



WATER-RIGHT DOCKET

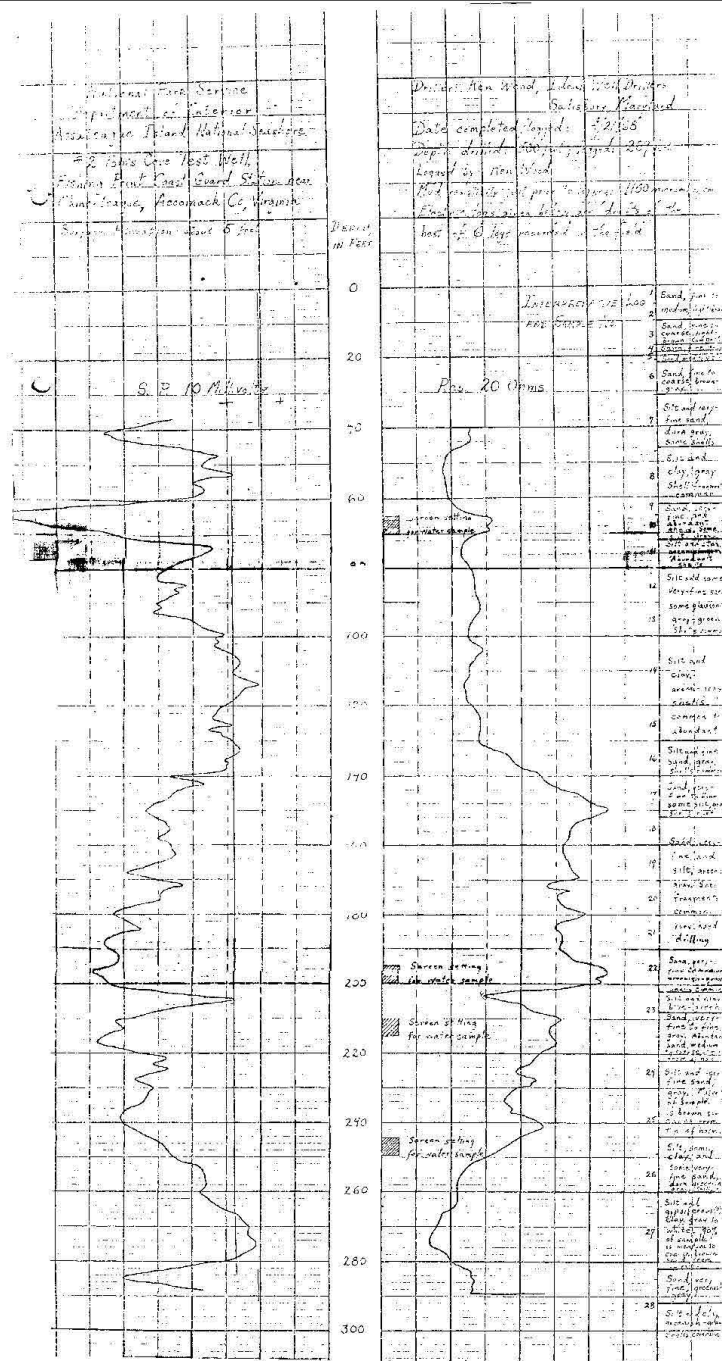
Assateague Island National Seashore

Docket No: 5

LITTLE FOX LEVELS WELL

Supporting Hydro Data

00-00-0000: electric and interpretative logs of #2 tom's cove test well



ENCLOSURE 23. -- Electric and interpretative logs of #2 Tom's Cove test well.

ADDITIONAL INFORMATION, ELECTRIC AND INTERPRETATIVE LOGS AND
GAMMA LOGS OF LITTLE FOX LEVELS ARE IN U. S. GEOLOGICAL SURVEY
REPORT by ESTE F. HOLLYDAY, HYDROLOGIST, TOWSON, MARYLAND,
dated DECEMBER 1969

Other Supporting Information

Little Fox Level

The production well and three observation wells at Little Fox Level are near Tingles Island (enclosure 22), 5.8 miles south of Sinnepuxent Neck bridge. The wells are in or adjacent to blocks 66, 166, and 266 along South 26th Street, Ocean Beach (enclosures 23 and 24).

Contract work was performed by Delmarva Drilling Co., Inc., Denton, Maryland, under National Park Service Contract No. 14-10-7:933-320. Work on the test well was begun December 9, 1968, and final work on the production well was completed on or about February 12, 1969.

Observation Well Wor-Ef 4

The test well drilled at the Little Fox Level site for geologic and hydrologic data was completed as observation well Wor-Ef 4, the oceanside observation well.

The 6-inch-diameter test well was drilled to a depth of 477 feet by hydraulic-rotary method and samples of the drill cuttings were collected at 10-foot intervals. An electric log

was obtained to a depth of 477 feet (enclosure 25), and a gamma log to a depth of 468 feet (enclosure 26). Examination of the electric log revealed two major sands: a shallow sand between depths of 142 feet and 182 feet, and a deep sand between depths of 307 feet and 336 feet. The deep sand was selected for screening the test well as an observation well.

