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REPORTS

DATE:

02-29-1995

GPM GAS CORPORATION

GPM GAS SERVICES COMPANY
A DIVISION OF PHILLIPS PETROLEUM COMPANY

4044 PENBROOK
ODESSA, TX 79762

September 29, 1995

Mr. William C. Olson - Hydrogeologist
New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division - Environmental Bureau
2040 South Pacheco
Santa Fe, New Mexico 87502

RE: Remediation and Monitoring Workplan for the Monument Booster Station
Lea County, New Mexico

Dear Mr. Olson:

The following is GPM Gas Corporation's (GPM) workplan for the proposed additional monitoring well, new recovery well, and product recovery system, at the Monument Booster Station as requested in your letter (Item number 1) to GPM dated August 24, 1995. Additional remedial action and monitoring activities will be performed as requested in item numbers 2 (a-d), 3, and 4 in your letter, and as approved in section 6.0 of the "*Subsurface Investigation and Preliminary Remedial Response for the Monument Booster Station Gas Compressor Station, Lea County, New Mexico*" (dated July 25, 1995).

Additional Monitoring Well

Based on the analytical results obtained during the subsurface investigation conducted by Geoscience Consultants, Ltd. (GCL) in May 1995, the areal extent of hydrocarbon-impacted groundwater has been estimated as covering a triangular-shaped area that covers most of the southern half of the facility (approximately 5 acres), however, hydrocarbon-impacted groundwater is not likely to have migrated beyond the north, east, and south boundaries of the facility. Due to the elevated benzene levels (0.265 mg/L) in MW-5, it could not be concluded whether the groundwater is impacted beyond the southwestern property boundary; therefore, the installation of an additional monitoring well (MW-6) located near the southwest boundary of the facility is proposed (Attachment 1, Figure 1).

Additional Recovery Well

Approximately 2½ feet of free product (crude oil) was measured in monitoring well MW-1 during the GCL investigation. The areal extent of free product in this area (former AST location) is not known but is roughly estimated to extend 50 to 100 feet downgradient (southeast) of MW-1. The installation of monitoring well (MW-7), located approximately 50 feet southwest of MW-1 as depicted in Figure 1, is proposed to determine the downgradient extent of free product and to serve as an additional recovery well for product removal if free product is present.

Monitoring Well Installation Methods

OCD-approved methods shall be used to construct the monitoring wells. GPM proposes to construct the two additional monitoring wells (MW-6 and MW-7) using 4-inch diameter Schedule 40 PVC well casing and screen. The monitoring wells shall be completed with approximately 10 feet of 0.020-inch slotted well screen below the water table and 5 feet of screen above the water table. The screened portion of the monitoring wells shall be surrounded with a filterpack consisting of 8/16 Brady sand or comparable sand and capped with a minimum 2-foot thick bentonite seal. The annular space above the bentonite seal will be sealed using a grout composed of portland cement with a 5% bentonite mixture that extends from the top of the bentonite plug to ground surface. A concrete pad shall be constructed at the surface and the top of the well casing protected with a locking steel well cover.

Sampling and Analysis Procedures

GPM shall use OCD-approved methods to obtain representative soil and groundwater samples. During the performance of advancing soil borings at the above-proposed monitoring well locations, soil samples will be obtained at 5-foot intervals and screened with a photoionization detector (PID) capable of measuring relative concentrations of volatile organic vapors. For each monitoring well, the soil sample with the highest PID reading and the sample immediately above the saturated zone shall be submitted for laboratory analysis.

Soil samples will be analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH), using EPA Methods 8020 and 8015, respectively. Groundwater samples from monitoring wells MW-6 and MW-7 shall be analyzed for BTEX (EPA Method 8020), polynuclear aromatic hydrocarbons (PAH) (EPA Method 8270), total dissolved solids, major cations and anions, and heavy metals. Field measurements of depth to water, and dissolved oxygen will also be obtained.

