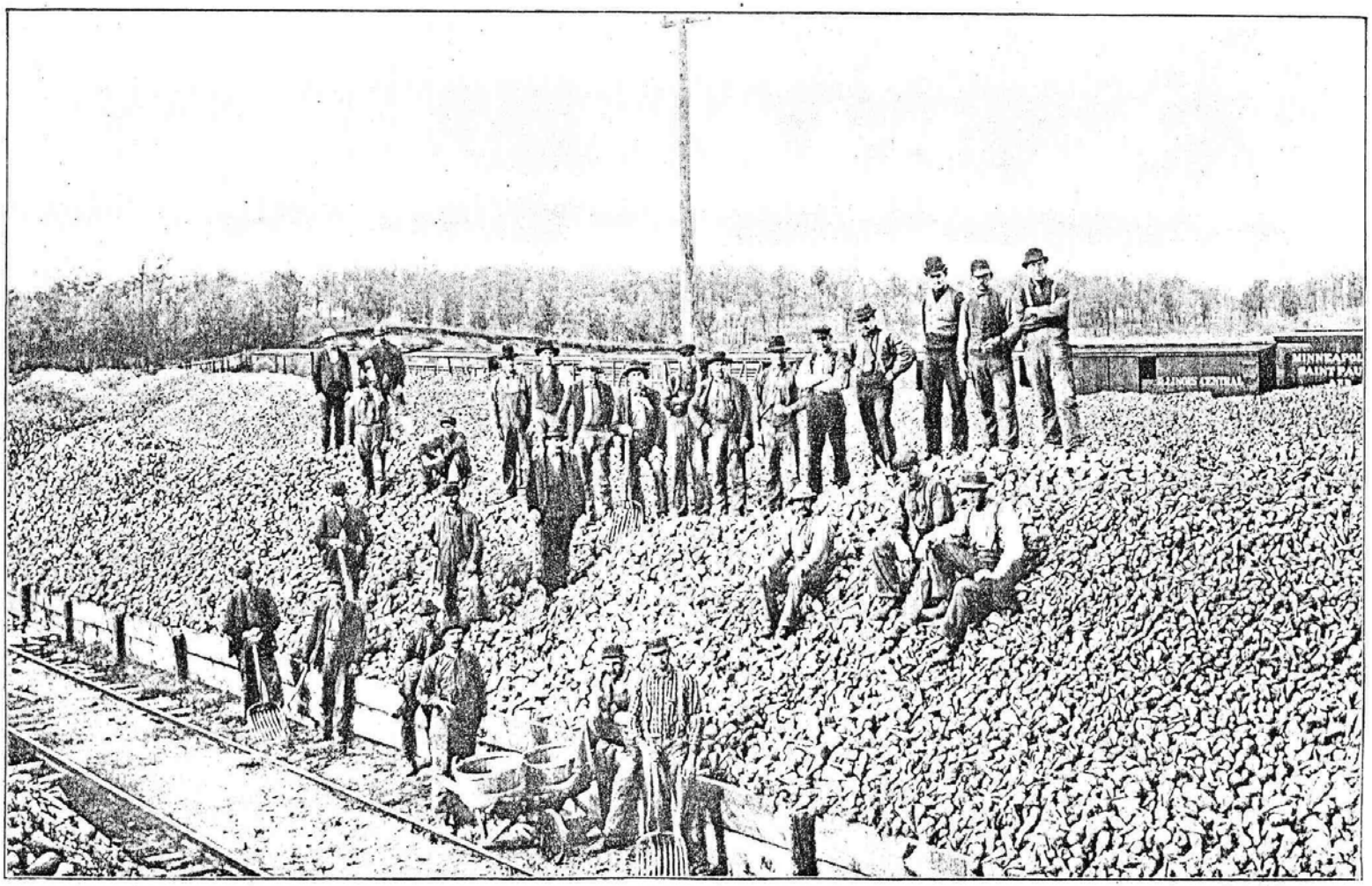
ENSR | AECOM

Coal Tar Migration in a Multiaquifer Well at the Reilly Site – The Story of Well W23

Introduction and Background

- Allegation of waste injection via well(s) from old correspondence, lawsuit, and technical reports.
- How did W23 actually become contaminated?
- Reilly Site history.
- 1978 W23 Investigation.
- Multi-aquifer well hydraulics.
- 1980-82 W23 cleanout.
- Summary and conclusions.

PLATE V.