Twenty feet of plastic screen was set between the depths of 310 feet and 330 feet in the same sand to be screened in the production well. The hole was cased with 2-inch-diameter steel pipe from about 3 feet above land surface to 310 feet below land surface.

The well was developed and a recorder installed to obtain a record of tidal fluctuations prior to conducting a pumping test on the production well. A tidal fluctuation of about 0.3 foot was recorded.

During the pumping test on the production well, 650 feet west of observation well Wor-Ef 4, the water level in observation well Wor-Ef 4 was lowered about 2.4 feet (enclosure 31).

Production Well Wor-Ef 6

The production well was drilled to a depth of 340 feet and gamma logged to a depth of 339 feet (enclosure 27). The hole was underreamed to 18-inch diameter between depths of 300 feet and 340 feet. Twenty feet of wire-wound screen was set between

310 feet and 330 feet below land surface with a #2 gravel pack (enclosure 28). Suitable size of gravel-pack material and screen slots were selected by U.O.P. Johnson Co. on the basis of mechanical analyses of the samples of the drill cuttings from observation well Wor-Ef 4 (enclosure 29).

The production well was developed intermittently for 2 weeks with air lift and turbine pump. The mud cake around the gravel pack and on the screen was opened initially by pressurizing the well at 150 psi (pounds per square inch, gage pressure).

During the pumping test on February 11, 1969, the production well was pumped at about 21 gpm for 8 hours. Water-level measurements were made during both drawdown and recovery in the production well (enclosure 30), and during drawdown in the three observation wells. Drawdown in observation well Wor-Ef 4, screened in the same sand as the production well, is given in enclosure 31. Water-level fluctuations in the other two observation wells, one screened in a sand above and the other in a sand below the one screened in the production well, appeared to be caused by tide and not by pumping. The production well produced about 21 gpm continuously for 8 hours and had a drawdown of about 100 feet. The resulting specific capacity is about 0.2 gpm per foot of drawdown. Based upon an analysis of data from observation well Wor-Ef 4 using the nonequilibrium formula (Ferris and others, 1962), the transmissibility of the sand was estimated to be approximately 400 gallons per day per foot and the coefficient of storage 1×10^{-4} .

A water sample was collected from the production well during a preliminary pumping test and analyzed by a U.S. Geological Survey laboratory (enclosure 35).

The Little Fox Level production well, when equipped with an adequate pump set near the top of the screen, should be capable of producing 60 gpm of potable water.

Observation Well Wor-Ef 5

Observation well Wor-Ef 5 was drilled to a depth of 190 feet by hydraulic rotary method and gamma logged to a depth of 174 feet (enclosure 32). Prior to obtaining a gamma log, 20 feet of plastic screen was set between depths of 154 feet and 174 feet in the bottom of the major sand stratigraphically above the sand screened in the production well. The hole was cased with 4-inch-diameter steel pipe from about 4 feet above land surface to 6 feet below land surface and with 2-inch-diameter steel pipe from a depth of 6 feet to a depth of 154 feet.

During the pumping test on the production well, 50 feet north of observation well Wor-Ef 5, water levels in observation well Wor-Ef 5 had a tidal fluctuation of at least 0.5 foot.

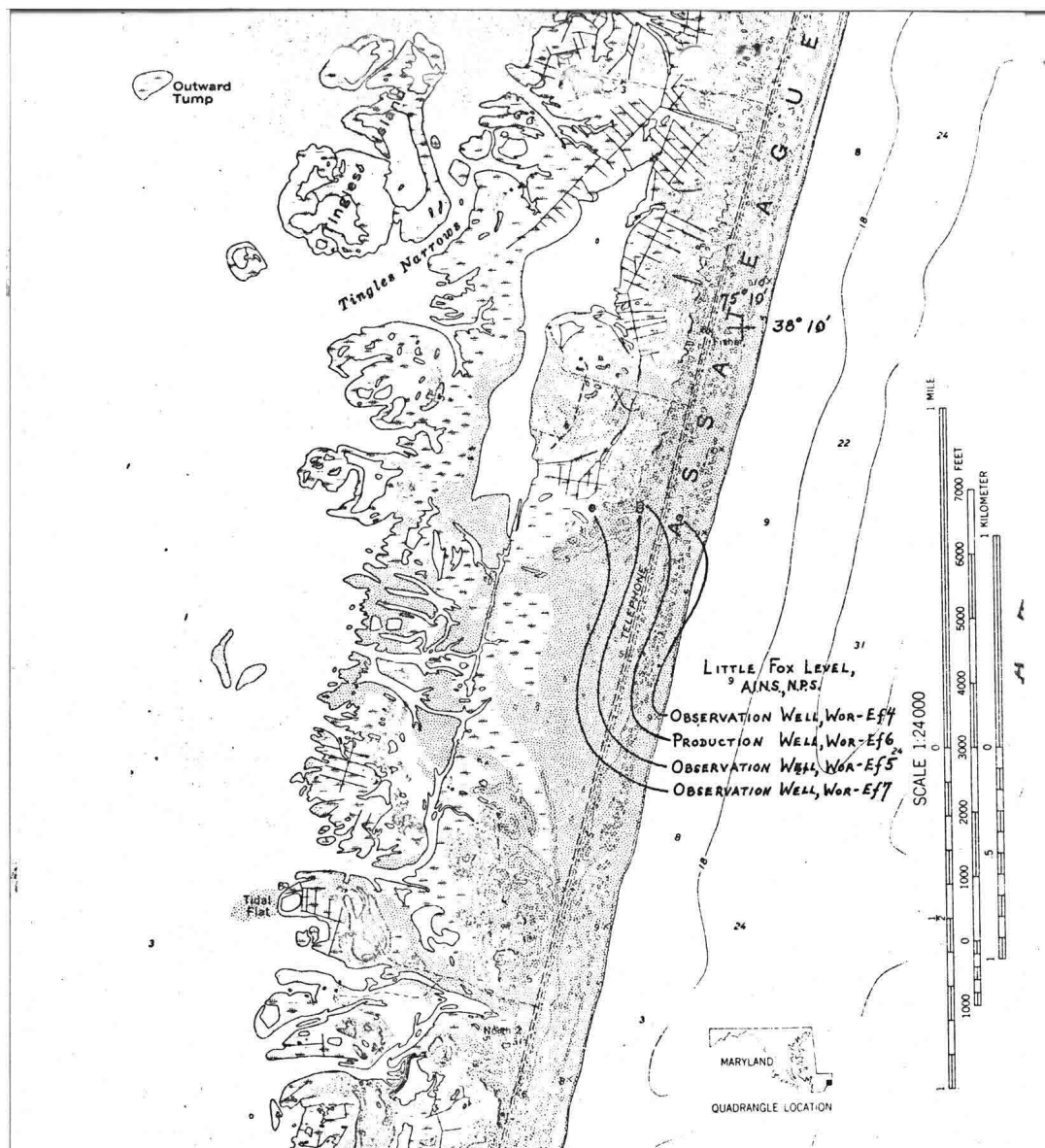
A water sample was collected from this observation well following the pumping test and analyzed by a U.S. Geological Survey laboratory (enclosure 36).

