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BUILDING R-12 SKIMMER SYSTEM
STATUS REPORT
FOR NOVEMBER 1999
NAVAL WEAPONS STATION - EARLE
LEONARDO, NEW JERSEY

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1.0 INTRODUCTION/PROJECT OBJECTIVES

Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) has been contracted by the Northern Division, Naval Facilities Engineering Command (Navy) to recover free product from the shallow water table aquifer utilizing the existing recovery wells adjacent Building R-12, at the Naval Weapons Station (NWS) Earle located in Leonardo, NJ. This Summary Report is being submitted to satisfy the post construction requirements included in paragraph 1.2.1, Pre- and Post-Construction Documentation of the Statement of Services for Delivery Order No. 0051 under Remedial Action Contract No. N62472-94-D-0398.

The project objective for the Product Recovery at Building R-12 is the collection and removal of recoverable free product by means of a sub-surface recovery system and the proper disposition of recovered product.

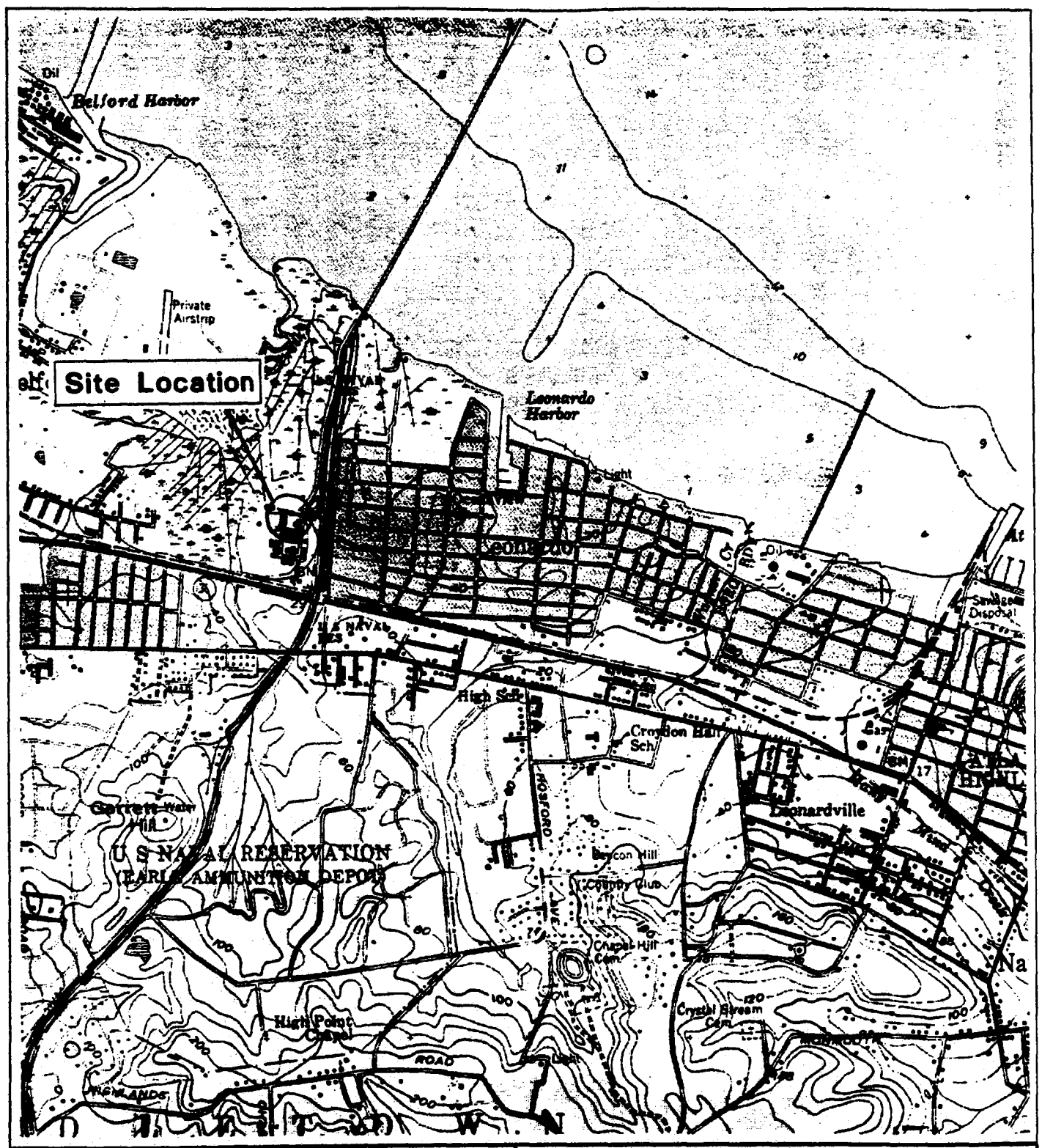
2.0 PROJECT LOCATION AND DESCRIPTION

Naval Weapons Station Earle (NWS-Earle) is located in Monmouth County in east-central New Jersey as presented on Figure 2-1, Site Location Map. The Base consists of a Mainside area and a Water Front area occupying a total of approximately 11,134 acres. The Mainside of the Base is located approximately 10 miles inland from the Atlantic Ocean. The Mainside and the Waterfront areas of the Base are linked by a narrow tract of land that serves as a right-of-way for a government road and railroad line.

