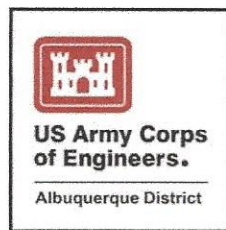


# Well 340 Assessment Report

22 October 2015

Prepared for:

United States Army Corps of Engineers  
Albuquerque, New Mexico District



Prepared by:

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Contract Number: W912PP-15-P-0050

## **Ft. Wingate Well 340 Assessment Summary**

Note: All depths are reported as feet below ground level

1. Well ID = Well 340 [35° 29'41.3" N and 108° 34'30.6" W]
2. Static Water level = Flowing at ~ 3 gpm
3. Conductivity ~ 1550 micromhos
4. Well TD ~ 956'
5. Total depth of boring ~ 980' from USGS; depth inferred from video log ~ 972'
6. Casing Diameters
  - 12¾" ground level to 622'
  - 10" from 622' to 690' = 68'
  - 8⅝" from 690' to 956' = 266'
7. All casing and slotted pipe is steel
8. Perforated intervals from 646' top most to 940' bottom most
9. Screen type is slotted in the 8⅝" (8 slot/round & 3 round/ft.), and perforated with 4 shots/ft
10. Condition of the 12¾" casing is fair, 10" is fair and 8⅝" is poor
11. Well Video DVD with 2 DVD copies submitted with this report
12. Well Video Log Summary Attachment 1
13. Well photos Attachment 2

## **Ft. Wingate Well 340 Assessment Narrative**

On September 29, 2015 crews were mobilized from Rodger's and Co. in Albuquerque, New Mexico to the Ft. Wingate Well 340. The site is 130 miles from Albuquerque and crews arrived at the Command Trailer by 10:30 hours. After check in and safety review, the crews were led to well site 340 and a video of the well was recorded. Afterward the crews were led to Well 2. The well top was cut off and a sounder lowered into the well. The water level was 2.5' below the concrete pad. The sounder was lowered to greater than 50'. It was determined that a video was needed, therefore authority to exercise option Item 0003 was obtained and a video captured and recorded. Well 2 Assessment Report, Item 0004, will be delivered upon authorization to exercise. Please note that all references to depths are in

feet below the measuring point, in this case the top of the casing being 2' above the concrete floor. Attached to this report:

- 1.) Summary listing of photos used for the assessment
- 2.) Captured images from the video identifying significant characteristics of the exiting well.

The video identified well diameters and lengths of each casing string. These existing conditions were then compared to the reported data in the well completion report from the USGS Open File report dated July 1969, "Drilling and testing of well 340, Ft Wingate Army Depot". Differences were noted as follows:

- The USGS report shows the total length of the 12 $\frac{3}{4}$ " blank casing as 615', however Photo 020 from the video records a length of 622'. This difference is 7'.
- The USGS report shows the total length of the 10" blank casing 615' to 710' for 95' total, however Photo 024 from the video records a length from 622' to 690' for 68' total. This difference is 27'.
- The USGS report shows a total length of 8 $\frac{5}{8}$ " slotted pipe from 710' to 980' for 270' total, however Photos 024 and 034 from the video records a length from 690' to 956' for 266' total. This difference is 4'.

The perforations and slotted areas of the 8 $\frac{5}{8}$ " pipe are difficult if not impossible to view in the video. The insides of the pipe have loose scale and silty deposits on them. Holes can be seen on the video from 645.6' to 653.1' which correlates to the reported perforations in the 10" casing from 634' to 642', however there is a difference from the reported depths to the video of approximately 12'. Additional perforations can be seen from 738.5' to 742.5' and correlate to the reported perforations in the 8 $\frac{5}{8}$ " slotted pipe from 726' to 730'.

## Findings

The total well depth can be inferred to be 960' deep. This comes from the reported length of the 8 $\frac{5}{8}$ " slotted pipe used for the screened interval being 270' long. The top of this string of screen was identified in the video at 690' (Photo 024), therefore the bottom of the screen, and the well in total is 690' + 270' = 960'. The camera captured the bottom of the screen at 956' (Photo 034). This is likely the true bottom of the well as the screen was reportedly set on caved borehole materials, see page 9 paragraph 4 from the report. The established lengths of various diameters requiring placement of plugging materials are as follows:

- 12 $\frac{3}{4}$ " from surface to 622' total length = 622'
- 10" from 622' to 645' total length = 23' by using the perforated interval of 645.6' to 653.1. The volume calculation will assume a borehole diameter of 11" from the upper most reported perforation found in the video at 645'.