Observation Well Wor-Ef 7

Observation well Wor-Ef 7, the bayside observation well, was drilled to a depth of 480 feet by hydraulic-rotary method. An electric log was obtained to a depth of 472 feet (enclosure 33), and a gamma log to a depth of 467 feet (enclosure 34). Examination of the geophysical logs revealed a major sand between depths of 418 feet and 460 feet. This sand did not appear on the geophysical logs as a major sand in the test well, observation well Wor-Ef 4. Twenty feet of plastic screen was set between depths of about 408 feet and 428 feet in the top of this sand, which is stratigraphically below the sand screened in the production well. The hole was cased with 4-inch-diameter steel pipe from about 4 feet above land surface to 6 feet below land surface and with 2-inch-diameter steel pipe from a depth of 6 feet to a depth of about 408 feet.

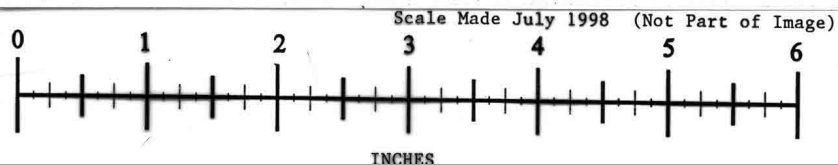
During the pumping test on the production well, 740 feet east of observation well Wor-Ef 7, water levels in observation well Wor-Ef 7 had a tidal fluctuation of at least 0.1 foot.