NWS Earle is responsible for furnishing ammunition to the Naval fleet, and coordinates all port services and logistical support for home-ported and visiting ships. The Base also conducts safety inspections, supervises ammunition loading for the United States Coast Guard, and provides marine fire fighting capability and standby tug services. The Waterfront consists of an ammunition depot and associated piers for loading and servicing the Naval fleet.

Building R-12 is located in the Waterfront area of NWS-Earle along Road R1. The area of concern (AOC) is a small, grassy area adjacent to the northeast corner of the building. The three monitoring wells that are to be incorporated into the product recovery system are located in close proximity to the building and each other. The wells are 4-inch diameter wells, with screened intervals from 4 to approximately 10 feet below grade. Refer to Figure 2-2 for a detailed map of the AOC at Building R-12.

The source of contamination and free product is believed from a former underground storage tank (UST) near Building R-12 that was abandoned in place. The former UST was used for heating oil.



0 2000 4000 FT

Source: U.S.G.S. Topographic Maps (7.5 Minute)
Sandy Hook, NJ Quadrangle

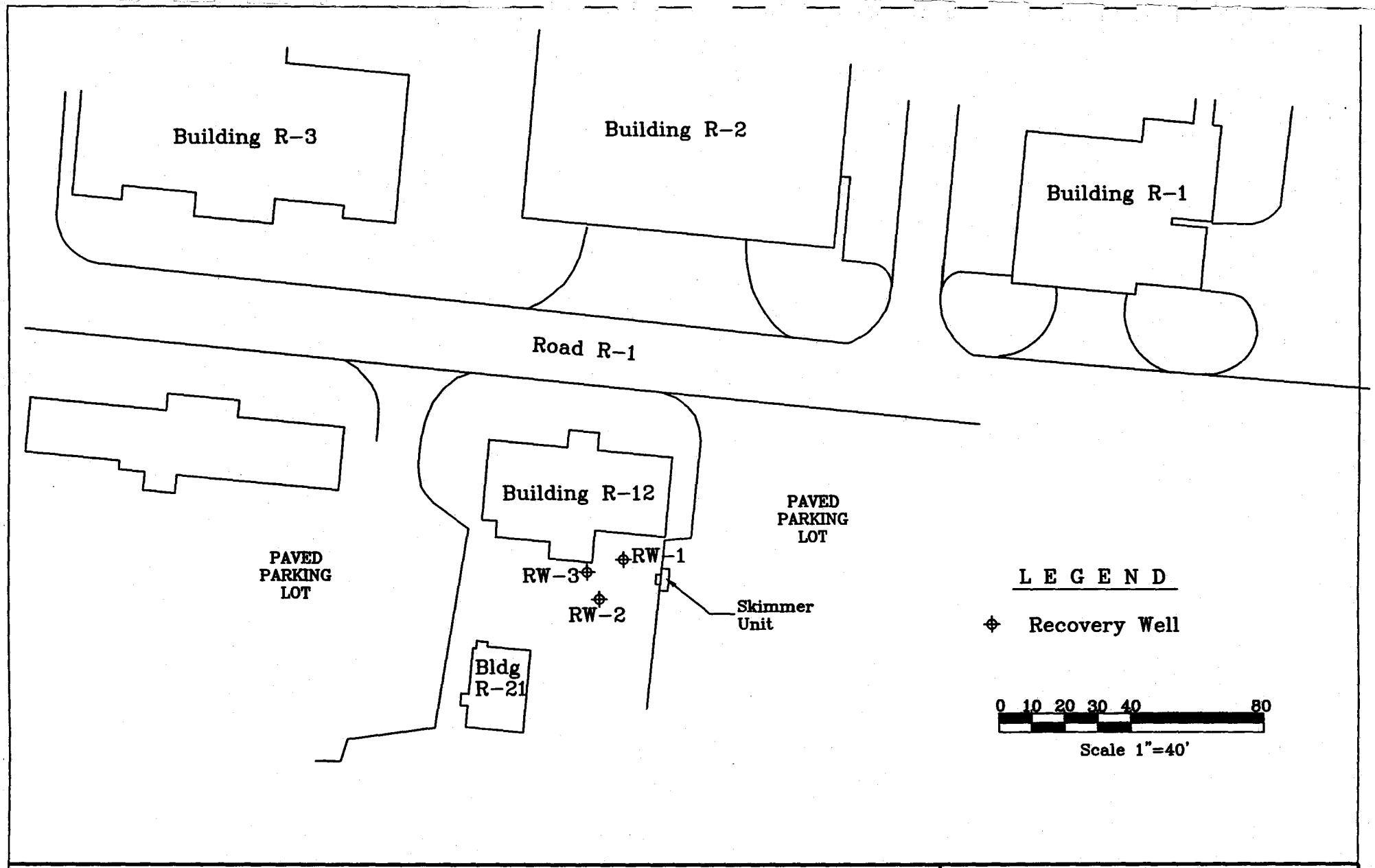
NWS – Earle

Colts Neck, N.J.

Figure 2–1
Building R-12

FOSTER WHEELER ENVIRONMENTAL CORPORATION

earle\siteloc.dwg



U.S. Navy RAC
Naval Weapons Station – Earle

Figure 2-2
Building R-12
Product Recovery Wells

FOSTER WHEELER ENVIRONMENTAL CORPORATION

navyrac\earle\bldgR-12

3.0 SITE ACTIVITES

3.1 EVALUATION OF BUILDING R-12 BASEMENT

The sub-grade rooms in Building R-12 were checked for evidence of free-product during the initial installation of the skimmer system. The floor drains and sumps were visually inspected for evidence of free-product infiltration. No evidence of free product was observed in the drains located in the basement of Building R-12. A PID organic vapor detector and a combustible gas indicator (CGI) meter were used to monitor the sub-grade rooms evaluate the potential for harmful organic vapors or explosive conditions within Building R-12. No PID or LEL readings above background were detected in the sub-grade rooms of Building R-12.

According to Navy personnel occupying Building R-12, and on-site observations, a concrete slab underlies the main portion of Building R-12, and there are only two sub-grade rooms in the back (eastern) portion of the building. The sub-grade rooms were evaluated for organic vapors.

3.2 OPERATION OF SKIMMER PUMP

