OCCURRENCE OF URANIUM IN GROUND WATER IN THE VICINITY OF THE U.S. DEPARTMENT OF ENERGY FEED MATERIALS PRODUCTION CENTER, FERNALD, OHIO

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CONVERSION FACTORS

For the convenience of readers who prefer to use metric (International System) units, conversion factors for terms used in this report are listed below:

Multiply inch-pound unit	By	To obtain metric unit
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
acre (acre)	0.4047	square hectometer (hm^2)

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ABSTRACT

Process wastes are stored on site in rubber- and clay-lined pits and in large tanks at the U.S. Department of Energy Feed Materials Production Center (FMPC), where purified uranium and uranium compounds are produced. Water samples collected from offsite domestic and commercial wells in December 1981 by NLO, Inc., and in August 1982 by the U.S. Geological Survey contained concentrations of dissolved uranium that ranged from <0.4 to 430 micrograms per liter. The wells whose samples contained unusual concentrations of uranium (greater than 10 micrograms per liter) lie roughly along a line extending about 2000 feet south from the southern boundary of FMPC. The offsite area affected by these concentrations is probably less than 100 acres.

It is not possible to determine the exact point of origination of contaminants in the ground water on the basis of data presently available.

INTRODUCTION

The Feed Materials Production Center (FMPC), operated by NLO, Inc., for the U.S. Department of Energy, covers about 1.6 square miles of flat to gently rolling terrain in Hamilton and Butler Counties, Ohio. The southern edge of the tract is about 0.7 mile north of Fernald (fig. 1). The rubber- and clay-lined pits and concrete-encased storage tanks that comprise the process-wastes storage area are located about 0.3 mile west of the production area at FMPC (fig. 2) and are about 1.5 miles north of Fernald. As part of its monitoring program, NLO, Inc., the operator of FMPC, sampled a number of offsite wells in December 1981 (fig. 2). These and other wells also were sampled by the U.S. Geological Survey in August 1982 for uranium and other constituents; the wells were assigned local numbers H-101 through H-134 (fig. 3). The dissolved uranium concentrations obtained by NLO, Inc., shown in figure 2, were converted from milligrams per liter (mg/L) to micrograms per liter (μg/L) for consistency.

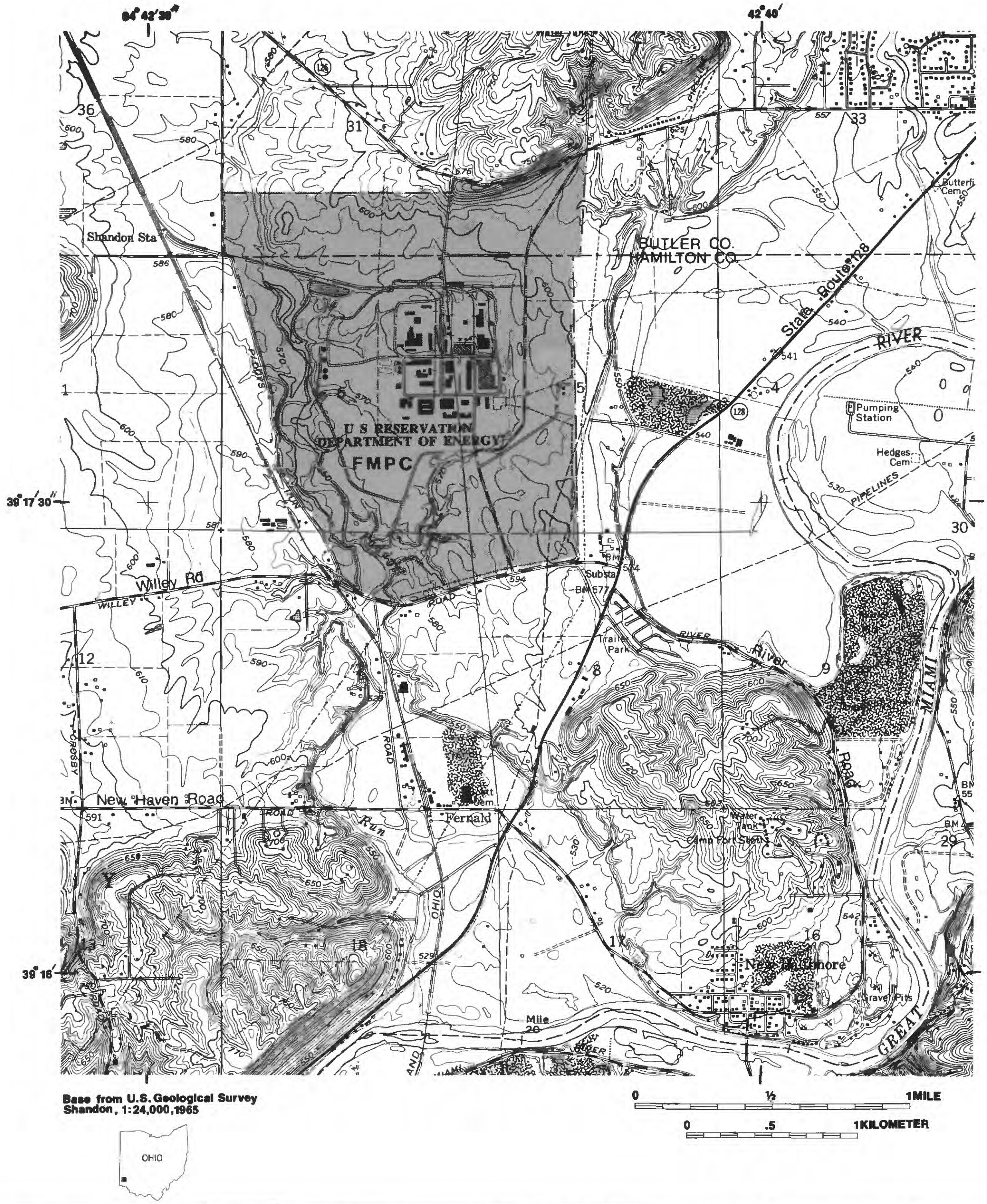


Figure 1.--Feed Materials Production Center (FMPC)-Fernald study area, Hamilton and Butler Counties, Ohio.

