

Water Quality Research Project
Summer 1986
Funded by the National Demonstration Water Project
Submitted by Sparta Health Center, Inc.
Sparta, MI

Resource ID#: 2807

Water Quality Research Project

EDWANWD .S62
Sparta Health Center, inc.
Water quality research project
1039

The goal of this project as stated in our funding application was "... for the testing of water wells in migrant labor camps to determine if pesticide pollution of potable water is a health hazard." I am pleased to report that this goal was accomplished and in some respects exceeded. Twenty three wells were tested for 56 chemical compounds (see appendix) in Western Michigan. Wells were also tested for bacteria, iron, sodium, nitrates, chloride, fluoride, hardness and conductivity (Table 1). One of the wells tested showed evidence of contamination by chloroform. All others were negative.

In April of 1986 a letter with a postage paid reply card (see appendix) was mailed to 105 growers in our service area who operated migrant labor camps. Twenty three growers requested testing of their wells, 3 declined testing for various reasons and the remainder failed to return the cards.

Thirteen wells were selected for testing from the original group of 23 responses. Most of these wells were located in our immediate service area where static water levels tend to lie 75-200 feet below the surface. In an effort to test wells that might be shallower the Michigan Department of Public Health sanitarian was asked to recommend wells for testing. Based on his recommendation and the height of the water tables ten additional wells were sampled. The closer the well point is to the surface the more likely the well is to be contaminated from surface runoff or spillage, therefore we attempted to include more samples than in the original sample in areas of high water tables.

A sanitarian from the Michigan Department of Public Health who inspected labor camps was asked to recommend wells in his area for testing based on his experience and knowledge of the water table. From this list wells were plotted on soil survey maps provided by the United States Department of Agriculture Soil Conservation Service and topographic maps in an attempt to locate wells in high water table areas. Soil maps were not available for Kent County. Based on grower interest, camp location, budgetary constraints, and the recommendations of the sanitarian a total of twenty three wells were selected for testing.

Three testing laboratories in West Michigan which were approved for E.P.A. testing were contacted for price quotes for performing organic analyses. Muskegon Waste Water Management Laboratory was selected based on economic factors and a history of having performed EPA grant work. Analyses were carried out by EPA test methods numbers 608 and 624 (See Appendix). Gas chromatographic and mass spectrometer methods were used for compound identification. There two methods were recommended by the laboratory chemist as being the most cost effective means for measuring the greatest number of possible or likely contaminants. Unfortunately the cost for detecting all possible pesticides used was prohibitive. Sample containers were supplied by the laboratory. Sample collection was carried out under the supervision of a Michigan Department of Public Health Sanitarian and all samples were delivered to the Sparta Health Center within 48 hours of collection. Samples were then transported to the testing laboratory within 24 hours of receipt. Four samples were collected from each water system; one sample was submitted for Volatile Organic Compounds, one for pesticide and PCB analyses and two samples were sent to the State Health Department for bacteria and partial chemical analyses.

Test results are presented in table form (Table 1) Testing for organochlorine pesticides, polychlorinated biphenyls (PCB's) and Volatile Organic Compounds revealed no detectable compounds at the limits indicated, except for one well with an insignificant level of chloroform (.03 PPM). Two wells had iron levels greater than 5.0 mg/l and numerous wells had hardness levels greater than 250 mg/l. Iron content and hardness may effect the taste and appearance of the water but are generally not considered health hazards. Three wells demonstrated evidence of coliforms and are being retested. Excessive nitrates are frequently found where excess runoff of fertilizer has contaminated an aquifer; it is gratifying to note that none of the wells tested had a nitrate level greater than 1.7 mg/l; up to 10 mg is considered acceptable (See Appendix B).

Based on the above results it appears that wells in migrant labor camps in West Michigan (Kent and Ottawa Counties) are generally free of contamination by organic compounds and that the water is potable. This does not exclude the possibility of an isolated well having been contaminated. These results may not be generalized to cover all compounds; however, the lack of contamination in the wells tested is certainly encouraging.

