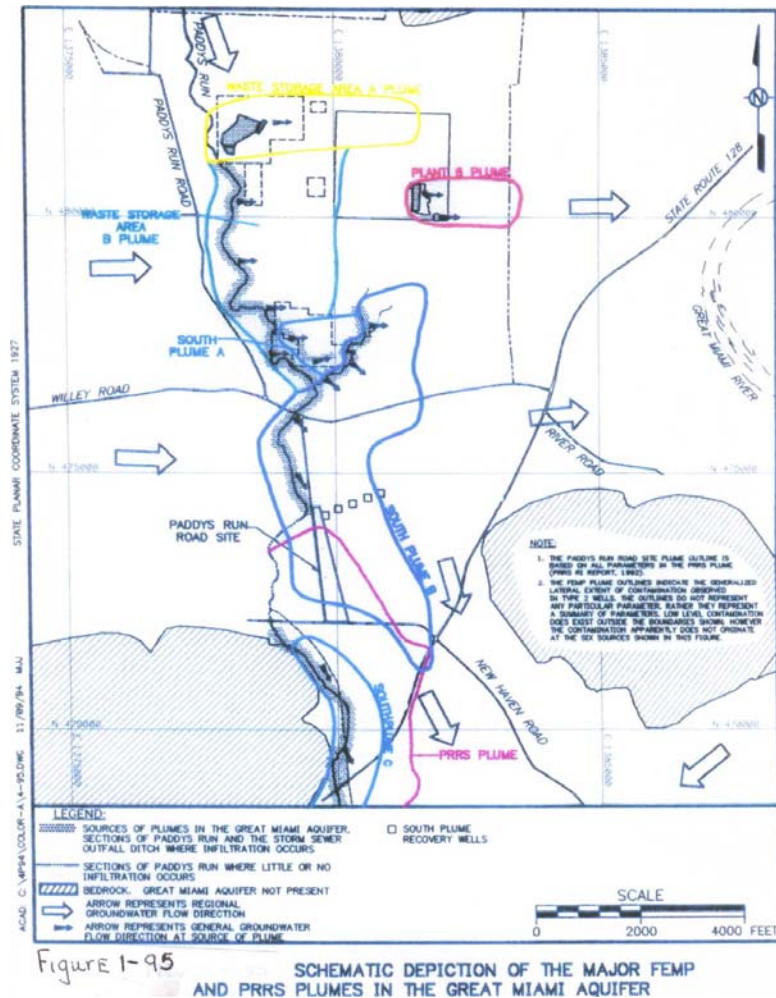


## Fernald Water Quality

Fernald Community Health Effects Committee, Inc. (F-CHEC) partnered with the University Environmental Health Foundation (UEHF) in conducting a health-related research project, identifying and reviewing existing information on contaminants of water in wells and cisterns in a five mile radius of the former Fernald Uranium Processing Plant. This area is known as the exposure domain.

Historically, the main source of drinking water was the Great Miami Aquifer. Groundwater supplied private wells and cisterns until 1997 when a public water supply was installed. Uranium contamination found in the ground water south of the Fernald site motivated residents to seek a public water system. The area is recognized as the contaminated South Plume. (See Figure WQ-1.)

**Figure WQ-1: South Plume Mapped in 1995**



F-CHEC and UEHF, hereinafter called the Research Team, determined that the existing data pertaining to the measurement of radiologic, chemical and heavy metal contaminants in cistern and well water sources have not been adequately catalogued and summarized for inclusion in dose reconstruction studies, exposure assessment or epidemiologic studies. The Research Team focused on available resources to help identify existing information related to the water quality in the exposure domain and compiled a database of sources which included both qualitative and quantitative data.

The Research Team conducted a comprehensive literature search by contacting and/or visiting the following resources:

- Fernald Public Environmental Information Center;
- public and university librarians;
- Ohio Department of Natural Resources;
- regulatory agency personnel;
- local water haulers;
- reference lists;
- OKI Regional Council of Governments; and
- on-line reference service.