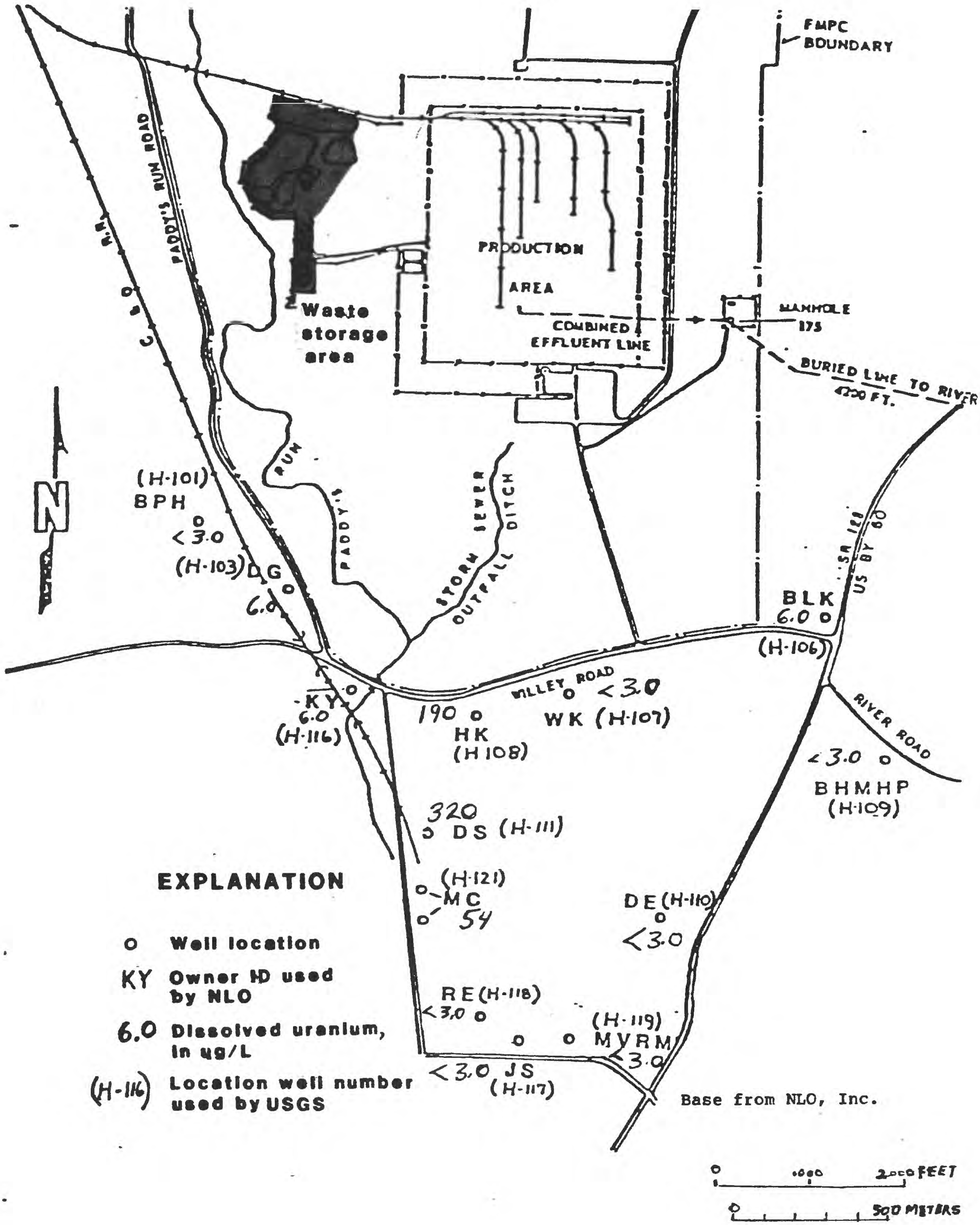
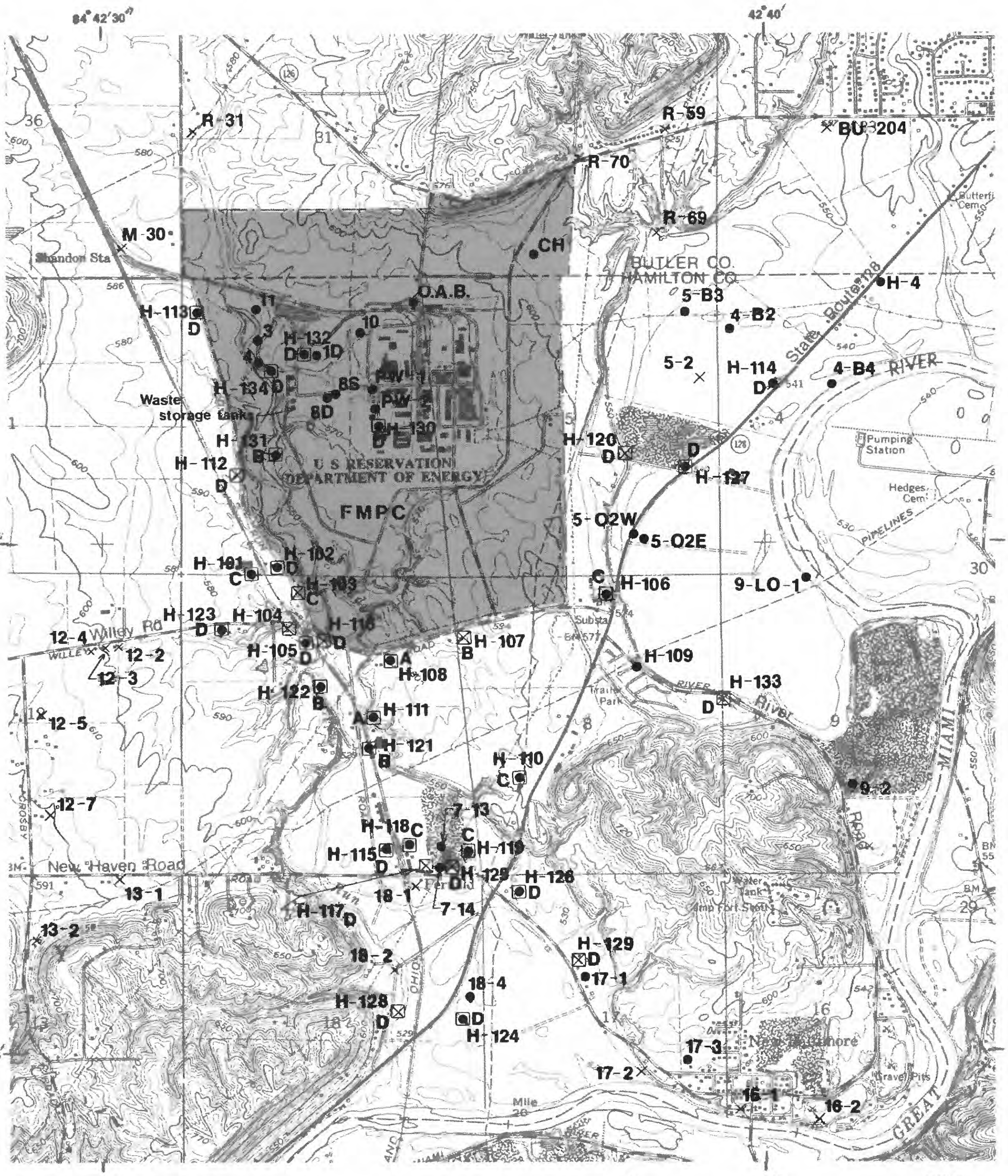


Figure 2.--Location of FMPC offsite wells sampled by NLO, Inc., and dissolved uranium concentrations, December 1981.



Base from U.S. Geological Survey
Shandon, 1:24,000,1965

0 ½ 1 MILE
0 .5 1 KILOMETER

EXPLANATION

FMPC-Fernald area

H-101 Well number (See table 1)

• Water level measured in this investigation

X Water level data site

☐ Site sampled for water quality August 1982

D Code letter referring to constituents determined (See table 2)

Figure 3.--Location of water-level observation and water-quality sample wells used in U.S. Geological Survey study, August, 1982.

Of particular concern are the concentrations of dissolved uranium at wells H-121, H-111, and H-108, which are at least several times greater than background levels. As stated by Hem (1970, p. 212), "Uranium is present in amounts between 0.1 and 10 µg/L in most natural water. Amounts greater than this are unusual."

Drinking-water standards for uranium have not yet been established, but according to Lappenbusch (1980), an interim guideline of 10 pCiU/L (picoCuries of uranium per liter) has been suggested. A conversion factor of 1 µg/L = 0.68 pCi/L can be used when all three uranium isotopes are considered. (If only the radioactivity of uranium-238 is considered, the factor is 1 µg/L = 0.33 pCi/L (Thatcher and others, 1977, p. 88).)

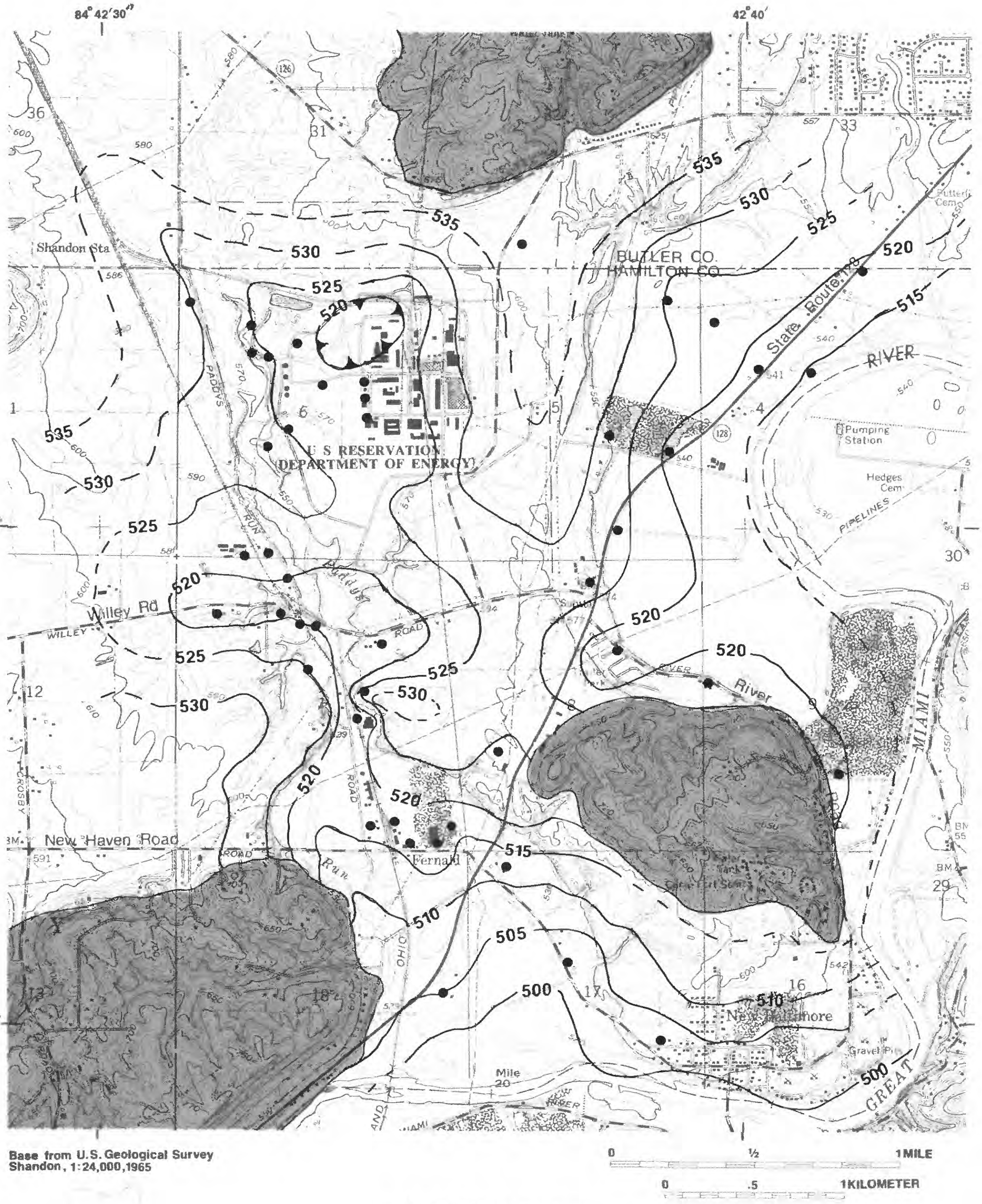
The elevated level of uranium appears to be confined to an area of about 100 acres that includes wells H-108, H-111, and H-121. If this represents a plume of excessive uranium concentration in the ground water, its position is inconsistent with the ground-water flow patterns that may be inferred from the potentiometric map (fig. 4). Water-quality problems at the community of Fernald (farther south) do not yet appear to be related to uranium contamination.