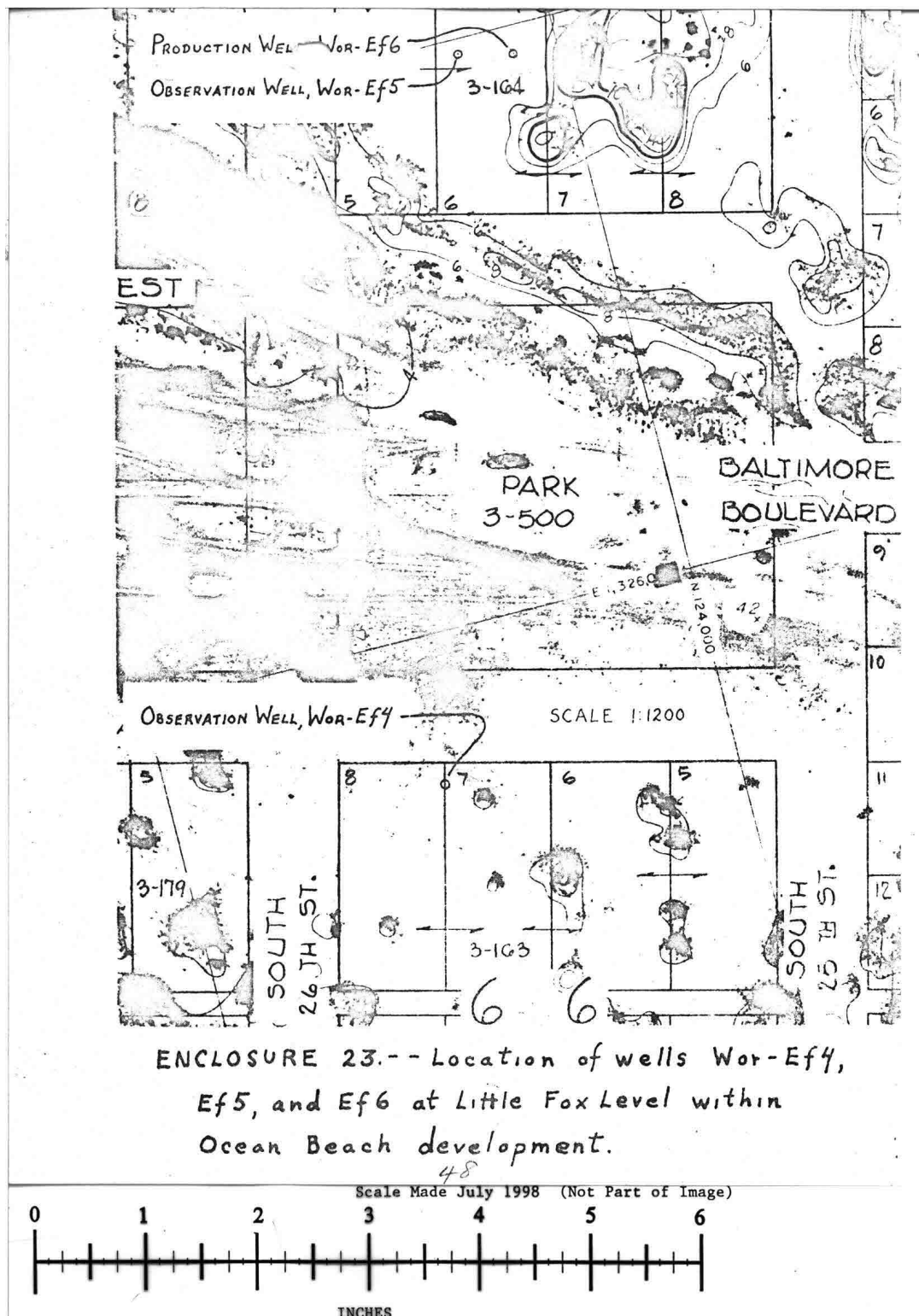
A water sample was collected from this observation well during development. As determined by field analysis, the water contained 330 mg/l of chloride.