- 8 $\frac{5}{8}$ " slotted pipe length will assume an 11" borehole volume. This is because the screen was set in the 11" open hole. No gravel pack was used. Therefore the length for volume is from the 645' top most perforations to the bottom of the well at 960' = 315'

The volumes of plugging materials needed for abandonment are as follows:

12 $\frac{3}{4}$ " casing volume is calculated as  $0.87 \text{ ft}^3/\text{ft} \times 622' = 542 \text{ ft}^3$

10" casing volume is calculated as  $0.502 \text{ ft}^3/\text{ft} \times 23' = 12 \text{ ft}^3$

Volume of 11" theoretical bore hole is calculated as  $0.608 \text{ ft}^3/\text{ft} \times 315' = 192 \text{ ft}^3$

A rough order of magnitude for actual abandonment activities is approximately \$10k to \$25k. The cost is highly dependent upon specific conditions required in the approved plugging and abandonment plan from the Office of the New Mexico State Engineer.

### **Recommendation**

Develop abandonment and plugging operation plan that includes a total volume of plugging material necessary of approximately 750 ft<sup>3</sup>. The well screen section will need to be cut with a mills knife tool, pulling 2' to 3' cuts from 956' to 710' to allow openings for plugging material access to annular space. Plugging material may need special specification for use with Well 340 water chemistry to ensure a solid set.



## Ft. Wingate Well 340 Video Log

Photo #	DVD	Counter Depth	Comments
	Time Stamp Disk 1	feet below top of casing	
001	01:47	31.2	Joint 12 3/4" OD casing
002	01:52	33.5	Joint 12 3/4" OD casing
003	01:56	36.2	Joint 12 3/4" OD casing
004	02:12	46.3	Joint 12 3/4" OD casing
005	02:49	70.5	Debris
006	05:14	166.2	Joint 12 3/4" OD casing
007	05:23	172.3	Typical scaling conditions inside 12 3/4" OD casing
008	06:15	206.1	Joint 12 3/4" OD casing
009	06:53	230.5	Typical scaling conditions inside 12 3/4" OD casing
010	07:17	246.3	Joint 12 3/4" OD casing
011	08:18	285.9	Joint 12 3/4" OD casing - less appearant scaling
012	09:20	325.9	Joint 12 3/4" OD casing
013	09:51	344.5	Typical view of less scaling
014	10:26	366.9	Poor view of joint in 12 3/4" OD casing
015	11:28	405.7	As above
016	13:14	444.3	Joint 12 3/4" OD casing
017	14:49	486.7	Joint 12 3/4" OD casing side view
018	16:15	525.4	Joint 12 3/4" OD casing
019	17:43	565.5	Joint 12 3/4" OD casing
020	19:50	621.2	Bottom of the 12 3/4" OD casing - ID is approximately 12" ∴ volume in casing to a depth of 622 is roughly 487.6 ft <sup>3</sup>
021	19:51	621.6	Transition to 10" casing
022	19:53	622.2	Top of the 10" casing
023	22:44	662.6	Joint in 10" casing
024	23:55	689.9	Bottom of 10" with swedge and top of 8 5/8" slotted pipe - Bottom of the 10" is 690' and top is 622' ∴ volume (0.5454 ft <sup>3</sup> /ft) of 68' of 10" casing = 37.1 ft <sup>3</sup>
025	24:31	704.8	Joint in 8 5/8" slotted pipe
026	27:27	769.5	Joint in 8 5/8" slotted pipe
027	28:23	790.1	Joint in 8 5/8" slotted pipe
028	29:19	811.0	Joint in 8 5/8" slotted pipe
029	30:23	834.7	Joint in 8 5/8" slotted pipe
030	31:13	852.5	Joint in 8 5/8" slotted pipe
031		872.5	Joint in 8 5/8" slotted pipe
	Disk 2		
032	07:36	892.7	Joint in 8 5/8" slotted pipe
033	06:19	913.9	Joint in 8 5/8" slotted pipe
	Disk 3		
034	00:11	956.3	Bottom of well - flat, solid and silted