This study was undertaken at the request of the U.S. Department of Energy to determine the source of elevated concentrations of uranium in water from offsite wells near the FMPC property. The study is based on data from existing wells and is concerned with water-level conditions and the quality of the ground water at FMPC as well as in adjacent offsite areas extending southward to include the community of Fernald.

Well-Sampling Program and Water-Quality Analyses

Table 1 (at back of report) is an inventory of wells in the FMPC-Fernald area. Water samples were collected from selected wells between August 24 and August 31, 1982 by the U.S. Geological Survey. Choice of sampling sites was based on several considerations. Wells selected included (1) the offsite wells sampled by NLO, Inc. (fig. 2); (2) wells along Paddys Run that could be affected by infiltration of contaminants from surface runoff; (3) wells at FMPC that are located near waste storage facilities; (4) wells at Fernald, an area where the ground water is allegedly of poor quality; and (5) wells near the east and west boundaries of FMPC that could be used to identify ground-water flow in any other direction.

Table 2 is a listing of four analytical schedules used in the sampling study. The letter codes (A, B, C, D) used in the table are also shown on figure 3 for the sites sampled in August 1982.



EXPLANATION

—525— Water-level contour showing altitude of potentiometric surface, in feet, National Geodetic Vertical Datum of 1929. Dashed where inferred.

● Water-level measurement site.

Area where bedrock is at or near the surface.

▲▲ Contour encloses lower altitude of potentiometric surface.

Figure 4.--Potentiometric surface at FMPC-Fernald area, August 1982.

Table 2.--Key to constituents determined in water samples from wells shown on figure 3

Constituent	Symbol on figure 3			
	A	B	C	D
Radiochemical:				
Uranium, dissolved	x	x	x	x
Gamma scan	x	x		
Gross alpha (dissolved, U-nat)	x	x		
Gross beta (dissolved, Sr-90)	x	x		
Gross beta (dissolved, Cs-137)	x	x		
Common inorganic:				
Calcium, dissolved	x	x	x	
Magnesium, dissolved	x	x	x	
Potassium, dissolved	x	x	x	
Sodium, dissolved	x	x	x	
Silica, dissolved	x	x	x	
Chloride, dissolved	x	x	x	
Fluoride, dissolved	x	x	x	
Sulfate, dissolved	x	x	x	
Nitrate, dissolved	x	x	x	
Iron, dissolved	x	x	x	
Manganese, dissolved	x	x	x	
Bicarbonate, as HCO_3	x	x	x	
Hardness, as $CaCO_3$	x	x	x	
Noncarbonate hardness	x	x	x	
Solids, dissolved	x	x	x	
Metals:				
Barium, dissolved	x			
Beryllium, dissolved	x			
Cadmium, dissolved	x	x		
Cobalt, dissolved	x	x		
Copper, dissolved	x			
Chromium, dissolved		x		
Lead, dissolved	x	x		
Lithium, dissolved	x			
Molybdenum, dissolved	x			
Strontium, dissolved	x	x		
Vanadium, dissolved	x			
Zinc, dissolved	x	x		
Arsenic, dissolved		x		
Mercury, dissolved		x		
Cyanide, total, as CN	x			
Organic:				
Nitrogen, organic, as N	x			
Nitrogen, ammonia, total, as N	x			
Nitrogen, ammonia + organic, total, as N	x			
Nitrogen, NO_2 + NO_3, total, as N	x			
Phosphorus, total, as P	x			
Carbon, total, organic	x			

At each well, untreated water was collected as close as possible to the wellhead. The well was pumped for several minutes to obtain water that was representative of aquifer conditions. Field determinations were made of water temperature, specific conductance, pH, and alkalinity. The hydrogen-sulfide content was determined by U.S. Geological Survey personnel in Columbus, Ohio. Radiometric analyses and dissolved uranium concentrations were determined in the U.S. Geological Survey regional laboratory at Denver, Colo. Other constituents (table 2) were analyzed at the Survey's regional laboratory at Doraville, Ga. Analytical results of dissolved-uranium concentrations determined by NLO, Inc., in December 1981 are presented in table 3. Analytical data from all of the samples collected in August 1982 are included in table 4 (at back of report).

HYDROGEOLOGIC SETTING OF THE FEED MATERIALS PRODUCTION CENTER (FMPC)-FERNALD AREA

The aquifer system is composed essentially of sand and gravel of glacial origin. In places, the aquifer is stratified with clay, or capped by clayey till.

Spieker (1968, pl. 2) shows the FMPC area as situated on a terrace (above the Miami River floodplain) and consisting of a clay-rich till underlain by about 150 feet of sand and gravel. A 10-foot bed of clay about 130 to 140 feet below land surface divides the sand and gravel section into an upper and a lower aquifer. The clay bed reportedly pinches out to the east near the eastern boundary of FMPC.

Studies by Eye (1961, p. 21) and Spieker (1968, p. A15) indicate that the clay beds act as partially confining layers. Only a few of the wells listed in table 1 are deep enough to have tapped the lower aquifer. At FMPC, these include the production wells (NLO/PW 1, 2, and 3) and test wells (NLO 1-D and 8-D). To the east, three wells drilled to bedrock by Southwestern Ohio Water Company apparently are not affected by the clay layer that divides the aquifer at FMPC.

An inventory of water wells and water-level measurements was completed in August 1982. Wells used in the inventory are listed in table 1, and their locations are shown in figure 3. Water-level data obtained in this investigation were used to prepare the potentiometric map (fig. 4), which shows the general direction of ground-water flow within the aquifer system. Not all wells in the area were available for measurement because of problems of access to the property or an inability to measure the depth to water without dismantling equipment in the wells.

Table 3.--Uranium concentrations in water from wells sampled by NLO, Inc. (December 1981) and U.S. Geological Survey (August 1982)

[Well locations are shown in figures 2 and 3]

U.S. Geological Survey local well no.	NLO well ID	Concentrations: NLO (converted to µg/L)[a]	Concentrations: U.S. Geological Survey (µg/L)
H-101	BPH	<3.0	<2.0
H-103	DG	6.0	1.4
H-106	BLK	6.0	1.5
H-107	WK	<3.0	0.7
H-108	HK	190	250
H-109	BHMHP	<3.0	--[b]
H-110	DE	<3.0	<0.4
H-111	DS	320	430
H-116	KY	6.0	1.5
H-117	JS	<3.0	<0.4
H-118	RE	<3.0	<0.4
H-119	MVRM	<3.0	<0.5
H-121	MC	54	46

[a]Data reported by NLO as milligrams per liter have been converted to micrograms per liter for consistency of presentation.

[b]Sample from H-109 not used because of excessive bleach in water water supply.

Several features should be mentioned with reference to figure 4. First, bedrock crops out along the banks of the Great Miami River near Fernald, and probably controls ground-water movement south of FMPC.

Second, the water table defined by the 520-foot contour that appears as a troughlike low at the southern edge of FMPC along Willey Road opens to the south as a narrowly constricted channel between two control points, wells H-122 and H-111. In the area north of these wells, ground-water pumpage (mostly domestic and farm use) is low compared to the amount of ground water used at Fernald and FMPC. Where the north side of the 520-foot enclosure crosses Paddys Run (fig. 4) the altitude of the streambed is between 520 and 530 feet above sea level. Whether or not Paddys Run is a losing stream in this stretch or flows without connection with the water table was not determined. Paddys Run was virtually dry at the time of this investigation.

