
MMG-106	MILK	10	.96	.8	50		3-VIA
MMG-106	MILK		1.8	.5	.83		3-VIB
MMG-106	MILK		.80	.20	.69		3-VIB
MMG-107	MILK	10	ND	.8	60		3-VIA
MMG-108	MILK	2.5	1.0	.8	50		3-VIIA
MMG-108	MILK		ND	.6		-	3-VIIB
MMG-109	MILK	2.5	ND	3	50		3-VIIA
MMG-110	MILK	2.5	3.9	1	45		3-VIIA
MMG-110	MILK		7.3	1		.85	3-VIIB
MMG-111	MILK	2.5	2.0	1	50		3-VIIA
MMG-111	MILK		3.2	.6		.84	3-VIIB
MMG-112	MILK	2.5	1.5	.5	60		3-VIIA
MMG-112	MILK		2.2	.6		.83	3-VIIB
MMG-113	MILK	2.5	1.7	.6	55		3-VIIA
MMG-113	MILK		2.9	.6		.81	3-VIIB
MMG-114	MILK	2.5	2.0	.7	50		3-VIIA
MMG-114	MILK		2.2	.6		.81	3-VIIB
MMG-115	MILK	2.5	ND	.9	50		3-VIIA

MMG-116	MILK	2.5	ND	1	45		3-VIIA
MMG-117	MILK	2.5	ND	.7	40		3-VIIA
MMG-118	MILK	2.5	1.4	.6	40		3-VIIA
MMG-118	MILK		ND	1		-	3-VIIB
MMG-119	MILK	2.5	ND	.7	40		3-VIIA
MMG-120	MILK	2.5	3.3	.6	45		3-VIIA
MMG-120	MILK		2.4	.3		.80	3-VIIB
MMG-121	MILK	2.5	ND	.6	50		3-VIIA
MMG-122	MILK	2.5	ND	1.1	35		3-VIIA
MMG-123	MILK	2.5	ND	.9	55		3-VIIA
MMG-124	MILK	2.5	ND	1	55		3-VIIA
MMG-125	MILK	2.5	.89	.5	60		3-VIIA
MMG-125	MILK		.50	.2		.94	3-VIIB
MMG-125	MILK		1.5	.8		.75	3-VIIB
MMG-126	MILK		2.0	.5		.69	3-VIIIB
MMG-126	MILK		.6	.1		.84	3-VIIIB
MMG-126	MILK	2.5	1.3	.6	50		3-VIIIA
MMG-127	MILK	2.5	ND	.7	60		3-VIIIA
MMG-128	MILK	2.5	ND	.8	60		3-VIIIA
MMG-129	MILK	2.5	2.9	.7	70		3-VIIIA
MMG-129	MILK		3.6	.3		.79	3-VIIIB
MMG-130	MILK	2.5	ND	.4	55		3-VIIIA
MMG-131	MILK	2.5	ND	.5	65		3-VIIIA
MMG-131	MILK		ND	.5		-	3-VIIIB
MMG-132	MILK	2.5	ND	.4	70		3-VIIIA
MMG-132	MILK		ND	1		-	3-VIIIB
MMG-133	MILK	2.5	ND	.7	60		3-VIIIA
MMG-134	MILK	2.5	ND	.5	70		3-VIIIA
MMG-135	MILK	2.5	ND	.7	60		3-VIIIA
MMG-136	MILK	2.5	ND	.6	65		3-IXA
MMG-137	MILK	2.5	.6	.6	85		3-IXA
MMG-137	MILK		ND	1		-	3-IXB
MMG-138	MILK	2.5	ND	.9	70		3-IXA
MMG-139	MILK	2.5	ND	.9	85		3-IXA
MMG-140	MILK	2.5	ND	1	65		3-IXA
MMG-141	MILK	2.5	ND	1	85		3-IXA
MMG-142	MILK	2.5	ND	1	45		3-IXA
MMG-143	MILK	2.5	ND	1	90		3-IXA
MMG-144	MILK	2.5	1.0	.8	75		3-IXA
MMG-144	MILK		1.0	.4		.73	3-IXB
MMG-145	MILK	2.5	ND	1	85		3-IXA
MMG-146	MILK	2.5	.7	.7	90		3-IXA
MMG-146	MILK		ND	.5		-	3-IXB
MMG-147	MILK	2.5	1.2	1	85		3-IXA
MMG-147	MILK		1.3	.6		.81	3-IXB
MMG-148	MILK	2.5	ND	.8	70		3-IXA
MMG-149	MILK	2.5	ND	.7	100		3-IXA
MMG-150	MILK	2.5	ND	1	65		3-IXA
MMG-151	MILK	2.5	3	2	40		4-I
MMG-152	MILK	2.5	130	20	45		4-I
MMG-153	MILK	2.5	48	6	55		4-I
MMG-154	MILK	2.5	ND	1	60		4-I
MMG-155	MILK	2.5	4	2	50		4-I
MMG-156	MILK	2.5	12	6	60		4-I

MMG-157	MILK	2.5	8	3	60	4-I
MMG-158	MILK	2.5	7	4	50	4-I
MMG-159	MILK	2.5	5	1	60	4-I

Table III. Analysis of Water and Sediment for TCDD (Alsea, Oregon Study - Phase I).

Sample No.	Sample Type	Ngs Spike	Conc (ppt)	Det limit	% Recovery	Isotope Ratio	Data Report
UN 1	WATER	2.5	.067	.02	75		2-IVB
UN-1	WATER	2.5	.027	.005	65		3-IV
UN 2	WATER	2.5	.76	.04	85		2-IVB
UN 3	WATER	2.5	.092	.01	90		2-IVB
UN-3	WATER	2.5	.023	.009	45		3-IV
UN 4	WATER	2.5	.067	.03	80		2-IVB
UN 5	WATER	2.5	.041	.03	50		2-IVB
UN-5	WATER	2.5	ND	.008	55		3-IV
UN 6	WATER	2.5	.061	.03	50		2-IVB
UN 7	WATER	2.5	.31	.02	50		2-IVB
UN 8	WATER	2.5	ND	.03	75		2-IVB
UN 9	WATER	2.5	ND	.04	60		2-IVB
UN 10	WATER	2.5	.040	.03	65		2-IVB
UN-10	WATER	2.5	ND	.007	55		3-IV
UN 11	WATER	2.5	ND	.04	60		2-IVB
UN 12	WATER	2.5	.070	.02	75		2-IVB
UN 13	SEDIMENT	2.5	ND	3	60		2-IVB
UN-14	SEDIMENT	2.5	13	5	60		3-I
UN-14	SEDIMENT	2.5	ND	.9	45		3-IV
UN-15	SEDIMENT	2.5	30	14	55		3-I
UN-15	SEDIMENT	2.5	2.0	1.4	30		3-IV
UN-15	SEDIMENT		1.9	.2		.78	3-V
UN-16	SEDIMENT	2.5	5.9	3	105		3-I
UN-16	SEDIMENT		ND	1.5		-	3-V
UN-16	SEDIMENT		ND	.7		-	3-V
UN-17	SEDIMENT	2.5	19	9	80		3-I
UN-17	SEDIMENT		2.3	.5		.83	3-V
UN-18	SEDIMENT	2.5	ND	11	60		3-I
UN-19	WATER	2.5	.061	.03	70		3-II
UN-20	WATER	2.5	ND	.02	120		3-II
UN-21	WATER	2.5	ND	.04	70		3-II
UN-22	WATER	2.5	.083	.02	90		3-II
UN-23	WATER	2.5	.065	.03	60		3-II
UN-23	WATER	2.5	.0081	.005	60		3-IV
UN-24	WATER	2.5	ND	.05	80		3-II
UN-25	WATER	2.5	.11	.04	60		3-II
UN-25	WATER	2.5	.011	.009	50		3-IV
UN-26	WATER	2.5	.081	.06	45		3-II
UN-26	WATER	2.5	ND	.004	55		3-IV
UN-27	WATER	2.5	ND	.07	45		3-II
UN-28	WATER	2.5	ND	.07	40		3-II
UN-29	WATER	2.5	ND	.08	40		3-II
UN-30	WATER	2.5	.17	.03	70		3-II
UN-31	WATER	2.5	ND	.08	45		3-II
UN-32	SEDIMENT	2.5	ND	9	70		3-I
UN-32	SEDIMENT	2.5	ND	.4	65		3-IV
UN-33	SEDIMENT	2.5	ND	4	85		3-I
UN-34	SEDIMENT	2.5	ND	4	90		3-I

UN-35	SEDIMENT	2.5	ND	14	35		3-I
UN-36	SEDIMENT	2.5	22	5	35		3-I
UN-37	SEDIMENT	2.5	ND	13	70		3-I
UN-38	SEDIMENT	2.5	ND	9	75		3-I
UN-39	SEDIMENT	2.5	38	4	35		3-I
UN-39	SEDIMENT		11.1	.7		.80	3-V
UN-40	SEDIMENT	2.5	21	3	55		3-I
UN-41	SEDIMENT	2.5	34	16	35		3-I
UN-41	SEDIMENT		11.7	1.6		.63	3-V
UN-42	SEDIMENT	2.5	20	12	25		3-I
UN-42	SEDIMENT		4.4	.5		.83	3-V
UN-43	SEDIMENT	2.5	ND	1.8	20		3-III
UN-44	SEDIMENT	2.5	1.3	.4	60		3-III
UN-45	SEDIMENT	2.5	ND	12	60		3-III
UN-46	SEDIMENT	2.5	ND	.9	45		3-III
UN-47	SEDIMENT	2.5	3.6	1.2	50		3-III
UN-47	SEDIMENT		3.6	.4		.86	3-V
UN-48	SEDIMENT	2.5	4.4	1.4	40		3-III
UN-48	SEDIMENT		5.8	.6		.78	3-V
UN-49	SEDIMENT	2.5	ND	.9	60		3-III
UN-50	SEDIMENT	2.5	ND	.8	60		3-III
UN 51	WATER	2.5	ND	.03	65		9
UN 52	WATER	2.5	ND	.06	80		9
UN 53	WATER	2.5	ND	.07	55		9
UN 54	WATER	2.5	.08	.03	100		9
UN 55	WATER	2.5	ND	.10	75		9
UN 56	SEDIMENT	2.5	64	17	45		9
		2.5	40	8	55		9
UN 57	SEDIMENT	2.5	24	13	55		9
UN 58	SEDIMENT	2.5	7	3	70		9
UN 59	SEDIMENT	2.5	32	4	50		9
		2.5	60	12	35		9
UN 60	SEDIMENT	2.5	7	4	35		9
UN 61	SEDIMENT	2.5	7	2	50		9
UN 62	SEDIMENT	2.5	5	2	45		9
UN 63	SEDIMENT	2.5	ND	2	55		9
UN 64	SEDIMENT	2.5	9	4	80		9
UN 65	SEDIMENT	2.5	58	5	75		9

Table VII. Analysis of TCDD in Biological and Environmental Samples ("Alsea, Oregon Phase II Project").

