GW - 80

# REPORTS

# YEAR(S):

1992

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

June 4, 1992 0388-2105-92

Mr. Bill Olson
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

RE: Closure of Deep Monitor Wells 5-1A and 5-3A, and Shallow Monitor Wells 5-7B, 5-8B, 5-26B and 5-27B at Transwestern Pipeline Company, Compressor Station No. 5, Thoreau, N.M.

Dear Mr. Olson:

The purpose of this letter is to describe closure (abandonment) details for Thoreau monitor wells 5-1A, 5-3A, 5-7B, 5-8B, 5-26B, and 5-27B as required by OCD correspondence dated March 12, 1992. The wells were abandoned during the period April 23 to May 7, 1992.

## WELL CLOSURE PROCEDURES

For all well closure procedures described below, depth measurements were referenced from ground surface. All casing and annulus depths were made using either an electronic sounding device or a tremie pipe. All volume calculations were based on the assumption that 18.2 sacks of hydrated cement are equal to 1 cubic yard.

All neat cement grout mixtures, with the exception of monitor well 5-1A, consisted of 7.5 gallons of water and 4 pounds of bentonite per 94-lb sack of type 1 & 2 cement. This mixture yielded approximately 14.2 lb/gal of cement having a specific gravity of 1.67. The bentonite used in 5-1A was a high yield material (SUPER GEL-X); therefore, only 2 pounds of bentonite per sack of cement were added in the above-mentioned mixture.

### SHALLOW MONITOR WELLS 5-7B, 5-8B, 5-26B and 5-27B

The shallow monitor wells were abandoned by filling the 2-inch PVC monitor well screen and casing from total depth to the surface with a bentonite neat cement grout. The grout was pumped from the bottom up through a 1-inch PVC tremie pipe. The steel monitor well vault cover was welded in place, and a steel identification plate with the well number and abandonment date was welded to the vault cover. Photographs of the identification plates are included in Attachment I, and well construction diagrams are included as Attachment II.

### MONITOR WELL 5-1A

An attempt was made to pull the entire well casing from the borehole. However, the casing could not be pulled using two 12-ton hydraulic jacks along with jars and the rig hydraulics pulling approximately 78,000 pounds. The casing stretched 3.5 inches, indicating material had fallen in


SOIL AND GROUND-WATER INVESTIGATIONS • REMEDIAL ACTION • LITIGATION SUPPORT • VADOSE ZONE HYDROLOGY
6020 ACADEMY NE • SUITE 100 • ALBUQUERQUE, NM 87109 • (505) 822-9400 • FAX (505) 822-8877
ALBUQUERQUE • LAS CRUCES • SANTA FE

around the casing at depth. A tremie pipe was lowered into the casing and the total depth of the well was measured at 663.5 feet.

The tremie pipe was removed and a mechanical perforating tool was lowered in the casing to a depth of 606 feet. A total of 59 perforations measuring 5/16 inches wide by 1 3/4 inches long were cut in the casing at approximately 25-foot intervals from total depth to 27 feet below ground surface. The tremie pipe was then lowered in the casing to a depth of 645 feet, and 2.08 cubic yards (38 sacks) of cement were pumped through the tremie into the casing. Six joints of tremie pipe were removed from the casing to eliminate the possibility of cementing the tremie in the hole. The cement was allowed to set up for approximately 4 hours. The tremie was then lowered into the casing and the top of the grout was tagged at 573.5 feet. An additional 2.08 cubic yards (38 sacks) were pumped through the tremie into the casing, and the tremie was then pulled from the casing.

The following morning the tremie pipe was used to tag the top of the cement at 210 feet. A 1-inch PVC tremie pipe was lowered in the annulus between the 10.75-inch surface pipe and the 6.25-inch well casing. The tremie would not pass below 82 feet, indicating a bridge or slough in the annulus. A total of 3.7 cubic yards (68 sacks) of cement were pumped in the casing and annulus alternating between the 2.67-inch steel tremie in the casing and the 1-inch PVC tremie in the annulus. The level of cement in the annulus was kept higher than that in the casing to eliminate the possibility of diluting the annular seal with displaced formation water through the perforations. Monitor well 5-1A required a total of 7.9 cubic yards (144 sacks) to bring the level of the cement to ground surface. The surface casing was then cut off, and a steel cap with the well number and abandonment date was then welded to the top of the surface casing (see Attachment I).

## MONITOR WELL 5-3A

Monitor well 5-3A was gravel packed from the bottom of the well screen to 23 feet below ground surface; therefore, no attempt was made to pull the casing. A perforating tool attached to the tool line was lowered into the casing. The total depth of the well was measured at 433.8 feet. A total of 48 perforations measuring 5/16 inches wide by 1 3/4 inches long were cut in the casing at approximately 25-foot intervals from 428 feet to 56 feet below ground surface. The perforator was then pulled from the casing.