Third, the water level at the abandoned "cone house" well (labeled "CH," fig. 3) near the northeast corner of the FMPC just inside Butler County, is about 75 feet higher than in wells a half-mile to the east and to the west. The potentiometric surface along the eastern side of the FMPC is conjectural because of a lack of suitable well data; however, the well is evidently in a body of water that is perched or otherwise disconnected from the water-bearing zone mapped elsewhere in figure 4. An attempt to draw contours between this and other wells resulted in a hydraulic gradient that was unrealistically steep. The extent of the perched water body is unknown; thus, it is not shown in figure 4.

Finally, a ground-water divide may exist along the eastern boundary of the FMPC as suggested by Spieker (1968, pl. 2) between two bedrock areas (fig. 4). The contours as drawn in figure 4 suggest that a partial ground-water divide exists in the area.

The water table beneath the principal area of activity at FMPC is a relatively broad depression enclosed by the 525-foot contour (fig. 4). Static water levels of onsite wells were measured when the FMPC plant was shut down for vacation and the three main supply wells were idle. Water levels for the three wells were just below 524.0 feet, but in two observation wells to the north (NLO test well 10 and the old administration building well) the levels were 515.6 and 521.9 feet, respectively; this indicates that recovery in the aquifer was greater in the vicinity of the supply wells. During periods of plant operation the supply wells are pumped on a rotating basis, and the 520-foot enclosure north of the supply wells (fig. 4) would probably be enlarged to include all three wells.

The cone of depression at FMPC, even when major pumping is shut down, has become a persistent feature over the years. According to Spieker (1968, p. A19 and pl. 2), daily pumpage at FMPC in 1964 averaged more than 1.0 million gallons per day, but the cone of depression caused by pumping was too shallow to show on his map. Although the pumping rate has been less in recent years, development of the cone can be attributed to the fact that ground water pumped at FMPC is not returned to the aquifer but is discharged through sewers or lost by evaporation.

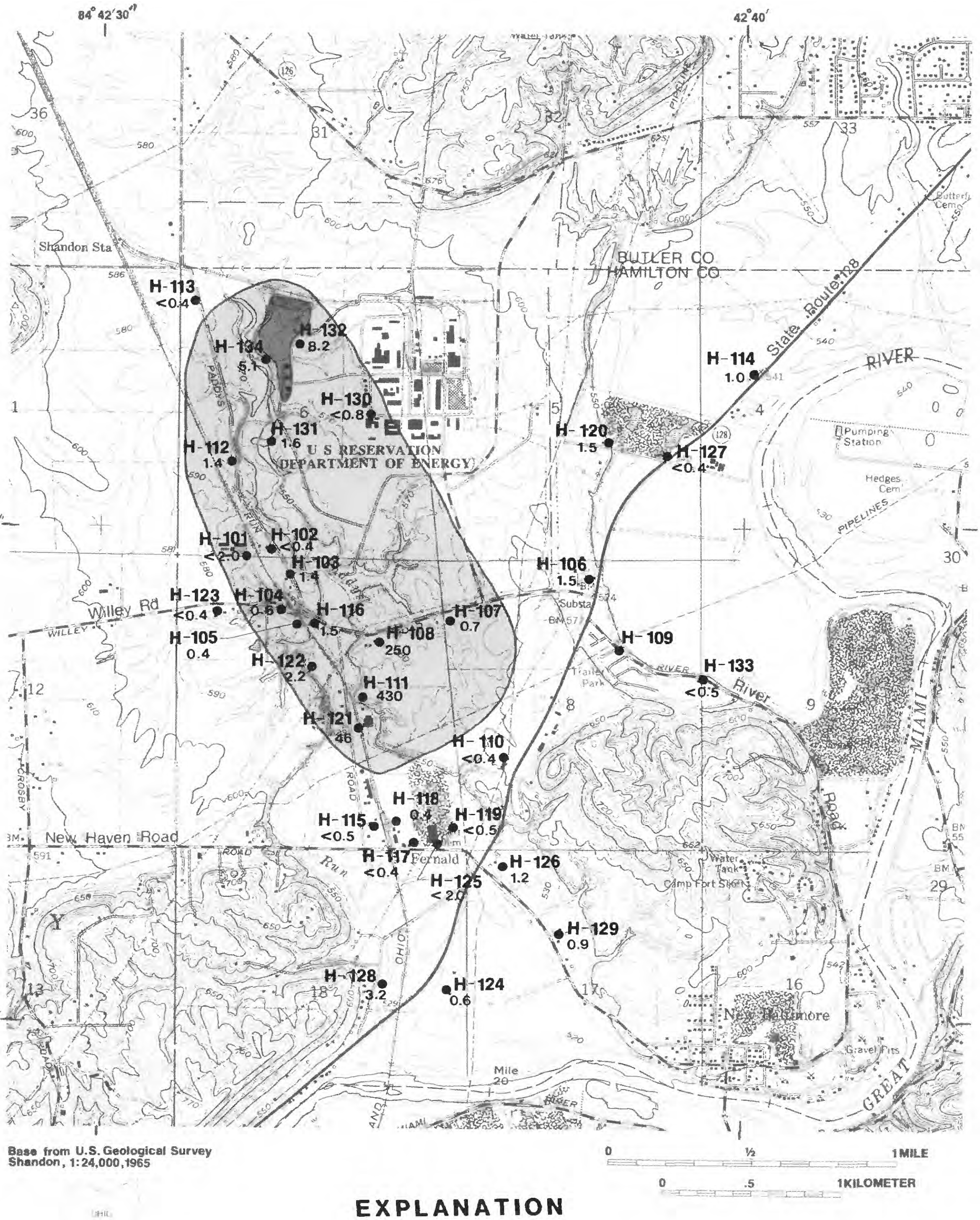
Recharge is essentially by precipitation. Rainfall in the area was deficient in July 1982. Had it been abundant, the cone of depression in figure 4 might have been smaller.

The water level at well H-132 (NLO test well 1-S, fig. 3), which is pumped continuously (at less than 100 gallons per minute) to intercept ground water between the waste pits and the main supply wells, was about 485 feet. Because water levels in nearby wells were much higher, the cone of depression at this well is too small to show in figure 4. Similarly, the cone of depression at well H-121 (fig. 3) is too small to show in figure 4.

URANIUM CONCENTRATIONS IN GROUND WATER AND THEIR SIGNIFICANCE

Table 3 compares concentrations of dissolved uranium determined by NLO, Inc., in December 1981 (fig. 2) to those determined by the U.S. Geological Survey for the same wells in August 1982. In general, the concentrations determined by the U.S. Geological Survey were lower than those determined by NLO, Inc., possibly because of differences in detection limits used in the analyses. However, the concentrations of dissolved uranium at wells H-108 and H-111 were greater; the concentration at well H-121 was nearly the same as that reported by NLO, Inc. These three wells were the highest in dissolved uranium content of the wells sampled in this study. All had concentrations at least several times higher than the dissolved uranium content found at wells H-132 and H-134 (fig. 5), both of which are situated near the FMPC waste-storage areas.

Two other onsite wells, H-130 and H-131 (fig. 5), are located farther from the waste-storage areas and were relatively low in dissolved uranium. Well H-131 taps the upper aquifer, whereas well H-130 is one of three supply wells that produces from the lower aquifer. The water-quality data for these wells and the potentiometric surface as mapped in figure 4 suggest that the high concentration of uranium at wells H-108, H-111, and H-121 did not reach these wells through the aquifer directly from the FMPC production area because several wells such as H-103, H-104, H-116, and H-122 situated similarly along the ground-water flow pathway were scarcely affected. Even though a localized source of contamination is possible, it would be reasonable to consider the various possibilities for contaminant migration from FMPC. These



EXPLANATION

H-124 ● Well location and local number

0.6 Dissolved uranium in µg/L

Area where additional study is needed

FMPC waste-storage area

Figure 5.--Uranium concentrations in ground water collected in the FMPC-Fernald area, August 1982, and area where additional study is needed (Analysis by U.S. Geological Survey).

would include movement down Paddys Run resulting from excessive discharges at some specific time, undetermined pathways of leakage from the storage pits, and contamination carried by storm runoff.

The amount of dissolved oxygen in the aquifer should be considered. According to Garrels and Christ (1964, p. 253-6), the more highly oxidized forms of uranium have greater solubility. This suggests that in areas of recharge where the oxygen content can be expected to be high, more uranium can be carried in solution than where the oxygen content is low. It is possible that uranium transported under conditions of oxygen enrichment could end up as excessive amounts in some localities, whereas a low uranium content could mean that potentially excessive amounts of uranium have already been precipitated out somewhere along the way from the source.

The amount of dissolved iron may be an indicator of oxygen concentration, that is, high iron concentrations would suggest reducing conditions or an oxygen deficiency. Conversely, low iron concentrations may indicate that conditions of oxygen enrichment prevailed. In this study, 13 samples were analyzed for dissolved iron. Wells H-108, H-111 and H-121, which were low in iron, may have been relatively rich in oxygen. Conversely, wells H-106, H-110, H-118, H-119, and H-122 were quite high in dissolved iron but low in dissolved uranium. One well, H-107, was low in both iron and uranium.