Sample No.	Sample Type	Ngs Spike	Conc (ppt)	Det. limit	% Recovery	Isotope Ratio	Data Report
UN 159	SEDIMENT	2.05	ND	19	30		10-IV
UN 160	SEDIMENT	2.05	120	15	40		10-IV
UN 160	SEDIMENT		-	8		-	10-V
UN 161	SEDIMENT	2.05	105	16	80		10-IV
UN 161	SEDIMENT		-	41		.21	10-V
UN 162	SEDIMENT	2.0	30	13	50		10-IV
UN 162	SEDIMENT		-	12		1.63	10-V
UN 163	SEDIMENT		-	680		2.00	10-V
UN 164	SEDIMENT	2.0	210	24	50		10-IV
UN 164	SEDIMENT		-	48		1.96	10-V
UN 165	SEDIMENT		-	10		-	10-V
UN 166	SLUDGE	4.0	220	140	75		10-IV
UN BLANK	SOLVENT	2.0	ND	4	50		10-IV
UN BLANK	SOLVENT	2.0	ND	1	70		10-IV
UN 166	SLUDGE		-	8		.96	10-V
UN 167	SLUDGE		-	8		.90	10-V
UN 168	SLUDGE		160	12		.78	10-V
UN 169	SLUDGE		5800	56		.78	10-V
UN 170	SLUDGE		470	10		.80	10-V
UN 171	SLUDGE		283	48		.79	10-V
UN 172	WATER		-	.25		2.16	10-V
UN 173	WATER		.38	.2		.84	10-V
UN 185	WATER FILTER	2.0	ND	5	50		10-II
UN 185	WATER FILTER		-	5		.39	10-VI
UN 186	CAT LIVER	1.85	ND	15	50		10-II
UN 187A	PRODUCTS OF CONCEPTION	2.05	ND	19	50		10-II
UN 187A	PRODUCTS OF CONCEPTION	Extracted only.		Analyzed elsewhere.			12-I
UN 188A	PRODUCTS OF CONCEPTION	2.0	3	2	50		10-II
UN BLANK	SOLVENT	10.0	ND	12	50		10-II
UN BLANK	CHARCOAL	10.0	ND	12	20		10-II
UN 188A	PRODUCTS OF CONCEPTION		-	1		-	10-VI
UN 188A	PRODUCTS OF CONCEPTION	Extracted only.		Analyzed elsewhere.			12-I
UN 191	MOUSE	2.5	ND	4	55		10-I
UN 192	SHREW	2.5	ND	3	55		10-I
UN 193	MOUSE	2.5	ND	18	6		10-I
UN 193	MOUSE	Extracted only.		Analyzed elsewhere.			12-II
UN 194	MOUSE	2.5	ND	2	50		10-I
UN 195	MOUSE	2.5	ND	3	50		10-I
UN 196	MOUSE	2.45	ND	3	55		10-I
UN 197	SHREW	Extracted only.		Analyzed elsewhere.			12-II
UN 197	SHREW	2.5	ND	8	30		10-I
UN 198	SHREW	2.45	ND	7	50		10-I
UN 199	SHREW	2.5	ND	4	65		10-I

UN 199	SHREW		ND	1		-	10-VI
UN 199	SHREW		ND	1		.98	10-VI
UN 200	BIRD	2.5	ND	5	50		10-I
UN 201	MOUSE	2.5	ND	2	60		10-I
UN 202	BIRD	2.5	ND	3	50		10-I
UN 202	BIRD	Extracted only.		Analyzed elsewhere.			12-I
UN 203	MOUSE	2.5	ND	3	30		10-I
BLANK 001	SOLVENT						12-II
BLANK 002	SOLVENT						12-II
BLANK 003	SOLVENT						12-II
UN 203	MOUSE	Extracted only.		Analyzed elsewhere.			12-II
UN 204	NEWTS	2.5	3	2	50		10-I
BLANK	SOLVENT	2.45	ND	5	50		10-I
BLANK	SOLVENT	2.4	ND	4	50		10-I
BLANK	SOLVENT	2.5	ND	3	55		10-I
UN 204	NEWTS		ND	1		-	10-VI
UN 204	NEWTS	Extracted only.		Analyzed elsewhere.			12-I

Capital Press
Regional Agricultural-Forest Weekly
Our 53rd Year

32 Pages ☆ Price: 50 Cents SALEM, OREGON ★ FRIDAY, DECEMBER 12, 1980 (USPS 082-600) Volume 53, Number

Look at 'highly exposed' segment proposed . . .

PARC shifts study emphasis

By CLAUDE STEUSLOFF
Capital Press Farm Editor

SALEM, Ore. — The Pesticide Analytical Research Center (PARC) has rejected a "retrospective type of study" of the pesticide problem in coastal counties of Oregon as outlined in a report made by the U.S. Center for Disease Control, Atlanta, Ga.

In a change of direction, PARC members decided to study a proposal to be made by Oregon State University on the effect of the pesticide 2,-4-D "on highly exposed people in Eastern Oregon and the Willamette Valley."

That proposal is due at the next meeting of the group, Jan. 30, at which time they will also consider a report of pesticide studies made by Dr. James Googin of the University of Oregon Health Sciences Center, Portland.

Marla Gillam, Eugene, of the Northwest Coalition for Alternatives to Pesticides, suggested PARC study "the rise and distribution of the use of chemicals in Oregon."

The action came after a morning of technical discussion on pesticides by a group of 15 scientists last Thursday at the Oregon Department of Agriculture, under direction of Bill Kosesan, administrator of the department plant division and chairman of PARC.

Warren Westgarth of the Department of Environmental Quality, made the original motion. He said he did so "after looking at all the data in the CDC report" and with the hope something could be going from the center before the summer applications of pesticides.

Larry Edmunds, epidemiologist with the disease control center at Atlanta, said the pesticide study he outlined would require $100,000 in funding from the state of Oregon. He said the CDC is not a funding group, the U.S. Environmental Protection Agency would not contribute, but the U.S. Forest Service could have some funds. Edmunds estimated total cost of the proposed study at $132,000.

Edmunds said birth defects among children born in Oregon runs lower than the national average but two counties have defects significantly higher than the U.S. average.

A pilot study by the Atlanta CDC was done in Lincoln, Benton and Polk counties on use of 2,4-D in primarily forested areas. Based on the Oregon rate of central nervous system birth defects from the Birth Defects Monitoring Program data, it was estimated 264 cases could be located and interviewed in Western Oregon.

Specifically, the study design rejected by PARC was "A retrospective matched case-control study, in-depth personal interviews would be conducted of 264 central nervous system cases and 264 normal controls to evaluate various maternal and paternal risk factors. With adequate staff, the work could have been completed in nine to 18 months.

The report states that a reliable, unbiased estimate of exposure to 2,4-D would be needed for both cases and controls. Because birth defects are rare events, it would be difficult to obtain enough cases for a study with sufficient statistical power, other than in a retrospective study.

Edmunds said the CDC report is "only an outline of an approach to the problem." During the discussion, he said the proposed further study has some advantages but there may be more disadvantages and there is no need to make a study for the sake of a study.

Mike Newton, professor of forest ecology at OSU, contended throughout the session that the CDC pilot study hypothesis blaming 2,4-D in coastal county birth defect problems is erroneous.

He said use of 2,4-D is a national problem and in many farming areas the use is much greater than in the timbered coastal community. He cited widespread roadside weed and brush use of 2,4-D and other herbicides.

Newton questioned whether the incidence of coastal defects is extraordinary and said birth defects in the region may be due to other causes such as high phosphate levels in soils and excessive rates of mercury and copper in water supplies at the coast.

He said a study of residents in urban areas at the coast — well removed from timber — showed that 17 percent of the population had high residues of 2,4-D in their urine.

"A study, if it is positive, would show defects but they would be subject to other variable causes than herbicides. We don't know what causes defects. There is only a 50 percent chance of picking up herbicide effects with a study," said Newton.

He said there is a 10,000-to-1 safety factor in herbicide applications. "Drugs, alcohol, etc., show birth defects in users, such confounding factors are large and will confuse the study," Newton continued.

Gillam said "lots of citizens are angry" about 2,4-D applications and warned that "sooner or later you must look at use of herbicides."

James Witt, agricultural Extension specialist in chemistry, OSU, proposed looking at positive controls for birth defects due to 2,4-D.

Virgil Freed, head of the agricultural chemistry department at OSU, called for a study of possible defects among husbands and wives who have used pesticides on family farms in Morrow and Umatilla counties, for many continuous years.

Dr. Stringham, family physician in Lincoln County, suggested both fathers and mothers should be studies for birth defects.

The Pesticide Analytical Research Center consists of representatives from the state departments of Agriculture, Health Division, Environmental Quality, Forestry and Fish & Game. One member from the public at large is appointed by the governor.

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BDMP DATA — Oregon, 1970-1978

Defect	Code	County: Lincoln No. Cases	Lincoln Rate	Benton No. Cases	Benton Rate	Polk No. Cases	Lane No. Cases	Lane Rate	Total Lincoln, Benton, Polk, Lane Counties No. Cases	Total Lincoln, Benton, Polk, Lane Counties Rate	All Oregon No. Cases	All Oregon Rate	70-77 U.S. Rate
Anencephaly	45	2	15.3	9	9.9*	--	12	4.6	23	6.2	85	4.9	4.6
Hydrocephaly	65	-	--	4	4.4	--	17	6.6*	21	5.6	39	4.0	4.4
Spina Bifida	56	1	7.7	10	11.0	--	9	3.5	20	5.4	72	4.1	6.2
Total CNS	125	4	30.6	27	29.6 *	--	48	18.6	79	21.2	307	17.6	
Cleft Lip	325	-	--	5	5.5	--	23	8.9	28	7.5	102	5.8	5.2
Cleft Palate	329	1	7.7	7	7.7	--	33	12.8*	41	11.0	167	9.6	9.6
T.E. Fistula	375	-	--	1	1.1	--	11	4.3	12	3.2	46	2.6	1.6
Rectal Atresia	393	-	--	4	4.4	--	11	4.3	15	4.0	61	3.5	3.4
Renal Agenesis	450	-	--	1	1.1	--	4	1.5	5	1.3	23	1.3	1.0
Reduction Deformity	483	1	7.7	3	3.3	--	17	6.6 *	21	5.6	59	3.4	3.3
Polydactyly	626	1	7.7	3	3.3	--	27	10.4	31	8.3	155	8.9	8.1
Births in BDMP Monitored		1,307 100%		9,123 100%		1,051	25,860 89%		37,341		174,659 65%		7,903,544 33%

70-77 significant increases

Benton - anencephaly (observed 8, expected 3.7) p = .05
Total CNS (observed 23, expected 16.68) p = .05

Lane - hydrocephaly (observed 16, expected 9.9) p = .05
cleft lip (observed 23, expected 11.6) p = .01
reduction deformity (observed 16, expected 7.3) p = .01

rate 10,000.

Medical Tribune

INTERNATIONAL MEDICAL NEWS

Wednesday, August 3, 1983

Volume 24 Number 16

Herbicide Dispute Ignites Tranquil Oregon County

BY RON LOVELL

ON THE SURFACE at least, Lincoln County, Oregon seems to represent the archetype of bucolic existence: a rugged coastline of whitewashed lighthouses perched on cliffs above the Pacific Ocean, which crashes against the rocks below; small towns with art galleries, gift shops, seafood restaurants, and a laid-back lifestyle; the lofty backdrop of the forest-covered Pacific Coast Range, containing a few hidden valleys where people raise crops and livestock and want to be left alone.

First of a series

The coast attracts thousands of tourists each year, a vital element of its economic well-being. Fishing is the second most important industry. The forests create the third mainstay of the economy: logging, lumber, and other wood products.

Behind this beautiful facade, however, lies another Lincoln County. Periodic aerial spraying of herbicides over the years to remove brush in the forests has created a flurry of lawsuits against the U.S. government and timber companies. Although not as well known as Love Canal in New York or Times Beach in Missouri, the battle in Lincoln County has already taken on national significance and has national ramifications far beyond the borders of this small, relatively isolated geographic area.

The spraying may have caused a number of health problems for the people living in the county, especially amid the forests of the Coast Range. A major concern is a higher-than-normal rate of neural-tube defects—especially anencephaly and hydrocephaly—among newborn infants, according to the Centers for Disease Control in Atlanta.

The Drs. Stringham: Alerted in 1977.