The following morning, the tremie pipe was lowered into the casing to a depth of 424.9 feet, and 1.1 cubic yards (20 sacks) of cement were pumped in the casing through the tremie pipe from the bottom up. Five joints of tremie pipe were pulled from the casing to eliminate the possibility of cementing the tremie in the casing. The cement was allowed to set up for four hours. The

tremie pipe was then lowered in the casing and the cement was measured at 332.6 feet. The tremie was elevated to 329.3 feet, and an additional 1.1 cubic yards (20 sacks) of cement were pumped in the casing through the tremie pipe from the bottom up and allowed to set up overnight.

The following morning the tremie was lowered into the casing and the cement was measured at 264.8 feet. The tremie pipe was elevated to 234.8 feet below ground surface, and 1.1 cubic yards (20 sacks) of cement were pumped through the tremie in the casing from the bottom up. The cement was allowed to set up for approximately 5.5 hours. The tremie was then lowered in the hole and the cement measured at 168 feet below ground surface. The tremie pipe was elevated in the casing to 140.4 feet, and 1.7 cubic yards (31 sacks) were pumped in the casing, bringing the grout to the surface. Monitor well 5-3A required 5 cubic yards (91 sacks) of cement to bring the level of the cement to ground surface. The surface casing was cut off, and a steel cap with the well number and abandonment date was then welded to the top of the surface casing (see Attachment I).

If you have any questions concerning these procedures or need more information, please call me.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.

KCT

K.C. Thompson
Geologist

Joanne Hilton
Project Manager

cc: Ted Ryther
Enron

2105\OLSON.604

# ATTACHMENT I

# PHOTOGRAPHS

## SHALLOW MONITOR WELLS

*Monitor well 5-7B prior to abandonment*


*Monitor well 5-7B abandoned*

## SHALLOW MONITOR WELLS

*Monitor well 5-8B cement grout level at surface, prior to welding steel abandonment cap*

*Monitor well 5-8B abandoned*

## SHALLOW MONITOR WELLS

*Monitor well 5-26B cement grout level at surface, prior to welding steel abandonment cap*

*Monitor well 5-26B abandoned*

## SHALLOW MONITOR WELLS

*Monitor well 5-27B cement grout level at surface, prior to welding steel abandonment cap*

*Monitor well 5-27B abandoned*

## MONITOR WELL 5-1A

*Pumping cement grout*

*Steel abandonment cap welded to surface casing*

## MONITOR WELL 5-1A

*Cement grout level at surface, prior to welding steel abandonment cap*

## MONITOR WELL 5-1A

*Measuring tremie pipe*

*Monitor well 5-1A abandoned*

## MONITOR WELL 5-3A

*Test perforation at surface*

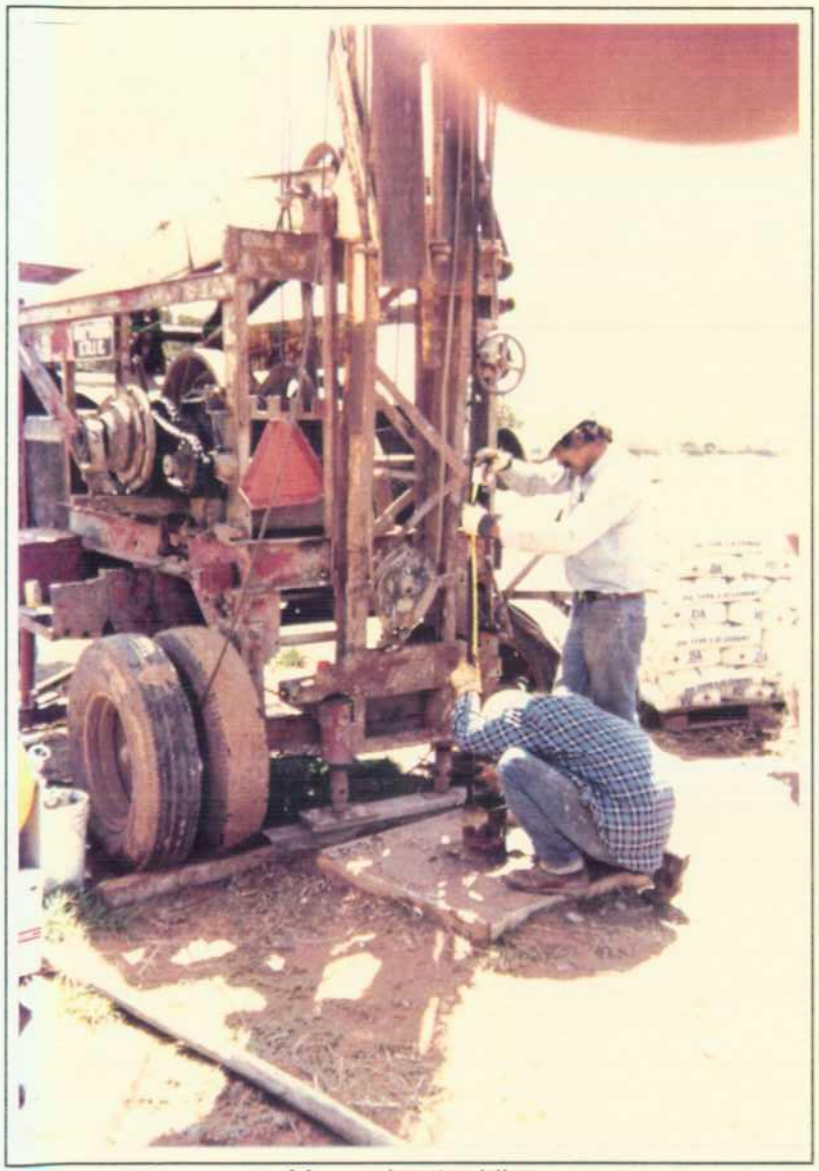
*Cement grout level at surface, prior to welding steel abandonment cap*