The installation of the skimmer pump (Skim Rite), compressor unit and drum storage locker were completed by October 29, 1999. A licensed electrician installed a dedicated 115-volt, 20-amp circuit in the Building R-12 basement for operation of the skimmer system. A flammable storage locker was set up adjacent to the parking lot behind Building R-12. The flammable storage locker houses the product storage drums. The product storage drums are equipped with a high-level sensor that would automatically shut down the system upon activation. The compressor unit associated with the skimmer system was placed immediately behind the flammable storage locker. The compressor unit is in a self-contained box that is equipped with heat and is locked at all times. As an added precaution, the tubing used to transfer the extracted product from the well (above grade) to the storage shed, was enclosed in larger tubing to provide secondary containment in the event of a break in the main transfer tubing. Appendix A contains photos of the system set-up at Building R-12.

The skimmer pump, which was obtained from another Naval base, experienced several problems upon installation and operation in the recovery wells. The skimmer pump, while recovering oil, also continued to extract large quantities of water. The skimmer pump is designed to removed product, with little to no water. Any additional water recovered was processed through the bioslurper units at Site 16. The pump was dismantled, and worn membranes inside the skimmer pump were replaced. The pump was re-installed, but continued to remove water along with oil. Worn tubing and fittings inside the skimmer pump were replaced, and the skimmer pump began extracting oil with very little water. The pump operated efficiently for about a week, and then began to extract water again.

During November 1999, the skimmer pump was utilized in alternate weeks at recovery wells RW-1 and RW-3, since these wells contained the greatest concentration of product. Table 3-1 summarizes the period of skimmer operation at each recovery well.

Table 3-1: Cycle Operation of Skimmer Pump in Recovery Wells

Operational Period	Skimmer Pump in RW-01	Skimmer Pump in RW-02	Skimmer Pump in RW-03
11/1/99 – 11/4/99			X
11/4/99 – 11/10/99	X		
11/10/99 – 11/17/99			X
11/17/99 – 11/26/99	X		

3.3 PRODUCT MEASUREMENTS

An oil-water interface probe (Solonist) was used to the depth to water and product thickness in the recovery wells, and to obtain product levels in the 55-gallon product accumulation drum. Table 3-2 summarizes the measurements obtained from the recovery wells. Appendix B contains graphical representations of the water and product elevations in each recovery well during the month of November 1999.