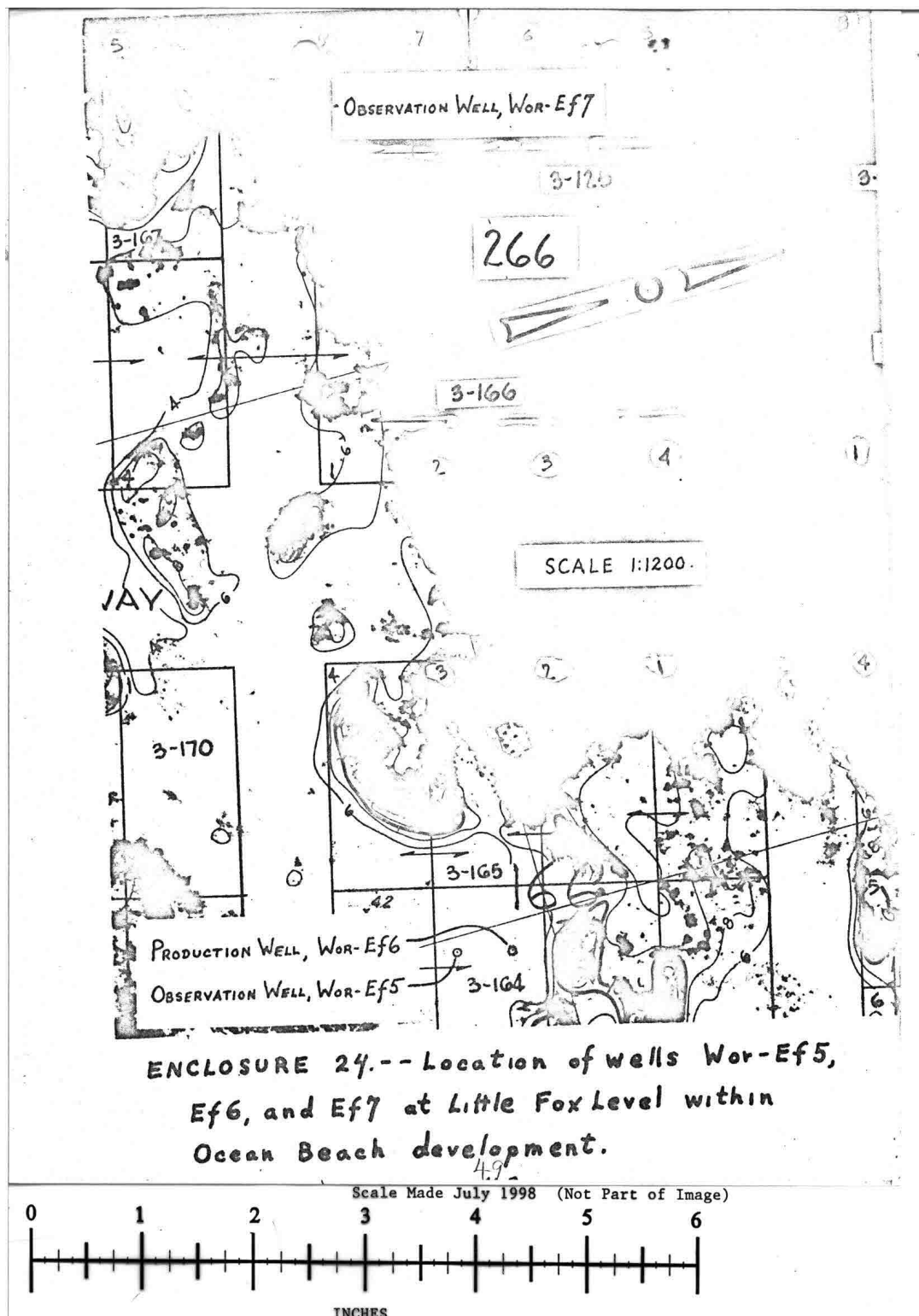


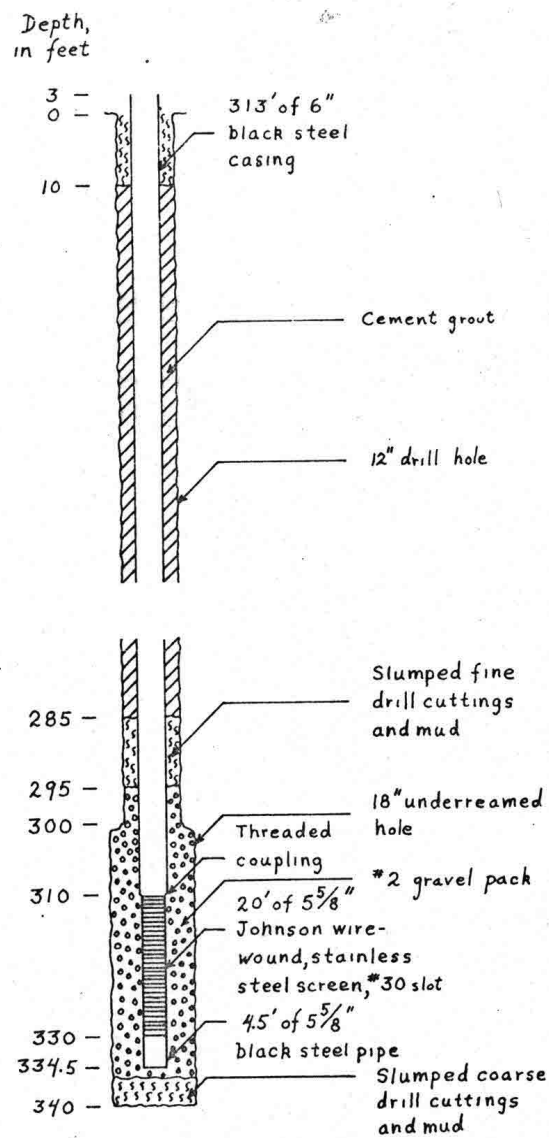
ENCLOSURE 22.-- Location of
Little Fox Level test site.

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ENCLOSURE 28.-- Construction diagram of Little Fox Level production well Wor-Ef6.

FORM 9-1387 (2-1960)
U. S. DEPT. OF INTERIOR
GEOLOGICAL SURVEY

ANALYTICAL STATEMENT - GW

COUNTY Worcester

79783

Towson

LAB NO. DC-5272

Location Assateague Isl. Na-
tional Seashore, Md.

Date of collection Feb. 7, 1969Ignition Loss _____ Color 60Wor - Efg

Dissolved Solids:

Source (type of well) Little Fox Pro-
duction Well, 310' to 330'
Time: 1600 hrs

Tesidue at 180°C 461
Calculated (Sum) 424

Tons per Acre Foot

Date dild 1/7/69

Cared to _____

ft

Hardness as CaCO₃ Ca/Mg 23

Depth _____

Diam _____

Non-carbonate Hardness 0Vsr Miocene; Manokin?T Na _____ SAR _____ pH 8.3

Water level _____

ft

Specific Conductance

Sampled after pumping 1/2 hrs(microhm at 25°C) 800Yield 40 GPM (gross or est)Alk as CaCO₃ 328ft of coll. 2" orifice dischargeCO₂ Calc. 3.2Appearance clear to slight brownTemp (°F) 17

Field Data:

Collector E. F. HollydayKx10⁶ 655Chemist ChenervsCl 38 mg/lDate completed Dec. 5, 1969

pumped 32 min at

Checked by _____

40 gpm.

Date transmitted _____

	meq/l	mg/l
SiO ₂		10
Fe	Total	1.3
Mn	Total	.07
Co		0.23
Mg		.22
Na		7.05
K		.14
		5.5
		7.64
Na + K		
HCO ₃		6.36
CO ₃		.20
SO ₄		.06
Cl		1.07
F		.03
NO ₃		.01
		7.73

ENCLOSURE 35.-- Chemical analysis of water
from Little Fox Level production well;
permanent screen setting 310 to 330 feet
below land surface.