## MONITOR WELL 5-3A

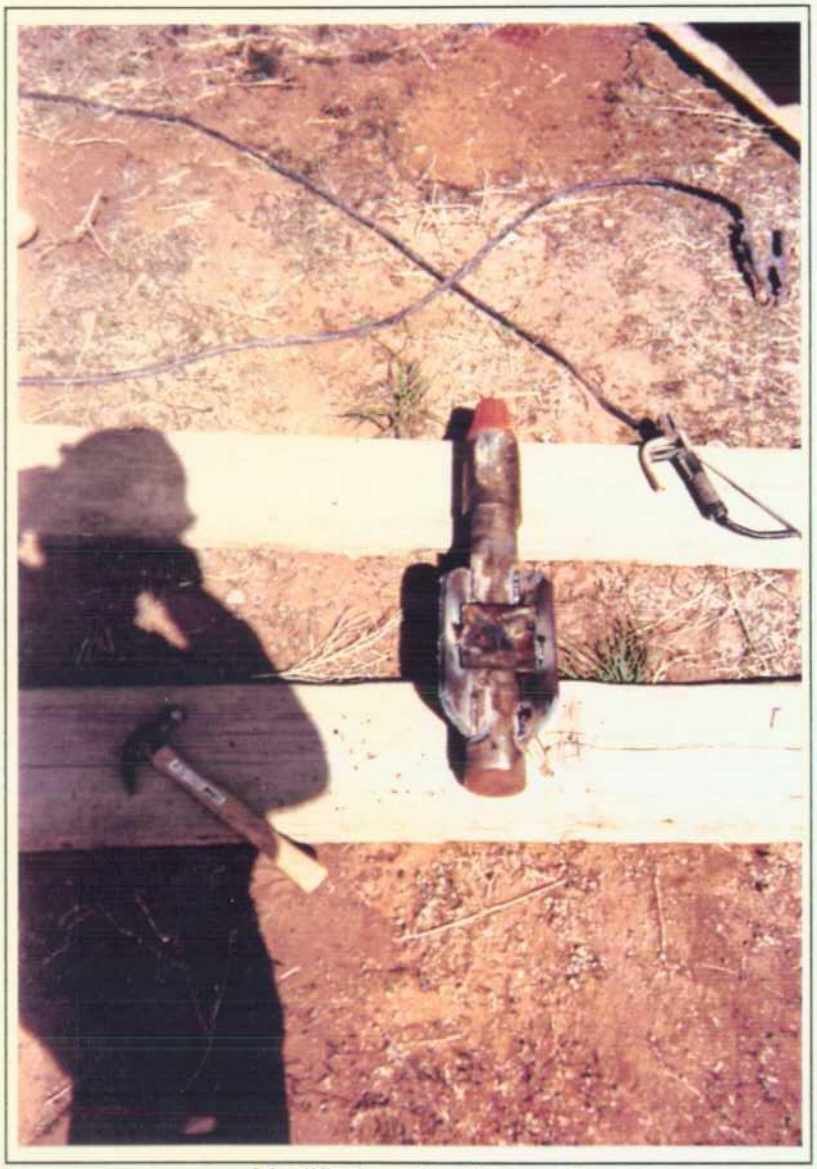

*Steel abandonment cap welded to surface casing*

*Mixing cement grout*