Except for H-111, H-121, and H-122, samples from the wells located along Paddys Run (fig. 5), contained less than 2 µg/L of dissolved uranium. However, the concentration of dissolved uranium in water from well H-128 near the southern end of Paddys Run was noticeably higher (3.2 µg/L). Because this well is shallow and located closer to the stream than other upstream wells (fig. 5), it is probably more susceptible to infiltration from surface-water contamination whenever the stream is bankfull.

Concentrations of dissolved uranium for most of the wells at Fernald were less than 2.0 µg/L; thus, dissolved uranium contamination does not appear to be a problem for wells in that community.

CONCLUSIONS

The source of the uranium found in wells H-108, H-111, and H-121 cannot be attributed directly to ground-water flow from the waste storage areas at FMPC; several other wells between FMPC and well H-108 would have been affected. More data concerning the flow characteristics of Paddys Run along the southwestern part of FMPC are needed to (1) determine if any part of the stream is losing water to the ground-water system, and (2) determine the distribution of uranium concentrations in Paddys Run at different flows. There is a possibility that surface-water runoff, such as storm overflow, could have carried high-level uranium wastes toward Paddys Run. The uranium wastes could have infiltrated the ground-water system along the reach near the affected wells.

Continued water-level measurements and water-quality sampling are needed to determine if the amount of uranium is increasing in the vicinity of wells H-108, H-111, and H-121, or if other wells in the area (wells H-122, H-116, H-107) are likely to be affected by increasing levels of uranium. Test wells may be needed to better define the direction of ground-water movement. Because the water table is relatively high in the vicinity of well H-111 (fig. 3), dissolved uranium at this locality could move in any of several directions toward wells that have not yet been affected.

The amount of dissolved iron in ground water suggests a relationship exists between the amount of available oxygen and the amount of dissolved uranium. Thus, if uranium wastes were carried by surface water, an opportunity exists for oxygen enrichment, which would permit greater transport of dissolved uranium to the ground-water system.

The area in which additional study is needed is outlined in figure 5. Water-level measurement and water-quality sampling could be continued at wells H-108, H-111, H-121, and in other nearby wells to determine if the uranium content is changing. To help delineate the area of high uranium content, additional wells north and east of wells H-108, H-111, and H-121 are needed. Other wells at FMPC, especially south of the storm outfall ditch, could be drilled to various depths; hydrogeologic samples could be taken during well construction.

Discharge measurements could be made along Paddys Run to determine if there are sections of the stream where water is being lost to the ground-water system. A soil sampling program conducted along Paddys Run and the storm sewer outfall ditch (fig. 1), would help identify places where infiltration may have taken place.

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Table 1.--Inventory of water wells in the Fernald-FMPC area, Hamilton and Butler Counties, Ohio

Location: County Township	Location: Section number	Well number: County number, if assigned	Well number: Other number	Owner or resident	Well diameter (inches)	Total depth completed (feet)
Butler Co.						
Morgan T.			M-30	C&O Railroad	6	144
Ross T.						
	31		R-31	William McFarland	6	42
	32		R-70	Ray Heading		50
			R-59	Bummer Builders		95
			R-69	Emerson Eliot	4	58
			Cone house	NLO, Inc.	36	45
	33	BU-204	SW-0-3	Southwestern Ohio Water Co. (SOWC)	6	
Hamilton Co.						
Crosby T.						
	at FMPC		NLO/PW-1	NLO, Inc.	12	210
			NLO/PW-2	do.	12	210
		H-130	NLO/PW-3	do.	12	210
		H-132	NLO/I-S	do.	4	120
			NLO/I-D	do.	4	180
			NLO/3	do.	8	105
			NLO/4	do.	8	43
		H-134	NLO/5	do.	8	95
			NLO/8-S	do.	4	116
			NLO/8-D	do.	4	180
		H-131	NLO/9	do.	4	103
			NLO/10	do.	6	130
			NLO/11	do.	6	130
			O.A.B	do.	6	141
	6	H-113	6-1	George Frankenstein	6	90
		H-101	BPH*,6-2	Best Panel Homes	6	90
		H-102	6-3	do.	6	90
		H-112	6-4	Eugene Hott	6	86
	5	H-127	5-1	Franklin Rack Excavating Co.	6	65
			5-2	R. Burwinkle/SOWC	10	120
			5-02E	Byron Knollman	2	42
			5-02W	do.	2	131
			5-B3	R. Burwinkel/SOWC	6	171
		H-120		B. Gieringer	6	75
	4	H-114	4-B1	R. Burwinkle/SOWC	6	165
			4-B2	do.	6	174
			4-B4	do.	2	
		H-4		SOWC	6	100
	9		9/LO-1	Byron Knollman	2	42
			9-2	Ralph Keith	4	25
		H-133	9-3	Ralph Atherton	6	80

Table 1.--Inventory of water wells in the Fernald-FMPC area, Hamilton and Butler Counties, Ohio--Continued

Location		Well number				
County Township	Section number	County number, if assigned	Other number	Owner or resident	Well diameter (inches)	Total depth completed (feet)
Hamilton Co.						
Crosby T.	8-------	H-110	DE*,8-1	Denier Electric Co.	6	100
		H-109	BHMHP*,8-2	Harry Klekamp	8	110
		H-106	BLK*,8-4	Byron Knollman	6	85
		H-107	WK*,8-5	William Knollman	6	90
	17-------		17-1	Dennis Heyob	6	
			17-2	Lorin Hann	5	33
			17-3	R&T Landscaping & Lawn Builders	5 1/2	99
		H-126	17-4	T. Pottenger	18	24
		H-129		Century Farms, Inc.	6	60
	16-------		16-1	Frank Tucker	6	70
			16-2	Matilda Kelsch	6	50
	18-------		18-1	Steelcorp, Inc.	6	145
			18-2	M. D. Pottenger	5	40
		H-124	18-3	Rumpke, Inc.	6	60
			18-4	do.	6	
		H-128	18-6	J. W. Rolfes		17
	7-------	H-123	7-1	Jacob Fuchs	6	81
		H-103	DG*,7-2	Dan Gierenger	6	70
		H-104	7-3	Mike Lienesch	6	80
		H-105	7-4	Frank Lienesch	6	80
		H-122	7-5	Clayton Burton	6	80
		H-108	HK*,7-6	Knollman Farms, Inc.	5 5/8	84
		H-111	DS*,7-7	Delta Steel Corporation	6	60
		H-121	MC*,7-8	Mobil Chemical	12	82
			7-8a	do.	6	48
			7-9	do.	12	83
		H-115	7-10	Rutgers-Nease Chemical Co.	10	96
		H-118	RE*,7-11	Ray Evers Welding	6	
		H-117	JS*,7-12	Jasper Stevens		27
			7-13	Web Pallet Co.	6	60
			7-14	do.	8	80
		H-125	7-15	do.	8	80
		H-119	MVRM*,7-16	Miami Valley Ready Mix	6	55
		H-116	KY*,7-17	Kenneth Yoakum		40
	12-------		12-2	Everett Buskirk	5	108
			12-3	do.	5	103
			12-4	Eugene & Hazel Buskirk	5	106
			12-5	George Fuchs	6	107
			12-7	Robert Brankamp	6	101
	13-------		13-1	Marshall Clark	5	105
			13-2	Paul J. Wiwi	6	54

Table 1.--Inventory of water wells in the Fernald-FMPC area, Hamilton and Butler Counties, Ohio--Continued

Location		Well number					
County Township	Section number	County number, if assigned	Other number	Date measured	Land-surface altitude (feet)	Depth of water below land surface (feet)	Altitude of water surface (feet above sea level)
Butler Co.							
Morgan T.			M-30		585	52.2	533
Ross T.							
	31		R-31	10-31-73	574	37	537
	32		R-70	11- -54	615	30	585
			R-59		625	48	577
			R-69		565	12	553
			Cone house	07-30-82	613	13.4	599.6
	33	BU-204	SW-0-3	07-29-82			524.59
Hamilton Co.							
Crosby T.							
	at FMPC		NLO/PW-1	07-30-82	578.91	55.17	523.74
			NLO/PW-2	do.	579.64	55.86	523.78
		H-130	NLO/PW-3	do.	579.84	56.18	523.66
		H-132	NLO/I-S	do.	585.55	100.0+	485.+
			NLO/I-D	do.	585.31	60.95	524.36
			NLO/3	do.	560.86	35.61	525.25
			NLO/4	do.	556.85	30.98	525.87
		H-134	NLO/5	do.	557.09	30.82	526.27
			NLO/8-S	do.	576.60	51.85	524.75
			NLO/8-D	do.	576.62	52.52	524.10
		H-131	NLO/9	do.	557.23	30.85	526.38
			NLO/10	do.	580.00	64.40	515.60
			NLO/11	do.	596.??	60.78	
			O.A.B	do.	589.96	68.07	521.89
	6	H-113	6-1	08-02-82	575	54.78	530.22
		H-101	BPH*,6-2	08-03-82	575	52.20	522.80
		H-102	6-3	do.	568	44.73	523.27
		H-112	6-4	--	580	--	
	5	H-127	5-1	08-27-82	540	20.16	519.84
			5-2	08-20-64	540	17.17	522.83
			5-02E	08-02-82	540	14.08	525.92
			5-02W	do.	540	13.88	526.12
			5-B3	08-03-82	539	14.80	524.20
		H-120		--	560		
	4	H-114	4-B1	08-03-82	540	21.39	518.61
			4-B2	08-03-82	539	14.58	524.42
			4-B4	08-03-82	537	22.72	514.
		H-4		08-04-82	541.57	21.88	519.69
	9		9/LO-1	08-02-82	532	16.85	515.15
			9-2	08-04-82	536	13.77	522.23
		H-133	9-3		560		