CDC's birth defects division combines neural tube defects (NTD) and central nervous system disorders (CNS) in its statistics. Totals noted include both Lincoln County and nearby Benton County, where many people on the coast and in the Coast Range go for their medical care. The figures.

Lincoln County (1970-1982/2,291 births): three cases anencephaly (13.1 rate per 10,000 births); one spina bifida (4.1 rate), one case listed as CNS, not otherwise specified; total, five cases (21.8 per 10,000). *Benton County* (1974-1982/10,008 births—with no cases before 1974). 12 cases anencephaly (8.4 rate per 10,000 births); 11 spina bifida (9.1 rate), seven hydrocephaly (4.9 rate), one encephalocele; seven other cases listed as CNS, not otherwise specified, total, 40

Continued on page 12

See Herbicide, Birth Defect Tie In Oregon County

Continued from page 1

cases (28.1 rate per 10,000 births).

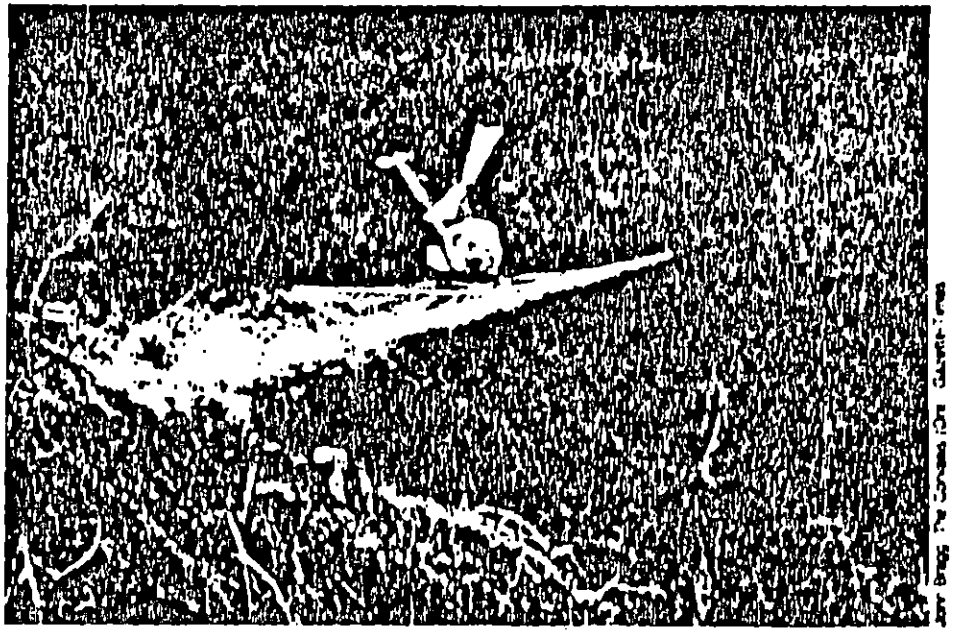
United States as a whole for the same period: anencephaly 4.2 per 10,000 births; spina bifida, 5.8 rate; hydrocephaly, 4.5 rate; encephalocele, 1.2 rate; total U.S., 18.8 rate per 10,000.

"The local rates are high for whatever reason," says Larry Edmonds, a CDC epidemiologist in the birth defects division. "You have two cases of anencephaly in Benton for 1982, for example. One case in any area is expected; two are not."

These statistics first attracted the attention of CDC three years ago because most counties with high rates are in the east, like Appalachia. Then, "here comes this funny little county in the west," said Mr. Edmonds. The agency sent him to the state capital of Salem in September, 1980, to a meeting of representatives from state forestry, agriculture, and health agencies, and doctors and consumers.

CDC's offer: to conduct a pilot study to assess the effect of herbicide spraying on the population. All those represented decided against doing the study, however, because critics could easily tear it down.

Part of the problem is that it is difficult to do such a study. Existing spraying records make it hard to confirm that people who say they have been sprayed were actually exposed. Although residents themselves think the problem has eased, Mr. Edmonds points out that the CNS total for 1982 was four cases. The only year that was higher—with five cases—was 1970.



Helicopter completes spraying pass over clear-cut Oregon hillside.

There has also been a higher-than-normal rate of miscarriages in the areas of heaviest spraying in Lincoln County and adjacent Benton County, findings which caused the Environmental Protection Agency to ban the use nationally of 2,4,5-T and Silvex on forest lands in 1979. But these herbicides can still be applied to agricultural land and home gardens.

Questions about the effects of spraying on the health of Coast Range residents—especially in the remote Five Rivers area, in the heart of the timber-rich Siuslaw National Forest—led U.S. District Court Judge Robert Belloni in April to issue an injunction prohibiting the U.S. Forest Service and U.S. Bureau of Land Management from spraying herbicides and pesticides within 25 miles of Siuslaw boundaries until the two agencies research the health effects of herbicide use in the area.

The herbicides affected are 2,4-D, Roundup, Piclorum, and Krenite. Although Belloni lifted his own ban a month later, the restriction was reinstated by the 9th U.S. Circuit Court of Appeals in San Francisco in May. Because the court tentatively scheduled hearings on these appeals in September, the ruling means spraying this summer will not take place. Timber companies were not affected, however.

Enter the Stringhams

As with other controversies involving herbicides over the years, the lines of battle have been drawn between the "big" (various agencies of the federal government, and large timber companies, who say they need to spray herbicides to protect their economic interests and rid the forests of brush to assure the growth of marketable trees) and the "little" (residents of the areas next to, or in the middle of, land to be sprayed who worry that their water and their bodies will be adversely affected by the spraying).

In the middle—sometimes taking sides, sometimes not—are the doctors of Lincoln County, to whom the people of the area turn when they think they have been made sick by the spraying.

Drs. Chuck and Renee Stringham, both MDs in family practice in the county since 1975, have been the most vocal in their questions about the effects of herbicide spraying. "I don't want herbicides banned altogether," says Dr. Chuck Stringham. "I just want to stop the wholesale use and abuse of them."

The Stringhams hadn't heard of herbicides when they started their practice. In the summer of 1977, a group protesting the spraying of herbicides on timber company land in the north part of the county were themselves sprayed. All 20 came to the Stringhams for help in treating their symptoms: headaches and nausea.

Next issue: The Stringhams ask questions.

On Herbicide Spraying in Oregon. . .

In rural Lincoln County, Ore., on the Pacific coast, a controversy boils over the health effects of aerial herbicide spraying by the U.S. Forest Service and timber companies, the last installment reported. While the chemicals remove forest brush, opponents argue they may also be responsible for a higher-than-normal rate of neural tube defects—especially anencephaly and hydrocephaly—among newborns there over the past decade. In 1977, FPs Chuck and Renee Stringham were alerted when they treated 20 demonstrators who had been sprayed during a protest; headache and nausea were the complaints.

BY RON LOVELL

"IN TRYING TO help these patients, I discovered I knew nothing, and that no one knew very much [about herbicides]," recalls Dr. Renee Stringham. "In the process of doing research, I became an expert in the side effects of spraying.

To find out more about the possible health hazards of herbicides, the Stringhams attended a conference in June, 1979 at the University of Oregon School of Medicine in Portland. There they heard experts on the subject like Dr. Samuel Epstein, professor of occupational and environmental medicine at the University of Illinois School of Public Health, citing the possible dangers of herbicide use. One the second day, foresters and farmers talked about their need for herbicides.

"We left with the feeling that these things could be dangerous," said Dr. Chuck Stringham. "The conference also gave us the knowledge that we were not just isolated people in the hinterlands worrying about what no one else knows."

The Stringhams became more persistent in their study of the problem. They noticed, for example, that of the 300 babies they delivered during their first four years in Lincoln County, seven had major neural-tube defects: three hydrocephalics, two anencephalics, one encephalocele, and one had a porencephalic cyst.

"I called the CDC to see if this rate was high and the person I talked to asked if I was near Benton County, which he called one of four hot spots for anencephaly in the country," said Dr. Renee Stringham. Benton County is the next county to the east and includes major portions of the Siuslaw National Forest. The Stringhams also noticed that one out of three pregnancies of patients they treated ended with spontaneous miscarriage. Although they had no hard evidence that these miscarriages were caused by herbicides, this discovery increased their questions.

In the spring of 1980, the Stringhams proposed that the Lincoln County Medical Society sponsor an initiative petition to get a measure on the ballot in the November, 1980 election that would decrease herbicide spraying over watersheds and limit roadside spraying so people would not be involuntarily exposed. The medical society members attending the regular meeting in April passed a motion in favor of sponsoring the petition seven to two.

The Stringhams returned from vacation a few weeks later on a Saturday to find that members who had not attended the first meeting had scheduled another one for the following Monday to reconsider the earlier vote. Two independent experts from California would present information on herbicides before the new vote.

The doctors felt they needed their own expert to present information so they arranged for Dr. Epstein to appear via satellite on the local religious cable channel to make his own presentation and answer questions from medical society members.

The vote this time was 14 to 7, again in favor of society sponsorship of the initiative measure. Both Stringhams campaigned actively for the measure which was defeated that November. The harrassment they suffered during the campaign, along with the needs of their three boys and Dr. Renee Stringham's recent bout with breast cancer, has caused both Stringhams to be less active now.

Dr. Chuck Stringham is still treating many of the same 20 patients that got him and his wife involved in the first place. Included among his newer patients are many women from the Five Rivers area. All have similar problems, according to Dr. Stringham: "suspicious uterine bleeding, menstrual irregularity, and abdominal pain."

Other doctors in the county take issue with the Stringhams or anyone connecting herbicides and illness. Dr. Donald Forinash has been in practice in Newport, a town nearer the heavily sprayed areas than where the Stringhams live, since 1958.

Dr. Forinash says he has seen "hardly any" patients complaining of herbicide-related illness during that time. "My practice doesn't include many of the hill folk," he adds. "Herbicides have a short life. They are not a permanent part of the soil. Much of this [controversy] comes from a dioxin craze. Truly dioxin is, without a doubt, one of the most potent chemicals in the world. Dioxin, at most, is only an impurity that has been pretty well eliminated. Most of the people complaining [have ailments that are] completely compatible with anxiety states—dizziness, lightheadedness, nervousness."

Dr. Forinash does not think there are enough data to say that herbicides cause medical problems. "Caution is advised," he continued. "But, as yet, with the ex-

Continued on next page

. . . And MDs' Views On The Threat of Congenital Defects

Continued from preceding page

ception of dioxin, there is not hard evidence that this is a real problem. If there was a great danger from herbicides, we wouldn't be wondering about it, we would know about it."

Another physician is not so sure. Dr. Peter J. Cookson is a pathologist who has practiced in Newport for 10 years. Although not actively involved in the herbicide issue on one side or the other, Dr. Cookson says he began to wonder about the relationship between spraying and health two years ago when he had two cases of anencephalic infants.

"In my experience, in all my years of training at the University of Pennsylvania Medical School, I had not seen any anencephalic cases," he said. "I talked to my instructors and asked when they had last seen one—among the 5,000 deliveries per year at the hospital. They hadn't seen any. They remarked, 'that's a lot to see in such a small, podunk place.' "

Since that time, Dr. Cookson has not seen any more cases. "But they haven't been spraying since then, either," he added.

The county health officer, Dr. Ethan Wilson, thinks the public reaction to spraying has had another consequence. "At the state level, there has been a decision to minimize spraying because of the hot spots and local reaction," he said. "Things are slowing down. Companies [which are still allowed to spray] have had to be more covert in announcing their plans because of the incidents. [A helicopter used for spraying was burned two years ago, and a large piece of logging equipment was set afire in June, in two different parts of the Coast Range.] There is also much more public awareness."