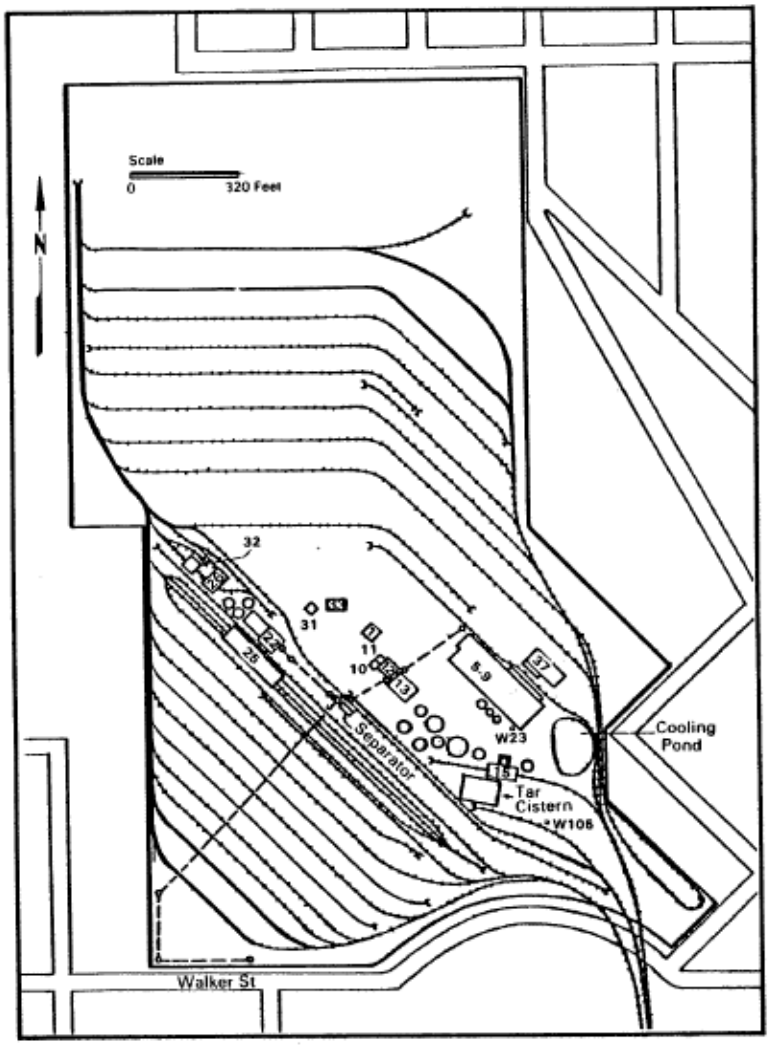


PILE OF BEETS BY RAILROAD TRACK TOGETHER WITH FORCE EMPLOYED HANDLING BEETS, MINNESOTA SUGAR COMPANY, ST. LOUIS PARK, MINN.

Progress of Beet-sugar Industry, 1902.

Plant Water Supply

- Sugar beet plant used ~1 MGD.
- 1898 Hinckley well (~1000 feet deep).
- 8-12 shallow wells to fill cistern.
- Reilly drilled “backup” water supply well (W23) at refinery building.



RT&CC PLANT SITE
BUILDING IDENTIFICATION

Description	Building No.
Office and Laboratory	1
Refinery	5-9
Blacksmith Shop	10
Locker and Change Room	11
Garage	12
By-Products Building	13
Tar Shed	15
Tank House	21
Boiler House	22
Treating Building	25
Adzing and Boring Mill	26
Garage	31
Wash Room	33
Tool House	37

EXPLANATION
- Narrow Gauge RR Track
- Standard Gauge RR Track
- Standard/Narrow Gauge RR Track
- Sewer Lines

Figure A3-1 Plant Site Drawing From 1944 Blueprint

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Location W-23 Town St. Louis Park

Date Started Dec. 10, 1917 Machine No. 3 State Minn.

Date Completed May 13, 1918 Owner Republic Creosoting Co.

File No. Total Depth of Well 909

MP = 894.49

DIAMETER OF HOLE	20	16	12	10	8 7	6	4½	TOTAL
Top of Pipe below Surface			2	80	227			
Bottom of Pipe below Surface			65	257	373			
No. of Ft. of Pipe in the Hole			63	177	145			
No. of Ft. of Hole Drilled			258	115	536			909

TEST	1	2	3
Depth of the Hole	909	909	909
Depth to Water at Rest	46	46	47
Depth to Water Pumping	63	80	27
Depth of Pump Pipe	63	87	47
Size of Cylinder	8	8	8
Length of Stroke	28	34½	34
Strokes per Minute	25	43	49
Gallons per Minute	150	300	330
Will well supply more			yes
Was Strainer in Hole			
Hours putting in Pump			
Hours Pumping			
Hours taking out Pump			
Hours Consumed			

STRAINER			
Make			
Diameter			
Total Length			
Number			
No. of Ft. Exposed			
Was Str. Sedged			
Did Sand come thru Str.			
Was Str. coarse enough			
Style of Fittings			

FORMATION	Thickness	Depth	Formation I.D. *
Limestone & Gravel	60	60	Qd
Limestone	35	95	Opl
Sand Rock	100	195	
Red Shale	15	210	
Sand Rock	4	214	
Red Shale	6	220	Osp
Sand Rock	6	226	
Red Shale	3	229	
Sand Rock Shaley	29	258	
Hard Rock	114	372	Opc
Sand Rock	85	457	€j
Shaley Sand Rock	50	507	€sl
Shale	138	645	€f
Shale Sand Rock	67	712	€lg
Shale	69	781	€e
Shaley Sand Rock	54	835	€e
Sand Rock	72	907	€ m s.
Shale & Sand Rock	2	909	

WL = 33' 11/78

NOTE:

The third test was made after the 10" pipe was cut off 80 feet - 6" below the surface.