Approximately 5.4 gallons of free-product were recovered from the recovery wells at Building R-12 during the month of November 1999. It should be noted that the skimmer pump is a passive product recovery system, and will only extract the product in the well (i.e., does not actively draw product into the well). This type of passive system relies on natural groundwater flow to the well, and density differences between water and hydrocarbons, to recharge nearby product into the well. Based on the initial product thickness measurements, the skimmer pump removed approximately 2.5 times the available product in recovery wells RW-1 and RW-3. Table 3-3 summarizes the original product thickness measurements in the wells and the approximate gallons of product in each well available for recovery. The product thickness measurements were multiplied by 0.653, the conversion factor for 4-inch diameter wells, to obtain the gallons of product in each well.

Table 3-2: Recovery Well Water and Product Measurements

Well No.	10/18/99			10/28/99			11/1/99			11/4/99			11/10/99			11/17/99			11/23/99		
	DTP	DTW	Prod. Thick.	DTP	DTW	Prod. Thick.	DTP	DTW	Prod. Thick	DTP	DTW	Prod. Thick	DTP	DTW	Prod. Thick	DTP	DTW	Prod. Thick	DTP	DTW	Prod. Thick
RW-1	9.05	11.19	2.14	9.44	9.93	0.49	9.44	9.94	0.50	9.38	9.40	0.02	9.30	9.75	0.45	9.50	9.73	0.23	9.52	9.73	0.21
RW-2	9.52	10.25	0.73	9.25	9.38	0.13	9.23	9.40	0.17	9.17	9.25	0.08	9.10	9.32	0.22	9.17	9.54	0.37	9.23	9.58	0.35
RW-3	9.42	10.57	1.15	8.75	9.17	0.42	9.54	9.60	0.06	9.29	9.46	0.17	9.42	9.43	0.01	9.46	9.84	0.38	9.63	9.77	0.14

DTP: Depth to product (in ft.) from top of PVC casing.
DTW: Depth to water (in ft.) from top of PVC casing.
Product Thick: Measured product thickness in the well.

Table 3-3: Gallons of Product Initially Available in Each Recovery Well (10/18/99)

Well No.	Product Thick. (feet)	Gallons
RW-1	2.14	1.40
RW-2	0.73	0.48
RW-3	1.15	0.75
Total Gallons:		**2.63**

4.0 CONCLUSIONS

The skimmer pump, which is over three-years old, was not in optimal working condition upon receipt at the site. The skimmer pump system was obtained from another Naval Base. While the pump and compressor unit visually appeared to be in good condition, problems developed upon operation of the pump. The pump was dismantled several times and components were replaced in an effort to repair the pump, which was extracting water in addition to the oil being recovered. Foster Wheeler worked closely with the manufacturer in order to trouble-shoot the problems. The pump would initially operate correctly, then begin to pull water again. The pump will be removed and shipped back to the manufacturer for an overhaul. The manufacturer suggested that the pump be overhauled, if the problems continued. The overhaul appears to be warranted due to the age of the pump, difficulties encountered, and the lack of operational maintenance record.

As demonstrated in the graphs contained in Appendix B, the skimmer pump is functioning in accordance with its design, which is to remove the existing product contained within the well casing. The pump will operate more efficiently when the problem of water extraction is resolved. Foster Wheeler will re-install the pump after maintenance, continue to monitor the wells and the product storage drum, and switch the pump between the wells.

The accumulated product has not been analyzed for recycling at this date due to the minimal quantity in the drum. The recovered product shall be laboratory-analyzed when the drum nears capacity.