Dr. Wilson said the recent cases in the county he is aware of resulted from known exposure that caused headache, nausea, and abdominal pain. The symptoms disappeared the next day. "I'm uneasy about the long-term effects of herbicides," he said. "We just don't have the data. It's a question of what won't show up for years."

Dr. Renee Stringham examines spraying victim; Dr. Chuck Stringham looks on.

The county itself is also much more aware of how to handle herbicide-related problems than most rural governments. Because of a rash of problems over the past few years, the Lincoln and Benton county health officers in 1981 worked out a plan, with help from an Oregon State University scientist, to respond when people call to complain of illness and link that illness to herbicides.

The caller is asked for details on when and where the incident happened. If the illness has been prolonged, the health department collects blood and urine samples and sends them for analysis to the Oregon Department of Agriculture. The health department also submits examples of foliage and livestock damage to the agriculture department. Last year there was little response, according to Gail Slater, environmental health program manager for Lincoln County.

"This year is another story," said Ms. Slater. "The difference is the amount of spraying. It's an emotional-political-economic issue."

This year's most celebrated incident occurred on May 11 when a Little League team practiced on a school playing field in Toledo, just east of Newport. That night and the next day 12 boys and nine parents had come down with headaches, intestinal cramps, and vomiting. The health department was asked to investigate and discovered that the school district had sprayed the field with NS 610 herbicide on May 5.

Sun Played a Role

In the intervening period, four other teams had played on the field with no ill effects. It had been raining intermittently until May 11, a sunny day. The sun apparently caused the bad reaction then. A delay in reporting the incident also caused a delay in making blood and urine tests. "If it's more than 48 hours, there is no chance of getting significant levels to do significant tests," said Dr. Wilson.

Continued on page 30

MDs View Spraying

Continued from page 11

This problem has always plagued physicians trying to prove herbicide poisoning elsewhere. People wait to go to the doctor beyond the time when complete data can be obtained, thus lessening the chance to prove their illness is herbicide-related. "Beyond 24 to 48 hours, the chance of getting anything measurable is pretty negligible," said Ms. Stater.

The matter of herbicide spraying—for both defenders of the practice and opponents of it—will doubtless go on as long as there are forests and people living near them.

Concludes pathologist Dr. Cookson: "My opinion is the cases [of deformed babies] showed up after a year of intense spraying. They disappeared after spraying stopped. Anyone can argue that this was not caused by the spraying. I can't prove it. If they start spraying again, we'll see funny-looking babies again. If we do, I'm going to ask those guys, you spray and then you drink the water."

Book Review

Herbicide Watcher

A Bitter Fog, *by Carol Von Strum. Sierra Club Books, San Francisco, 288 pp., $14.95.*

THIS IS A QUIETLY reasonable book about a controversial and often unreasonable subject, the use of herbicides in forestry and agriculture, and the consequences for the people exposed.

Carol Von Strum lives on a small farm in the middle of the Siuslaw National Forest in the Coast Range of Oregon. After her children were accidentally sprayed and got sick in 1977, she began to investigate the effects of herbicides on her neighbors and others living in the area. She discovered other sicknesses, as well as a pattern of miscarriages and deformed babies that could be linked to the spraying.

In the eyes of the government bureaucrats with whom she spoke, however, there was no way spraying could ever cause health problems. To them, she writes, "poisons are innocent until proven guilty."

She also goes on to present a review of herbicide use elsewhere—for example, Agent Orange in Vietnam, and 2,4,5-T in Globe, Ariz. Her book details medical evidence the proponents of herbicides always say is lacking but never research themselves. Indeed, this aspect makes the book useful to physicians who encounter occasional patients who complain of illness possibly linked to herbicides.

A Bitter Fog is an angry book, but it is not shrill in the way similar books have been in the past. It is a well-written projectile aimed at penetrating the wall of indifference of herbicide advocates. In closing, she writes:

"A government which truly derives its just powers from the consent of the governed cannot deny its people the opportunity to 'inform their discretion' and to exercise their control over potentially lethal poisons. The people have an equal duty to exercise their rights. More is at stake than erosion of democracy. Against the deadly proliferation of economic poisons, only an informed, caring public can defend the greatest gift of all—life itself."

ROB LOVELL

Citizens Key in Oregon Pesticide Fight

BY RON LOVELL

THE TWO MAJOR victories for herbicide opponents in Oregon in recent years were won not by doctors but by private individuals using medical evidence gathered largely on their own.

Bonnie Hill lives near Alsea, Oregon, just over the Benton County line from Lincoln County. In 1978, this high school English teacher with a long-standing interest in science chanced upon the research findings of James Allen, a University of Wisconsin scientist, about the increases in spontaneous abortions among rhesus monkeys exposed to dioxin.

"When I read that," she said in a 1981 interview, "it helped explain the miscarriage I suffered in 1975. By that time I had taught in Alsea five years and heard rumblings from former students about miscarriages they had had." She contacted them for information about how far along in pregnancy they had been and then got medical verification.

Third of Three Parts

From 1973 to 1977 there had been 34 miscarriages in the Alsea area, most clustered in 1976 and 1977, two years of heavy herbicide spraying. Over 70% occurred in the spring, roughly coinciding with the spray period. "It seemed very curious that the only variable in our lives here—the seasonal occurrences—was the use of herbicides in the spring," she said.

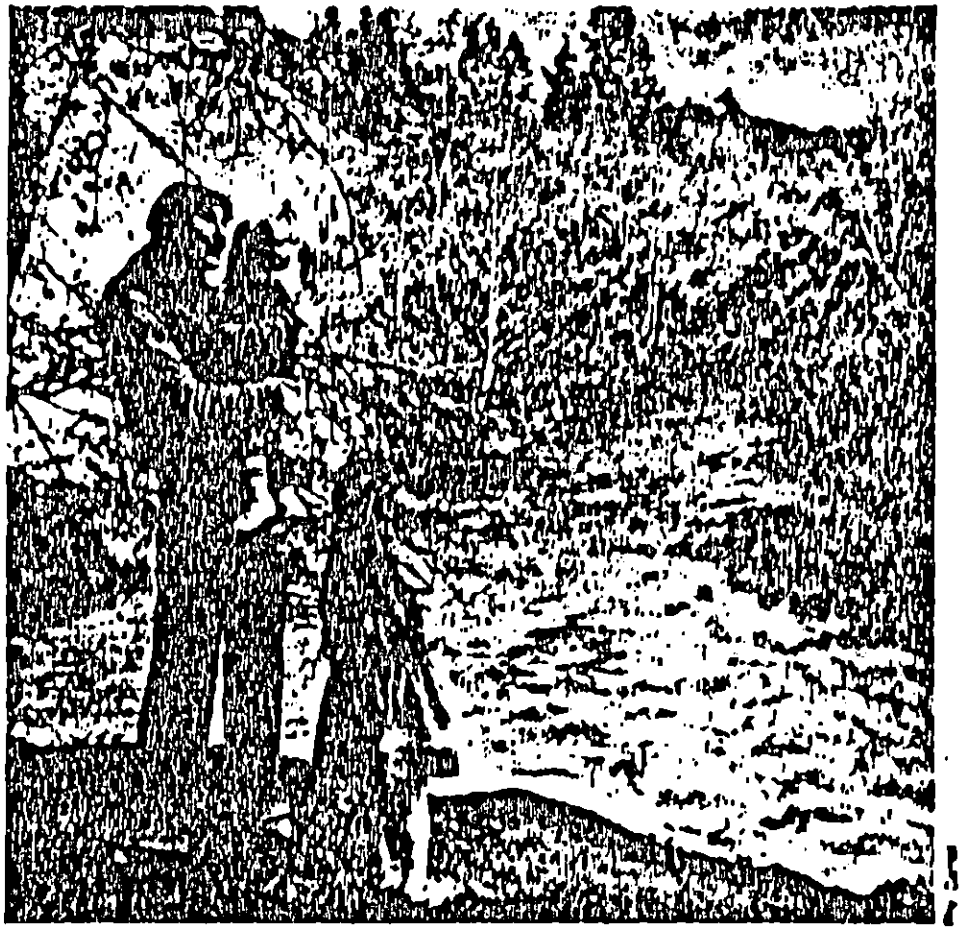
As often happens when someone is directly involved in the herbicide issue, Bonnie Hill's search to gain more information took on an element of a crusade. The day she verified the miscarriages, she contacted the government agencies and private companies who spray in the area for data on the location and amounts of herbicide used.

A Flurry of Publicity

She used data from the U.S. Environmental Protection Agency (EPA) on spraying patterns and potential spray sites, and material from the Oregon Department of Forestry, the U.S. Forest Service, and the U.S. Bureau of Land Management (BLM) on herbicide application, to prepare maps pinpointing the location and dates of spraying and the location of the homes of the women who had miscarried. She did this for each year from 1973 to 1977.

After she had prepared all her documen-

Continued on page 11



Persistent researcher Bonnie Hill and children keep lookout on creek near their home, typical of those used locally for drinking water.

Dogged Data Gathering by Citizens Began Pesticide Case

Continued from page 9

tation, Mrs. Hill wrote a letter to EPA, the other agencies concerned, and newspapers in Portland, Eugene, and Corvallis, stating her thesis that the spraying and the miscarriages were connected.

Those letters brought television camera crews to her door and a great deal of publicity. "I was not aware of the extent of the controversy until that time," she continued. "The word miscarriage caused the interest, although I was opposed to anything sensational. I was just interested in the effect these substances have on the environment."

Some weeks after her letter to EPA, the agency sent two scientists to meet with Mrs. Hill and two of the other women who had miscarried. That August, another EPA team arrived to interview the women and get them to fill out lengthy questionnaires. The team drew a water sample the following January, long after the last spraying. The area is crisscrossed by a number of streams from which all residents regularly draw their water.

EPA Study Confirmed Findings

This material (later to be called Alsea I) was then sent to 10 physicians around the country for review. These reviewers eventually said that there was no conclusive evidence to support the contention that herbicides caused the miscarriages.

In the meantime, EPA pressed ahead with its larger Alsea II study of 1,600 square miles from Lincoln City on the north to Florence to the south and inland 35 miles. On March 1, 1979, just before the spraying season began, the agency announced its conclusions:

- The spontaneous abortion rate of 188 was higher in this study area than in either of two other areas used for comparison.
- There was a seasonal four-month cycle of abortions with a peak of June in the study area.
- There was a significant cross-correlation between the spontaneous abortion index and the pattern of 2,4,5-T use.

At the same time, EPA banned most use of 2,4,5-T and Silvex nationwide, over strong objections from the forest products industry and Dow Chemical Company. The ban came because the agency said it had significant evidence linking the miscarriages in Alsea to the use of the chemicals. The Forest Service and the chemical companies have been trying to overturn the ban ever since, so far with no success.

As Bonnie Hill savored her victory, Paul Merrell's fight against herbicide spraying in the nearby Five Rivers area had not yet begun.

Acting as his own attorney Mr. Merrell filed suit to stop the spraying in April 1981, citing the failure of the U.S. Department of Interior and EPA to implement the procedural requirements of the National Environmental Policy Act of 1969.

In a January 1983 hearing, the court upheld Merrell's argument that federal law requires agencies to carry out their own scientific inquiry into the safety of herbicides, rather than asserting that EPA registration of a chemical for pesticide use is adequate proof of its safety.

Concludes Mr. Merrell: "The public has been alerted. That's the greatest thing. People have started looking. To me, the court victory was the turning point, the beginning of the end. There's a lot of work left to do but we're over the top."

