DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

19 JUL 1994

Ron K ✓
Steve P ✓
Please evaluate + comment as appropriate

377 ABW/EMR
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5659

Ms. Nancy Morlock, Environmental Engineer
RCRA Permits Branch
U.S. EPA Region 6
1445 Ross Ave, Ste 1200
Dallas TX 75202-2733

Dear Ms. Morlock

As part of the Stage 2C RFI at Kirtland AFB, Halliburton NUS (HNUS) will be investigating inflow and or outflow lines from oil/water separators, drains, and holding tanks. The work plan provided general procedures for locating these lines; however, HNUS identified a successful method to confirm line locations. We have attached a detailed summary of this methodology, involving a subsurface magnetometer using conductive and magnetic techniques. We will include this information in the final Stage 2C Waste Line RFI Work Plan; however, as your office previously agreed, we will not send you a copy of the final document.

Please call me at (505) 846-2773/0053 if you have any questions.

Sincerely

CHRISTOPHER B. DeWITT, R.P.G.
Acting Chief, Restoration Branch
Environmental Management Division

Attachment:
Waste Line Procedures

cc:
HNUS (R. Clark, K. Walter)
NMED-HRMB (Mr. B. Garcia)

STAGE 2C WASTE LINE LOCATION PROCEDURE

Included in the Stage 2C Waste Line Investigation are the inflow and or outflow lines of various units (i.e., oil/water separators, drains, holding tanks, etc.). This investigation will consist of soil sampling at varying depths adjacent to the lines. Although mechanical dispersion processes will cause lateral migration of contaminants, the highest concentrations are most likely to be found directly beneath the waste lines. It is therefore necessary to locate the lines as accurately as possible.

The method(s) proposed for locating Stage 2C waste lines include:

- Reference existing sanitary sewer line maps and drawings;
- Interview base personnel familiar with line locations at specific site investigated;
- Confirm suspected line location(s) using magnetic and cable locators.

For cost effectiveness and accuracy, the contractor will reference available maps of waste lines as the first option. If maps are not available or preliminary field investigation indicates they may not be accurate, the contractor will interview base personnel involved in the installation, operation, and or maintenance of the unit. If these interviews fail to provide enough information for accurate waste line location, the contractor will use an electronic location device.

Various electronic location devices exist. The capabilities and limitations of the difference devices and use methods depend on the construction, location, and depth of the line, soil composition, soil moisture, and electromagnetic interference (e.g., power lines, electric fences, other nearby metallic objects). The device to be used in this investigation, a Schonstedt© Model MAC-51B magnetic and cable locator with option MT-1 transmitter (mole), was selected because of its depth of detection sensitivity and versatility in detecting difference types of lines under varied conditions. The unit's sensitivity allows detection of a 4-inch cast-iron pipe at depths to 12 feet; when used with the MT-1 transmitter, its detection sensitivity increases to 18 feet. To detect different types of lines, the instrument provides four distinct modes of operation:

Magnetic locator. The instrument detects the magnetic field produced by a ferrous metal pipe. This is the simplest and fastest mode of operation but has two limitations: 1) the line must be constructed from a ferrous metal; and 2) the instrument provides no method for determining depth in this mode. The magnetic locator mode will be used in cases where the waste line is constructed from a ferrous metal line, and line depth is known.

Inductive. A transmitter placed on the ground surface parallel to the waste line creates an alternating circumferential field around the line itself. The line, if constructed of conductive material, will transmit the signal along its length until it ties into a line constructed of non-conductive material. The receiver unit locates the line by picking up the induced signal. By varying the angle of the receiver, line depth can be estimated as well. This method requires prior knowledge of the location of a small segment of line. The inductive method is the method of choice when lines are constructed of non-ferrous metal or depth is unknown.

Conductive. The transmitter creates a signal that is applied directly to the line with clamps. The line, if constructed of conductive material, transmits the applied signal along its length until it ties into a line constructed of non-conductive material. The receiver unit locates the line by picking up the applied signal. This method varies from the inductive method only in how the signal is applied. The conductive method requires access to at least one point along the line. The contractor will use this method will when results from the magnetic locator or inductive methods are unsatisfactory, and a segment of line is accessible.