Product Recovery System

GPM has conducted product recovery operations from MW-1 using a gravity siphoning technique (SWAP^{tm}4). Equipment specifications for the SWAP^{tm}4 product recovery system is attached (Attachment 2). During field trials, this technique has proven to be successful in passively collecting 12 gallons of free product from MW-1.

The SWAP^{tm}4 system is designed for a 4-inch diameter monitoring well and includes the following materials: PVC body and tank components, urethane seals, fuel resistant vinyl tubing, ABS plugs, polypropylene and nylon fittings, and stainless steel and/or brass hardware. When the collector is installed, the system is sealed at the bottom in the water table. The collector inlet screen is placed slightly above the product/water interface. The collector will automatically remain at the interface during its operation as it is calibrated (weighted) prior to installation. The in-well tank (3-gallon capacity), which is connected to the collector by a sufficient length of plastic tubing and various fittings, is then filled with clean water. A tank cap is installed to seal the upper end of the system. Once the tank is sealed the plastic ball is able to float to the top. A small amount of water will drain down the

communication tubes which soon reaches equilibrium and creates a negative pressure in the tank and essentially an artificial extension of the water table. Free product extending below the inverted weir (downcomer tube) inside the SWAP^{tm}4 collector will float up to the tank through a small tube. Water of an equal volume, or near equal mass in cases where air is present in the tank, will flow down a second small tube. Thinner layers of floating product are removed by the wicking action of the hydrophobic filter strips installed in the collector.

After the tank has accumulated free product, the product can then be removed by simply lifting the in-well tank from the monitoring well and pouring it into an appropriate container for proper disposal. The plastic ball in the tank, being lighter than water but heavier than product, floats at the oil/water interface. Once the tank plug is removed only water can drain back leaving the product in the tank. If the system was inadvertently breached, top or bottom, air would enter the tank and the water would drain, but the product would remain in the tank.

Continued operation of the recovery system would require approximately 3 separate monthly visits to empty the 3-gallon in-well tank and reset it in the monitoring well. Thereafter, it is anticipated that quarterly visits, in conjunction with the quarterly monitoring and sampling program, should be sufficient to service the SWAP^{tm}4 recovery system. More frequent service visits will be conducted if warranted. It should be understood that the SWAP^{tm}4 recovery system requires the introduction of clean water into the aquifer which will be "SWAPPED" for product; thus the water is lost to the aquifer. Therefore, GPM proposes to use the locally available water supplied at the facility (Monument municipal water supply). Since a minimal amount of water is required for the recovery operations and water from the Monument water supply is potable, no adverse impact to the shallow aquifer shall occur from these recovery operations.

Listed below are various advantages of the SWAP^{tm} System:

- The SWAP^{tm} system is a relatively simple design that is quick and easy to install. It has only two moving parts (plastic check balls) and can be installed in less than an hour by an experienced user.
- Requires no electricity or external power sources.
- SWAP^{tm} can track up to 48" of water table fluctuation.
- Requires minimal maintenance and operating manpower. Because of its simple design, system failures are less likely to occur, resulting in less downtime and continuous recovery.
- It detects and recovers floating product generally as quickly as the product enters the well.
- The SWAP^{tm} can recover product to a sheen thickness, and will start, stop, and resume operation until the reservoir is full or there is no longer product available. Once recovered, the product stays in the tank until such time that personnel are available to empty it.

- It does not smear the product within the wellbore because it is not creating a cone of depression in the water table. This is a common problem with conventional pump-and-treat systems.

- Unlike conventional pump-and-treat systems, the SWAP™ product recovery system does not interrupt continuity of free product migration towards the wellbore. This feature allows cohesive forces to enhance the SWAP™'s radius of influence which is very important in recovering the optimal volume of free product.

- It can recover high viscosity hydrocarbons, including crude oil, unlike other passive skimmer designs which rely solely on a hydrophobic filter.