In order to address the educational portion of the grant a letter was written in both Spanish and English explaining the purpose of the study and the study results (See Appendix). Copies of this letter were made available at local sites where migrant workers seek medical services, social services and employment information. Copies of the pamphlet "Work Smart...Work Safely...With Farm Chemicals" in Spanish and English were also made available. A press release was also made available to the Midwest Fruit and Vegetable Grower News.

Future studies should be funded at a level that would allow testing for all commonly used pesticides based on geographic distribution. Farm chemicals used in Michigan apple orchards may not be found in California lettuce fields. All migrant labor camp wells should be tested at least once to establish a baseline against which to reference future studies. This information would be invaluable to a researcher five or ten years from now.

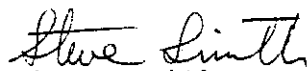
Acknowledgements:

Special thanks to Mr. Bob Aman of the Michigan Department of Public Health and Ms. Dru Allen for help in collecting samples and providing their expertise.

Respectfully submitted,



Drew Robinson
Project Manager



Steve Smith
Executive Vice President

TABLE 1
WATER QUALITY RESEARCH PROJECT

.D. No.	County	BACTERIA	CONDUCTIVITY (mmhos)	HARDNESS (mg/l)	NITRATES (as N) (mg/l)	IRON (mg/l)	SODIUM (mg/l)	CHLORIDE (mg/l)	FLUORIDE (mg/l)	PCB's (<0.001 mg/l)	PESTICIDES (<0.05 ug/l)	VOC's (<0.001 mg/l)	
1	Kent		>1	367	256	0.4	0.1	0	0	0	0	0	0
2	Kent		0	465	160	0	0.1	50	0	1.1	0	0	0
3	Ottawa		0	361	199	0	0	22	0	0.2	0	0	0
4	Kent		0	422	257	0	0.2	29	0	0.6	0	0	0
5	Kent		0	393	234	0	3.1	0	0	0.1	0	0	0
6	Kent		>1	450	299	0	0.1	0	0	0.2	0	0	0
7	Kent		0	969	503	0	3.7	44	121	0.1	0	0	0
8	Kent		0	366	248	0	0.2	0	0	0.2	0	0	0
9	Kent		0	370	272	0	0.2	0	0	0.3	0	0	0
10	Kent		0	381	260	0	0.2	0	0	0.4	0	0	0
11	Kent		0	630	367	0.4	0	0	23	0.2	0	0	0
12	Kent		0	624	405	0	0	0	23	0.2	0	0	0
13	Kent		0	390	273	0	0.3	0	0	0.3	0	0	0
14	Ottawa		0	131	101	1.7	0	0	0	0	0	0	0
15	Ottawa		>1	279	168	0	4.6	2.0	0	0	0	0	0
16	Kent		0	445	267	0	1.5	0	0	0.3	0	0	0
17	Kent		0	358	206	0	0	0	0	0.2	0	0	0
18	Ottawa		0	849	543	0	>5.5	0	14	0	0	0	0
19	Ottawa		0	236	139	1.0	0	0	0	0.2	0	0	0
20	Ottawa		0	135	119	0.3	0	0	0	0	0	0	0
21	Ottawa		0	1249	167	0	0.1	222	273	0.7	0	0	0
22	Ottawa		0	358	206	0	2.4	0	0	0.2	0	0	(a)
23	Ottawa		0	220	139	0.4	>5.5	0	0	0	0	0	0

(a) .031 PPM Chloroform



Test Method

Organochlorine Pesticides and PCBs — Method 608

1. Scope and Application

1.1 This method covers the determination of certain organochlorine pesticides and PCBs. The following parameters can be determined by this method:

Parameter	STORET No.	CAS No.
Aldrin	39330	309-00-2
α -BHC	39337	319-84-6
β -BHC	39338	319-85-7
δ -BHC	34259	319-86-8
γ -BHC	39340	58-89-9
Chlordane	39350	57-74-9
4,4'-DDD	39310	72-54-8
4,4'-DDE	39320	72-55-9
4,4'-DDT	39300	50-29-3
Dieldrin	39380	60-57-1
Endosulfan I	34361	959-98-8
Endosulfan II	34356	33212-65-9
Endosulfan sulfate	34351	1031-07-8
Endrin	39390	72-20-8
Endrin aldehyde	34366	7421-93-4
Heptachlor	39410	76-44-8
Heptachlor epoxide	39420	1024-57-3
Toxaphene	39400	8001-35-2
PCB-1016	34671	12674-11-2
PCB-1221	39488	11104-28-2
PCB-1232	39492	11141-16-5
PCB-1242	39496	53469-21-9
PCB-1248	39500	12672-29-6
PCB-1254	39504	11097-69-1
PCB-1260	39508	11096-82-5

1.2 This is a gas chromatographic (GC) method applicable to the determination of the compounds listed above in municipal and industrial discharges as provided under 40 CFR 136.1. When this method is used to analyze unfamiliar samples for any or all of the compounds above, compound identifications should be supported by at least

one additional qualitative technique. This method describes analytical conditions for a second gas chromatographic column that can be used to confirm measurements made with the primary column. Method 625 provides gas chromatograph/mass spectrometer (GC/MS) conditions appropriate for the qualitative and



Test Method

Purgeables — Method 624

1. Scope and Application

1.1 This method covers the determination of a number of purgeable organics. The following parameters may be determined by this method:

Parameter	STORET No.	CAS No.
Benzene	34030	71-43-2
Bromodichloromethane	32101	75-27-4
Bromoform	32104	75-25-2
Bromomethane	34413	74-83-9
Carbon tetrachloride	32102	56-23-5
Chlorobenzene	34301	108-90-7
Chloroethane	34311	75-00-3
2-Chloroethylvinyl ether	34576	110-75-8
Chloroform	32106	67-66-3
Chloromethane	34418	74-87-3
Dibromochloromethane	32105	124-48-1
1,2-Dichlorobenzene	34536	95-50-1
1,3-Dichlorobenzene	34566	541-73-1
1,4-Dichlorobenzene	34571	106-46-7
1,1-Dichloroethane	34496	75-34-3
1,2-Dichloroethane	34531	107-06-2
1,1-Dichloroethene	34501	75-35-4
trans-1,2-Dichloroethene	34546	156-60-5
1,2-Dichloropropane	34541	78-87-5
cis-1,3-Dichloropropene	34704	10061-01-5
trans-1,3-Dichloropropene	34699	10061-02-6
Ethyl benzene	34371	100-41-4
Methylene chloride	34423	75-09-2
1,1,2,2-Tetrachloroethane	34516	79-34-5
Tetrachloroethene	34475	127-18-4
Toluene	34010	108-88-3
1,1,1-Trichloroethane	34506	71-55-6
1,1,2-Trichloroethane	34511	79-00-5
Trichloroethene	39180	79-01-6
Trichlorofluoromethane	34488	75-69-4
Vinyl chloride	39175	75-01-4

1.2 The method may be extended to screen samples for acrolein (STORET No. 34210, CAS No. 107-02-8) and acrylonitrile (STORET 34215, CAS No. 107-13-1), however, the preferred

method for these two compounds is method 603.

1.3 This is a purge and trap gas chromatographic/mass spectrometer



Sparta Health Center

... "care with caring"

475 SOUTH STATE STREET • SPARTA, MICHIGAN 49345 • (616) 887 8231

TO: Barry Brand

Midwest Fruit & Vegetable Growers News

Sparta Health Center has recently completed a Water Quality Research Project that involved the testing of wells in 23 migrant labor camps. The study was funded by the National Demonstration Water Project to determine if pesticide contamination of water wells in migrant labor camp is a problem. The study found one well with trace amounts of chloroform. The level was .031 parts per million and is not considered a health hazard. The wells were tested for 56 organic compounds plus bacteria, iron, nitrates, sodium, fluoride, chloride, hardness and conductivity. Due to economic factors the wells could not be tested for all possible pesticides therefore a conclusion that no significant contamination is present cannot be made; however the evidence is strongly suggestive that well water contamination is not a problem in the wells tested.