Photo 001  
Joint 12 3/4" OD casing

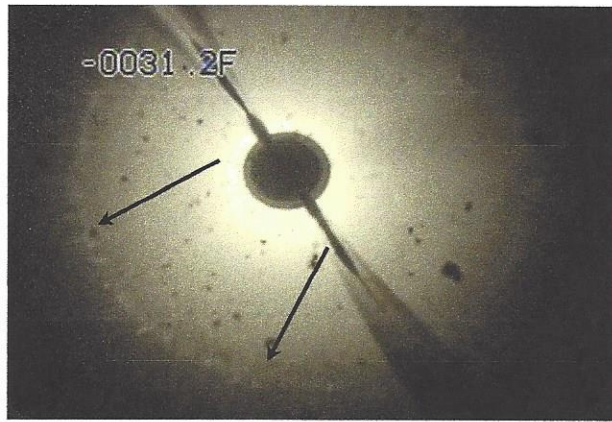


Photo 002  
Joint 12 3/4" OD casing



Photo 003  
Joint 12 3/4" OD casing

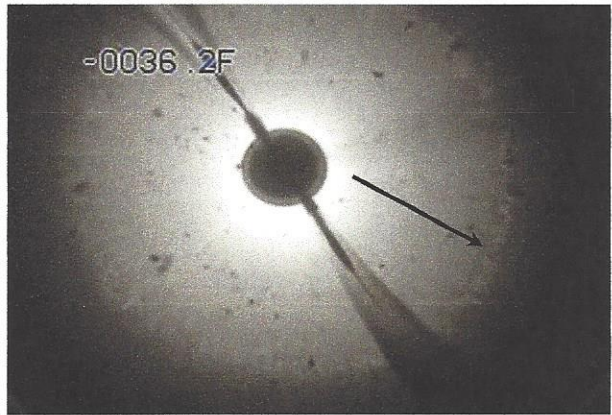


Photo 004  
Joint 12 3/4" OD casing





Photo 005  
Debris

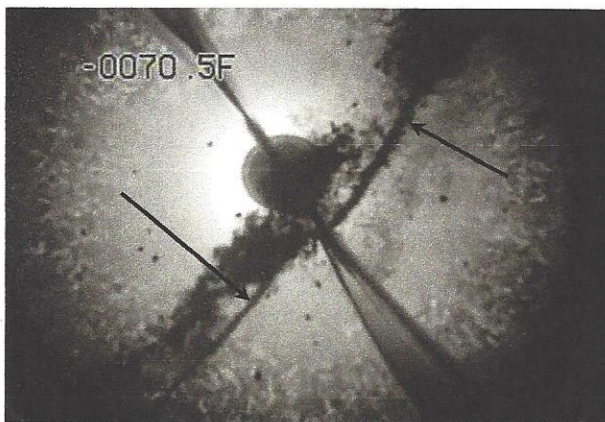


Photo 006  
Joint 12 3/4" OD casing

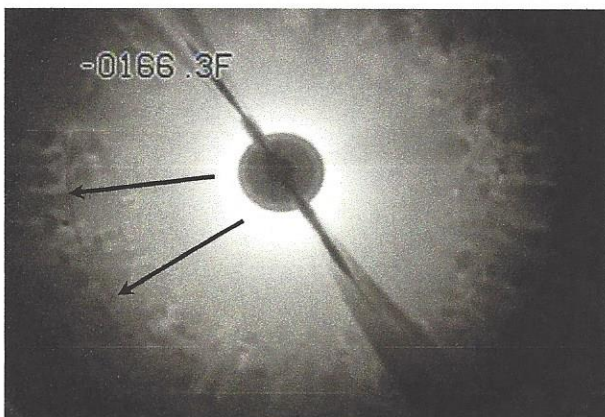


Photo 007

Typical scaling in upper 250' of casing

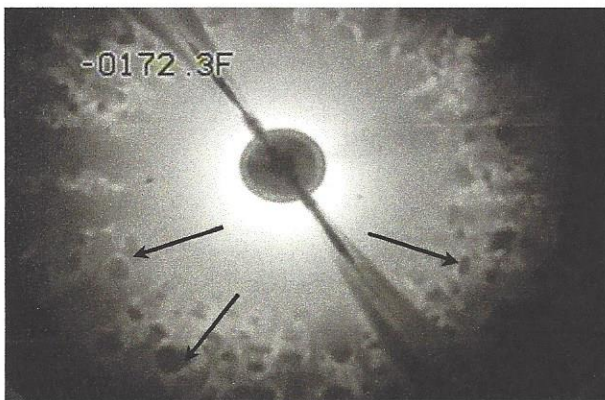


Photo 008  