DR Scott
1-24 1-7-00
J.R. Copy WJ

L54 WSC-OLW

December 13, 1968

Memorandum

To: Superintendent, Assateague Island National Seashore

From: Chief, Office of Land and Water Rights, WSC

Subject: Contract No. 14-10-7:993-320

As a followup to the recent meeting in your office on December 11 relative to subject enclosed is a rough draft of Change Order No. 1 with Findings of Fact.

Please feel free to add, change, or delete any portion of the Change Order which does not meet with your approval.

Should you have any questions regarding the Change Order, please do not hesitate to call on us.

~~Richard L. Stanton~~

Richard L. Stanton

Enclosure

cc:
Chief, Branch of Water Resources, WASO, w/c enc

DRAFT
GMOORE egz 12/13/68

CHANGE ORDER NO. 1

Delmarva Drilling Co., Inc.
P. O. Box 4456
Denton, Maryland 21629

Re: Contract No. 14-10-7:993-320

Gentlemen:

In accordance with Article 1 of the General Provisions of your Contract No. 14-10-7:993-320, dated October 30, 1968, the following ^{reductions} deletions and additions to your contract have been made:

1. Delete Item 6 of the Contract Bid Schedule. This deletion will reduce your estimated contract price by \$250.00.
2. Reduce Item 1 of the Contract Bid Schedule from an estimated quantity of 400 linear feet to 429 linear feet. This reduction will reduce your contract price by an additional \$610.60.
3. Add the following extra work:
 - a. Furnish all labor, equipment, and material for the installation of one section of pipe, six (6) inches in diameter and four (4) feet in length. The pipe shall be directly connected to the lower end of the well screen and fastened. A gravel pack shall be placed surrounding the pipe and shall extend upwards into the well screen portion of the well as agreed to in the contract.

Compensation for this portion of the Change Order shall be \$26.40.
 - b. Furnish all labor, equipment, and material for the installation of 200 feet of one-inch (1") diameter steel pipe. The pipe shall be welded to the outside of the well casing

by means of an elbow and shall extend to ground level from a depth of 200 feet.

Compensation for this portion of the change order shall be at a cost of \$0.35 per linear foot of pipe installed.- \$70.00.

- c. Furnish all labor, equipment, and material for the drilling of a pilot hole large enough to install a two inch steel pipe with screen.

The hole shall be drilled to a depth of 500 feet below ground surface, and is to remain open until the U. S. Geological Survey ground water specialist has completed electric-logging the hole. This addition also includes the collection of water samples for chemical analysis from two water zones. Points of collection of water samples are to be determined by the Contracting Officer.

Compensation for this portion of the change order shall be \$2.20 per linear foot. Total cost \$1,100.00.

- d. Furnish all labor, equipment, and material for the installation of 400 feet of 2 two-inch (2") inner diameter pipe complete with screen and developed at a unit cost of \$0.80 per linear foot of pipe installed.

The two inch pipe is to extend ~~eight~~ two (2) feet
above ground and capped.

Compensation for this portion of this change ~~order~~
order shall be \$320.00.

A All work covered by this Change Order shall be accomplished
in accordance with the applicable provisions of the contract specifications
and manufacturer's recommendations.

This Change Order shall increase your contract price by \$655.80
to a revised ~~max~~ ^{cost} estimate of \$8,993.80.

An allowance of five (5) calendar days of time is made for com-
pletion of the test well. Final completion date is recorded ~~as~~
January 8, 1969.

Very truly yours,

Bertrum C. Roberts
Superintendent

Denton, Maryland

Superintendent
Assateague Island National Seashore
Route 2, Box 111
Berlin, Maryland 21811

Dear Sir:

Adjustment of the amount of compensation under Contract

No. 14-10-7:993-320 and in the time required for its performance by
reason of Change Order No. 1 is satisfactory and is hereby accepted.

Delmarva Drilling Co., Inc.

By

Owner

DRAFT
GMOORE:egz 12/ '68

FINDINGS OF FACT

Change Order No. 1, Contract #14-10-7:993-320

At the time the present project was advertised, the proposed extra work was not anticipated.

It has been determined that the drilling of an observation well would greatly increase our knowledge of the geo-hydrologic regime of this area.

The extra work contemplated is an integral part of the work and will provide the Government with information which is essential for the construction of a water system to serve all visitor oriented facilities in that area.

The Contractor has agreed to this work at a reasonable price.

B. C. Roberts
Superintendent
(Contracting Officer)

By EW W. Brecheisen
Administrative Assistant

Form 10-194
(Rev. 9/60)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

5

Assateague Island National Seashore

(Park)

Check One:

Monthly
Estimate ☐Final
Estimate ☒

UNIT PRICE CONTRACT

ESTIMATE NO. 1	FOR (Period) December 4, 1968 - February 17, 1969	DATE
CONTRACT NO. 14-10-7:993-320	COMPLETION DATE January 2, 1969	EXTENDED DATE February 17, 1968
CONTRACTOR Delmarva Drilling Co., Inc.		ORIGINAL CONTRACT \$ 8,338.00
PROJECT Drilling Test Water Well		CHANGE ORDERS* \$
LOCATION Assateague Island National Seashore - Little Fox Level		TOTAL CONTRACT \$ 10,623.70