## MONITOR WELL 5-3A



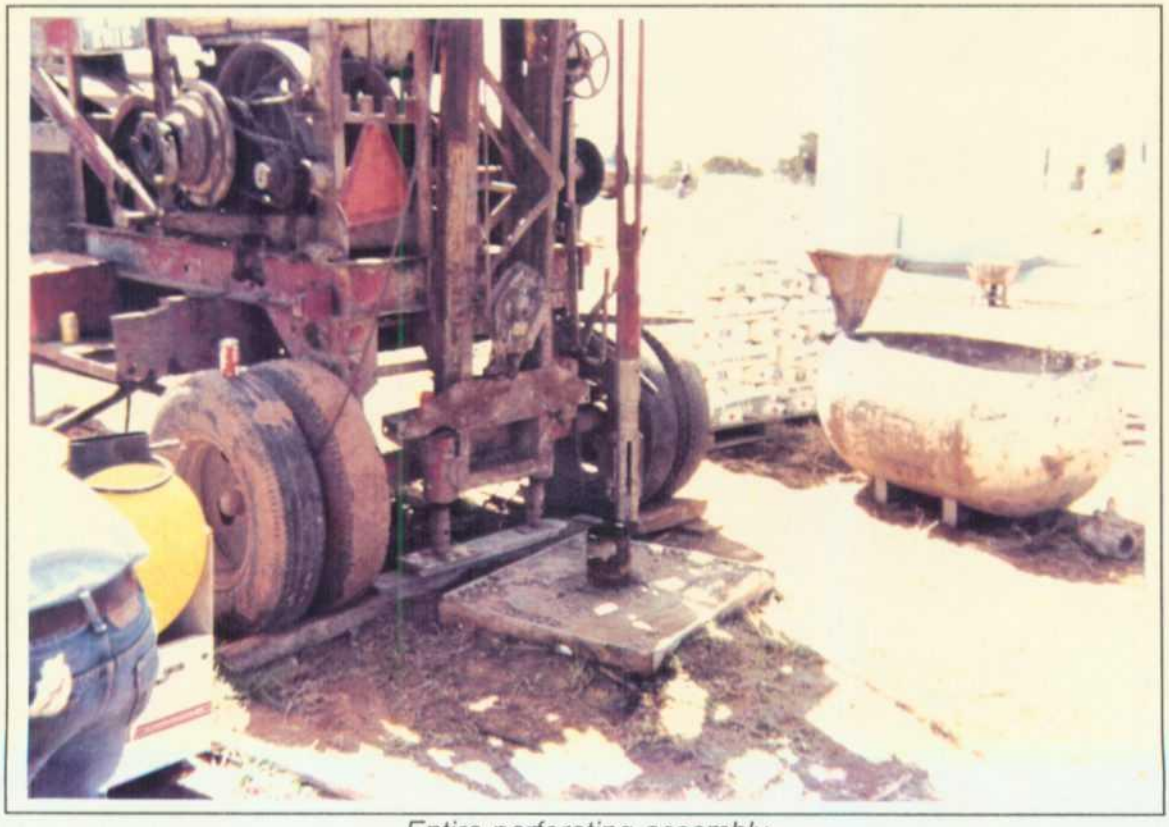
*Measuring tool line*



*Modified perforating tool*

## MONITOR WELL 5-3A

*Perforating knife*