Joint 12 3/4" OD casing

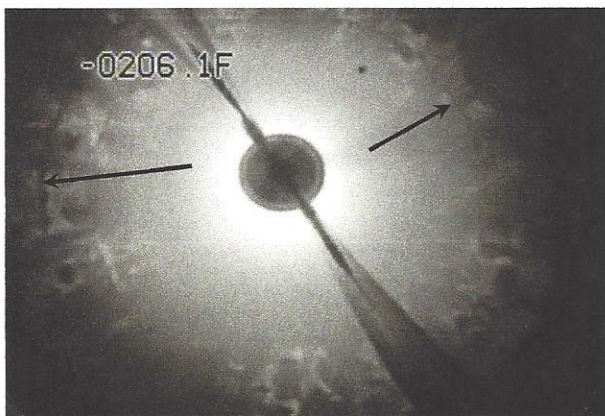


Photo 009

Typical scaling in upper 250 of casing

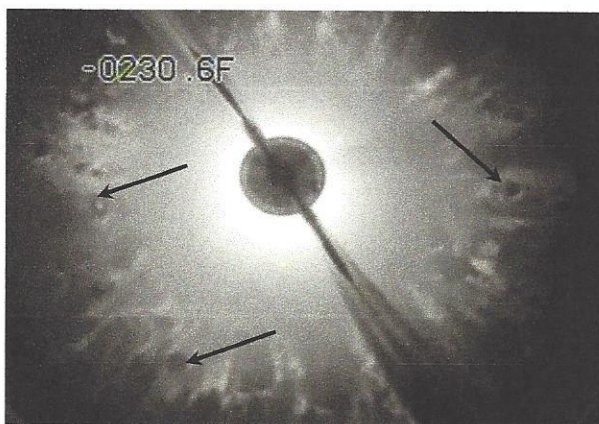


Photo 010

Joint 12 3/4" OD casing

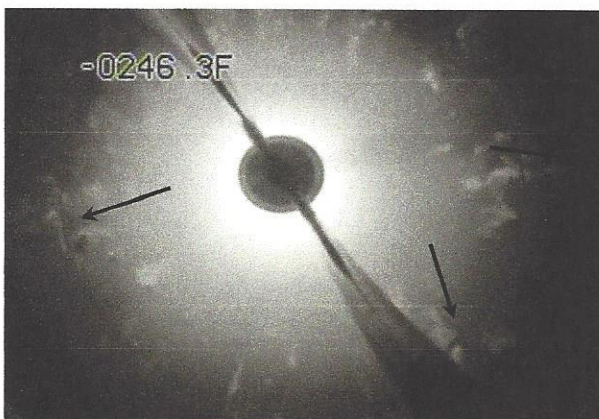


Photo 011

Joint 12 3/4" OD casing

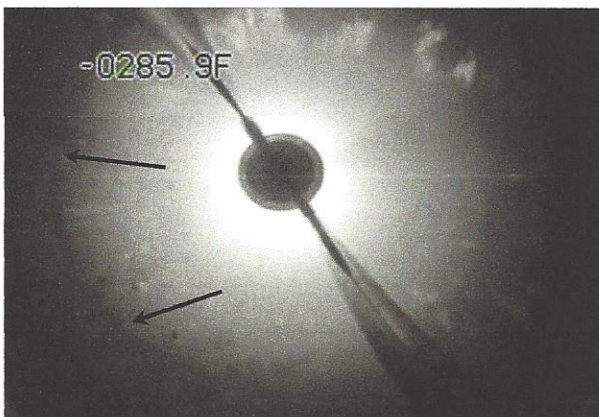


Photo 012

Joint 12 3/4" OD casing

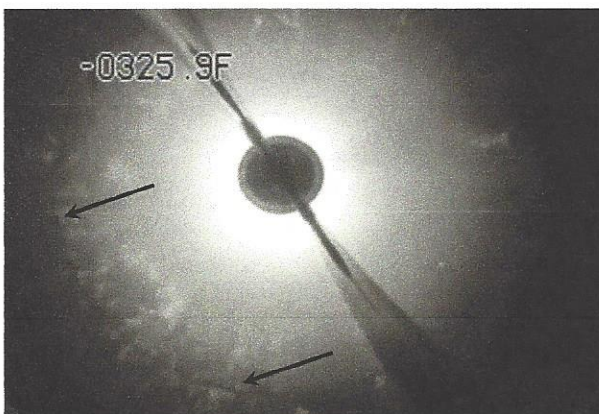




Photo 013  
Typical scaling in upper casing

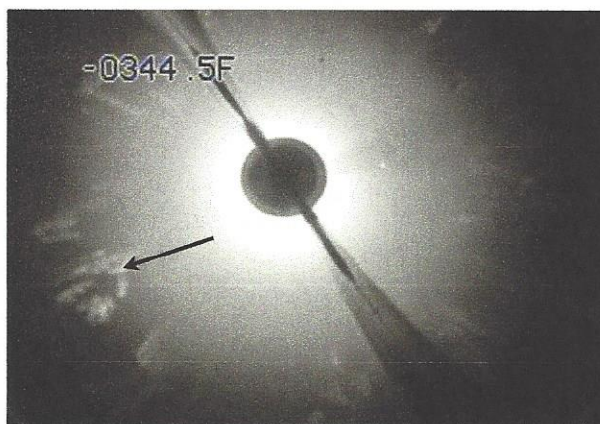