* Added by ERT.

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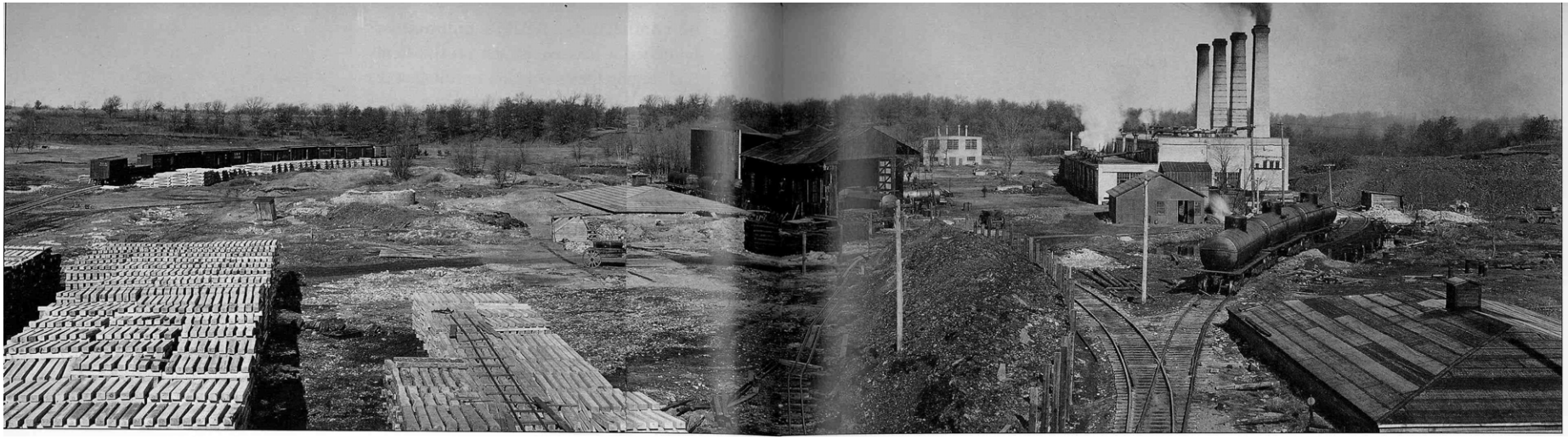
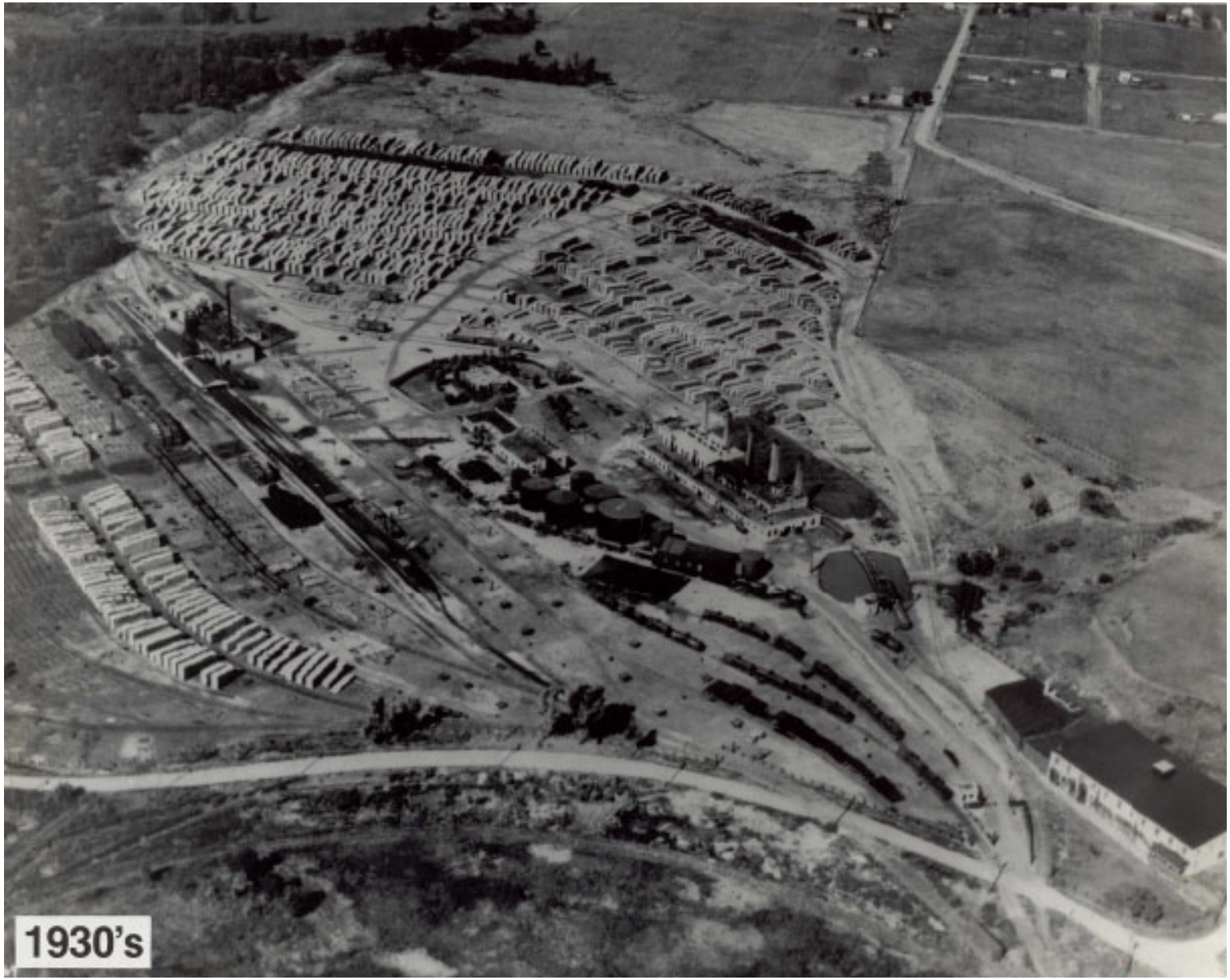
FIGURE 6-37 6-62