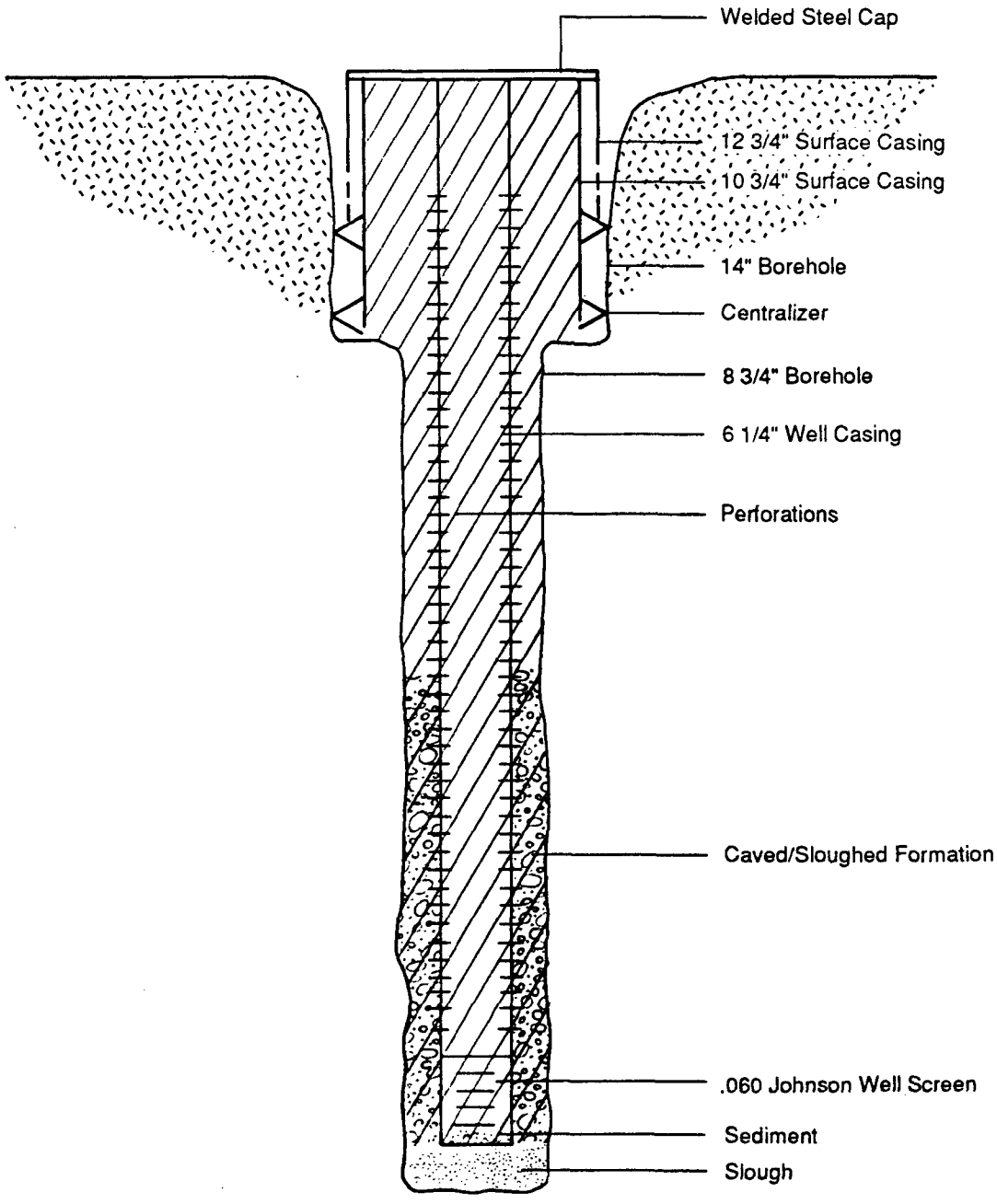
*Entire perforating assembly*

## MONITOR WELL 5-3A

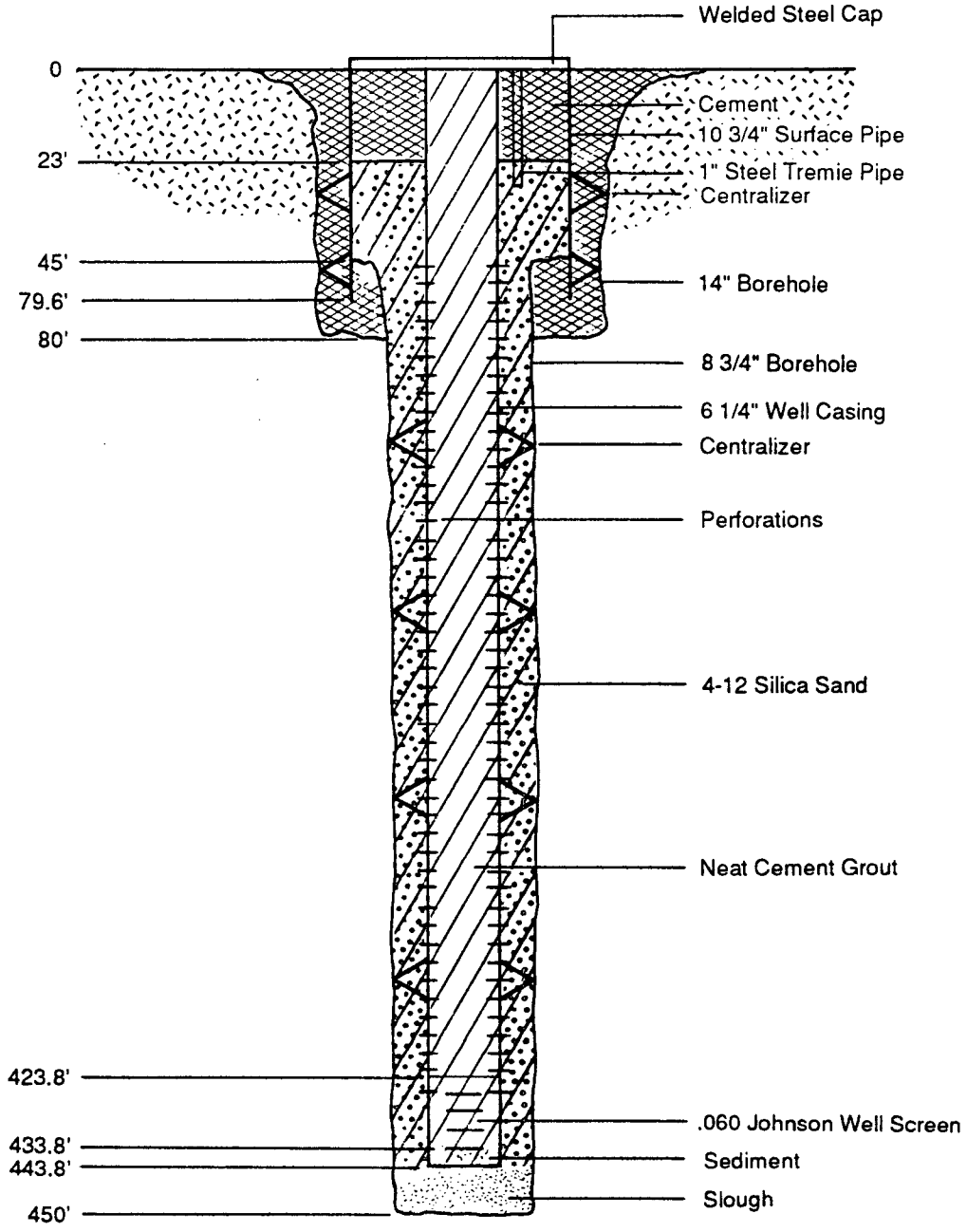
*Monitor well 5-3A abandoned*