Remote transmitter. A miniature, remote transmitter (mole) is introduced into the line, producing a continuous tracing signal. The mole is advanced in the line using a plumber's snake; as the receiver nears the mole, the signal strength increases. The mole is located where the maximum signal is produced. Tracing the mole's location indicates how the line runs. The contractor uses this method to locate lines constructed of non-conductive materials or extra depth detection (18 feet versus 12 feet using the other methods) is necessary. A 200-foot snake is sufficiently long enough to locate the inflow/outflow lines of the investigated units.

Special Situations

The procedures listed above should be adequate to allow line detection in most situations. However, circumstances at some units may complicate or even prevent use of the listed procedures. The following situations are anticipated:

Access to inflow/outflow lines only through tank. It may be necessary to drain underground tanks to gain access to the inflow/outflow lines. The most opportune time for locating the inflow/outflow lines of active units would be when they are routinely serviced and or maintained. In some instances, however, this may not be possible: it may be necessary to vacuum the unit's contents outside its maintenance schedule. In these cases, the contractor will use a transfer pump to move the unit's contents into a trailer-mounted poly-drum. Unless analysis indicates otherwise, the unit's contents will be handled as RCRA waste, and stored in an area meeting satellite accumulation area requirements. If the unit's contents are non-RCRA waste, the vacuumed material will be placed back in the unit after line location activities are completed for that unit. If the unit's contents are RCRA waste, the material will be transferred to a RCRA waste storage area.

The contractor may need to enter the various units to access the inflow and outflow lines. In such instances, access will be a confined space/limited egress (CS/LE) entry. Specific procedures are implemented during CS/LE activities, and include identifying potential hazards; monitoring the presence and or concentrations of those hazards; implementing safety procedures specific to the hazards and concentrations present; and continual monitoring and communication during CS/LE activities.

Line blockage prevents advancement of remote transmitter. When line blockage prevents the snake or fish tape advancement, the contractor will note the location of the line blockage and attempt access from the opposite end of the line.

Line cannot be accurately located by any of the procedures listed above. Because of site conditions or equipment limitations, it is possible a line cannot be located using the magnetic and cable locator. Examples of this situation are:

- The line is too deep to be detected by the magnetic and cable locator;
- The remote transmitter cannot be advanced through a non-conductive line due to numerous blockages or a small inside diameter;
- Strong electromagnetic interference or other buried objects prohibit accurate line location.

Under these circumstances, the contractor will consider following options:

- If the inflow and outflow locations or other available information indicate the line is less than 3 feet deep, the contractor will dig one or more trenches perpendicular to the suspected line direction to try and locate the line;

- The contractor will estimate the line location using the best available information, including inconclusive magnetic and cable locator results, surficial evidence of trenching, and or interpolation between known line locations.

A flow chart showing the process for choosing a line location method is at Figure 1.