SPONTANEOUS ABORTIONS AND 2,4,5-T

In March 1979, the Environmental Protection Agency (EPA) suspended 2,4,5-T and Silvex use on forest, rights-of-way, and rangeland because of accumulated evidence of animal toxicity data and epidemiological data which showed that human exposure to these chemicals may result in cancer, increased susceptibility to disease through suppression of the immune response, and adverse reproductive effects (1). Among the epidemiological evidence was a reported relationship between the timing and level of 2,4,5-T spraying and increased frequency of spontaneous abortions in the coastal forest area of Oregon (2). Subsequently, there was a court challenge of the suspension decision (3). The EPA decision was upheld and the cancellation process was begun in administrative hearings in Washington D.C. (5).

Because the matter has been in litigation almost continually since the suspension, the researchers primarily responsible for the spontaneous abortion study (including the authors of this report) were constrained by the requests of EPA adm[redacted] counsel not to discuss their work in any public forum. Recent developments [redacted] environmental contamination with dioxin (7), the findings of a recent conference in Ho Chi Minh City, concerning the effects of herbicide spraying during the Vietnam War (8) the accumulation of other epidemiological evidence (9,10), and the possibility that EPA is negotiating a settlement of the domestic 2,4,5-T issue with the Dow Chemical Company (11) make it imperative that the Oregon experience be publicly placed in the proper perspective. This is necessary because the findings of increased spontaneous abortions among women in areas of 2,4,5-T use, with the increases temporally related to spraying, have been seriously misrepresented to both the public and the scientific community as proponents of the chemical's relative safety, when it was discovered were taken from the EPA Rebuttable Presumption Against Registration (RPAR) position document and erroneously labeled, out of context, as the "Alsea II Report". The section of the RPAR document, clearly not meant to be presented as a self-supporting scientific

report was then submitted to interested members of the scientific community by the proponents of continued 2,4,5-T use.

The investigation of abortions in [redacted] Oregon originated in connection with the 2,4,5-T RPAR issued by the EPA in April 1978. The RPAR summarized the evidence that 2,4,5-T and its contaminant 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD) caused fetotoxic and carcinogenic effects in laboratory animals (12).

The herbicide 2,4,5-T is classified as moderately toxic with an acute oral LD_{50} (rat) at 500 mg (acid basis)/kg (14). However, the toxicity of 2,4,5-T has not been of principal public health concern, but rather the effects of its contaminant TCDD. Under recommendations made to EPA by the Advisory Committee on 2,4,5-T, the dioxin contaminant must be held to less than 0.1 parts per million (ppm) during the manufacturing process (14a). TCDD had been demonstrated to be embryotoxic in birds (15) and to be teratogenic in mammals (16,17,18). There was also the suspicion that exposure to 2,4,5-T and its TCDD contaminant was related to the occurrence of birth defects and stillbirths in humans (19,20,21). However, the conclusion of various study groups was that reproductive abnormalities reported among laboratory animals were associated with 2,4,5-T exposures containing 30 or more ppm of TCDD, and that the use of 2,4,5-T restricted to no more than 0.1 ppm TCDD (before dilution) should present no hazard to human health (22).

Field studies of fish and mammals have provided evidence both supporting and contradicting claims of TCDD accumulation in higher animals. An evaluation of biota in the area used by USAF for training bomber crews in application of military defoliants showed little accumulation of TCDD in fish living in the streams of the area. The area received approximately 1000 lb/acre 2,4,5-T. During the peak year of application the 2,4,5-T contained about 2-10 ppm TCDD. Mice in the area accumulated liver tissue burdens of several hundred parts per trillion (ppt) when measured at the end of the spray program, and the sandy soil had accumulated residues up to 700 ppt. These animals

demonstrated no pathological changes (23). Since in subsequent studies of the USAF ~~base~~, However, and it TCDD had entered certain food chains (insects, mosquito fish, sunfish, snakes, and birds), it was recommended that fishing in the area be restricted to prevent human consumption of fish until all traces of the TCDD disappeared (24).

Because phenoxy herbicides are applied to control noxious vegetation, the species of animals most likely to be critically exposed are the herbivores and those exposed directly to spray operations. For example, blacktail deer whose habitat had been treated with 2,4,5-T and 2,4-D ~~had~~ have been found with TCDD residues in heart, liver, muscle, stomach content and feces, and ~~Residues were also found~~ in other organs such as brain, blood, kidney, lung, lymph nodes, spleen, and thyroid, as well as blood and urine. Peak residues ranged from 6.0 to 191.6 g/kg (25).

Cows milk samples from 2,4,5-T-treated areas of Oklahoma, Arkansas, and Missouri were found to be negative for TCDD with detection limits on the order of 1 ppt (26). TCDD in beef fat was undetectable in two series of animals which had grazed on 2,4,5-T treated pastures in Oklahoma, Texas, and Missouri. In a third group of seven animals confined in a sprayed pasture, three samples were positive at the detection limit of 3-4 ppt (27). TCDD has been found in several beef cattle maintained in ~~a field~~ an experiment on fields which had received 1,2,3, or 4 pounds of 2,4,5-T/acre. Average TCDD in fat was 20.3 ppt in the 4 lb/acre group, but there were only three samples, one of which was extremely high. At 3 lb/acre, the average was 12.8 ppt, again derived from some high values and many negatives (28).

TCDD residues are strongly bound to soil sediments and migrate through water run-off (Young et al, 1978). Studies of TCDD bioaccumulation in aquatic biological samples in the drainage areas of an Agent Orange storage area have shown an approximate first-order decrease in residue levels with distance from the origin of the contamination (Young et al, 1979).

Thus, we see that women who have recently conceived could be exposed to TCDD through accumulated residues in fish and animals, through direct exposure during spraying operations, and through TCDD movement and accumulation in the sediment associated with the surface water drinking sources which are very common in the coastal region.

In a response to the RPAR request for public comments, eight women in the environs of Alsea, Oregon reported suffering 13 spontaneous abortions during the period of 1972-1977. They felt they were unduly exposed to 2,4,5-T by the frequent ~~exposure to the herbicide through~~ forest spraying. In response to the inquiry of the Oregon women, EPA commissioned Colorado State University researchers to survey the women and ascertain as much information as possible on 2,4,5-T exposure and subsequent abortions. The survey data were subsequently reviewed by ten experts in the fields of obstetrics, gynecology, epidemiology, biostatistics, reproductive endocrinology, and perinatal medicine. ~~and~~ The Squires concluded that although a causal relationship between forest herbicide use and reproductive wastage had not been demonstrated, there was a high numerical incidence of March to June abortions (nine of 13) and that the spontaneous abortions appeared to follow a seasonal pattern (2). Further, a report from the Yarram District, New Zealand on the relationship of 2,4,5-T usage and birth defects stressed the importance of the temporal relationship of spraying and conception (13). Subsequently, EPA decided ~~the decision was made~~ to investigate spontaneous abortions in Oregon in relation to timing and level of 2,4,5-T usage in the coastal forest area.

The research design was a descriptive epidemiologic study, suitable for comparing incidence of hospitalized spontaneous abortions in an area exposed to 2,4,5-T (the study area) and a ~~somewhat similar~~ area not exposed to 2,4,5-T (the control area). The study area represented about 1,600 square miles of Oregon forested Coastal Range. It included the western half of Benton County, a small western portion of Lane County, and nearly all of Lincoln County. The study area is predominately rural in nature with an estimated 48,000 persons based on the 1970 census. The control area was all of Malheur County in eastern Oregon (estimated population of 26,000), a rural

(R) Malheur Co. Cooperative Extension Agent and the Bureau of Land Management with responsibility for public land

(4)

area known not to have been the site of 2,4,5-T usage for the selected observation period of 1972-1977. While topologically different, the two areas were similar in two vital areas, e.g., the economic viability of the communities, and the medical management of spontaneous abortions among physicians practicing in both communities. Specifically, the two areas were similar in mean family income, percent of families below poverty level, median age of female population, birthrate, fertility rate, fertility ratio, infant death rate, and the number of physicians, and hospital beds per capita. Although the study area is a forested coastal region while the control area is a dry, arid region there is no evidence that such geographical differences are important to spontaneous abortion experience.

When community characteristics are similar, other factors, such as viruses, infections, lifestyle (including drug use) and poor maternal health are expected to play equal roles in both the study and comparison communities as causes of spontaneous abortions. Any differences in spontaneous abortion experience may then be related to a factor present in one area, but not the other; in this case the use of 2,4,5-T within the boundaries of the study area and its absence from the control area.

A field study of spontaneous abortions represents a formidable task, since it is not only difficult to agree upon an acceptable definition of spontaneous abortion but the epidemiology of spontaneous abortions is also poorly understood (30,29). This is true in part because the diagnosis and reporting of spontaneous abortions is a complex problem. Any abortion taking place prior to the first missed menstrual period will almost surely go unnoticed. If an abortion occurs during the fourth to seventh week of gestation it can easily go unreported and be clinically unconfirmed since women are unlikely to seek medical care that early. From the eighth week of gestation forward, fetal losses begin to come to the attention of the physician, but reporting to vital statistics registries is not generally required until about 20 completed weeks of gestation (30).

See page 5 - bottom of page

Potts, Diggory and Peel. 1977. Abortion, Cambridge University Press, Cambridge., pages 1-64.

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April 4, 1980

Mr. Edwin L. Johnson
Deputy Assistant Administrator
Office of Pesticide Programs
Environmental Protection Agency
401 M St. S.W.
Washington, D.C. 20460

Dear Mr. Johnson:

I had some disturbing news yesterday and I thought I'd share it with you since it concerns HED support for OGC and the 2,4,5-T hearings. Bob Duncan was informed by OGC staff that although OGC was 100 percent in support of the Alsea study there were continuous and frequent scatological comments from HED staff about the Alsea study, and a reluctance to provide requested support. The OGC staff did not elaborate on exactly who the complainers were, and frankly, that's not important. What does matter is whether or not the attitude of the staff is reflective of Peter McGrath's and/or your thinking.

I have also been told on different occasions by different people that Steve Jellinek is not happy with the study nor with the Colorado project's conduct of the effort. This is quite bothersome, since the project had only six weeks to go into the field, conduct the study, and draft an initial report. The time frame was mandated by EPA and the project conformed accordingly. Anyone who knows anything about field studies must know that to develop a study protocol, transport staff hundreds of miles, conduct a major study, analyze the data, and generate a respectable, even good report in such a short time is nothing short of phenomenal. Sue Sherman has also been quoted as saying you don't want "another Alsea study" of "soft" data. If this is true, I'm really discouraged, since Bob Duncan and I have said since the beginning of this effort that the Alsea data are not soft. In terms of numbers of SA's per pregnancy, the Alsea numbers are unbelievably reflective of other studies conducted throughout the years in other communities and referenced in the literature. There is also no doubt that the medical management of SA's in both the study and comparison communities is very similar both in treatment and in hospitalization practices; i.e., we reported what is taking place regarding the hospitalization of SA's and we did not under report or over report in either area. Upon review of the hospital records by a University of Miami physician (with a specialty in maternal and child health), Bob Duncan and myself, there is no doubt that the use of ICDA coded hospital record face sheets actually reflect what was determined by the physician of record to be the diagnosis of the patient.

In fact, I was gratified that the abstraction process was done so well, so accurately by the Colorado project staff people and the hospital records clerks. There is also no question but that the cyclic nature of the data is genuine and reflective of what is found in the literature and that the variance in the cyclic nature of the data between the study and control communities is statistically associated with the time and amount of 2,4,5-T spray.