Photo 014  
Joint 12 3/4" OD casing poor view

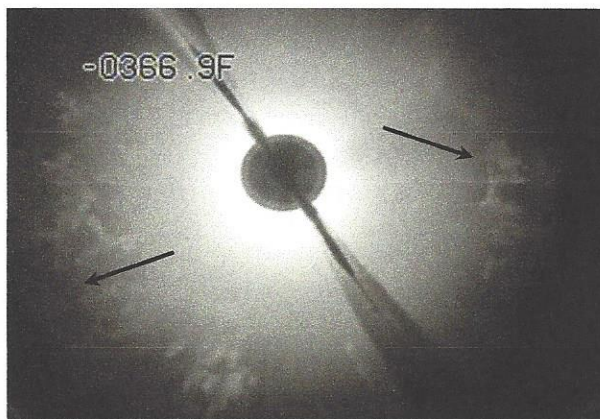


Photo 015  
Joint 12 3/4" OD casing

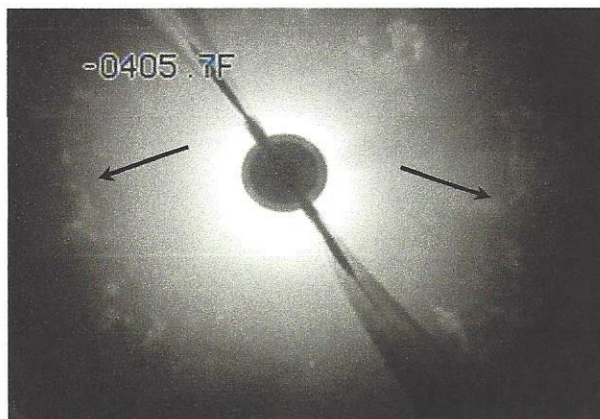


Photo 016  
Joint 12 3/4" OD casing

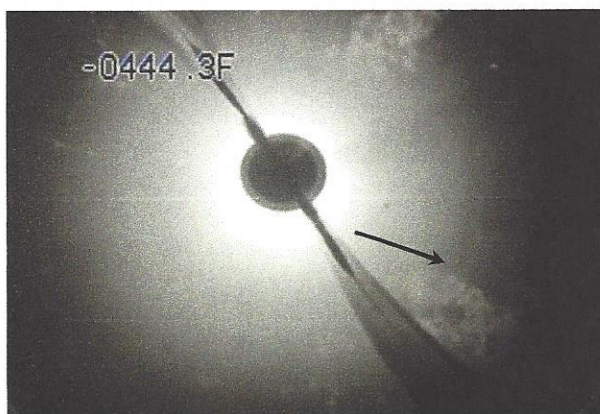


Photo 017  
Joint 12 3/4" OD casing - side view

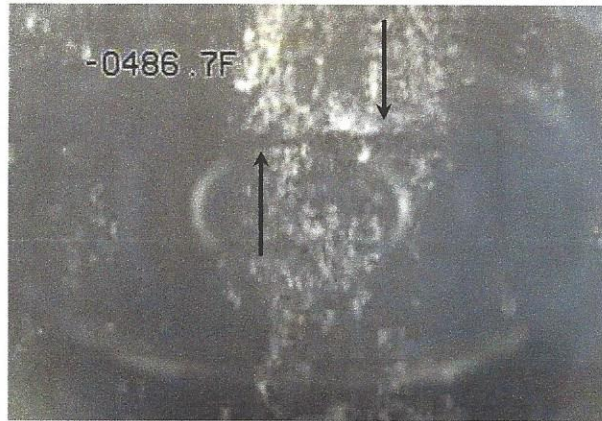


Photo 018  
Joint 12 3/4" OD casing

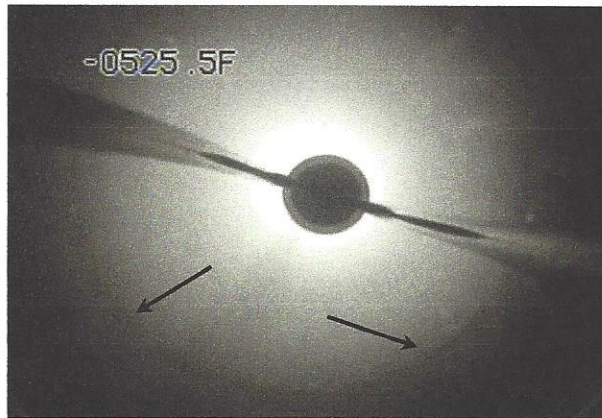


Photo 019  
Joint 12 3/4" OD casing

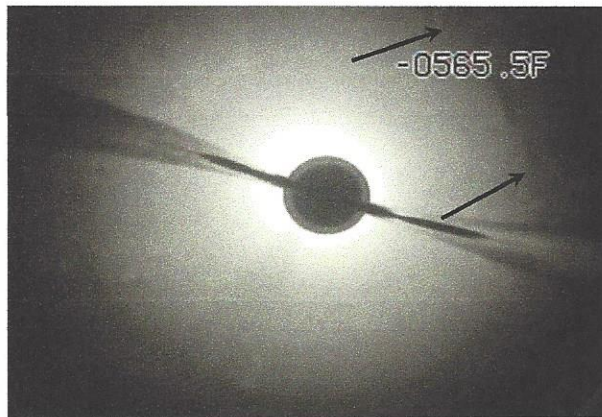