# ATTACHMENT II

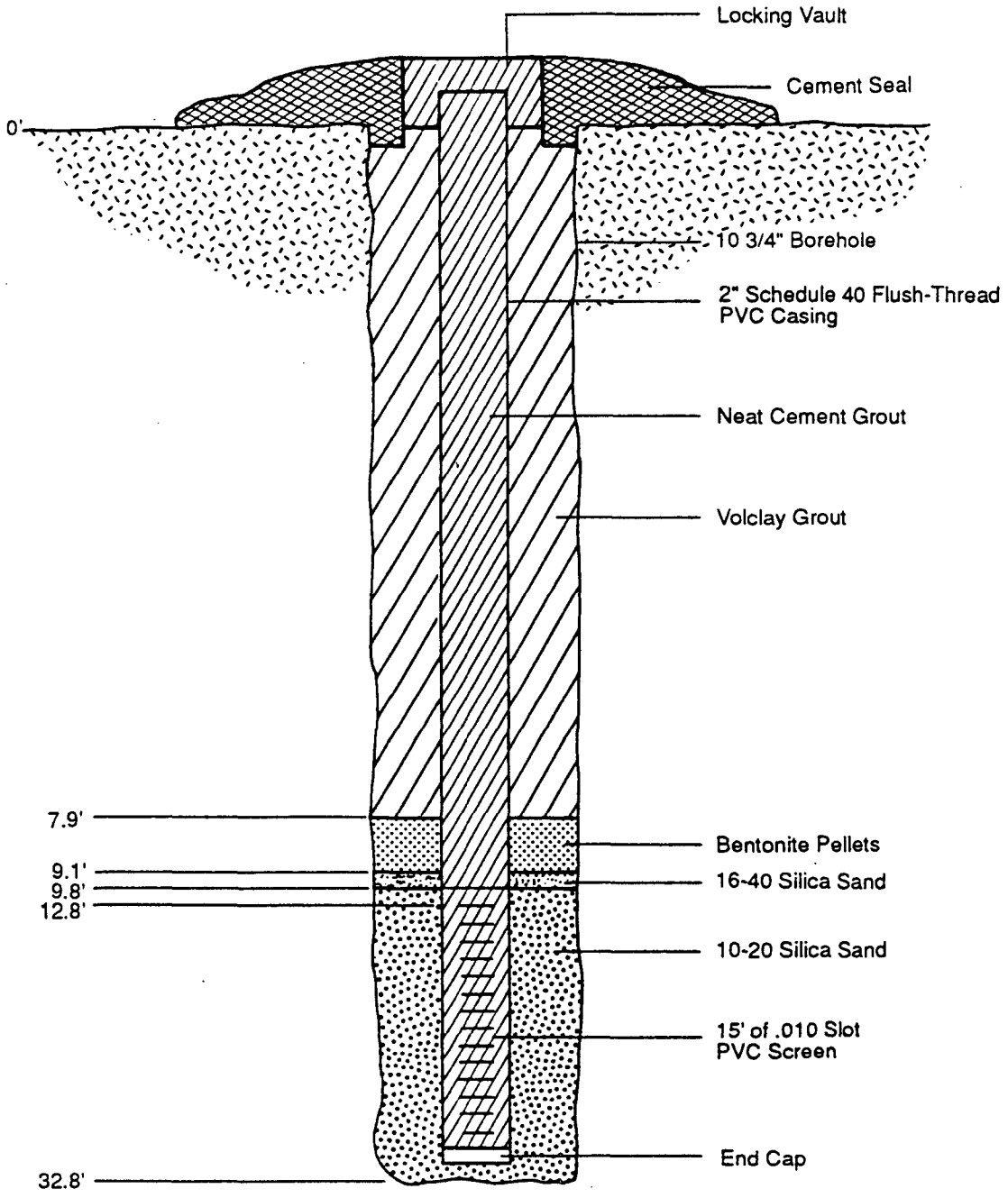
# WELL SCHEMATICS



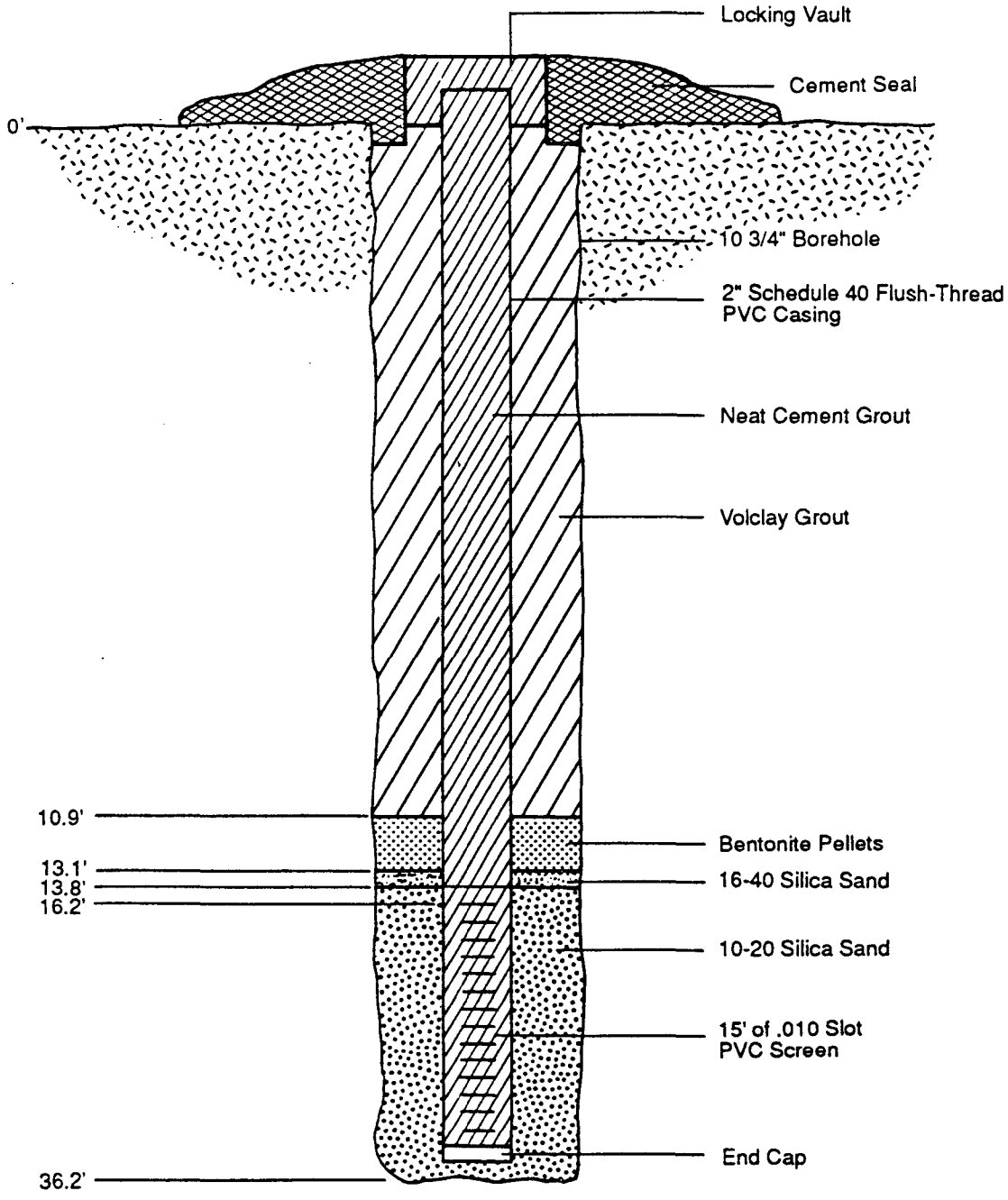