Table 1.--Inventory of water wells in the Fernald-FMPC area, Hamilton and Butler Counties, Ohio--Continued

Location		Well number					
County Township	Section number	County number, if assigned	Other number	Date measured	Land-surface altitude (feet)	Depth of water below land surface (feet)	Altitude of water surface (feet above sea level)
Hamilton Co. Crosby T.	8-------	H-110	DE*,8-1	08-03-82	605	80.56	524.44
		H-109	BHMHP*,8-2	08-04-82	572	54.70	517.30
		H-106	BLK*,8-4	08-02-82	579	52.92	526
		H-107	WK*,8-5	08-03-66	580	63.0	517
	17-------		17-1	08-04-82	534	32.61	501.39
			17-2	05-05-55	525	21.6	503.4
			17-3	08-04-82	565	60.57	504.43
		H-126	17-4	08-27-82	531	20.77	510.23
		H-129		05-04-56	532	27.5	504.5
	16-------		16-1	12-10-64	545	42	503
			16-2	10-02-63	525	24	501
	18-------		18-1	03-27-73	530	19	511
			18-2	02- -53	515	8	507
		H-124	18-3	07-30-82	519.5	15.19	504.31
			18-4	07-30-82	520.0	13.78	506.22
		H-128	18-6	--	510	--	--
	7-------	H-123	7-1	08-04-82	570	54.14	515.86
		H-103	DG*,7-2	04-04-59	570	28	542
		H-104	7-3	08-18-65	562	51	511
		H-105	7-4	08-03-82	569	48.11	520.89
		H-122	7-5	08-02-82	540	15.03	524.97
		H-108	WK*,7-6	08-03-82	575	59.40	515.60
		H-111	DS*,7-7	08-02-82	555	25.65	529.35
		H-121	MC*,7-8	08-02-82	530	19.33	510.67
			7-8a	08-02-82	529.5	8.62	520.88
			7-9		529	--	--
		H-115	7-10	08-02-82	528.5	13.28	515.22
		H-118	RE*,7-11	07-30-82	527.5	10.42	517.08
		H-117	JS*,7-12		528		
			7-13	07-30-82	526	9.52	516.48
			7-14	07-30-82	529	12.22	516.78
		H-125	7-15	12-06-74	529	12.8	516.2
		H-119	MVRM*,7-16	07-30-82	528	12.04	519.96
		H-116	KY*,7-17		533		
	12-------		12-2	05-23-59	595	74.5	520.5
			12-3	10-28-60	595	69	526
			12-4	09-26-60	605	70	535
			12-5	04-08-68	613	82	531
			12-7	11-05-68	595	68	527
	13-------		13-1	08-02-55	609	88	521
			13-2	04-26-61	610	19	591

Table 1.--Inventory of water wells in the Fernald-FMPC area, Hamilton and Butler Counties, Ohio--Continued

Location: County Township	Location: Section number	Well number: County number, if assigned	Well number: Other number	Use of well	Remarks
Butler Co.					
Morgan T.	-------------		M-30	Industrial	Driller's log 95429
Ross T.					
	31-------		R-31	Domestic	Driller's log 434543
	32-------		R-70	do.	Driller's log 145666
			R-59	do.	Driller's log 172559
			R-69	do.	Driller's log 115633
			Cone house	Observation	Dug well
	33-------	BU-204	SW-0-3	Observation	Data from ODNR
Hamilton Co.					
Crosby T.					
	at FMPC-----		NLO/PW-1	Industrial supply	Well idle when measured
			NLO/PW-2	do.	do.
		H-130	NLO/PW-3	do.	do.
		H-132	NLO/I-S	Test well	Pumped continuously, level varies
			NLO/I-D	do.	
			NLO/3	do.	Driller's log 258889
			NLO/4	do.	
		H-134	NLO/5	do.	Driller's log 258890
			NLO/8-S	do.	
			NLO/8-D	do.	
		H-131	NLO/9	do.	
			NLO/10	do.	
			NLO/11	do.	Land-surface datum questionable
			O.A.B	do.	O.A.B. = Old Admin. Building well
	6-------	H-113	6-1	Domestic	Driller's log 327205
		H-101	BPH*,6-2	Commercial	Driller's log 366564
		H-102	6-3	Domestic	
		H-112	6-4	do.	Inaccessible
	5-------	H-127	5-1	Commercial	Driller's log 402900
			5-2	Irrigation	Driller's log 291494, inaccessible**
			5-02E	Observation	Observation well meas. by SOWC
			5-02W	do.	do.
			5-B3	do.	do.
		H-120		Domestic	Inaccessible
	4-------	H-114	4-B1	Domestic & farm	
			4-B2	Observation	Observation well meas. by SOWC
			4-B4	Observation	
		H-4		Observation	State obs. well operated by USGS
	9-------		9/LO-1	Observation	
			9-2	Domestic	
		H-133	9-3	Domestic	Inaccessible

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Table 1.--Inventory of water wells in the Fernald-FMPC area, Hamilton and Butler Counties, Ohio--Continued

Location		Well number			
County Township	Section number	County number, if assigned	Other number	Use of well	Remarks
Hamilton Co.					
Crosby T.	8-------	H-110	DE*,8-1	Commercial	
		H-109	BHMHP*,8-2	Public supply	Driller's log 434526
		H-106	BLK*,8-4	Domestic & farm	Driller's log 291459
		H-107	WK*,8-5	Domestic	Driller's log 327231, inaccessible
	17-------		17-1	do.	
			17-2	do.	Driller's log 145698, inaccessible
			17-3	Commercial	
		H-126	17-4	Domestic	Dug well
		H-129		Farm	Driller's log 172574
	16-------		16-1	Domestic	Driller's log 291498
			16-2	do.	Driller's log 291473
	18-------		18-1	Unused	Driller's log 434519, inaccessible
			18-2	Domestic	Driller's log 107451, inaccessible
		H-124	18-3	Commercial	Driller's log 470774, unfit to drink
			18-4	Commercial	
		H-128	18-6	Domestic	
	7-------	H-123	7-1	do.	Driller's log 596060
		H-103	DG*,7-2	do.	Driller's log 225124, inaccessible
		H-104	7-3	do.	Driller's log 327213, inaccessible
		H-105	7-4	do.	
		H-122	7-5	do.	
		H-108	WK*,7-6	Domestic & farm	Driller's log 115637
		H-111	DS*,7-7	Commercial	
		H-121	MC*,7-8	Industrial	Driller's log 402882
			7-8a	Unused, test well	
			7-9	Industrial	Driller's log 358263, inaccessible
		H-115	7-10	Industrial	Driller's log 198165
		H-118	RE*,7-11	Commercial	
		H-117	JS*,7-12	Domestic	Inaccessible
			7-13	Unused	Driller's log 366597
			7-14	Unused	Driller's log 470793
		H-125	7-15	Fire protection	Driller's log 470794
		H-119	MVRM*,7-16	Industrial	
		H-116	KY*,7-17	Domestic	Inaccessible
	12-------		12-2	do.	Driller's log 225131
			12-3	do.	Driller's log 227445
			12-4	do.	Driller's log 227441
			12-5	do.	Driller's log 366561
			12-7	do.	Driller's log 366572
	13-------		13-1	do.	Driller's log 157871
			13-2	do.	Driller's log 260757

*NLO sampling point identification
**Inaccessible = wellhead buried or covered or some other impediment to measuring water level.