Due to the relatively low hydraulic conductivity (silty fine-grained sand) and thin saturated thickness of the aquifer (approximately 8 feet), the viscous nature of the free product, and some of the reasons listed above, a more 'robust' system such as a total fluids submersible pump or pneumatic pump groundwater recovery system is deemed inappropriate as it would not necessarily provide a higher recovery rate.

Investigation Report

GPM will submit the results of the above proposed investigation in the next quarterly sampling and monitoring report. The report shall contain the following:

- A description of all activities which occurred during the investigation, conclusions, and recommendations.

- A summary of the laboratory analytical results for the soil and groundwater sampling activities. The results for each monitoring well will be presented in tabular form and will show all past and present sampling results.

- An updated potentiometric surface map depicting the water table elevation of each monitoring well and groundwater flow direction.

- A product thickness map based on product thicknesses measured in monitoring wells MW-1 and proposed MW-7 (if free phase product is present).

- Geologic logs and monitoring well completion diagrams for each additional well.

All original documents submitted for approval will be submitted to the Santa Fe Office with copies provided to the OCD Hobbs District Office.

Schedule

We will pursue implementation of the scope of work described above within 30 days of your approval of this workplan. GPM will notify the OCD at least one week in advance of all scheduled activities such

that the OCD has the opportunity to witness the events and/or split samples. If you have any questions or concerns with our proposed workplan, please advise. I can be reached at (915) 368-1085.

Sincerely,

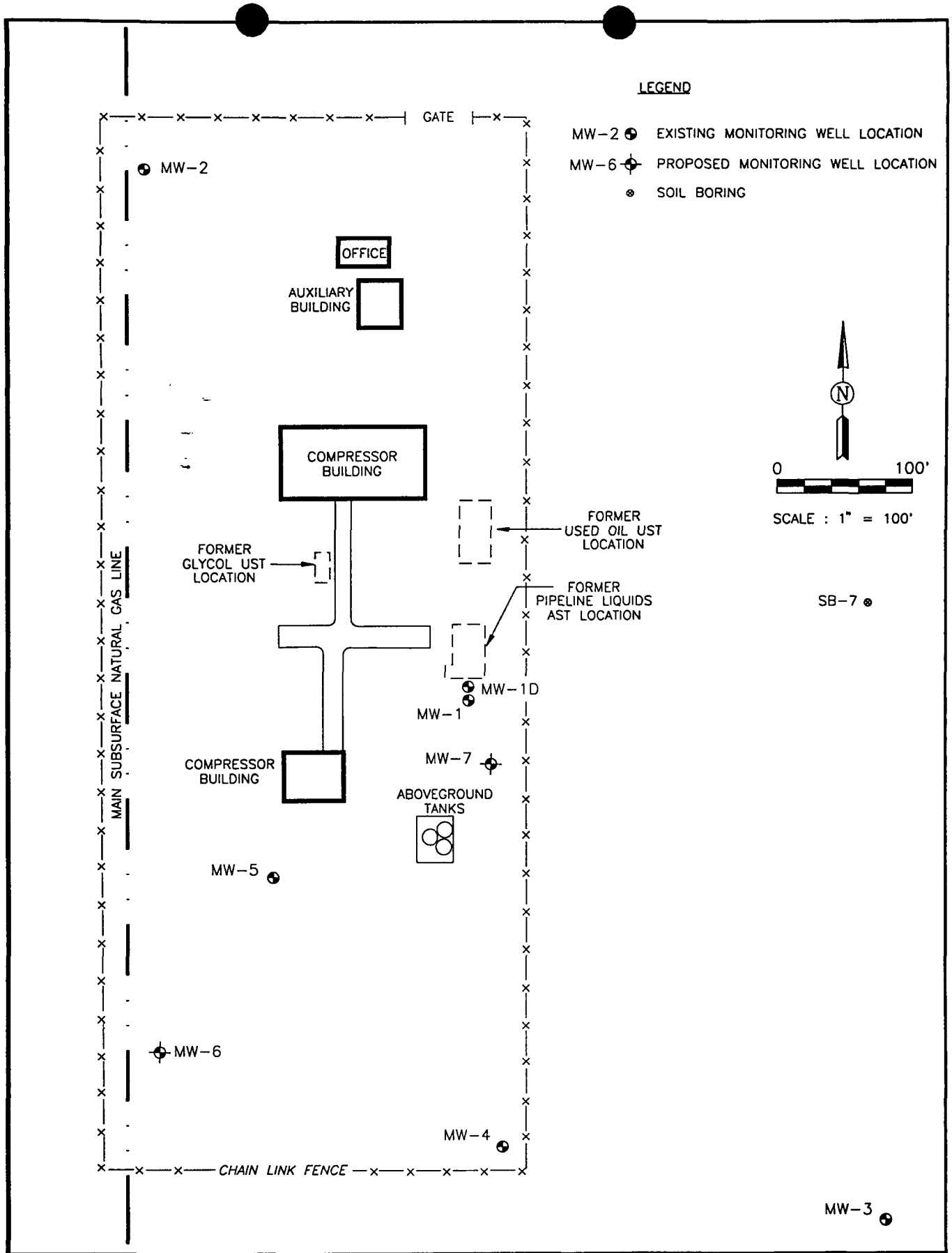
Vince Bernard
Safety & Environmental Director
New Mexico Region