ITEM NO.	CONTRACT QUANTITY	DESCRIPTION	QUANTITY TO DATE	UNIT PRICE	AMOUNT TO DATE
1.	500 LF	Drilling hole to receive six-inch (6") inside diameter casing and two-inch (2") minimum grout ring.	336	8.60	\$2,889.60
2.	480 LF	Furnishing and installing six-inch (6") casing and two-inch (2") minimum grout ring.	312	4.80	1,497.60
3.	20 LF	Furnishing and installing six-inch (6") diameter stainless steel well screen.	20	36.00	720.00
4.	30 LF	Reaming well hole to 18" in diameter in water aquifer for gravel envelope around well screen.	30	7.00	210.00
5.	30 LF	Furnishing and installing gravel envelope.	30	5.00	150.00
6.	1 LS	Furnishing an electric log of entire well hole.			
7.	4 Hr.	Developing well, by pumping and surging.	72	22.00	1,584.00
8.	8 Hr.	Pump testing for yield of well	8	22.00	176.00

RECOMMENDED (Project Supervisor)

Ernest Horne 3/3/69

APPROVED (Contracting Officer)

B. C. Roberts, Superintendent

DATE

SUMMARY

TOTAL TO DATE	\$ 10,623.70
LESS RETAINED AMOUNT.....	
NET.....	
LESS PREVIOUS PAYMENTS.....	
LESS LIQUIDATED DAMAGES.....	
DUE THIS ESTIMATE.....	10,623.70
% COMPLETED TO DATE:	100%

*Show Breakdown on Reverse

(See Reverse for Distribution)

Form 10-194a
(12/61)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

UNIT PRICE CONTRACT CONTINUATION SHEET

Contract No.
14-10-7:993-320Contractor
Delmarva Drilling Company, Inc.

ITEM NO.	CONTRACT QUANTITY	DESCRIPTION	QUANTITY TO DATE	UNIT PRICE	AMOUNT TO DATE
9.	8 Hr.	Standby time for crew and equipment	9	17.50	\$ 166.50
10.	1 LS	Plugging test well hole which has been abandoned by direction of the Government through no fault of the Contractor			
		Total (Items 1 through 10) \$7,393.70			