Reilly Site 1920s




1930's

1932 GW Problems

- SLP drilled its first municipal supply well
- Taste & odor problems after two weeks of pumping
- 10-inch casing added to W23 (to “seal” the Platteville)
- Memo from driller “waste creosote being drained down into the ground via several old wells”

PHONE: NESTOR 1554

McCarthy Well Company

EXPERIENCED AND DEPENDABLE SINCE 1860

NORTHWEST'S LARGEST WATER DEVELOPERS

Minneapolis and St. Paul

ADDRESS REPLY TO
670 EUSTIS ST.
ST. PAUL, MINN.

ST. LOUIS PARK MINNESOTA.
REPAIR JOB 1933.
well 1 block west of C. 2nd St P Ry well

Dec. 13, 1934.

This well always had a creoste taste to the water and we found two old abandoned wells at the Repbblic Creosoting Co. plant about one half mile away which were being used to drain creosote down to the ground, and it was thought that this creosote was going down in these old wells and passing over thru the crevices in the Shakopee Dolomite and being pumpgd up into

where this was coming from. They talked of possibly recasing this hole and drilling down to the Hinckley Sandrock, so as to get away from the creosote, and also perforating the 16" pipe up in the glacial drift, sand and gravel, and plugging off the xxkxx rock below and taking water from the drift, with the possibility of getting away from the creosote, and another plan was to case off from the top of the Jordan sandrock to the surface, thereby shutting off the creosote from entering the well thru the Shakopee Dolomite crevices, so in Feb. 1933 we were employed by the village on a per hour basis to furnish 12" pipe and packer to shut off everything above the top of the Jordan Sandrock.

So we installed the packer and on top of the packer we had an 8 x 10 bushing, because the packer was threaded for standard 10" pipe, and on top of this bushing we had 197 feet of 8" pipe, and on top of this we had a swedge nipple out to 12" pipe, and on top of this we had 185'6" of 12" pipe, which brought the pipe up to the surface. We had to have 12" pipe in here because the bowls of the pump were of such size that it had to be a 12" hole where the pump was set. This is a Layne turbine.
Before setting the packer it was ~~xxxxx~~ 69'9" to water. After setting the packer it was 76'6" to water, and on the following Monday morning, after the packer was set it was 78'5" to water, and when we set the packer it only settled 9" and came to a stop.

It was 68'9" to water before any packer or pipe was installed, so after packer was set we installed the turbine pump and the pump operated at 250 GPM 24 hours per day, and this is all the well would supply drawing the water down 125' below surface. This was pumping water out of the Jordan sandrock only.

The village then kept pumping this well off and on for a period of over a month and they took various tests of the water, but the creosote did not seem to clear up so ordered us to remove the pump and pipe and packer again, because we agreed to take this material all back again without charge to them. So when we went in to remove the packer we could not get the packer loose, and we had to jack on the pipe to start it loose. It jumped loose and the 8" pipe stripped out of the 8 x 10 cast bushing which was on top of the packer, and all of the pipe was

9600182

two old abandoned wells…
used to drain creosote down to the ground

'PHOOEY!' SAYS WATER EXPERT

Sunday Trib - 9/3/33

"Phooey!" That's just what Joe S. Williams, chief of the water department and assistant commissioner of the St. Louis Park candidly thinks of the sparkling [illegible] up from the new municipal well. It's [illegible]