I do know that the study has been knocked by the best of experts and found to have little in the way of redeeming value. But I would point out that despite all the criticism there are two salient facts regarding the Alsea study, i.e., none of the detractors have actually gone into the field and completed a better designed study; and none of the reviewers have refuted the fact of significant differences among the study and control populations with other than a rehash of the data gathered by EPA. In fact, when one looks at all the critical reviews, one begins to see that they center about four major criticisms: 1) study and control populations are not similar; 2) medical treatment in obstetrics cases is dissimilar in the study and control groups; 3) the hospital generated data are "soft" because: the data were abstracted by different persons; did not accurately reflect all SA's taking place in the study and control areas; did not include significant physician/patient input; did not adjust for the large numbers of tourists coming into the study area yearly and giving birth or having abortions; we used inappropriate statistics to support an already decided EPA position; and 4) spray data in the Alsea basin area did not accurately reflect the spray data figures used in the entire Alsea study area. I will not bore you with individual responses to each of these criticisms, suffice it to say, that we have reliable data to refute each one, and will do so during the 2,4,5-T hearing.

I would however, like to review the following points: the Alsea report as released was a severely edited version of the original paper prepared by HED/HEB. The editing at the request of the 2,4,5-T project support team removed a major portion of the introduction, purpose of the study, and background data on the animal studies that theoretically lead to the development of the Alsea study. In fact, the paper was edited to fit into the official EPA Program Support Document, and should never have been submitted for public comment or review without the appropriate background information.

I understood when developing the study that we were involving ourselves in a very difficult endeavor, i.e. spontaneous abortions would be particularly difficult to measure due to the scarcity and incompleteness of any data. However, such data if it could be generated, would provide us with the only opportunity for a viable human link between 2,4,5-T and possible adverse health effects.

As you no doubt recall, I had serious reservations about finding anything, much less a significant relationship between the study and control groups since descriptive epidemiologic studies are generally not sensitive enough to identify very small differences among study groups. Quite frankly, the use of hospitalized cases made this determination possible because of the "hard" data nature of the information. If we had included other data sources, we likely would have masked the significant, but small, differences between the two populations.

Much has been said about other factors being responsible for the increased numbers of SA's in the study area. I pointed out consistently, and from the beginning, that given two like communities (and in the medical management of SA's, the population at risk to pregnancy and thus abortions, and their rural and economic nature, the study and comparison communities are very much alike) factors influencing SA's must be assumed to be the same i.e., recurring factors that are known to negatively influence fetal welfare such as very young or advanced maternal age; previous abortions; poor socio-economic status; prolonged time to conception; impaired maternal health; illegitimate pregnancies; pelvic pathology; anatomic defects of the generative tract, et al, and to affect all child bearing populations equally, until shown to be different.

Although not a great deal is known about the epidemiology of SA's this much can be said: the successful development of the fetus is without doubt significantly related to factors which influence the intra-uterine environment, such as TCCD. Since one must assume (supported by the literature) that generally the onset of SA's in one community would not be significantly different from another without an identified fetotoxic variable influencing the outcome, one must also assume that when the variable and an increased number of SA's are statistically associated, there is a distinct likelihood of a causative relationship. It has been my position from the beginning that the Alsea study, upon appropriate data analysis, reflected this approach and that, if in fact detractors felt that other causes might be responsible for the place-time relationships we are seeing between spray and abortion, then it would most properly be their place to provide data to support their hypotheses. To date this has not been done.

The critical point in this entire episode is that people really know little about the cause of SA's and apparently less about the nature of epidemiologic studies. Consistently throughout this exercise over the past year, reviews of the Alsea study have reflected an intense interest in evaluating the Alsea study as if it were designed to provide cause-effect relationships. This simply is not the case. The study was descriptive in nature, with what I would consider to be a special wrinkle on my part, a comparison community. I knew that any differences found would be quite small, and had we not used a comparison community we would have recognized no difference in the number of SA's in the Alsea population when compared to other reported populations. This approach is unique to descriptive studies.

It was quite impossible to use the standard case-control approach since all child-bearing women conceiving and delivering in the study area were at risk to exposure to TCCD. The use of the comparison community perhaps caused some confusion on the part of different reviewers, but the study is still only a search of hospital records and a descriptive rendition of what is found on those records. The purpose of any findings would be to call attention to interesting facets of the data, and to generate comment, discussion and additional studies required to support or reject the findings.

It is obvious to me at least, as an epidemiologist, why Dow and others have not presented new work to support their position. What we found is scientifically supportable, and they know it. Rather than undertake another study, which for them would have been simple to do in the past year, they have chosen to attack the study publically and politically, stress the cause-effect concept when it clearly is not a study of that nature, and cast enough doubt about the reliability and validity of the data that EPA would be forced or coerced into repudiating the results. I must say, that the actions of OGC along the way have tended to support this effort. The study report (taken out of context from the 2,4,5-T Program Support Document) was submitted for review and criticism without the benefit of explanation and/or supporting documentation, and frankly, it was rightly denounced by members of the scientific community (however solicited or biased). In fact, the study did exactly what we hoped it would do. It provided us with useful information on the number of SA's in the study and comparison communities, and enabled us to determine that a significant relationship existed between 2,4,5-T usage and the increased number of SA's in the study community. I don't know frankly, that you could ask more of a study. Surely there was some sloppy work, both on the part of the contractor, and of the Washington staff, but the study design was sound, the data were good, and the results reflective of what is happening in the study and control communities.

In one last aside, I feel constrained to point out that everyone associated with the development of the Alsea study has been restrained from speaking against the negative comments on the study and on the capability and veracity of those involved in its development, conduct and interpretation by OGC. This is quite unfortunate and although it may be much better for our defense in the hearing, I believe it may be causing much of the negative thought and non-support expressed by HED staff to OGC.

Sincerely,

Jack Griffith

JG/bt

Jack Griffith, Ph.D., Professor
Dept. of Epidemiology & Public Health
University of Miami School of Medicine
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(305) 251-9823

Call on "Judy" etc

This is to advise you of a potential problem regarding OGC's involvement with the Five Rivers Investigation

DRAFT 9/1/83

MEMORANDUM

SUBJECT: Merrell v. Block and the Five Rivers Investigation

FROM: Stanley H. Abramson
Associate General Counsel
Pesticides & Toxic Substances Division (LE-132P)

TO: Gerald H. Yamada
Deputy General Counsel

Judith Wheeler of my staff has looked at the litigation files in our possession regarding the case of Merrell v. Block to determine whether the question of the Five Rivers investigation was part of the court proceedings. This issue is of particular concern because of a letter from Michael Gross to Linda Fentiman dated September 22, 1981, which transmitted the results of some of the Five Rivers' sample analyses (Attachment A).

It is clear from the pleadings in the Merrell litigation that Paul Merrell made repeated efforts through the court to obtain the results of the Five Rivers' analyses in addition to similar efforts under FOIA. The following are examples of his efforts and the government's response.

° 4/15/81 - Complaint

Merrell referenced the complaints regarding Forest Service spraying in 1979 and follow-up study and stated that "(n)o results of that course of study were ever made public." The FOI request and the Agency response (6/23/81) were part of the court record.

° 8/31/81 - Plaintiff's Second Request for Production

Item (1-7) requested "(a)ny and all agency records . . . pertaining or relating to any past, current, or proposed study, investigation, or inquiry into alleged, suspected, or confirmed human health effects associated with the use of pesticides in the area of the Siuslaw National Forest. . . ."

° 10/23/81 - EPA Defendants' Response to Plaintiffs' First Request for Admissions Under Rule 36

Item 2-10 contains an admission that by mid-August, 1979 "a health study was commenced in an attempt to ascertain if there was an association between residency in the Five Rivers Valley and exposure to certain pesticides." Item 2-11 admits information about samples taken for chemical analyses and transported to Bay St. Louis and states "(d)efendants deny that all of these samples were to have been analyzed for residues of 2,4-D, picloram, 2,4,5-T, silvex and cioxin (sic). Defendants deny that because of analytical priorities set up by U.S.E.P.A.'s Special Pesticide Review Division, no chemical analyses were ever performed." Item 2-17 admits that "(d)efendant Edwin L. Johnson has claimed that the document listed in Enclosure A to Exhibit 2 are '. . . all of the documents in our filed (sic) concerning the studies done in the Five Rivers areas and any complaints specific to that area.'" In Item 2-18 defendants deny that "documents referred to in Enclosure A to Exhibit 2 do not give any results of 'studies done in the Five Rivers area' or of any investigations into 'any complaints specific to that area'" because these documents do include some preliminary

results of the studies and investigations involved. */

*/ Enclosure A of Exhibit 2 is EPA's 6/23/81 response to Merrell's FOI Request No. 213. Ms. Wheeler did not see any "preliminary results" in these documents, except for Bill Wheeler's autopsy report on the two headed kitten which contained no chemical analysis.

- 12/4/81 Memorandum in Support of Plaintiff's Motion to Compel Production

Merrell referenced his second request for production under the heading "B. The Five Rivers Health Study" and requests the court to compel production based on EPA's admission that there was a health study. He tied in the Five Rivers "study" with the NEPA requirement for the EIS to address adverse impacts.

- 12/17/81 - EPA Response to Second and Third Requests for Production

Makes no reference to Five Rivers investigation.

- 12/23/81 - Plaintiff Paul E. Merrell's Motion for Summary Judgment

Describes the complaints to EPA made in the spring of 1979 regarding Forest Service spraying. Paragraph 53 specifically references Motion to Compel Production and Five Rivers Health study.

- 1/25/82 - Plaintiff Paul E. Merrell's Reply Brief in Support of Motion to Compel Production

In paragraph 15 Merrell states that the type of information requested by plaintiff, including the Five Rivers Health Study, is unqualifiedly required to be disclosed. In paragraph 35, under the heading "What about the Five Rivers Health Study" he states that he "has been unable to identify a single document

among those provided or listed as withheld . . . which deal with the Five Rivers Health Study. Is the agency contending there are no more documents relating to this study, even after they have refused to admit that no chemical analyses were ever performed? [EPA response to plaintiff's first request for admissions, October 23, 1981, page 5."

- 4/26/82 - Plaintiff Paul Merrell's Motion to Amend Complaint

Paragraph 9 refers to FOIA No. 213 (the Five Rivers request) and claims key documents were arbitrarily withheld without explanation. Paragraph 15 is a claim that Merrell is entitled by law to access to the documents sought in the FOIA request. Merrell seeks expedited processing of the FOIA requests and an injunction against withholding the documents.

- 6/9/82 - Memorandum in Opposition to Plaintiff's Motion to Amend Complaint and transmittal letter from Thomas Lee (Assistant U.S. Attorney) to Linda Fentiman (EPA, OGC)

The transmittal letter to Linda Fentiman states "a copy of your Memorandum as filed, is enclosed" (underscoring added). The memorandum (p. 2) states "(d)efendants Anne M. Gorsuch and EPA have fully responded to plaintiff's requests (for production), and have released to him all non-privileged documents in EPA's files which are responsive to his discovery requests. . . . " In regard to an issue raised concerning whether Merrell's appeal of the partial denial of his FOIA requests (unrelated to Five Rivers), at p.4 the memorandum indicates his appeal is being treated as a new FOIA request and "(a)gency files will be searched to determine

if there are any new documents which fall within the terms (of the FOIA requests). The memorandum argued there was no relationship between Merrell's FOIA requests and Merrell's allegations in the original complaint.*/

On p. 8, defendants stated "(p)laintiff never asked for the documents sought under FOIA as part of his numerous discovery requests. . . .**/

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*/ Merrell had argued the Five Rivers information was necessary for a proper analysis of adverse effects under NEPA. On 4/30/82 the court denied Merrell's motion to amend his complaint as to the FOIA argument.