Photo 020  
Bottom of the 12 3/4" casing ∴ volume of casing from surface to 622' = 487.6 ft³





Photo 021  
Transition to 10" casing

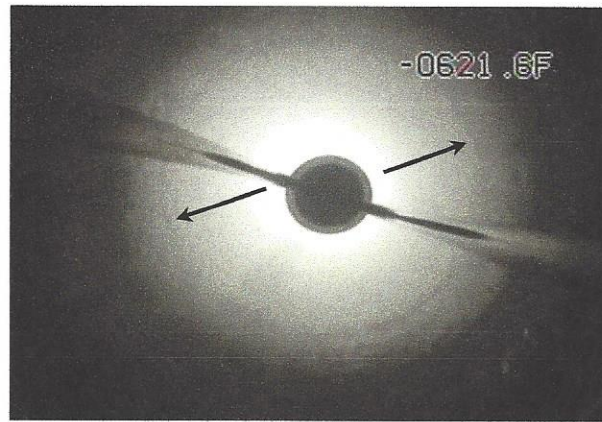


Photo 022  
Inside the 10" casing

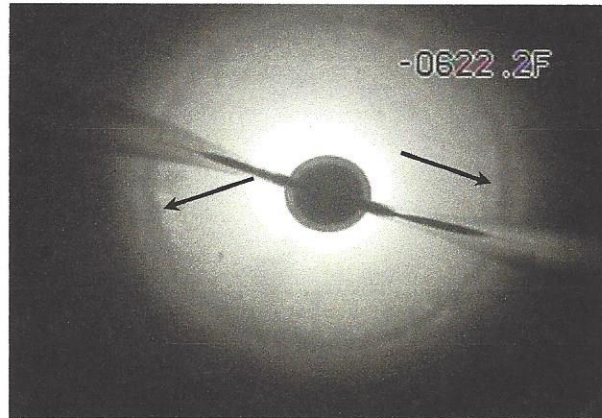


Photo 023  
Joint in 10' casing



Photo 024  
Bottom of 10" with swedge and top of 8 5/8" slotted pipe - Bottom of the 10" is 690' and top is 622' volume (0.5454 ft<sup>3</sup>/ft) of 68' of casing = 37.1 ft<sup>3</sup>