Attachments

cc: Jerry Sexton, OCD-Hobbs District
Scott Seeby, GPM
Randall T. Hicks, GCL-Albuquerque
Gilbert J. Van Deventer, GCL-Midland

ATTACHMENT 1

Site Map



GCL

CLIENT: GPM GAS CORPORATION	
DATE: 9/15/95	REV. NO.: 2
AUTHOR: GJV	DRAWN BY: MP
CK'D BY: RTH	FILE: MONUMNT

FIGURE 1
MONUMENT
BOOSTER STATION
SITE MAP

ATTACHMENT 2

Manufacturer Specifications for SWAP[tm] Product Recovery System

SWAP4 - SPECIFICATIONS

Dimensions:

collector body - 3.5" OD x 28" OL (less fittings)

Materials:

body - PVC
float - PVC
internal - PVC, polypropylene
tubing, fittings and hardware (may vary) - PVC, PP, ABS, SS, urethane, nylon, vinyl

Volumetric Performance:

The recovery rate is dependent upon product viscosity, floating layer thickness, product availably, temperature, recovery tube ID, height of recovery, size of well and many other factors.

approximate recovery rates at 10 foot lift 68°F with 1/4" ID coiled tubes:

gasoline	- 40 gpd
#1 kerosene	- 35 gpd
#2 fuel and diesel	- 27 gpd

with 5/16" ID coiled tubes recovery rate is 1.77 times greater

Capacity (3" Iron Pipe Size tank):

standard 2.5 foot tank - .90 US gallons
optional 5.0 foot tank - 1.8 US gallons
"add-on" tank lengths are available from the factory

Lift Range (at 29.92" Hg):

top of the tank - approximately 33 feet above liquid table for water
supply line (0.83 SG) approximately 39.75 feet