**/ Merrell's FOIA #213 asked for, inter alia, "(a)ll documents in the possession of the USEPA. . . which EPA . . . can reasonably identify as having knowledge or records pertaining to the 'Lincoln County Study. . . concerned with phenoxy herbicides, principally 2,4-D. . . .'" He also requested "(a)ny and all records pertaining to terms and results of cooperation among the Siuslaw National Forest, the Institute of Rural and Environmental Health (U. of Colorado), the U.S. Environmental Protection Agency, or any other agencies or persons involved in the review and monitoring of the Siuslaw National Forest's fall 1979 pesticide program. . . ." In paragraph 9, he requested "(a)ny and all records pertaining to any other investigations, reports, or complaints of human health problems in the area of Five Rivers, Oregon (at any time) in which involvement of pesticides was or is known, suspected, or claimed by any person." Paragraph 10 requested any communications relating to human health problems in the Five Rivers area and paragraph 11 requested PIMS reports for 1981 relating to pesticide use in the Five Rivers area.

- 8/10/82 - Memorandum in Support of Plaintiff Paul E. Merrell's Motion for Reconsideration of Magistrate's Order by District Judge

This relates to denial of Merrell's motion to amend his complaint to include FOIA arguments. In a footnote on p. 6., Merrell stated "(w)hile plaintiffs' administrative appeals did

produce some further documents (re IBT) . . . many documents were again withheld without explanation. The request for documents relating to the Five Rivers Health Study has once again (as in discovery) simply been ignored."

- 1/27/83 - Plaintiff Merrell's Summary Judgment Supplemental Memorandum

On p. 5 Merrell states "(n)o discussion of the results of this (1979 human health) study appear anywhere in the record of this case." At p. 8 he argues that the Five Rivers Health Study must be completed and the results analyzed.

It appears from the above cited documents in the court records that the Office of General Counsel was cognizant of, and in certain instances, developed, statements which would indicate that the results of the Five Rivers analyses were not available. In light of the September 22, 1981 letter from Gross to Fentiman, it would appear that OGC did not properly respond to Merrell's claims. It is known that Ms. Fentiman, both as a matter of philosphy and practicality, interpreted the discovery requests in the narrowest possible light. Since EPA records referred to "Five Rivers" and not the "Siuslaw National Forest," it would appear that certain agency records where, therefore, not turned over to Merrell. In light of the repeated references to Five Rivers in Merrell's pleadings, hindsight would indicate this interpretation of Merrell's discovery request may have been unduly restrictive.

I recommend that appropriate language be included in the "Conlon" report on Five Rivers to indicate that OGC did not fully respond to Merrell's discovery request and that the government made certain statements in its pleadings which were apparently incorrect. Attachment B contains suggested wording for the "Conlon" report regarding the issues addressed herein.

Attachments

EPA is a defendent in the case of Merrell v. Block, which involves a challenge under NEPA to the Forest Service herbicide spray program in the Siuslaw National Forest. As part of that litigation, the plaintiff, Paul Merrell, requested that EPA produce, through the discovery procedure, documents relating to a study or investigation of human health effects associated with the use of pesticides in the area of the Siuslaw National Forest. In several places in the pleadings, Mr. Merrell reiterated his request and also referenced his FOIA request (FOIA No. 213) regarding a study of human health effects related to pesticide use in the Five Rivers area. The discovery requests were interpreted narrowly by the Office of General Counsel in the context of the litigation and, as a result, certain documents relating to the results of the Five Rivers analyses of which the Office of General Counsel apparently was aware were not produced in response to Mr. Merrell's discovery requests. These documents were also not produced by the Agency in response to Mr. Merrell's FOIA request. Further, statements were made in the government's pleadings which would indicate that no further information was available beyond that turned over to Mr. Merrell in response to his FOIA request.

MEMORANDUM

SUBJECT: Pesticides and the Dioxin Monitoring Program

TO: Steven Jellinek
Assistant Administrator
for Pesticides and Toxic Substances (TS-788)

In response to your request, we have prepared a status report on 2,4,5-T and the Dioxin Monitoring Program.

From its very beginning, the mission of the Dioxin Monitoring Program (DMP) was to develop the analytical methodology to detect dioxins in the parts per trillion level, and then follow that development with environmental monitoring studies designed to determine the amount of tetrachlorodibenzo-p-dioxin (TCDD) found in man and the environment as a result of the uses of 2,4,5-T. We have achieved this initial goal, with a number of environmental studies still in progress. The results of many of these studies will be used in the 2,4,5-T cancellation hearings.

Appendix #1 lists some of these studies which are funded through our cooperative agreements with Wright State University and the University of Nebraska at a cost of $700 per sample. We also receive technical support from the Toxicant Analysis Center, Bay St. Louis, MS and the Health Effects Research Laboratory, Research Triangle Park, NC. Our cooperative agreements and our in-house support are scheduled to end this fiscal year, FY 80.

Funding uncertainties have introduced some degree of uncertainty to our monitoring responsibilities. At this moment, we are managing a human adipose tissue study, attempting to initiate a phenoxy phenol study of formulated 2,4,5-T and silvex products, and considering a study of silvex use in orchards. The human adipose tissue samples have been collected by the Survey and Analysis Division (SAD), but the funds for this study will come from our current program. The phenoxy phenol study has still to be designed. However, it may be conducted by SAD at the Gulf South Research Institute, New Orleans, LA. We could do the silvex orchard study but only at the expense of one of our current projects. Also, we do not have enough funds to participate in the phenoxy phenol study.

Dioxin Contamination of Pesticides and the Environment

We are also concerned with the presence of dioxins in other pesticides: RED identified 20 pesticides that may contain dioxins, based on an analysis reflecting both the manufacturing processes and chemical structure of those pesticides. We will establish priorities for these suspect chemicals on the basis of potential for human exposure and on the basis of how much a suspect pesticide is used each year. The DMP would confirm the presence of dioxins in these pesticides, a fact which would lead to appropriate environmental monitoring studies in order to document the exposure associated with the uses of those chemicals which contain dioxin. At this time, however, we do not have any funding for this important responsibility.

In the past, we have conducted dioxin analyses for regional offices (at no charge to them) in support of their enforcement activities dealing with 2,4,5-T use and those dealing with hazardous waste sites. The requests we receive for dioxin analysis in waste sites continue to increase. In this instance, we are concerned with the very high levels of dioxin we have found in our analyses of waste samples collected at Love Canal, NY, Jacksonville, AR, and Verona, MO. We believe that there exists a real potential for contamination of people and the environment near these sites which will require dioxin analyses in the parts per trillion level. If we are to support this activity in the future, we will need additional funds not merely to respond to these requests but also to make laboratory improvements at our facilities to ensure the safe handling of these dangerous and toxic samples.

In addition to these needs for dioxin analyses, we feel that something has to be done about the presence of chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans created during combustion. Our experience with analyses of combustion products shows that these kinds of analyses are complex because of the affinity of dioxins to particulates, a fact that makes the extraction processes difficult and time-consuming. These analyses are also complex because the different dioxin isomers that may be present in a sample must be separated from each other. Furthermore, in order to pinpoint a combustion plant which may be generating dioxins, it is necessary to analyze a large number of samples to show that dioxins are being emitted from the stack into the environment. At the same time it is necessary to analyze those plant conditions which influence the production of these toxic substances.

As you are aware, dioxins have been detected at a resource recovery plant at Hempstead, Long Island. In August, the Office of Solid Waste and OPP will do an in-depth study of this plant to determine whether or not dioxins are created during the operation of the incinerator and, if they are, whether or not those dioxins reach the atmosphere. Region V is telling us that a similar problem may exist with a similar plant near Chicago. In that case, plant emissions are said to have killed the horses of a man who has also come down with chloracne. Region V is investigating all these allegations. At this time, dioxins are only one of several suspected causes for these adverse effects, but Region V has requested that we perform dioxin analyses after they rule out other possible causes. Unless we receive additional funding, we will not be able to honor their request for dioxin analysis. It also appears that PCB incinerators may be responsible for the creation of dioxins and dibenzofurans.

Strengthening EPA's Dioxin Monitoring Program

A. EPA Funding of Dioxin Program

Clearly, it is in the Agency's best interest to continue to fund the dioxin monitoring program to the point that it could make a positive contribution in the identification and analysis of dioxins in pesticides, hazardous waste sites, and incinerators. These analyses are complex and may be hazardous. As such, they certainly are beyond the scope of most contractors. I believe that this in-house program could do the work cheaper and better than any outside contractor. In light of this fact, I recommend that this program receive about $5 million for a period of five years.

B. OPP Current Dioxin Funding Requirements

The Office of Pesticide Programs needs a minimum of $875,000 to maintain an effective dioxin monitoring program* during fiscal years 1981 and 1982:

PURPOSE	FY'81	FY'82	TOTAL
RPAR Hearing Support	$175,000	*****	$175,000
Methods Development	250,000	$250,000	500,000
Laboratory Equipment	100,000	100,000	200,000
TOTAL	$525,000	$350,000	$875,000

* Appendix #2 lists all those studies which are either underway or scheduled to be completed sometime during this year or so.

** Projection will be done at a later date.

To conclude, OPP's dioxin monitoring requirements and responsibilities are increasing because dioxin contamination of pesticides and the environment is also increasing. It seems that we will have to establish levels of tolerable exposure for people and the environment from products which either contain dioxins or substances like dibenzofurans which are structurally similar to dioxins. In this context we need to develop standards for the higher-level dioxin compounds like the hexa-, hepta-, and octa-dioxins because some of these isomers are carcinogenic. We also need to refine our analytical methodology for dibenzofurans because these substances are related to dioxins and they may well be contaminants to some pesticides, though we know virtually nothing about this subject yet. We estimate that $500,000 would suffice to support the development of methods for dioxin isomers and dibenzofuran analyses during FY'81 and FY'82. Moreover, additional laboratory equipment will be necessary to speed up the analysis of dioxin samples. Approximately $90,000 will be needed to buy intermediate instruments such as a liquid chromatograph and a capillary column gas chromatograph in order to improve the quality of analysis for dioxin and dibenzofuran samples. Another $110,000 will be necessary in order to buy glassware and safety equipment for the Bay St. Louis Laboratory. Finally, there's a need to work closely with the Survey and Analysis Division (SAD) of OPTS and the Dioxin Work Group (which has OPP, OPTS, and ORD members) to determine: (a) the feasibility of meeting our needs within the present funding constraints projected by the FY'81 and FY'82 budgets, and (b) the requirements that can be satisfied by SAD (versus using internal OPP capabilities). In essence, we expect to refine our requirements even further and negotiate priorities based on budget restrictions.

Edwin L. Johnson
Deputy Assistant Administrator
for Pesticide Programs

Attachment

cc: OPP Division Directors
M. Conlon
D. Longmire
W. Chlosta
E. Vallianatos
A. Conner
M. Dellarco

R. Kutz

bcc: 'WHITFIELD:vf8512/TX10:pam:pjd:49192:Vallianatos:06/26/80
REVISED:ctd:6-30-80

Appendix #1

Dioxin Studies in Support of the Agency's 2,4,5-T Hearings

Top Priority

This group represents a collection of studies which are already underway. Only a few analyses need be done in order to complete the work. Each study contains important data which will contribute to our direct case in the hearings:

1. Deer and Elk Adipose Study--Accession No. 9

   Wildlife from the Pacific northwest in the region of forest spray have been found to contain traces of TCDD in their adipose tissue. To date the analyses have been done by Wright State University (WSU) and 2/3 have shown positives. The samples need be analyzed by HERL/PTP, with the prospect that potentially lower detection limits will increase the incidence of positives.

2. USDA Deer Exposure Study (Bladgett Forest)--Accession No. 30

   This study, conducted with the support of USDA, involved spraying of a specified area containing a penned-in group of deer. Preliminary data obtained by one of the DMP contractors, working outside the DMP structure, indicate positives. The samples are being reanalyzed by HERL/PTP.