## Well Schematic 5-1A as Abandoned



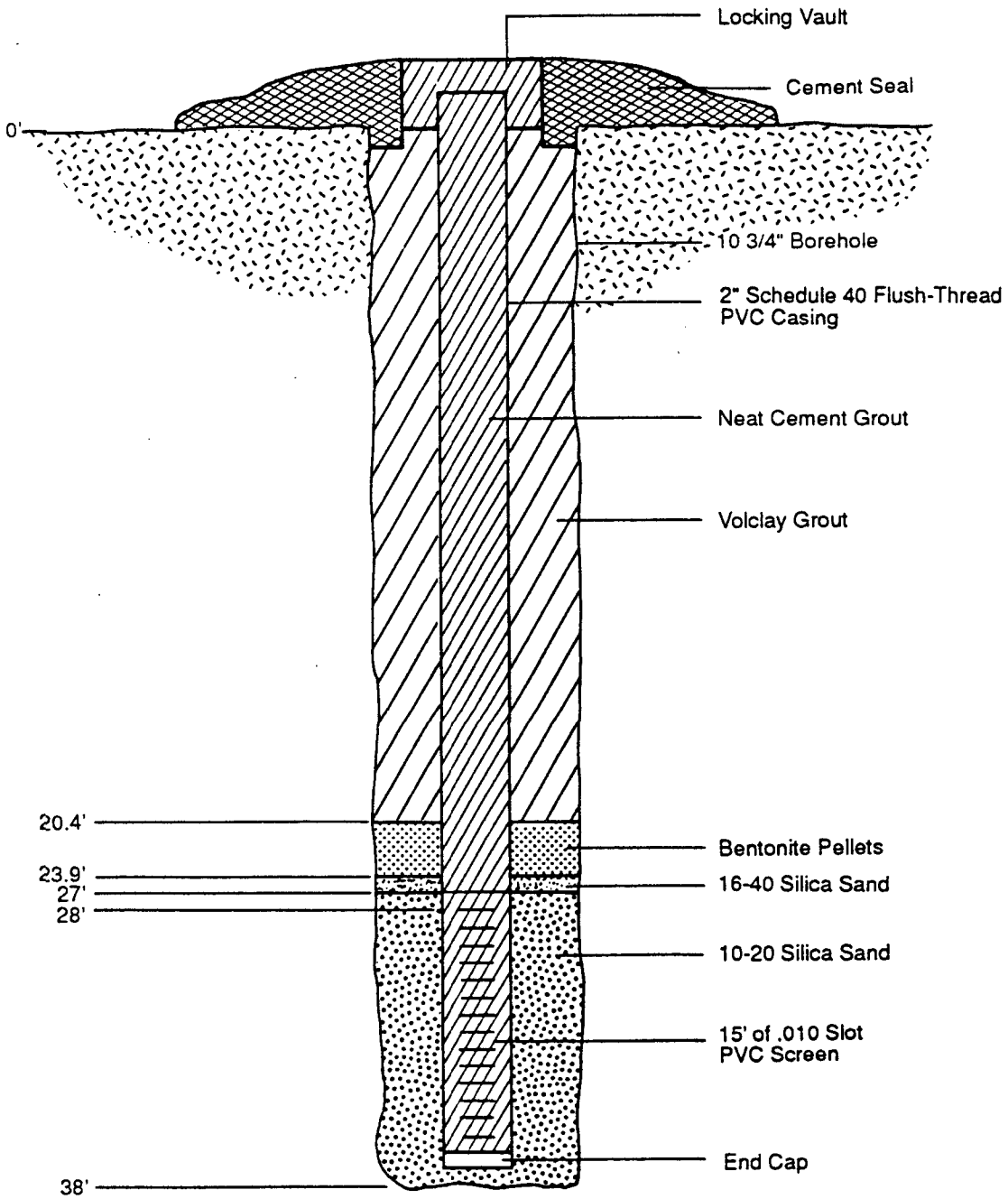

# Well Schematic 5-3A as Abandoned



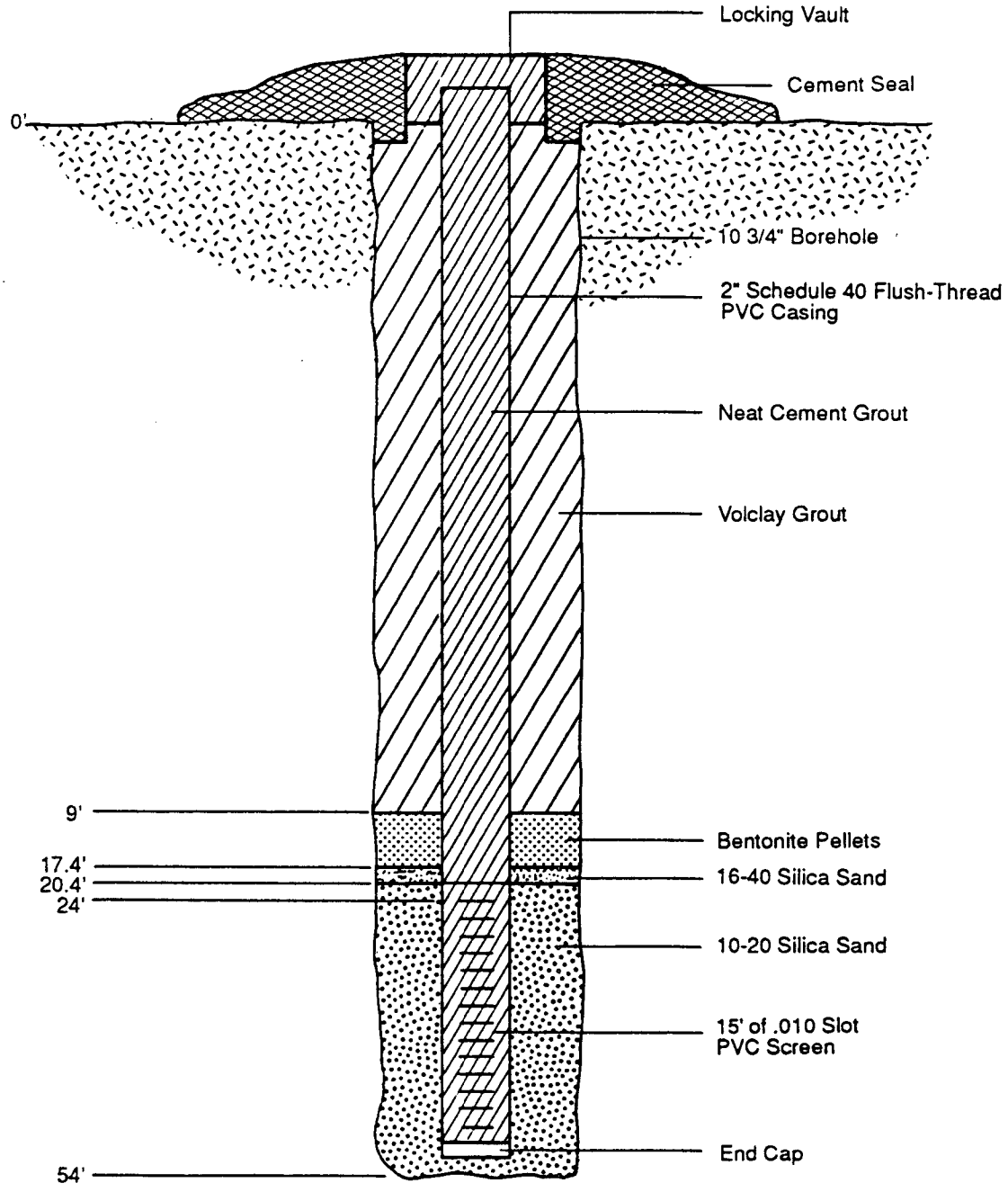

## Well Schematic 5-7B as Abandoned




## Well Schematic 5-8B as Abandoned




## Well Schematic 5-26B as Abandoned




## Well Schematic 5-27B as Abandoned