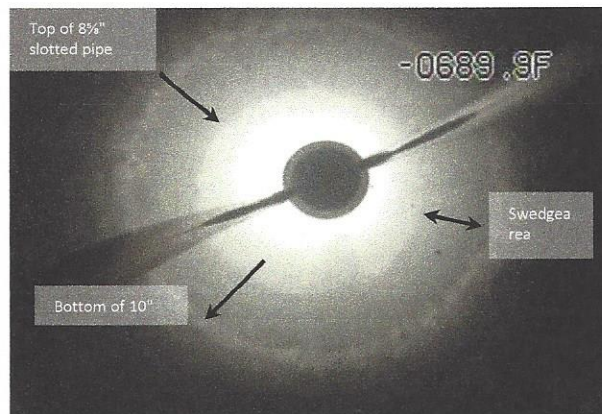




Photo 025  
Joint in 8<sup>5</sup>/<sub>8</sub>" slotted pipe

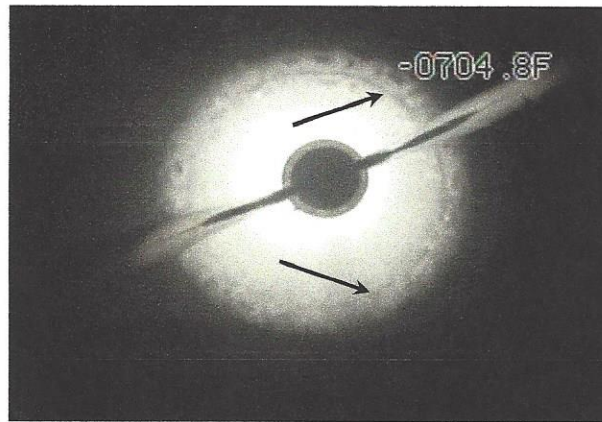


Photo 026  
Joint in 8<sup>5</sup>/<sub>8</sub>" slotted pipe

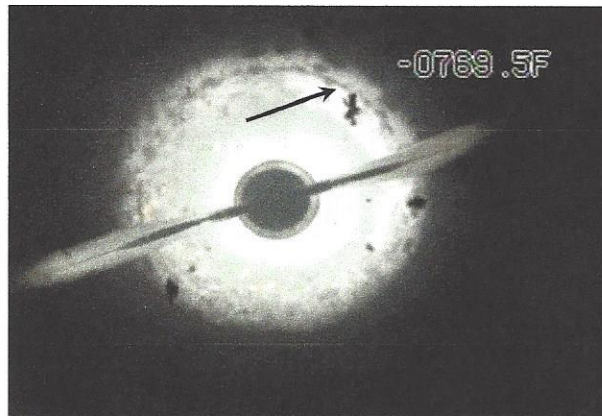


Photo 027  
Joint in 8<sup>5</sup>/<sub>8</sub>" slotted pipe



Photo 028  
Joint in 8<sup>5</sup>/<sub>8</sub>" slotted pipe

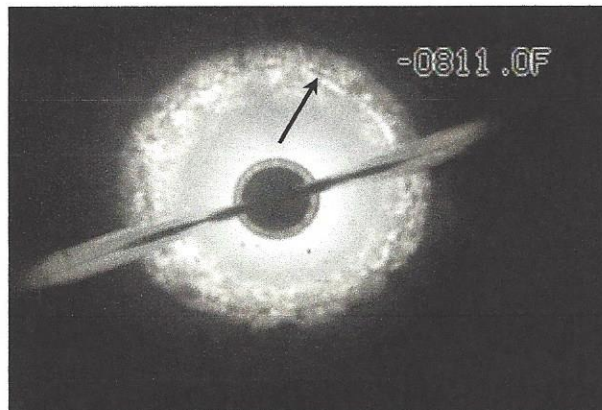


Photo 029  
Joint in 8 $\frac{5}{8}$ " slotted pipe

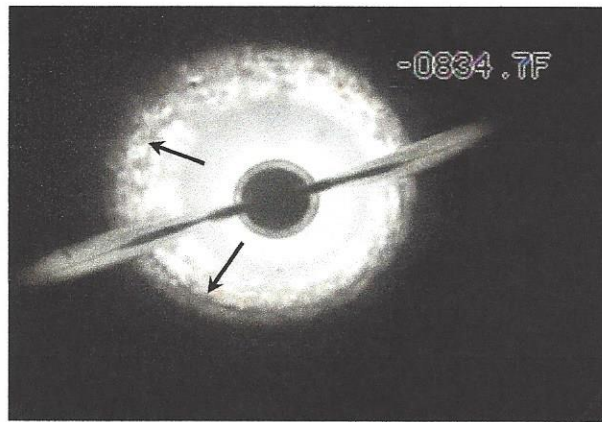


Photo 030  
Joint in 8 $\frac{5}{8}$ " slotted pipe

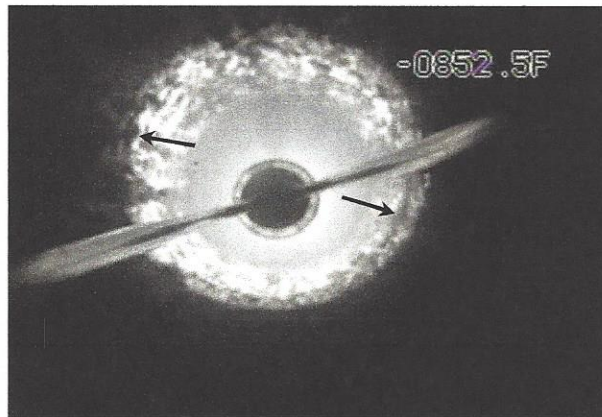


Photo 031  
Joint in 8 $\frac{5}{8}$ " slotted pipe



Photo 032  
Joint in 8 $\frac{5}{8}$ " slotted pipe



Photo 033  
Joint in 8 $\frac{5}{8}$ " slotted pipe



Photo 034  
Bottom 8 $\frac{5}{8}$ " slotted pipe in silt at 956'  
Volume of 8 $\frac{5}{8}$ " slotted pipe (0.35 ft<sup>3</sup>/ft)  
266' of pipe X 0.35 ft<sup>3</sup>/ft = 92.85 ft<sup>3</sup>







**RODGERS & COMPANY**

**VIDEO SURVEY REPORT**

Client: Sorrell Consulting Well No.: 340 page 1 of 1  
 Job No.: F7 Wingate Meas. Pt.: Well House Date: 5/29/215  
 Camera Number: \_\_\_\_\_

Casing Size: 12 3/4" in. OD  
 Band setting: 12" in.  
 Static Water Level: Flowing at surface  