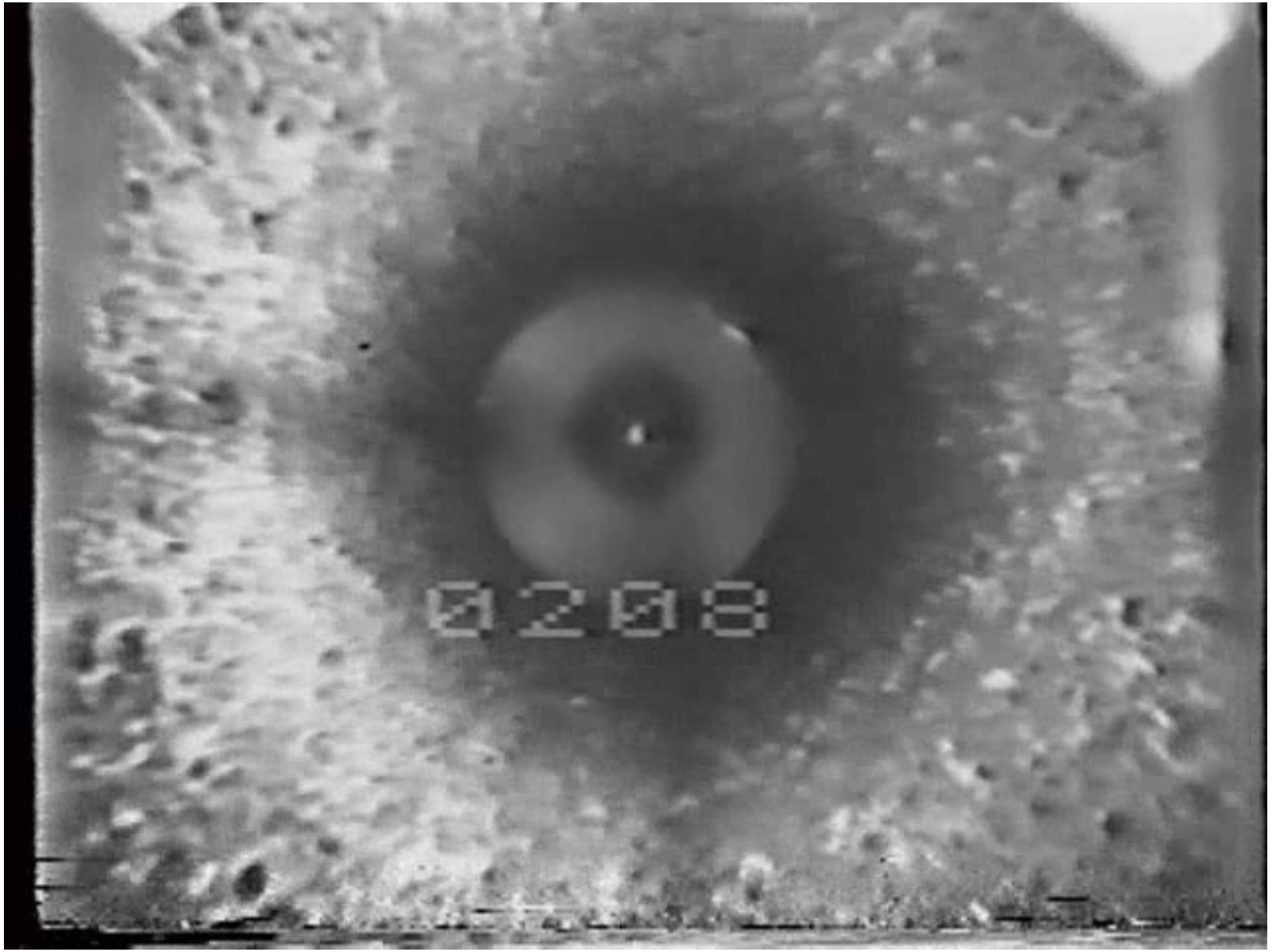
—By Tribune Staff Photographer.

1950's "Tar Balls"

- New pump in 1955 – automatic cycling.
- In 1956 pump seized; driller pulled pump.
- "Very effective solvent" supplied by Reilly (likely benzene)
- Re-occurrence within several months.
- Gravel was poured down the well to "hold down the tar"
- Well depth in 1966 was 610 feet.