High nitrate levels are found when fertilizer run off contaminates wells; none of the nitrate levels exceeded 1.7 mg/l with the acceptable level being as high as 10 mg/l. This was an additional encouraging finding of the study.

A brief nontechnical summary of the study results have been written in Spanish and English and copies made available to area migrant workers. The complete report is on file at the National Demonstration Water Project, 1111 N. 19th Street, Suite 400, Arlington, VA 22209. Project manager was Mr. Drew Robinson under the direction of the Executive Vice President of the Sparta Health Center.



Sparta Health Center

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475 SOUTH STATE STREET • SPARTA, MICHIGAN 49345 • (616) 887 8831

September 22, 1986

To Migrant Farm Workers in Kent & Ottawa Counties, Michigan:

A recent study was completed of water wells in 23 local farm labor camps. The purpose of the study was to see if any of the wells were contaminated by pesticides or other chemicals used in farming. None of the wells tested showed significant evidence of contamination by chemical compounds that were tested for.

Water should only be used that is taken from approved wells; never use water from streams, lakes or ditches for drinking or cooking. A copy of the completed study is on file at the National Demonstration Water Project, 1111 N. 19th Street, Suite 400, Arlington, VA 22209

22 de septiembre, 1986

A Los Trabajadores Migratorios en los condados de Kent y Ottawa, Michigan:

Un estudio reciente, de las norias de agua de 23 campos locales, fue completado. El objeto del estudio fue para averiguar si algunas de las norias estaban contaminadas con pesticidas o otras quimicas usadas en la agricultura. Ningunas de las norias examinadas ensenaron evidencia significativa de contaminacion por quimicas compuestas por cuales fueron examinadas.

Usted debe usar agua cogida solamente de norias aprobadas; nunca use agua de un arroyo, lago, o foso, para tomar o cocinar. Una copia del estudio completo esta archivada con el Proyecto Nacional de Demostracion de Agua, 1111 N. 19th Street, Suite 400, Arlington, VA 22209.



Sparta Health Center

... "care with caring"

475 SOUTH STATE STREET • SPARTA, MICHIGAN 49345 • (616) 887 8831

May 5, 1986

Dear Grower:

I hope you have seen a copy of the enclosed article which appeared in the Fruit and Vegetable Growers News. If you have not, please take a minute to look it over since I believe the information it contains is quite important.

As part of our commitment to maintaining a healthy environment for all rural residents, we are working with the National Demonstration Water Project to carry out water analysis for persons employing seasonal farm labor in the West Michigan Area. Most wells in West Michigan have never been tested for pesticide residue; most contamination is odorless, tasteless and does not affect the appearance of the water.

We have received a small grant for the testing of wells; this testing will be done at no cost to you. All information that we receive will be shared with you. Enclosed is a pre-addressed, stamped postcard; please return this card to me no later than May 15, 1986 in order to take advantage of these limited funds. Remember, you can't tell how safe your water is by how it looks or tastes.

Sincerely,

Drew Robinson
Water Quality Research Project

**WATER QUALITY RESEARCH PROJECT
RESPONSE CARD**

Please Check:

- Yes, I am interested in free testing of my drinking water for bacteria and chemicals. I understand I will not be charged for this service.
- No, I am not interested in this service at this time.

Name _____

Address _____

Phone _____

PLEASE MAIL THIS CARD TODAY

Testing of Wells

A new front will be opened this season in Westcentral Michigan by the Sparta Health Center in Sparta which has received an \$8,000 grant from the federal government to look at wells on farms as a potential source of pesticide contamination of drinking water.

According to Drew Robinson, Physician Assistant at the Sparta Health Center who is directing the program, limited free testing of water from wells will be conducted on the grower's property. The wells to be tested will be selected by May with the results of the testing expected to be known in September, he added.

Although the levels of pesticide contamination deemed hazardous have not been established yet by the Environmental Protection Agency (EPA), they will be set at levels that could potentially cause problems to human health. Mr. Robinson stated, "The main thrust of the program is directed toward the wellbeing of migrant workers," he added.