Note: gasoline may boil under negative pressures less than 33 feet

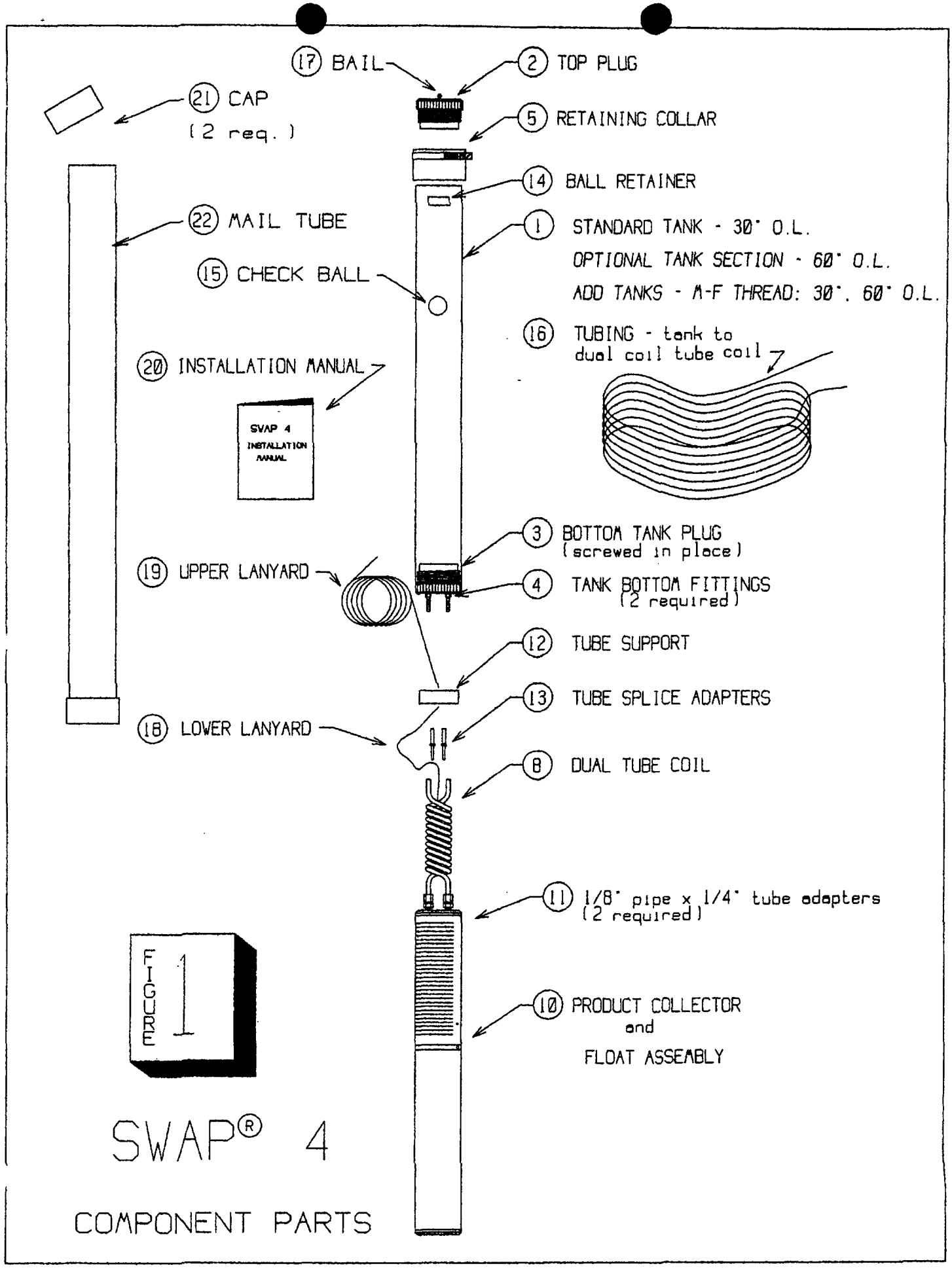


FIGURE 1

SWAP® 4

COMPONENT PARTS

FIGURE 2

SWAP® 2, 2F & 4

INITIAL DRAFT SETTING