Site Closure

- 1972 plant closed and sold to the City of St. Louis Park
- Hold harmless agreement
- Site demolished, graded
- Storm sewers, commercial, & residential redevelopment
- Lots of studies, esp. groundwater studies throughout the 1970's.
- Investigated Reilly's plant supply well: well W23.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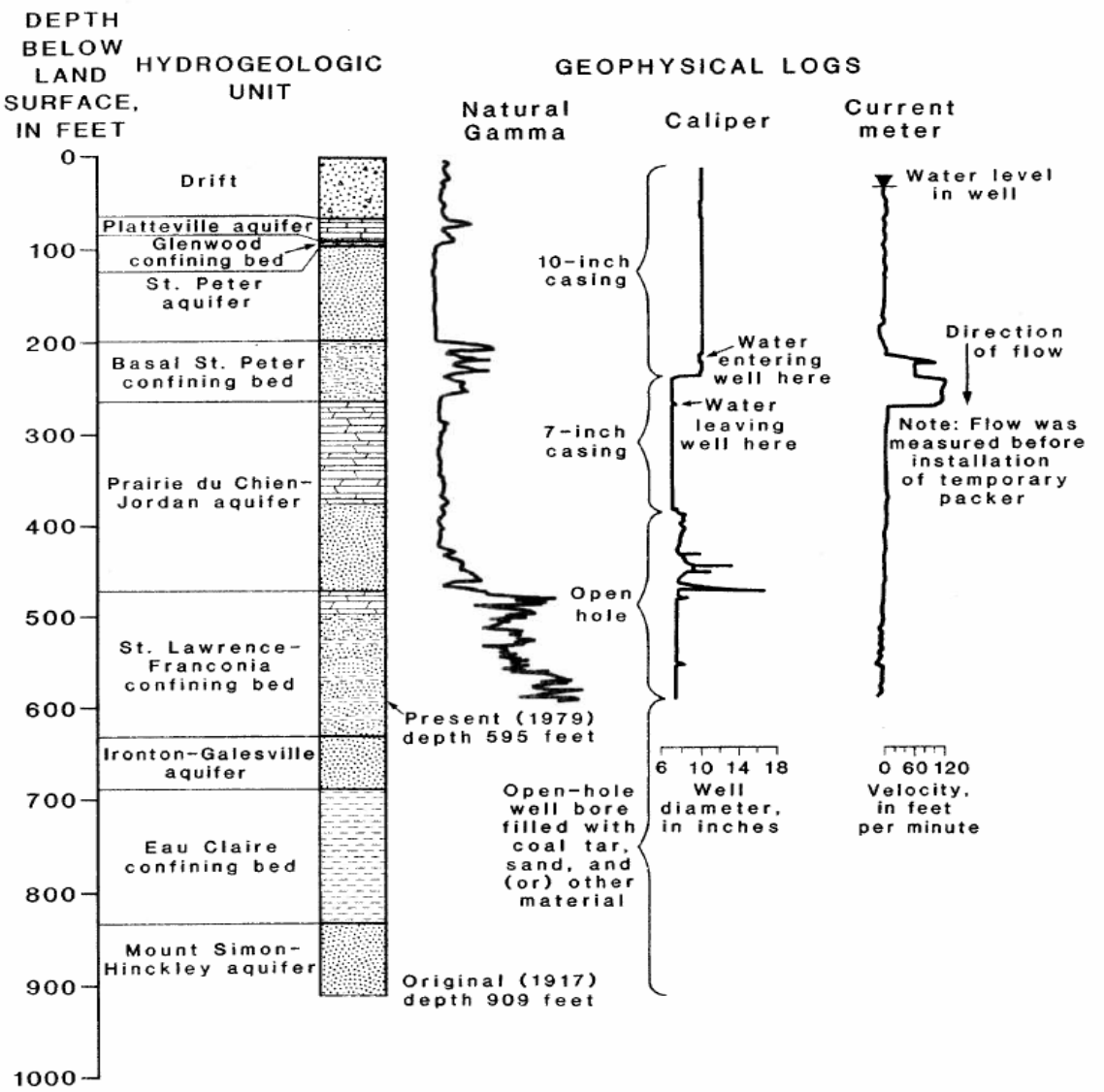
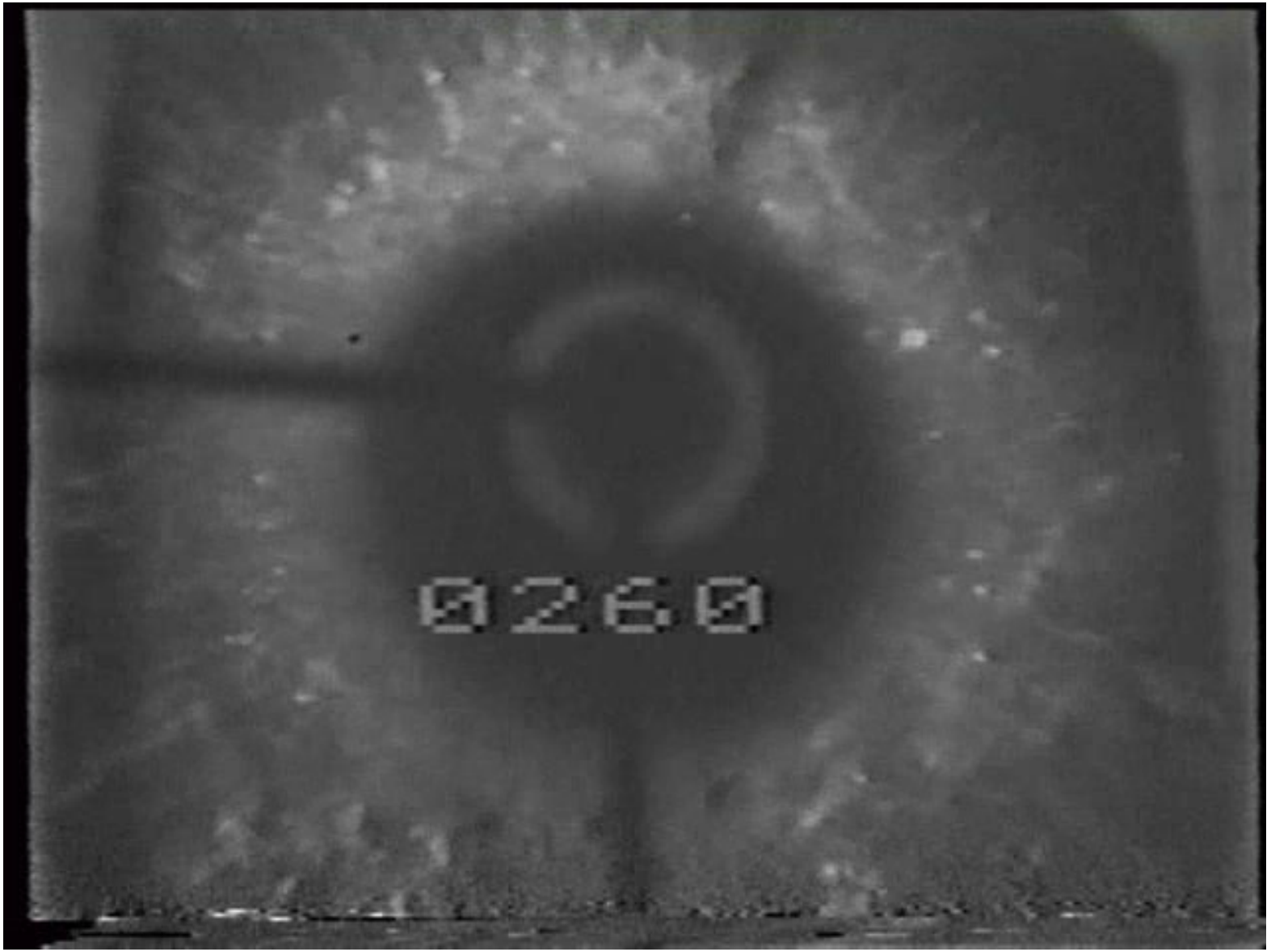