Mr. Robinson noted that the first farms to be included in the program will be within a radius of activity fairly near Sparta, and then sampling is to take place only in wells considered to be of high risk. To do this a geologist from Grand Valley State College at Allendale will participate in the program.

Mr. Robinson feels that most wells in Westcentral Michigan appear to be safe because of their depth. These tests, which will be administered at no cost to the grower, normally would cost on a commercial basis between \$300 and \$400 each. Anyone interested in participating should call Mr. Robinson at the Sparta Health Center - Telephone (616) 887-8831. □

JUL 0 8 1986

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WASTEWATER MANAGEMENT SYSTEM
8301 WHITE ROAD, MUSKEGON, MICHIGAN 49442
PHONE 616-853-2291

July 3, 1986

Y.A. Demirjian, Ph.D.
Manager-Director

LABORATORY ANALYSES

COMPANY: Sparta Health Center

Date: July 1, 1986

<u>WVCN</u>	<u>Sample Designation</u>	<u>Sample Date</u>	<u>Pesticides</u>	<u>PCB's</u>
0686084	41-0030	06/17/86	None Detected	None Detected
0686085	41-0098	06/17/86	None Detected	None Detected
0686086	70-0125	06/17/86	None Detected	None Detected
0686087	41-0084	06/17/86	None Detected	None Detected
0686088	41-0033	06/17/86	None Detected	None Detected
0686089	41-0057	06/17/86	None Detected	None Detected
0686090	41-0095	06/17/86	None Detected	None Detected
0686091	41-0018	06/17/86	None Detected	None Detected
0686092	41-0089	06/17/86	None Detected	None Detected
0686093	41-0009	06/17/86	None Detected	None Detected
0686094	41-0120	06/17/86	None Detected	None Detected
0686095	41-0112	06/17/86	None Detected	None Detected
0686096	41-0062	06/17/86	None Detected	None Detected

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0686096	41-0062	06/17/86	No organics detected

AUG 04 1986

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8301 WHITE ROAD, MUSKEGON, MICHIGAN 49442
PHONE 616-853-2291

Y.A. Demirjian, Ph.D.
Manager-Director

July 28, 1986

Mr. Drew Robinson
Sparta Health Center
475 S. State Street
Sparta, MI 49345

Dear Mr. Robinson:

Per your request, I have enclosed the detection limits for the organic analyses which we did for you on July 1, 1986. Also, we have been approved by the EPA to do EPA grant work. If you have any further questions, please feel free to call at any time.

Detection Limit

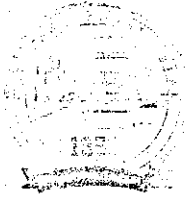
Volatile Organic Analysis	<0.001 mg/l
Pesticide Analysis	<0.05 ug/l
PCB's Analysis	<0.001 mg/l

Sincerely,



Mike Barry
Chemist

MB/lbs



City of Muskegon

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8301 WHITE ROAD, MUSKEGON, MICHIGAN 49442
PHONE 616-853-2291

Y.A. Demirjian, Ph.D.
Manager-Director

August 21, 1986

Mr. Drew Robinson
Sparta Health Center
475 S. State Street
Sparta, MI 49345

Dear Mr. Robinson:

I have enclosed a copy of the pesticides and PCBs which we analyze for and also a list of volatile organic compounds that we analyze for.

If you have any further questions, please contact me at any time.

Sincerely,

Mike Barry
Chemist

MB/lrb

Enc.

AUG 04 1986

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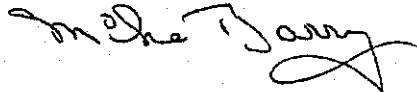
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Volatile Organic Analysis
Pesticide Analysis
PCB's Analysis

Detection Limit

<0.001 mg/l
<0.05 ug/l
<0.001 mg/l

Sincerely,



Mike Barry
Chemist

MB/l sb

Community of Muskegon

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JUL 0 8 1986



City of Muskegon

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