3. Louisiana Catfish/Crayfish Study--Accession No. 13

   When first analyzed, these samples indicated strong positives for the presence of TCDD. Prudence dictated that these be re-extracted and re-analyzed. Because these 11 samples came from human food sources, they could be particularly important in the exposure part of our case. The schedule currently calls for completion in July.

4. Nebraska Study (Vietnam veteran fat samples)--Accession No. 17.

   TCDD was found in veterans of the Vietnam War and others who never served in Southeast Asia. A few of these samples need be re-confirmed in order to fully appreciate the implications of these results.

Other Studies of Interest to the 2,4,5-T Hearings

1. Beef Fat Phase II--Accession No. 2

   Beef samples taken from animals fed on a range treated with 2,4,5-T in the mid-1970's have shown the positive presence (13%) of TCDD in fat. These data need be confirmed by analysis at a second laboratory. Approximately 30 samples of fat and liver are involved.

2. Alsea Phase II Study-- Accession No. 12

   Shortly after the Alsea epidemiology study was completed, various water, sediment, and wildlife environmental samples were collected from that area in Oregon. Some early problems with the study design were resolved and the study is now on schedule.

3. Louisiana Rice Study (includes catfish/crayfish referred to above)--Accession No. 13

   Thirteen samples of water, seventeen of sediment, and twenty of rice have been gathered as part of a larger study which includes catfish and crayfish. 2,4,5-T is used in rice growing areas on an annual basis and may result in a persistence/accumulation of TCDD in water, sediment and/or rice.

4. Mississippi Catfish Study--Accession No. 16

   This is a study similar to the Louisiana study (Accession No. 13), except that the samples came from Arkansas and Mississippi only.

5. Wisconsin Monkey Study (Allen's monkeys)--Accession No. 15

   Forty samples have been received from James Allen at the University of Wisconsin. These animals have been fed a diet contaminated with a known amount of TCDD. Various toxic effects have been observed. Knowledge of the TCDD levels in various tissues will be of importance in predicting TCDD's potential human toxicity.

6. Oregon Monkey Study (McNulty's monkeys)--Accession No. 19

   Similar to the previous study with Allen's monkeys.

7. Hempstead Study: Region II request--Accession No. 21

These are samples from the area around Hempstead, Long Island, where an incinerator burning municipal waste is said to be emitting dioxins into the atmosphere.

Other Studies Not Likely to Have an Immediate Impact on the 2,4,5-T Hearings

1. Region V Request--Accession No. 4

Some 15 samples (water and sediment) have been collected in connection with an incident in the Region. These samples are scheduled for analysis in July.

2. San Antonio Analysis--(Region VI Request)--Accession No. 20

Two samples have been collected in connection with an incident in the Region.

3. Technical Grade Pesticide Analysis Request for SPRD--Accession No. 22

A number of other pesticides in addition to 2,4,5-T and silvex could possibly contain TCDD and other dioxins.

4. Verona, Missouri Analysis (Hazardous Waste Task Force Request)--Accession No. 24

Two samples have been collected from a site of buried wastes (so-called Farm Site I) which are thought to contain dioxins. The Region needs to know whether or not dioxins are indeed present before proceeding with the clean-up.

5. Syntex Analyses (Region VII Request)--Accession No. 25

This is "the other Verona" case. A large container of waste, heavily contaminated by TCDD, was held by the company for many years. Two samples await analysis. The company plans to initiate a detoxification process which will lead to additional samples.

6. Penta Exposure Analyses (Region X Request)--Accession No. 26

These four samples are scheduled for analysis.

7. TCP Laboratory Analyses (SPRD Request)--Accession No. 27

Two samples will be analyzed by July.

Appendix #2

Dioxin Monitoring Requirements

	Type	Application	Data Source	Monitoring Type	Sample Size	Start Date	Completion Date	Geographic Area	Expected Use
	Human exposure	Silvex residues in human urine	Human Monitoring Network	Ambient Study	NK	NK	1977	Nationwide	RPAR PD-1
STUDIES	Human exposure	Silvex residues in agricultural soils	Soils Monitoring Network	Ambient Study	NK	NK	1977	Nationwide	RPAR PD-1
	Environmental fate	TCP residues in environmental samples	Soils Monitoring Network	Ambient Study	NK	NK	1977	Laboratory analysis	RPAR PD-1
	Human exposure	2,4,5-T residues in food	FDA Market Basket Study	Special Study	NK	NK	1977	Nationwide	Pre-RPAR
COMPLETED	Human exposure	2,4,5-T residues in human urine	Human Monitoring Network	Ambient Study	NK	NK	1977	Various hot spots	RPAR PD-1
	Human exposure	2,4,5-T residues on rice, corn, and sugar-cane soils, and riceland soils	Soils Monitoring Network	Ambient Study	NK	NK	1977	Various hot spots	RPAR PD-1
	Air Sampling	2,4,5-T residues in air	Air Monitoring Network	Ambient Study	NK	NK	1977	Various hot spots in 9 states	RPAR PD-1

NK = NOT KNOWN

8

	Type	Application	Data Source	Monitoring Type	Sample Size	Start Date	Completion Date	Geographic Area	Expected Use
	Seawater, water, wildlife	Forest areas near Alaska, Oregon	HED Dioxin Monitoring Program Contract labs	Special Study	20	11/78	1/80	Alaska, Oregon	RPAR Hearing Support
STUDIES	Environ-mental fate	Residues in soil	HED Dioxin Monitoring Program	Special Study	28	5/79	3/80	Wisconsin	RPAR Hearing Support
COMPLETED	Drinking water	Water and sediment and streams near Alaska, Oregon	HED Dioxin Monitoring Program	Special Study	39	3/79	3/80	Alaska, Oregon	RPAR Hearing Support
	Human adipose tissue	Vietnam veterans	Veterans Administration	Special Study	40	6/79	2/80	Nationwide	RPAR Hearing Support
	Human milk	Humans residing near forests	SAD/OPII Regional Offices Contract labs	Ambient & Special Study	103	11/77	4/80 Completed	California, Oregon, Washington, Alaska	RPAR Hearing Support
STUDIES	Animal ex-posure Food-dietary	Cattle grazing on pastureland	SAD/OPII Regional Offices Contract labs	Ambient & Special Study	64	4/79	5/80	Kansas, Missouri, Oklahoma, Texas	RPAR Hearing Support
IN	Water, sedi-ment, sealife	Edible fish in riceland areas	RTP Contract labs SAD/OPII	Special Study	71	1/79	5/80	Louisiana	RPAR Hearing Support
PROGRESS	Environ-mental fate	Deer and elk grazing on treated forest-land	Region X	Special Study	25	10/78	5/80	Oregon, Washington	RPAR Hearing Support

	Type	Application	Data Source	Monitoring Type	Sample Size	Start Date	Completion Date	Geographic Area	Expected Use
STUDIES	Sea life Dietary exposure	Catfish in confinement vs. catfish in treated ricelands	Contract labs	Special Study	50	3/79	5/80	Mississippi Arkansas	RPAR Hearing Support
	Human exposure	Pathological study of TCDD in laboratory monkeys	RTP Dioxin Monitoring Program	Special Study	40	1/80	5/80	Laboratory Analysis of Samples	RPAR Hearing Support
IN	Human Exposure	Pathological study of TCDD in pregnant monkeys and off-spring	RTP Dioxin Monitoring Program	Special Study	NK	3/80	5/80	Laboratory Analysis of Samples	RPAR Hearing Support
PROGRESS	Chemical Analysis	Analysis for TCDD content in Ronnel	EPA Laboratory	Special Study	NK	6/80	9/80	Spot checks of manufacturers	Pre-RPAR
	Chemical Analysis	Analysis for TCDD content in Erbon	EPA Laboratory	Special Study	40	12/79	5/80	South-rice growing areas	RPAR Hearing Support
	Human adipose tissue	Presence of TCDD residues	SAD	Special Study	50	4/80	5/80	Laboratory Analysis of Samples	RPAR Hearing Support
	Human adipose tissue	Pesticide users farm workers in rangeland areas	Mt. Sinai Medical Center	Special Study	50	10/80	3/81	Western rangeland area	RPAR Hearing Support
	Sea life Dietary exposure	Crayfish, catfish (edible, seafood)	Univ. of Nebraska	Special Study	20	10/80	3/81	Louisiana	RPAR Hearing Support
STUDIES	Spray drift	Forest, rights-of-way, rice fields and rangeland	Univ. of Nebraska HED	Special Study	40	10/80	3/81	Southwest US	RPAR Hearing Support
	Dioxin combustion	Dioxin combustion products	Univ. of Nebraska	Special Study	40	10/80	3/81	Laboratory	RPAR Hearing Support
PROJECTED	Dietary exposure	Apple & prune orchards near treated areas	Univ. of Nebraska	Special Study	50	10/80	3/81	Northwest US	RPAR Hearing Support

	Type	Application	Data Source	Monitoring Type	Sample Size	Start Date	Completion Date	Geographic Area	Expected Use
STUDIES	Worker exposure study	TCP & TCDD dermal and inhalation effects on workers o cooling towers o pulp & paper mills o tanneries o machine shops	Contractor and/or EPA Laboratory	Special Study	To be determined	6/80	1/81	Cooling towers, paper mills, tanneries, and machine shops	RPAR Hearing Support
	Chemical Analysis	Residues of TCP in leather from from tanneries	Contractor and EPA Laboratory	Special Study	To be determined	6/80	1/81	Samples from leather tanneries	RPAR PD-2/3
PROJECTED	Chemical Analysis	Residues of TCP & TCDD in paper from pulp and paper mills	Contractor and EPA Laboratory	Special Study	To be determined	6/80	1/81	Samples from pulp and paper mills	RPAR PD-2/3
	Chemical Analysis	Analysis for TCDD content in hexachlorophene	EPA Laboratory	Special Study	To be determined	9/80	4/81	Spot checks of manufacturers	RPAR Hearing Support
	Environmental fate	Sugarcane fields near treated areas	Univ. of Nebraska	Special Study	25	10/80	7/81	Southwest US	RPAR Hearing Support
	Dioxin Combustion	Presence of dioxins in combustion products	Univ of Nebraska Wright State Univ. MRI	Special Study	200	1/81	NK	Laboratory Analysis of Samples	Methods development
	Tech Grade	Presence of dioxins in manufacturing	TAC/Bay St. Louis Univ. of Nebraska Wright State Univ.	Special Study	500	1/81	NK	Nationwide	Methods development

(4) Dioxins from Resource Recovery and Waste Combustion

- To emphasize the importance of analytic accuracy and quality control in the sampling work OSW is planning to conduct on this subject, Don Barnes, Walt Kovalick and I will meet with Plehn/Dietrich to discuss the "stakes" for both the OTS and OSW programs. Following that, Barnes will prepare a memorandum recommending no further sampling for dioxins without an approved (by CDWG) Agency protocol for sampling from incineration and resouce recovery facilities. If necessary, you will approach Chris Beck.

- For the August 6 TSPC meeting, the need for $1.5 million to support the dioxin combustion study will be discussed. This money will be in addition to the $400-500,000 required for Hempstead.

(5) Reinforcement of Role of Chlorinated Dioxin Work Group

- Don Barnes will proceed to finalize the memorandum from you to the Regional Administrators describing both the availability of the DMP for analytic work and the requirement for accurate sampling protocols (acceptable to the DMP) prior to taking samples. The issue of regional participation in funding such efforts will be raised.

- A potential TSPC discussion item is the allocation by program offices to the Regional programs of sufficient funds to pay a share of the dioxin study design and analysis costs. Analyses would be coordinated through the DMP.

cc: Don Barnes
Marty Halper
Paul Lapsley
Ed Johnson
Toby Clark