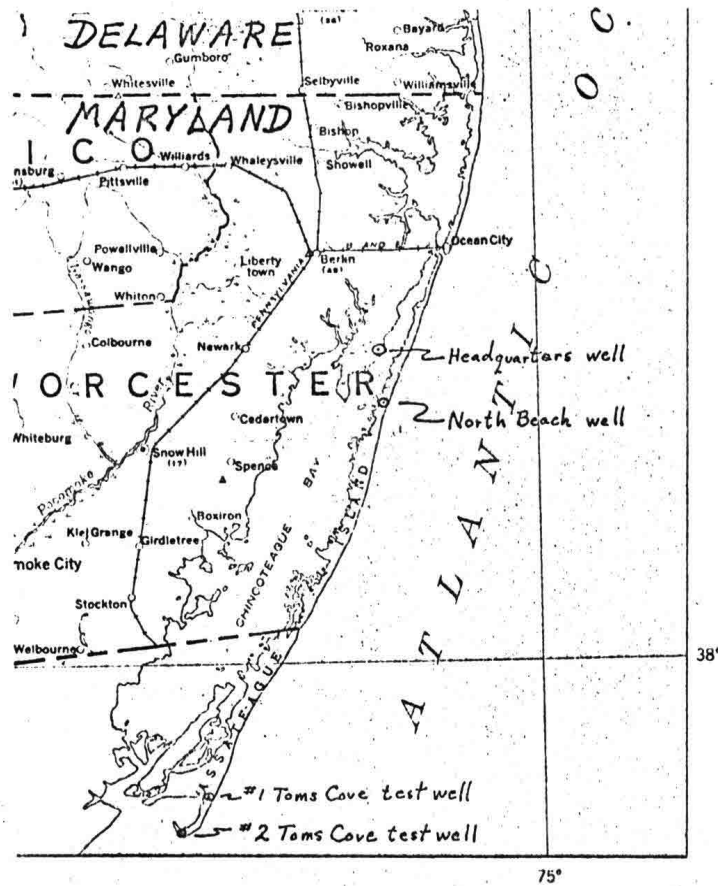
GSA DC 65-19566

Form 10-194a
(12/61)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

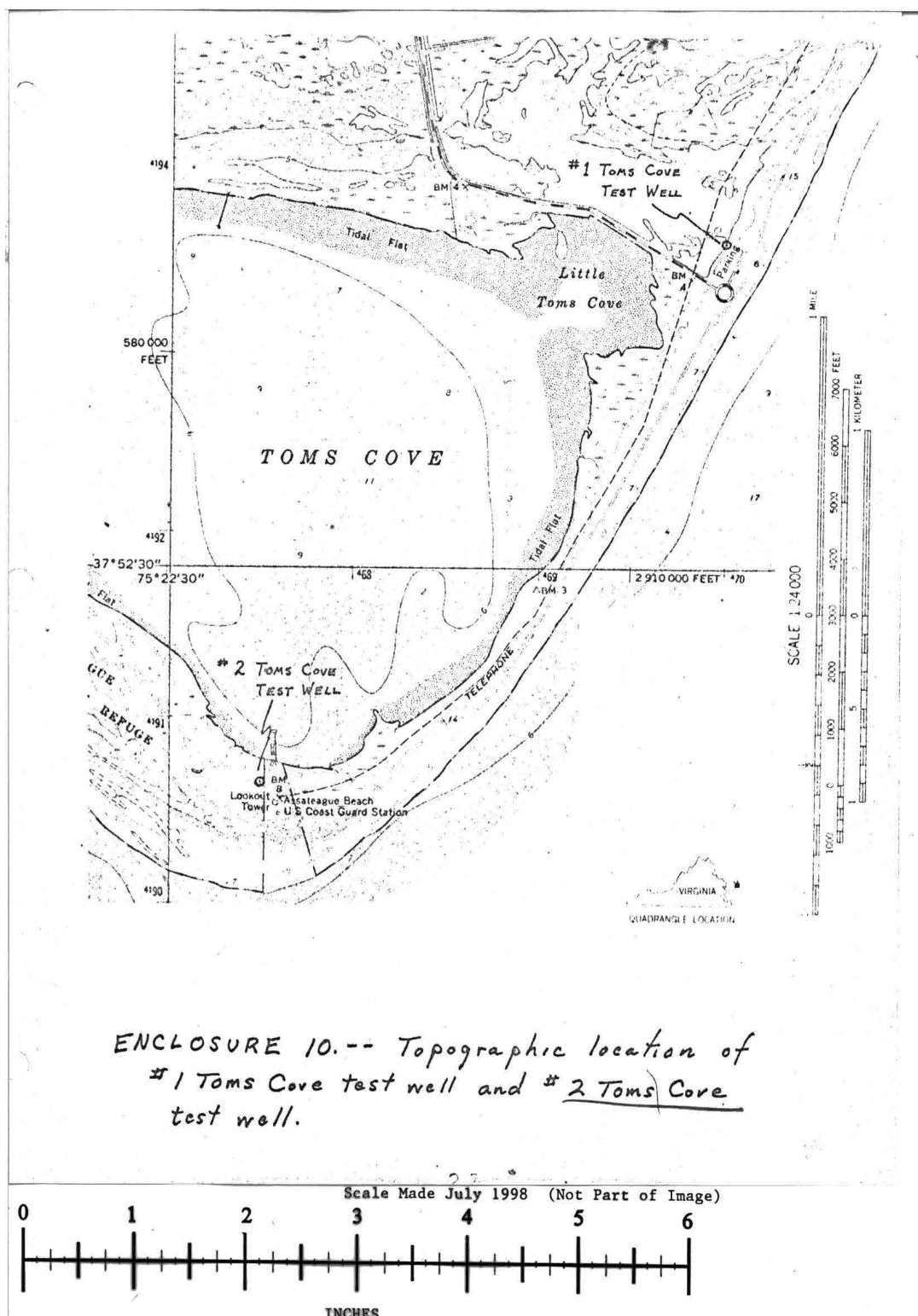
UNIT PRICE CONTRACT CONTINUATION SHEET

Contract No.		Contractor			
14-10-7:993-320		Delmarva Drilling Company, Inc.			
Item No.	Contract Quantity	Description	Quantity to date	Unit Price	Amount to date
9	8 Hr.	Standby time for crew and equipment	9	17.50	\$ 157.50
10	1 LS	Plugging test well hole which has been abandoned by direction of the Government through no fault of the Contractor			
Total		(Items 1 through 10)		\$7,384.70	
<u>CHANGE ORDER NO. 1</u>					
		Cellar Pipe	Job	26.40	26.40
		Subtotal			\$26.40
<u>CHANGE ORDER NO. 2</u>					
Observation Well #1					
		Drill hole to receive two-inch (2") inside diameter casing.	477 lf	2.20 lf	1,049.40
		Furnish and install two-inch (2") casing w/screen.	330 lf	0.80 lf	264.00
		Subtotal			1,313.40
<i>Change Order #2</i>					
Observation Well #2					
		Drill hole to receive two-inch (2") inside diameter casing. Furnish and install	174 lf	2.20 lf	382.80
		two-inch (2") casing w/screen.	174 lf	0.80 lf	139.20
		Subtotal			\$ 522.00
Observation Well #3					
		Drill hole to receive two-inch (2") inside diameter casing.	467 lf	2.20 lf	1,027.40
		Furnish and install two-inch casing w/screen.	426 lf	0.80 lf	340.80
		Subtotal			\$1,368.20
<u>CHANGE ORDER NO. 3</u>					
		No Charges			00
		Subtotal			00
<u>CHANGE ORDER NO. 4</u>					
		Increase development of well by 68 hours, cost figures included in Item 7.			
		TOTAL (Change Order Nos. 1, 2, 3, & 4)			\$2,357.40
		GRAND TOTAL (Contract)			\$10,614.70

Maps and Miscellaneous Information



ENCLOSURE 1.-- Location of Assateague Island and test-well sites.



Docket Information

Number of Documents in Docket 23

Documents Dated from 12/13/1968 to 2/7/1969

Docket Compiled: 1/31/2011