Figure 13. Hydrogeologic and geophysical logs of well W23 ("Hinckley" well on the site)

Source: USGS WSP 2211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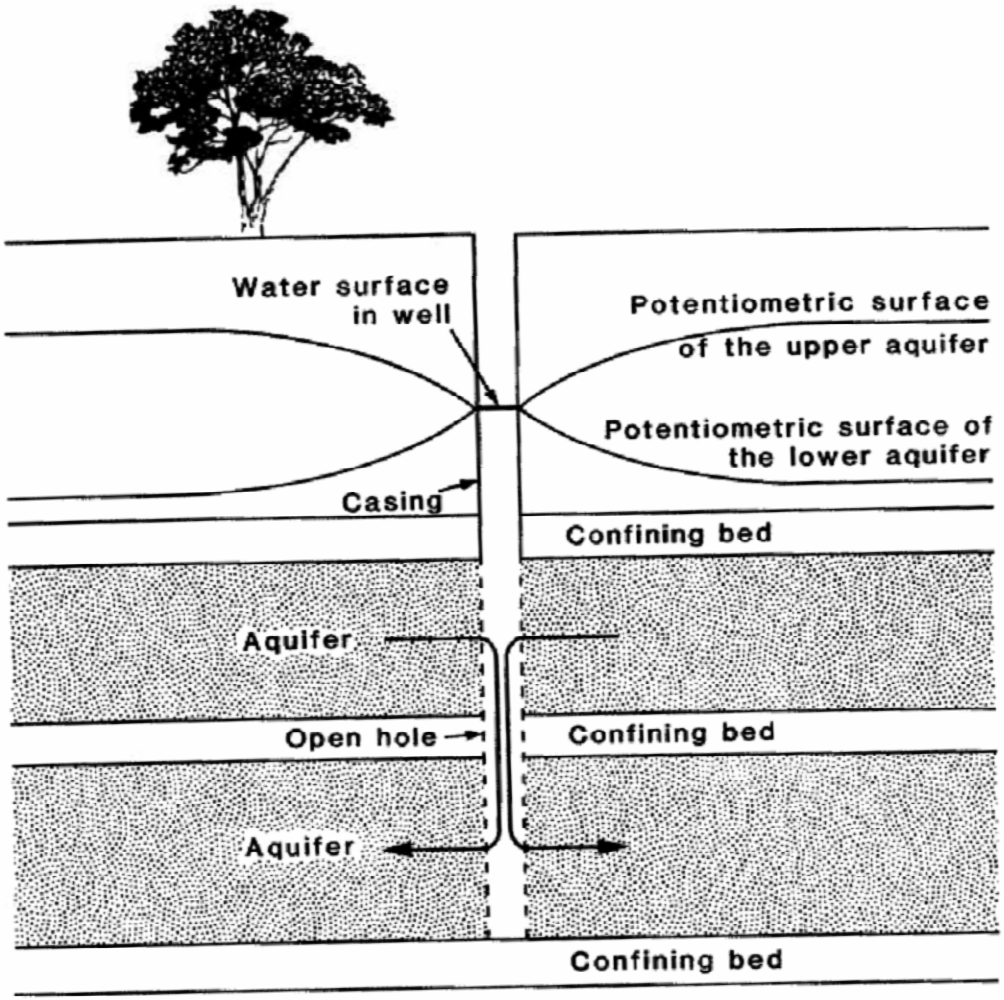

Figure 14. Schematic hydrologic section showing a well connecting two confined aquifers, flow through the well bore, and the effects of this flow on the potentiometric surfaces of the two aquifers

Source: USGS WSP 2211

Well W23 Cleanout

- Used cable tool methods to remove the plug of material for W23.
- Found a gravel layer between 653 and 665 feet deep.
- 50+ feet of tarry material had accumulated over the gravel after circa 1956.
- Plug removed but debris & sloughing prevented driller form reaching 909 feet.
- Removed the 10 inch casing that had been installed in 1932.