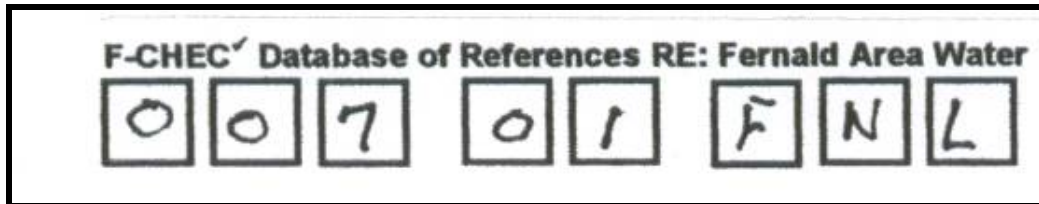
The Research Team designed a DOCUMENT SELECTION FORM (Figure WQ-2) to record bibliographic information to be entered into a computerized database. The information on the collection form consists of the following information:

- document title;
- author(s);
- document type;
- contract number;
- publishing date;
- publisher;
- company of author;
- sponsoring agency;
- number of pages;
- tables/appendices;
- data pertained to groundwater, surface water, cistern or well; and
- notes.



The Research Team developed an 8-digit coding system (Figure WQ-3) as the DATABASE NUMBER to catalog reference information; the coding system includes a sequential three-digit number, two-digit publish year, and a three-digit key for document type. This 8-digit coding system was implemented with the DOCUMENT SELECTION FORM.

**Figure WQ-3: 8-digit Database Number**



The three-digit key for DOCUMENT TYPE was designed to easily identify the kind of document. Table WQ-1 defines the keys used in the database and the number of documents by publication date in each category.

The Research Team has placed in their library 179 reference materials pertaining to Fernald water quality, dated from 1940-2005. See Table WQ-1 for the breakdown of references by publication date.

**Table WQ-1: Publication Dates by Document Type**

Document Type	Key	Publication Date							Total
		Code	ND*	Pre-1960	1960s	1970s	1980s	1990s	
Abstract	ABS	-	-	1	-	-	1	-	2
Appendix	APP	1	-	-	-	-	2	1	4
Article	ART	-	-	-	-	-	2	2	4
Correspondence	COR	-	-	-	1	-	5	1	7
Fact Sheet	FAC	1	-	-	-	-	14	6	21
Map	MAP	-	1	-	-	4	1	2	8
Other	OTH	-	1	1	1	2	7	3	15
Presentation	PRE	-	-	-	-	-	4	5	8
Report, Annual	ANN	-	-	1	2	5	7	6	21
Report, Draft	DFT	-	-	-	-	-	8	2	10
Report, Final	FNL	-	1	4	3	16	15	13	52
Report, Quarterly	QTR	-	-	4	-	-	-	-	4
Report, Sampling	SMP	-	-	-	-	4	2	1	7
Report, Semi-annual	SEM	-	-	2	2	-	1	1	6
Report, Summary	SUM	-	-	-	-	2	3	1	6
Thesis	THS	-	-	-	-	-	1	2	3
<b>Totals</b>		2	3	13	9	33	73	46	179

ND\* No Date.

Once the DOCUMENT SELECTION FORM was completed, it was attached to the respective document. An F-CHEC member of the Research Team entered the information into the Water Quality Database and generated a DATA ABSTRACT FORM (Figure WQ-4). The DATA ABSTRACT FORM and the document were forwarded to an environmental engineering student who reviewed the document, identified the water source and recorded the types of data (i.e. chemical, radioactive, biological risk, risk model, and risk assessment) by water source on the DATA ABSTRACT FORM. The completed DATA ABSTRACT FORM with the respective document were then returned to the Research Team for entry into the Water Quality Database.