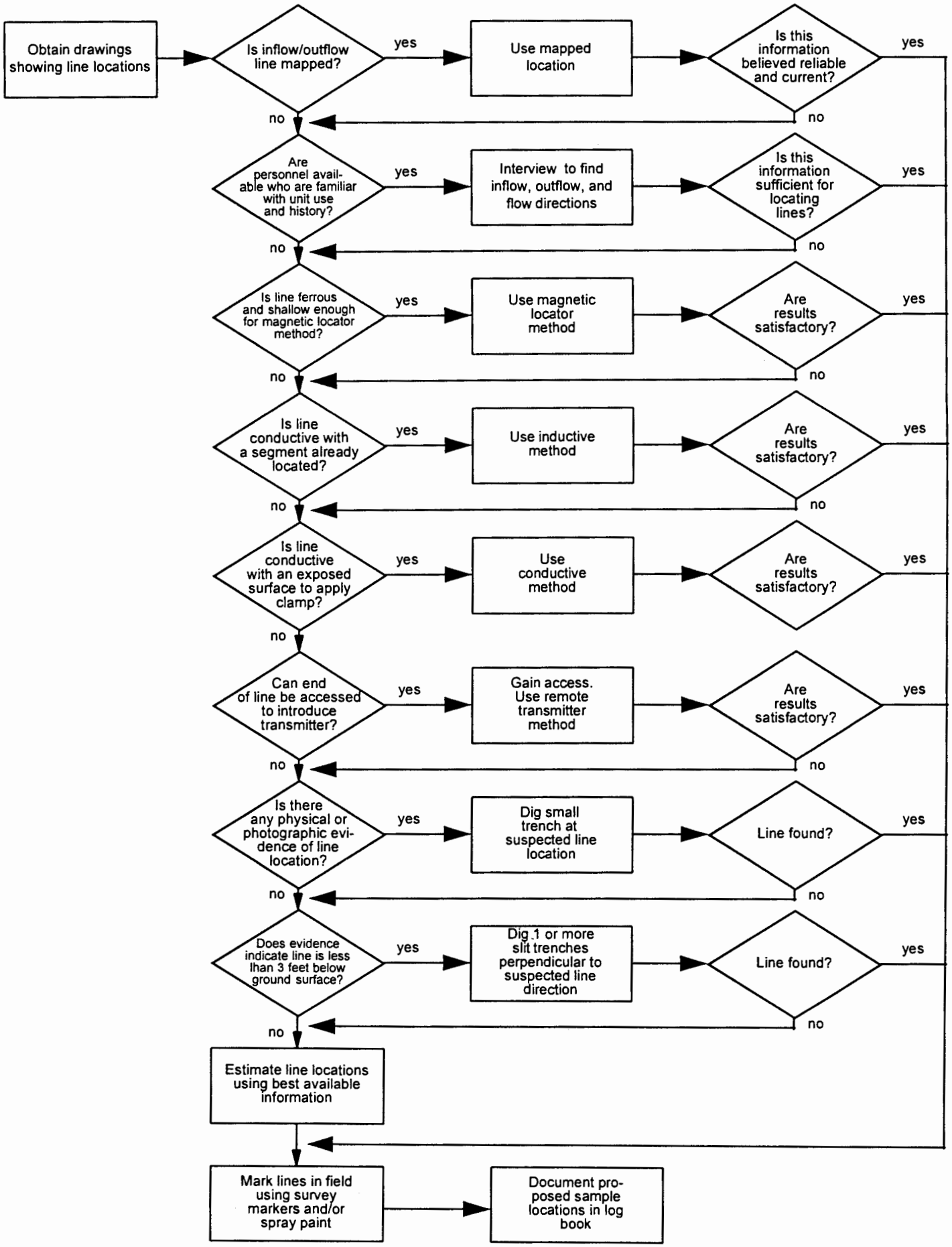
Obtain drawings showing line locations
Is inflow/outflow line mapped?
yes
Use mapped location
Is this information believed reliable and current?
yes
no
no
Are personnel available who are familiar with unit use and history?
yes
Interview to find inflow, outflow, and flow directions
Is this information sufficient for locating lines?
yes
no
no
Is line ferrous and shallow enough for magnetic locator method?
yes
Use magnetic locator method
Are results satisfactory?
yes
no
no
Is line conductive with a segment already located?
yes
Use inductive method
Are results satisfactory?
yes
no
no
Is line conductive with an exposed surface to apply clamp?
yes
Use conductive method
Are results satisfactory?
yes
no
Can end of line be accessed to introduce transmitter?
yes
Gain access. Use remote transmitter method
Are results satisfactory?
yes
no
no
Is there any physical or photographic evidence of line location?
yes
Dig small trench at suspected line location
Line found?
yes
no
no
Does evidence indicate line is less than 3 feet below ground surface?
yes
Dig 1 or more slit trenches perpendicular to suspected line direction
Line found?
yes
no
no
Estimate line locations using best available information
Mark lines in field using survey markers and/or spray paint
Document proposed sample locations in log book

FIGURE 1