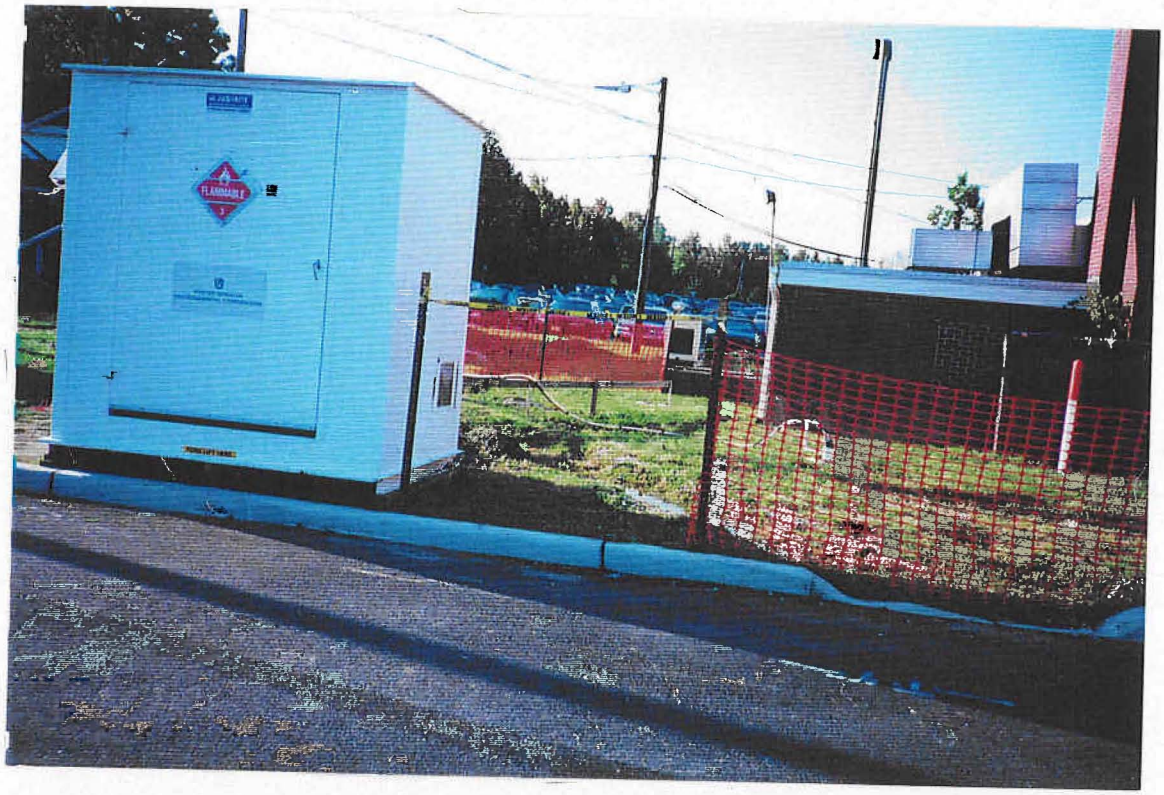


Photo 01: **The flammable storage shed and product skimming system located behind Building R-12.**

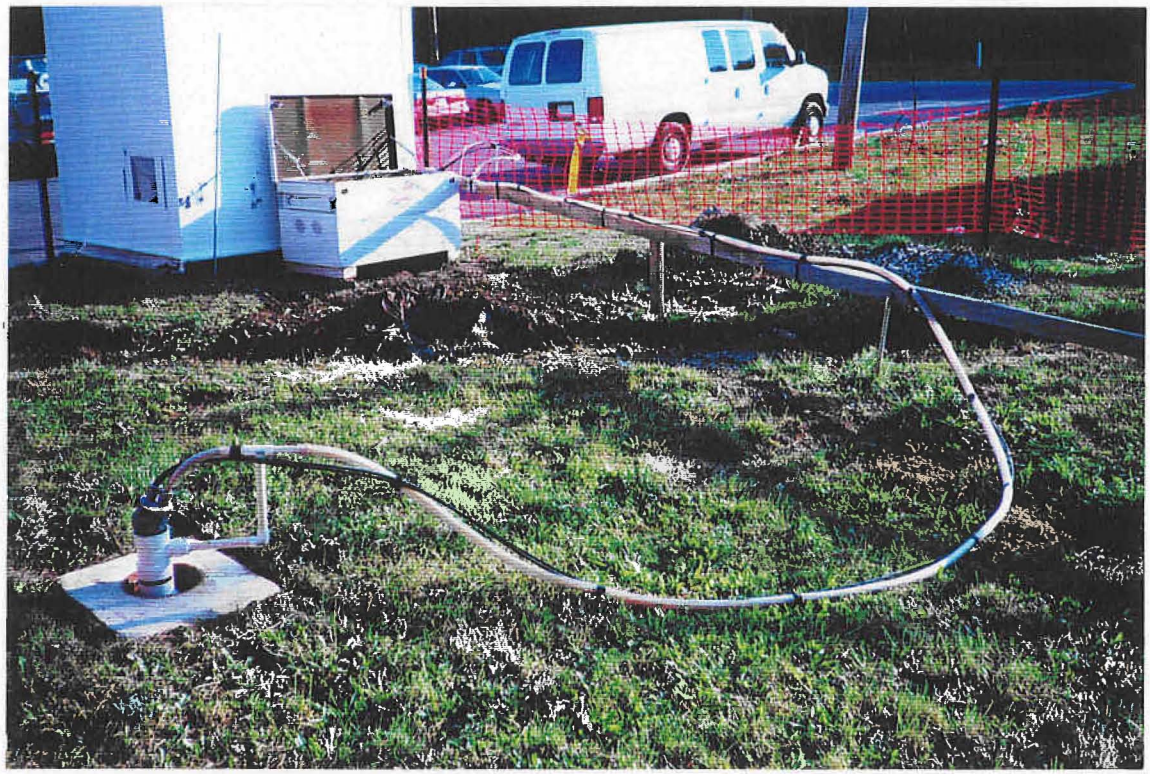


Photo 02: **Photo of skimmer pump box and air line and product discharge line to the recovery well.**

Photo 03: **Close-up of the air compressor skid associated with the product skimmer system.**