Table 4.--Chemical quality of water from selected wells

LIST OF ABBREVIATIONS USED

AS	arsenic (As)	MG/L	milligrams per liter (mg/L)
BA	barium (Ba)		
BE	beryllium (Be)	MN	manganese (Mn)
CA	calcium (Ca)	MO	molybdenum (Mo)
CACO3	calcium carbonate ($CaCO_3$)	NA	sodium (Na)
CD	cadmium (Cd)	NO2	nitrite (NO_2)
CL	chloride (Cl)	NO3	nitrate (NO_3)
CO	cobalt (Co)	PB	lead (Pb)
CO2	carbon dioxide (CO_2)	PCI/L	picocuries per liter (pCi/L)
CO3	carbonate (CO_3)		
CR	chromium (Cr)	PO4	phosphate (PO_4)
CS	cesium (Cs)	SIO2	silica (SiO_2)
CU	copper (Cu)	SO4	sulfate (SO_4)
DEG C	degrees Celsius	SR	strontium (Sr)
FE	iron (Fe)	SR/YT-90	strontium-yttrium-90
FET-FLD	fixed-endpoint titration, field determined	U-NAT	uranium, natural
H2S	hydrogen sulfide (H_2S)	UG/L	micrograms per liter (μg/L)
HCO3	bicarbonate (HCO_3)		
HG	mercury (Hg)	UMHOS	micromhos per centimeter (μmho/cm)
LI	lithium (Li)		
MG	magnesium (Mg)	ZN	zinc (Zn)

Table 4.--Chemical quality of water from selected wells

Local well number	STATION NUMBER	DATE OF SAMPLE	SPECIFIC CONDUCTANCE (UMHOS)	PH (STANDARD UNITS)	TEMPERATURE (DEG C)	HYDROGEN SULFIDE TOTAL (MG/L AS H2S)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	POTASSIUM, DISSOLVED (MG/L AS K)
H-124	391606084410800	82-08-27	1050	7.6	15.5	--	--	--	--	--	--	--
H-128	391607084412500	82-08-30	1100	7.2	19.0	--	--	--	--	--	--	--
H-129	391616084404300	82-08-31	730	7.4	13.5	--	--	--	--	--	--	--
H-126	391628084405500	82-08-27	785	7.6	13.5	--	--	--	--	--	--	--
H-125	391633084411100	82-08-27	690	7.6	16.0	--	--	--	--	--	--	--
H-117	391633084411700	82-08-31	2050	7.2	17.0	--	--	--	--	--	--	--
H-119	391636084410900	82-08-27	695	7.7	13.5	.0	353	58	100	25	5.7	1.7
H-115	391636084412600	82-08-31	2100	6.8	18.5	--	--	--	--	--	--	--
H-118	391637084412100	82-08-31	1100	7.3	13.5	.0	469	108	97	55	17	57
H-110	391648084405600	82-08-25	770	7.3	12.5	.0	390	103	110	28	6.3	1.9
H-121	391654084413000	82-08-31	695	7.8	12.5	.0	361	66	100	27	15	2.4
H-111	391659084412900	82-08-25	720	7.6	14.5	.0	334	55	94	24	14	3.1
H-133	391702084400900	82-08-30	1300	7.4	14.0	--	--	--	--	--	--	--
H-122	391704084414100	82-08-27	775	7.5	12.0	.0	399	87	110	30	10	2.3
H-108	391709084412500	82-08-25	650	7.4	12.5	.0	310	56	86	23	11	3.0
H-107	391713084410800	82-08-25	720	7.6	11.5	.0	344	24	93	27	18	2.9
H-116	391713084414000	82-08-27	1050	7.5	12.5	--	--	--	--	--	--	--
H-105	391713084414400	82-08-24	790	7.4	12.5	.0	--	--	--	--	--	--
H-104	391715084414800	82-08-24	755	7.3	12.5	.0	387	59	110	27	6.8	.7
H-123	391715084420300	82-08-30	585	7.6	13.0	--	--	--	--	--	--	--
H-106	391721084403600	82-08-25	880	7.3	13.0	.0	427	83	120	31	12	4.1
H-103	391721084414600	82-08-24	650	7.6	12.5	.0	304	50	87	21	12	2.6
H-101	391725084415600	82-08-24	775	7.4	13.0	.0	390	119	110	28	13	1.7
H-102	391726084415100	82-08-24	610	7.4	15.0	.0	--	--	--	--	--	--
H-112	391742084415900	82-08-25	720	7.6	15.0	.0	--	--	--	--	--	--
H-127	391743084401800	82-08-27	765	7.6	16.5	--	--	--	--	--	--	--
H-131	391745084415100	82-08-31	610	7.6	10.0	.0	301	104	84	22	11	2.0
H-120	391746084403200	82-08-30	960	7.5	17.0	--	--	--	--	--	--	--
H-130	391750084412800	82-08-31	580	7.4	14.5	--	--	--	--	--	--	--
H-134	391800084415200	82-08-31	660	7.5	12.0	--	--	--	--	--	--	--
H-132	391803084414200	82-08-31	750	7.6	13.0	--	--	--	--	--	--	--
H-114	391806084394900	82-08-27	770	7.6	14.0	--	--	--	--	--	--	--
H-113	391810084420900	82-08-25	840	7.8	14.0	--	--	--	--	--	--	--

Table 4.--Chemical quality of water from selected wells--Continued

Local well number	STATION NUMBER	DATE OF SAMPLE	BICAR-BONATE FET-FLD (MG/L AS HCO3)	ALKA-LINITY FIELD (MG/L AS CACO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)
H-124	391606084410800	82-08-27	590	484	24	--	--	--	--	--	--	--
H-128	391607084412500	82-08-30	500	410	50	--	--	--	--	--	--	--
H-129	391616084404300	82-08-31	380	312	24	--	--	--	--	--	--	--
H-126	391628084405500	82-08-27	360	295	14	--	--	--	--	--	--	--
H-125	391633084411100	82-08-27	370	303	15	--	--	--	--	--	--	--
H-117	391633084411700	82-08-31	920	755	92	--	--	--	--	--	--	--
H-119	391636084410900	82-08-27	360	295	11	77	23	.2	9.9	329	421	--
H-115	391636084412600	82-08-31	900	738	227	--	--	--	--	--	--	--
H-118	391637084412100	82-08-31	440	361	35	85	100	<.1	26	731	655	--
H-110	391648084405600	82-08-25	350	287	28	110	23	.2	10	418	465	--
H-121	391654084413000	82-08-31	360	295	9.1	75	28	.2	9.2	--	435	--
H-111	391659084412900	82-08-25	340	279	14	60	42	.2	8.9	412	414	2.0
H-133	391702084400900	82-08-30	570	468	36	--	--	--	--	--	--	--
H-122	391704084414100	82-08-27	380	312	19	76	34	.2	10	--	461	--
H-108	391709084412500	82-08-25	310	254	20	68	18	.3	7.3	466	369	2.7
H-107	391713084410800	82-08-25	390	320	16	62	17	.2	10	--	422	--
H-116	391713084414000	82-08-27	390	320	20	--	--	--	--	--	--	--
H-105	391713084414400	82-08-24	350	287	22	--	--	--	--	--	--	--
H-104	391715084414800	82-08-24	400	328	32	83	14	.3	14	--	454	--
H-123	391715084420300	82-08-30	360	295	14	--	--	--	--	--	--	--
H-106	391721084403600	82-08-25	420	344	33	110	33	.2	10	397	528	--
H-103	391721084414600	82-08-24	310	254	12	70	21	.2	9.4	315	376	--
H-101	391725084415600	82-08-24	330	271	21	120	34	.2	11	439	480	--
H-102	391726084415100	82-08-24	290	238	18	--	--	--	--	--	--	--
H-112	391742084415900	82-08-25	380	312	15	--	--	--	--	--	--	--
H-127	391743084401800	82-08-27	340	279	14	--	--	--	--	--	--	--
H-131	391745084415100	82-08-31	240	197	9.6	71	22	.2	7.9	--	339	--
H-120	391746084403200	82-08-30	380	312	19	--	--	--	--	--	--	--
H-130	391750084412800	82-08-31	350	287	22	--	--	--	--	--	--	--
H-134	391800084415200	82-08-31	330	271	17	--	--	--	--	--	--	--
H-132	391803084414200	82-08-31	320	262	13	--	--	--	--	--	--	--
H-114	391806084394900	82-08-27	390	320	16	--	--	--	--	--	--	--
H-113	391810084420900	82-08-25	510	418	13	--	--	--	--	--	--	--