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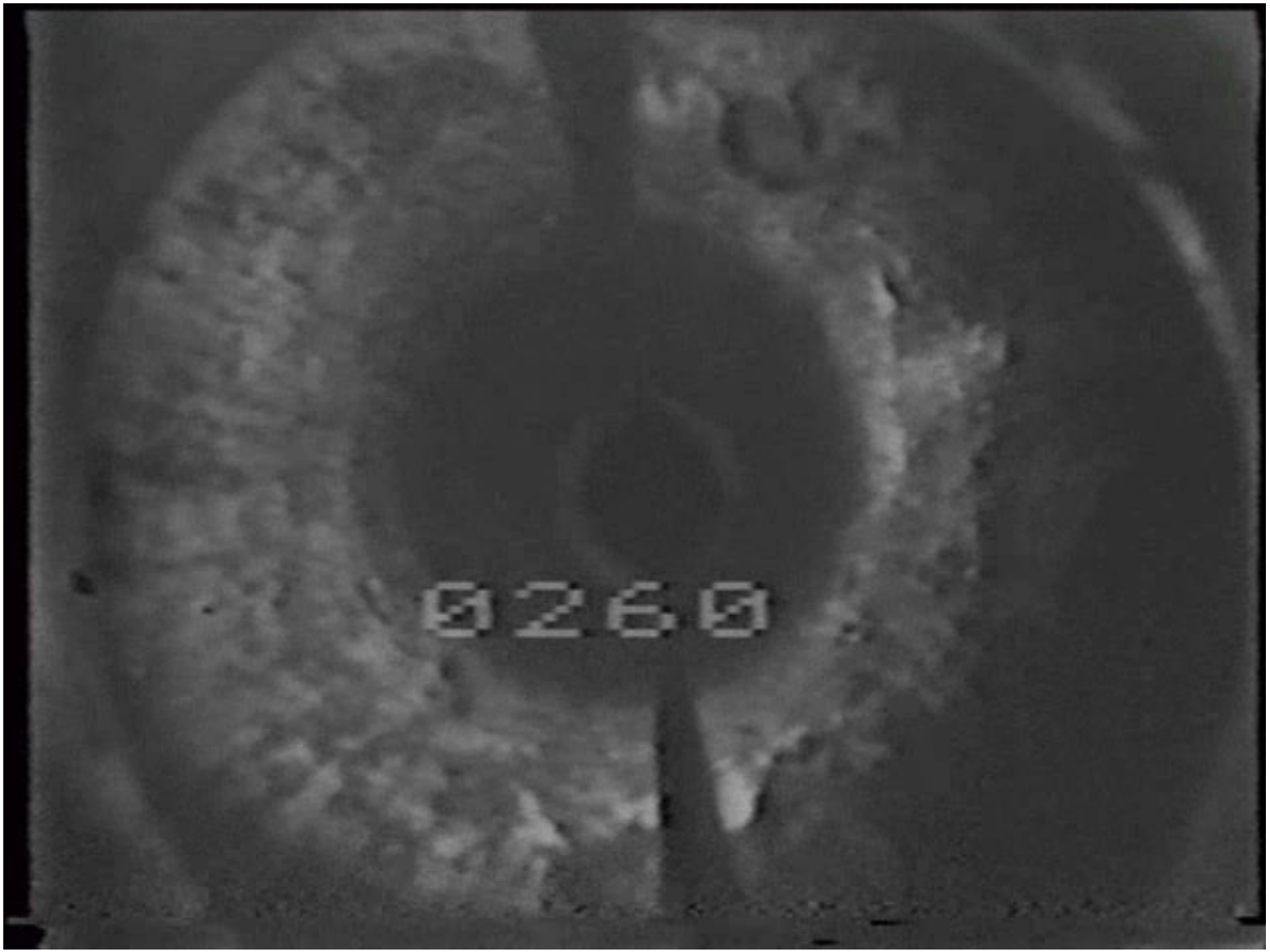
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Conclusions

- Well 23 was not used as a disposal or injection well. Reilly did not pump or dump wastes down their water supply well.
- Creosote DNAPL migrated into the well via the Platteville prior to 1933 and along ungrouted casings.
- DNAPL and sediment formed a plug in the well due to bridging.
- Multi-aquifer flow aided contaminant migration into the Prairie du Chien – Jordan.