1. REMOVE TOP CAP FROM MAILING TUBE

2. ADD WATER TO SUFFICIENT TO MAKE SWAP UNIT FLOAT

3. CHECK REFERANCE (small hole) WITH TUBE COIL EXTENDED HALF WAY

4. ADD WATER TO FLOAT TO MAKE UNIT SINK DEEPER

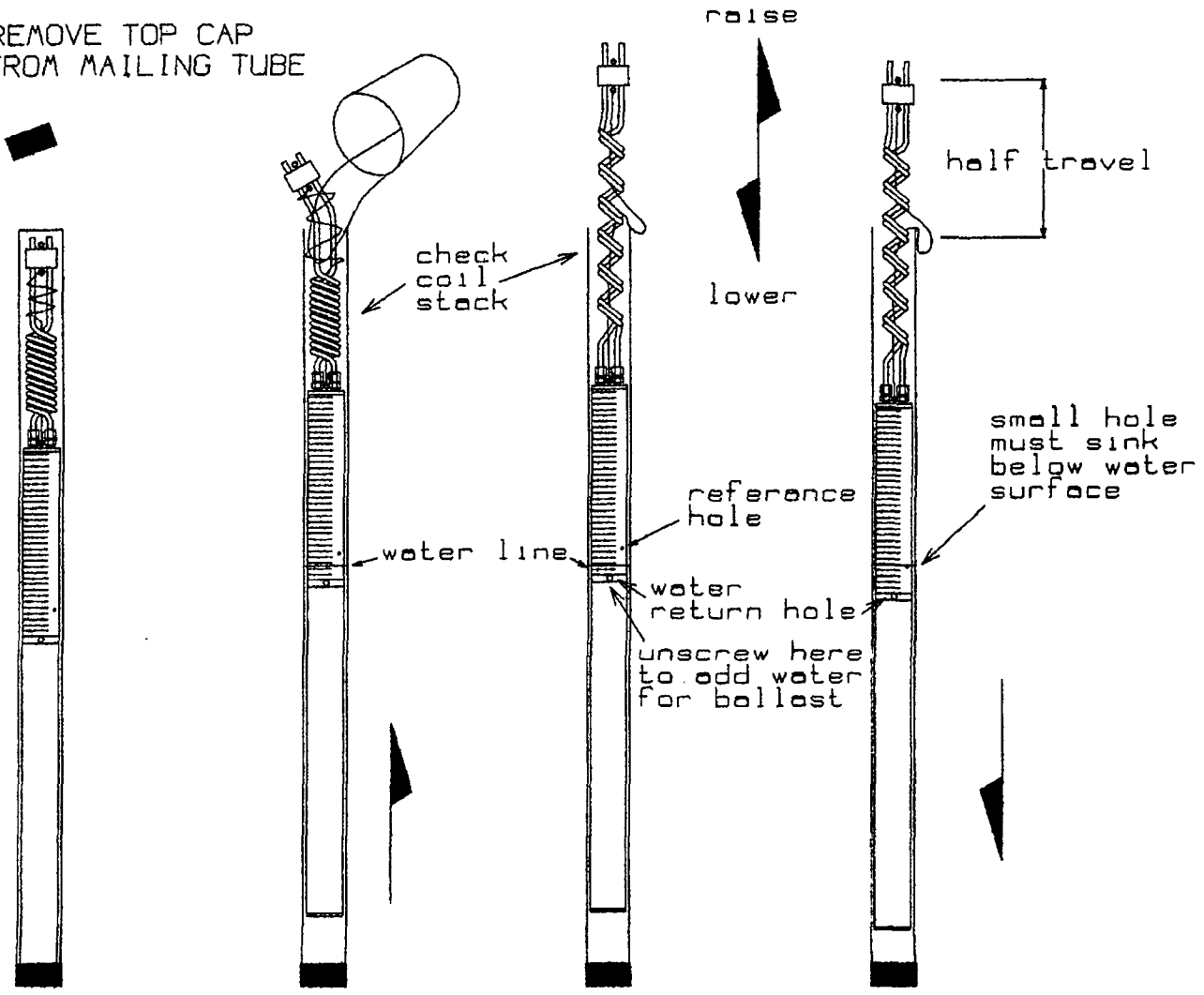


FIGURE 3

SWAP® 2, 2F & 4

TYPICAL "IN WELL" TANK INSTALLATIONS

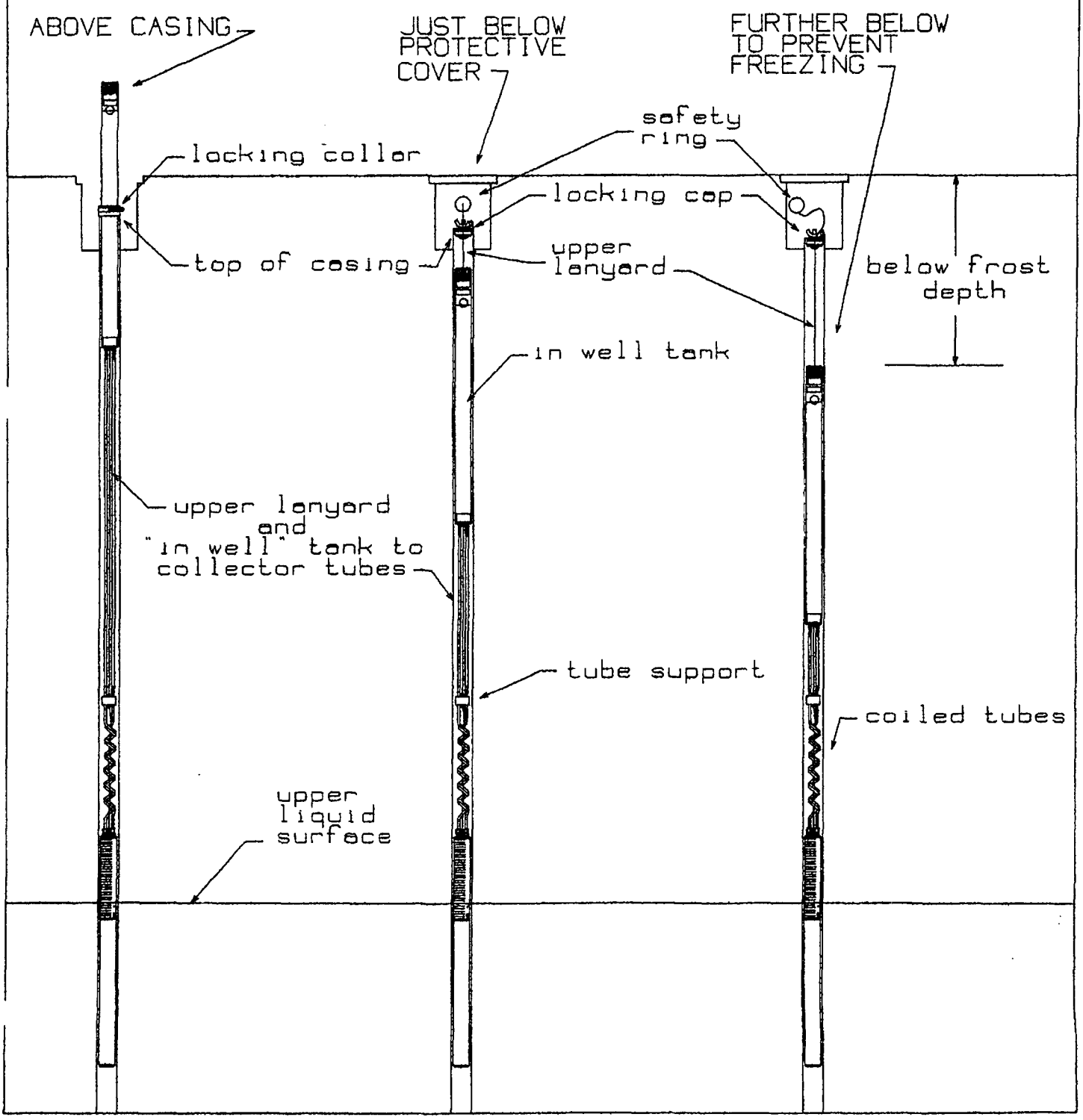


FIGURE 4

SWAP® 2, 2F & 4

TUBE DIMENTIONING & FINAL INSTALLATION