**Figure WQ-4: Data Abstract Form**

Document ID:	<input type="text" value="1"/>	DocumentID	<input type="text" value="001"/>	Year	<input type="text" value="93"/>	Type	<input type="text" value="DFT"/>
Title	<input type="text" value="The Fernald Dosimetry Reconstruction Project"/>						
Sub-Title	<input type="text" value="Task 5. Review of Historic Data and Assessment for the Feed Material Production Center (FMPC)"/>						
Project Name	<input type="text"/>						
AuthorLastName	<input type="text" value="Shleien"/>	Author FirstName	<input type="text" value="Bernard"/>	More than one Author	<input checked="" type="checkbox"/>		
Document Types	<input type="text" value="Report, Draft"/>		Other <input type="text"/>				
Book/Journal Title	<input type="text"/>						
Publication Date	<input type="text" value="5/1993"/>	Journal Volume	<input type="text"/>	Journal Number	<input type="text"/>		
Document Number	<input type="text" value="RAC. Report No. CDC-4"/>		Contract Number <input type="text" value="200-90-0803"/>				
Company of Author	<input type="text" value="Radiological Assessment Corporation"/>						
Publisher	<input type="text" value="Centers for Disease Control (CDC)"/>						
Sponsoring Agency	<input type="text" value="CDC"/>						
Number of Pages	<input type="text" value="17"/>	Tables/Appendices	<input checked="" type="checkbox"/>				
Data Types	<input type="text" value="all water types"/>			General Reference	<input type="checkbox"/>		
Cistern	<input checked="" type="checkbox"/>	Chemical	<input type="checkbox"/>	Ground	<input checked="" type="checkbox"/>	Chemical	<input type="checkbox"/>
		Radioactive	<input checked="" type="checkbox"/>			Radioactive	<input checked="" type="checkbox"/>
		Bio	<input type="checkbox"/>			Bio	<input type="checkbox"/>
		Risk Mod	<input type="checkbox"/>			Risk Mod	<input type="checkbox"/>
		Risk Asses	<input type="checkbox"/>			Risk Asses	<input type="checkbox"/>
Surface	<input checked="" type="checkbox"/>	Chemical	<input type="checkbox"/>	Well	<input checked="" type="checkbox"/>	Chemical	<input type="checkbox"/>
		Radioactive	<input checked="" type="checkbox"/>			Radioactive	<input checked="" type="checkbox"/>
		Bio	<input type="checkbox"/>			Bio	<input type="checkbox"/>
		Risk Mod	<input type="checkbox"/>			Risk Mod	<input type="checkbox"/>
		Risk Asses	<input type="checkbox"/>			Risk Asses	<input type="checkbox"/>
Notes	<input type="text"/>						

## Results

The number of documents in the Water Quality Database by source of water quality data is summarized in Table WQ-2.

**Table WQ-2: Documents by Source of Water Sample Data**

<b>Water Sources</b>	<b>Number of Documents</b>
General Reference only	<b>76</b>
Cistern only	<b>2</b>
Cistern & Well	<b>5</b>
Cistern, Surface & Well	<b>2</b>
Cistern, Ground, Surface & Well	<b>2</b>
Ground only	<b>4</b>
Ground, Surface	<b>9</b>
Ground & Well	<b>1</b>
Ground, Surface & Well	<b>7</b>
Surface only	<b>18</b>
Surface & Well	<b>32</b>
Well only	<b>21</b>
<b>TOTAL</b>	<b>179</b>

Water sample data by type of data and water source are presented in Table WQ-3. Water sample data refers to sampling and/or monitoring results included in a document.

**Table WQ-3: Water Sample Data by Data Type and Water Source**

<b>Data Types</b>	<b>Cistern</b>	<b>Ground</b>	<b>Surface</b>	<b>Well</b>	<b>Total</b>
<b>Chemical</b>	1	14	41	30	<b>86</b>
<b>Radioactive</b>	5	19	63	52	<b>139</b>
<b>Biological</b>	2	-	2	1	<b>5</b>
<b>Risk Modeling</b>	2	3	17	14	<b>36</b>
<b>Risk Assessment</b>	5	1	17	20	<b>43</b>
<b>TOTAL</b>	<b>15</b>	<b>37</b>	<b>140</b>	<b>117</b>	<b>309</b>

Other reference materials developed as part of this MTA-funded grant project include a Well Directory and maps of the seven townships in the exposure domain.