 Type of Perf.: slotted & perforated w/ guns  
 Perforation Schedule

top	bottom
_____ ft	_____ ft
_____ ft	_____ ft
_____ ft	_____ ft
_____ ft	_____ ft
_____ ft	_____ ft
_____ ft	_____ ft

well	depth	remarks
	46.3	Joint 12 3/4" OD casing
	70.5	Rebars
	166.2	Joint in 12 3/4"
	206.1	Joint in 12 3/4"
	246.3	Joint in 12 3/4"
	285.9	Joint in 12 3/4"
	325.9	Joint in 12 3/4"
	346.9	Poor View of Joint
	444.3	Joint in 12 3/4"
	486.7	Joint in 12 3/4"
	525.4	Joint in 12 3/4"
	565.5	Joint in 12 3/4"
	622	Bottom of 12 3/4" casing Top of 10"
	662	Joint in 10" casing
	690	Bottom of 10" Top of 8 5/8" w/swedge
	704	Joint in 8 5/8"
	769	Joint in 8 5/8"
	790	Joint in 8 5/8"
	811	Joint in 8 5/8"
	834	Joint in 8 5/8"
	852	Joint in 8 5/8"
	872	Joint in 8 5/8"
	892	Joint in 8 5/8"
	914	Joint in 8 5/8"
	956.3	Bottom of well Flat & solid 10" = 0.545 X

Casing Reductions

to 10 in. ~~10~~ <sup>622</sup> ft  
 to 8 5/8 in. ~~10~~ ft  
 to \_\_\_\_\_ in. ~~8 5/8~~ <sup>690</sup> ft  
956

Cased Depth: ~~700~~ ft 956  
 Current Depth: ~~955~~ ft 956  
 Drilled Depth: \_\_\_\_\_ ft

$V = \pi r^2 h = vol$

$1 \text{ cu ft} = 1728 \text{ in}^3$   
 $12" \rightarrow 135 \text{ in}^3$   
 $\frac{135}{1728} \text{ cu ft} / \text{ft} = 0.784 \text{ ft}^3 / \text{ft}$