Table 4.--Chemical quality of water from selected wells--Continued

Local well number	STATION NUMBER	DATE OF SAMPLE	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS NO3)	PHOS-PHORUS, TOTAL (MG/L AS P)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
H-124	391606084410800	82-08-27	--	--	--	--	--	--	--	--	--	--
H-128	391607084412500	82-08-30	--	--	--	--	--	--	--	--	--	--
H-129	391616084404300	82-08-31	--	--	--	--	--	--	--	--	--	--
H-126	391628084405500	82-08-27	--	--	--	--	--	--	--	--	--	--
H-125	391633084411100	82-08-27	--	--	--	--	--	--	--	--	--	--
H-117	391633084411700	82-08-31	--	--	--	--	--	--	--	--	--	--
H-119	391636084410900	82-08-27	--	--	--	--	--	--	--	--	--	--
H-115	391636084412600	82-08-31	--	--	--	--	--	--	--	--	--	--
H-118	391637084412100	82-08-31	--	--	--	--	--	--	--	--	--	--
H-110	391648084405600	82-08-25	--	--	--	--	--	--	--	--	--	--
H-121	391654084413000	82-08-31	--	--	--	--	--	1	--	--	1	20
H-111	391659084412900	82-08-25	.030	.17	.20	9.7	.050	--	57	<1	<1	--
H-133	391702084400900	82-08-30	--	--	--	--	--	--	--	--	--	--
H-122	391704084414100	82-08-27	--	--	--	--	--	2	--	--	1	20
H-108	391709084412500	82-08-25	.050	.15	.20	13	.010	--	53	<1	2	--
H-107	391713084410800	82-08-25	--	--	--	--	--	1	--	--	1	20
H-116	391713084414000	82-08-27	--	--	--	--	--	--	--	--	--	--
H-105	391713084414400	82-08-24	--	--	--	--	--	--	--	--	--	--
H-104	391715084414800	82-08-24	--	--	--	--	--	1	--	--	1	20
H-123	391715084420300	82-08-30	--	--	--	--	--	--	--	--	--	--
H-106	391721084403600	82-08-25	--	--	--	--	--	--	--	--	--	--
H-103	391721084414600	82-08-24	--	--	--	--	--	--	--	--	--	--
H-101	391725084415600	82-08-24	--	--	--	--	--	--	--	--	--	--
H-102	391726084415100	82-08-24	--	--	--	--	--	--	--	--	--	--
H-112	391742084415900	82-08-25	--	--	--	--	--	--	--	--	--	--
H-127	391743084401800	82-08-27	--	--	--	--	--	--	--	--	--	--
H-131	391745084415100	82-08-31	--	--	--	--	--	2	--	--	1	30
H-120	391746084403200	82-08-30	--	--	--	--	--	--	--	--	--	--
H-130	391750084412800	82-08-31	--	--	--	--	--	--	--	--	--	--
H-134	391800084415200	82-08-31	--	--	--	--	--	--	--	--	--	--
H-132	391803084414200	82-08-31	--	--	--	--	--	--	--	--	--	--
H-114	391806084394900	82-08-27	--	--	--	--	--	--	--	--	--	--
H-113	391810084420900	82-08-25	--	--	--	--	--	--	--	--	--	--

Table 4.--Chemical quality of water from selected wells--Continued

Local well number	STATION NUMBER	DATE OF SAMPLE	COBALT, DIS-SOLVED (UG/L AS CO)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	VANA-DIUM, DIS-SOLVED (UG/L AS V)
H-124	391606084410800	82-08-27	--	--	--	--	--	--	--	--	--	--
H-128	391607084412500	82-08-30	--	--	--	--	--	--	--	--	--	--
H-129	391616084404300	82-08-31	--	--	--	--	--	--	--	--	--	--
H-126	391628084405500	82-08-27	--	--	--	--	--	--	--	--	--	--
H-125	391633084411100	82-08-27	--	--	--	--	--	--	--	--	--	--
H-117	391633084411700	82-08-31	--	--	--	--	--	--	--	--	--	--
H-119	391636084410900	82-08-27	--	--	1200	--	--	250	--	--	--	--
H-115	391636084412600	82-08-31	--	--	--	--	--	--	--	--	--	--
H-118	391637084412100	82-08-31	--	--	1100	--	--	290	--	--	--	--
H-110	391648084405600	82-08-25	--	--	2800	--	--	230	--	--	--	--
H-121	391654084413000	82-08-31	<1	--	110	1	--	390	.1	--	350	--
H-111	391659084412900	82-08-25	<3	<10	4	<10	12	13	--	10	230	<6.0
H-133	391702084400900	82-08-30	--	--	--	--	--	--	--	--	--	--
H-122	391704084414100	82-08-27	<1	--	1500	1	--	190	.2	--	370	--
H-108	391709084412500	82-08-25	<3	<10	<3	<10	11	<1	--	<10	220	<6.0
H-107	391713084410800	82-08-25	<1	--	3	2	--	43	<.1	--	180	--
H-116	391713084414000	82-08-27	--	--	--	--	--	--	--	--	--	--
H-105	391713084414400	82-08-24	--	--	--	--	--	--	--	--	--	--
H-104	391715084414800	82-08-24	<1	--	13	2	--	1	.3	--	1100	--
H-123	391715084420300	82-08-30	--	--	--	--	--	--	--	--	--	--
H-106	391721084403600	82-08-25	--	--	1100	--	--	310	--	--	--	--
H-103	391721084414600	82-08-24	--	--	41	--	--	78	--	--	--	--
H-101	391725084415600	82-08-24	--	--	27	--	--	250	--	--	--	--
H-102	391726084415100	82-08-24	--	--	--	--	--	--	--	--	--	--
H-112	391742084415900	82-08-25	--	--	--	--	--	--	--	--	--	--
H-127	391743084401800	82-08-27	--	--	--	--	--	--	--	--	--	--
H-131	391745084415100	82-08-31	<1	--	82	2	--	62	.2	--	250	--
H-120	391746084403200	82-08-30	--	--	--	--	--	--	--	--	--	--
H-130	391750084412800	82-08-31	--	--	--	--	--	--	--	--	--	--
H-134	391800084415200	82-08-31	--	--	--	--	--	--	--	--	--	--
H-132	391803084414200	82-08-31	--	--	--	--	--	--	--	--	--	--
H-114	391806084394900	82-08-27	--	--	--	--	--	--	--	--	--	--
H-113	391810084420900	82-08-25	--	--	--	--	--	--	--	--	--	--

Table 4.--Chemical quality of water from selected wells--Continued

Local well number	STATION NUMBER	DATE OF SAMPLE	ZINC, DIS-SOLVED (UG/L AS ZN)	GROSS ALPHA, DIS-SOLVED (UG/L AS U-NAT)	GROSS BETA, DIS-SOLVED (PCI/L AS CS-137)	GROSS BETA, DIS-SOLVED (PCI/L AS SR/YT-90)	URANIUM NATURAL DIS-SOLVED (UG/L AS U)	GAMMA SCAN, DIS-SOLVED (pCi/L as U-235)	CARBON, ORGANIC TOTAL (MG/L AS C)	CYANIDE TOTAL (MG/L AS CN)
H-124	391606084410800	82-08-27	--	--	--	--	.6	--	--	--
H-128	391607084412500	82-08-30	--	--	--	--	3.2	--	--	--
H-129	391616084404300	82-08-31	--	--	--	--	.9	--	--	--
H-126	391628084405500	82-08-27	--	--	--	--	1.2	--	--	--
H-125	391633084411100	82-08-27	--	--	--	--	<2.0	--	--	--
H-117	391633084411700	82-08-31	--	--	--	--	.4	--	--	--
H-119	391636084410900	82-08-27	--	--	--	--	<.5	--	--	--
H-115	391636084412600	82-08-31	--	--	--	--	<.5	--	--	--
H-118	391637084412100	82-08-31	--	--	--	--	<.4	--	--	--
H-110	391648084405600	82-08-25	--	--	--	--	<.4	--	--	--
H-121	391654084413000	82-08-31	4	41	18	17	46	0.05	--	--
H-111	391659084412900	82-08-25	69	490	140	130	430	7.3	.7	<.01
H-133	391702084400900	82-08-30	--	--	--	--	<.5	--	--	--
H-122	391704084414100	82-08-27	4	<14	<7.4	<7.0	2.2	<.04	--	--
H-108	391709084412500	82-08-25	130	280	85	81	250	4.0	.6	<.01
H-107	391713084410800	82-08-25	34	<12	21	20	.7	<.04	--	--
H-116	391713084414000	82-08-27	--	--	--	--	1.5	--	--	--
H-105	391713084414400	82-08-24	--	--	--	--	.4	--	--	--
H-104	391715084414800	82-08-24	9	<13	<6.8	<6.4	.6	<.04	--	--
H-123	391715084420300	82-08-30	--	--	--	--	<.4	--	--	--
H-106	391721084403600	82-08-25	--	--	--	--	1.5	--	--	--
H-103	391721084414600	82-08-24	--	--	--	--	1.4	--	--	--
H-101	391725084415600	82-08-24	--	--	--	--	<2.0	--	--	--
H-102	391726084415100	82-08-24	--	--	--	--	<.4	--	--	--
H-112	391742084415900	82-08-25	--	--	--	--	1.4	--	--	--
H-127	391743084401800	82-08-27	--	--	--	--	<.4	--	--	--
H-131	391745084415100	82-08-31	15	<10	<5.4	<5.1	1.6	<.04	--	--
H-120	391746084403200	82-08-30	--	--	--	--	1.5	--	--	--
H-130	391750084412800	82-08-31	--	--	--	--	<.8	--	--	--
H-134	391800084415200	82-08-31	--	--	--	--	5.1	--	--	--
H-132	391803084414200	82-08-31	--	--	--	--	8.2	--	--	--
H-114	391806084394900	82-08-27	--	--	--	--	1.0	--	--	--
H-113	391810084420900	82-08-25	--	--	--	--	<.4	--	--	--