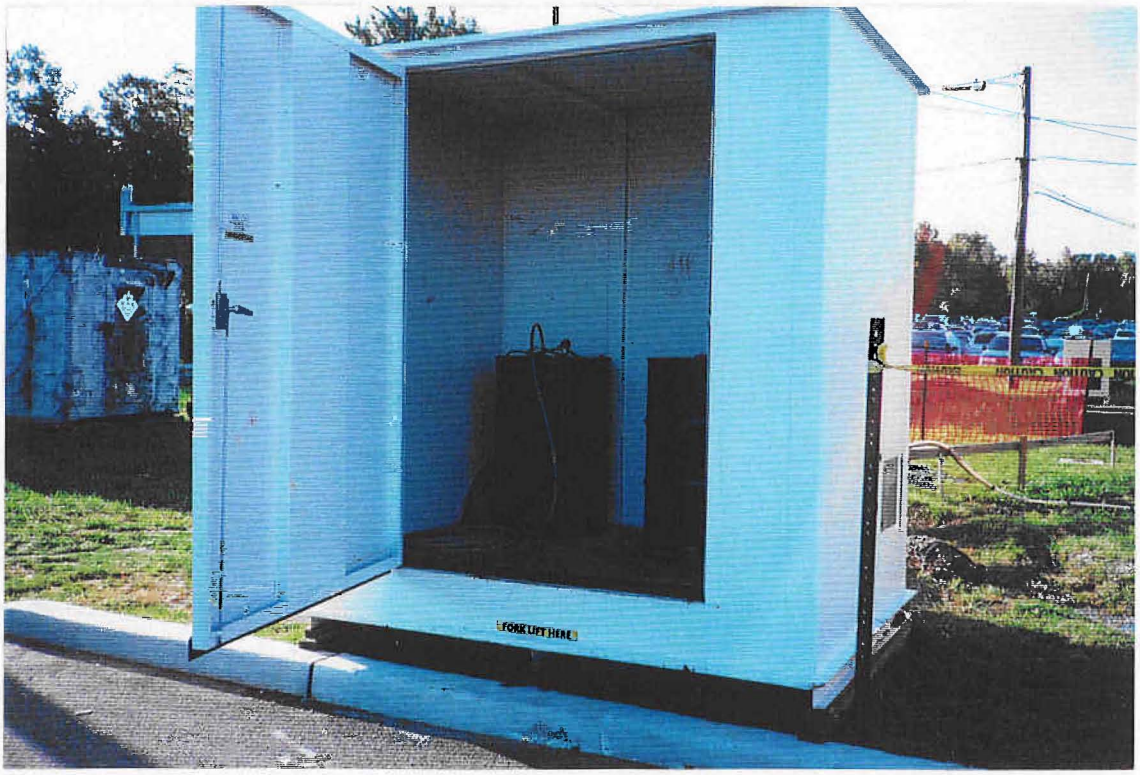


Photo 04: **Photo of inside (secondary containment) flammable storage locker.**

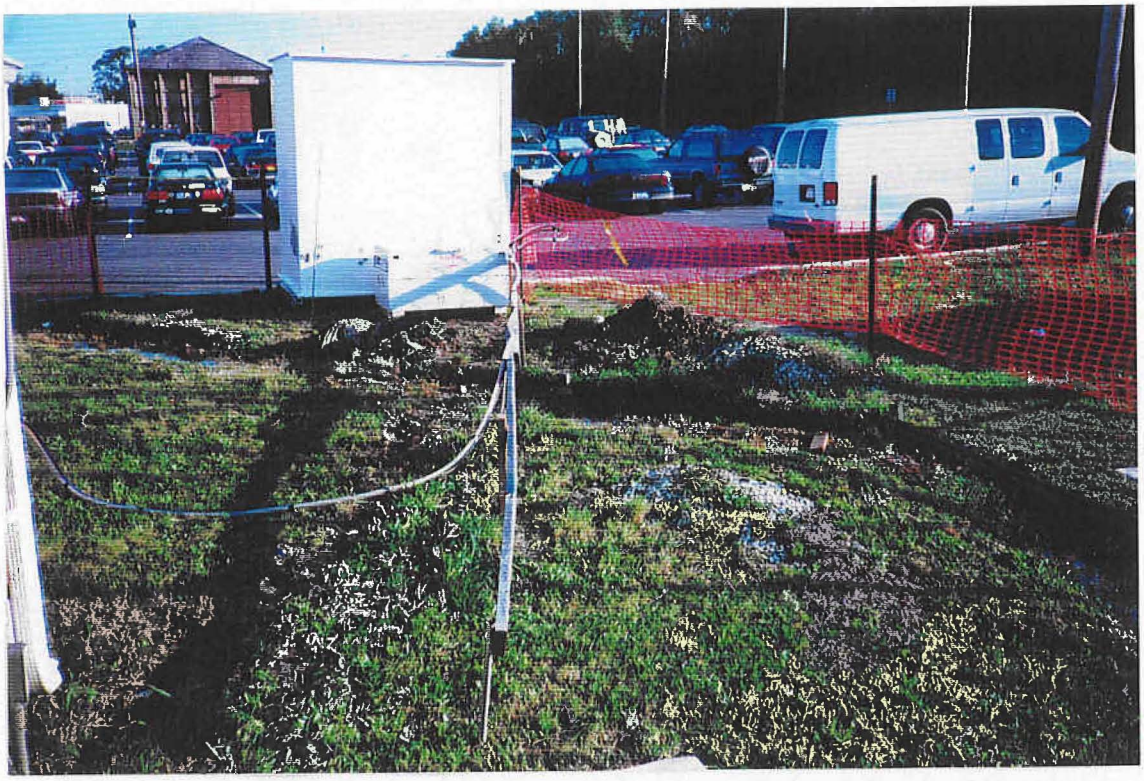
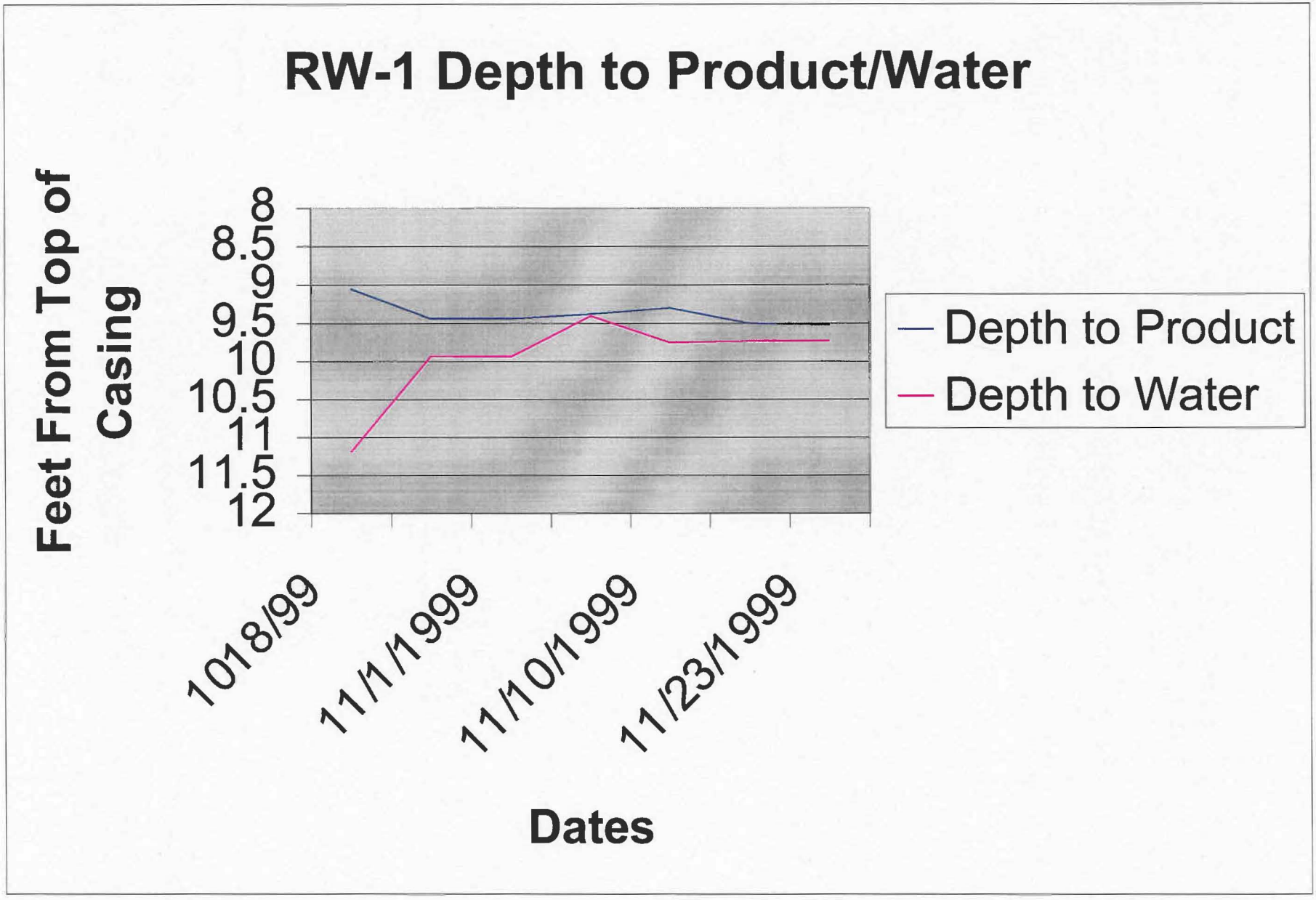
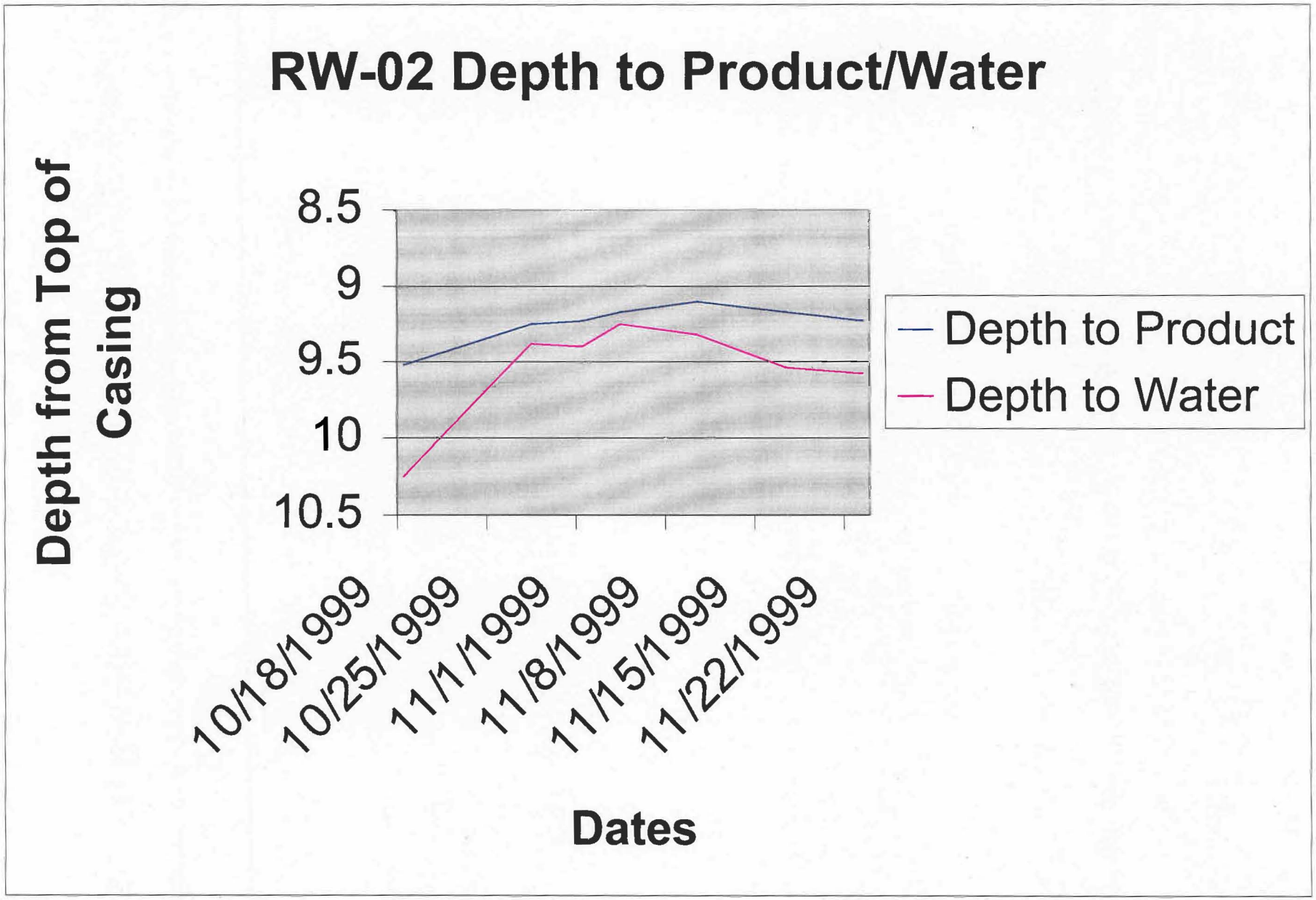


Photo 05: **Photo of line from skid unit and storage shed to the extraction well.**

Photo 06: **Photo of lines going to and from the extraction well. Note the product line is contained inside a secondary containment line.**


RW-1 Depth to Product/Water
Feet From Top of Casing
8
8.5
9
9.5
10
10.5
11
11.5
12
1018/99
11/1/1999
11/10/1999
11/23/1999
Dates
Depth to Product
Depth to Water


RW-02 Depth to Product/Water
Depth from Top of Casing
8.5
9
9.5
10
10.5
10/18/1999
10/25/1999
11/1/1999
11/8/1999
11/15/1999
11/22/1999
Dates
Depth to Product
Depth to Water