APOLLO GEOPHYSICS CORPORATION
Engineering, Geology, Environmental, Construction & Mining

Tuesday, January 13, 1998

Brian Custer
Dames & Moore, Inc.
500 Market Place Tower
2025 - 1st Avenue
Seattle, Washington 98121

AGC's File No.: **98-103**

Re: **UST Locate**
Phase II Investigation, Diamond Transport Property
Seattle, Washington

Dear Mr. Custer,

This letter reports the results of geophysical exploration for underground storage tanks (UST) and buried drums at the above referenced site. The site is located on 912 Dexter Avenue North, Seattle, Washington. The field work was completed on January 9th, 1998 by a two person field crew from Apollo Geophysics.

We investigated the site with an Electromagnetic (EM) instrument, which locates buried metal objects. We traversed the site with the EM instrument on approximate 5 foot line spacings, which produced target anomalies for the Ground Penetrating Radar (GPR). We further investigated the anomalies using GPR, which enabled us to identify anomalies as possible UST's, underground utilities, or demolition debris. Ground Penetrating Radar established a relative depth, size and ground projection of the object; (i.e. to determine if the object was indicative or was not indicative of a UST). Small objects in the near surface, 1 to 2 feet, will respond the same as a larger object (UST) at depth.

RESULTS OF THE GEOPHYSICAL SURVEY

Due to the significant amount of metal scrap debris scattered across the site, we had an unusual amount of cultural interference with the EM instrument. The EM instrument has a simplistic design and the null adjustment can be skewed by a large amount of cultural interference. Thus, the cultural interference limited the use of the EM unit at the site.

We were notified by Mr. Michael Uchacz of Dames & Moore, Inc. about several primary target areas for GPR evaluation. We traversed these areas with the GPR to evaluate their potential as UST or buried drum locations.

We investigated the northwest corner of the site, where buried drums were suspected. We traversed the suspected buried drums area with the GPR at approximate 3 foot centers on east to west traverses. The suspected buried drums location produced no noticeable hyperbolic images, which indicate a presence or previous presence of buried drums. The traverses did indicate the presence of a large amount of scattered debris. The GPR traverses are shown in Figure 2 through 7.

We traversed the metal canopy area in a similar form as the buried drum area at approximate 3 foot centers on north to south traverses. An area under the metal canopy produced a square shape, which may be a potential UST. Due to the square shape, the anomaly may or may not be a UST. Sufficient contrast between the anomaly and surrounding material exists. We recommend the area for direct exploration.

On the southeast corner of the metal canopy, we found a suspected UST, which produced good results. The suspected UST produced typical GPR Imagery results from a typical UST. We found evidence of a pipe alignment from the existing building to the suspected UST, which may indicate a fueling line. The GPR Imagery records are shown in Figures 8 & 9.

We trolled back and forth in front of the bay doors, but didn't produce much of anything in the way of suspected USTs. Bay 1, 2, 3 & 4 were investigated for any possible waste oil or any other suspected USTs. None of the four bays produced any evidence, which would indicate a suspected UST. The only noticeable area was on the northeast corner of the building. We noticed a possible UST fill spout and traversed the area with GPR. We believe, that the GPR Imagery records show a suspected waste oil UST. We have included the GPR Imagery records in Figures 10 & 11.

All targets were marked in the field with environmentally degradable paint and the approximate anomaly locations are shown on the attached site plan, Figure 1. The vertical scale white/black dashed lines across each record are at 2 foot intervals. The horizontal scale thin black lines across each record are at 8 nanosecond intervals. The normal relationship between radar time and actual depth in feet for the Seattle area is approximately 4 to 4.5 nanoseconds per foot of depth. It should be noted, that this relationship holds true in a general sense. Variations of water content, silt content and other factors, such as the presence of concrete flooring, may also change this relationship. Suspected pipes, demolition debris, etc. were not marked in the field.

ELECTROMAGNETIC

The electromagnetic, or EM device, transmits and receives an electromagnetic signal. The EM signal is transmitted through the ground, which in turn radiates a signal that is dependent on the ground conductivity and which is also received at the receiver. The two signals, the transmitted and ground response EM waves, are balanced for a zero response in the instrument. When the ground conditions change, for example, when the transmitted signal encounters buried metal, the balance or null point changes, and the instrument responds with an audible signal. Depending on the size of the metal object, the penetration is up to 10 feet in depth. The EM search was limited in areas, where reinforcing steel was present in the concrete or immediately adjacent to any above ground metal objects on the site.

GROUND PENETRATING RADAR

Apollo Geophysics used a GSSI SIR System-3 with a 500 MHz antenna for the UST Search. The radar antenna transmits a 2.3 nanosecond (Ns) pulse at a frequency of 500 MHz for a selected scan rate of 16 times per second. When the signal encounters a change in electrical properties/permittivity, a portion of the signal energy is reflected back to the surface. The character of the reflection is used to define the source of the reflection. The reflected signal is received by the antenna, processed by internal electronics with signal gain control and recorded in analog format on a internal printer. The radar displays the data in real-time, which enables us to review the data in the field for on the spot suspected UST locations.

A normal circular UST will produce, in cross-section, a hyperbolic reflection. A traverse parallel to the centerline of the UST will show a horizontal (if there is no velocity or elevation change along the traverse) reflection, with a partial hyperbolic signatures at both ends of the UST. The hyperbolic signature is the result of "seeing" the tank before the center of the antenna is over the tank.

WARRANTY OF SERVICES

All geophysical information presented are based upon geophysical measurements made by generally accepted methods and field procedures and Apollo Geophysics' interpretation of these data. The geophysical results are, therefore, interpretative in nature and are considered to be a reasonably accurate presentation of existing conditions within the limitations of the methods employed. Services performed by Apollo Geophysics under this agreement are conducted in a manner consistent with, but no less than, that level of care skill ordinarily exercised by members of the profession currently practicing under similar conditions. We cannot guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, cost, damages or expenses incurred or sustained by the Client resulting from any interpretation made by any of our officers, agents or employees. No other warranty, expressed or implied, is made. Apollo Geophysics recognizes that subsurface conditions may vary from those encountered at the location where geophysical or other explorations are made. The data interpretations and recommendations made by Apollo Geophysics are based solely on the information available to them at the time of performance; and Apollo Geophysics shall not be responsible for the interpretation, by others, of the information developed.

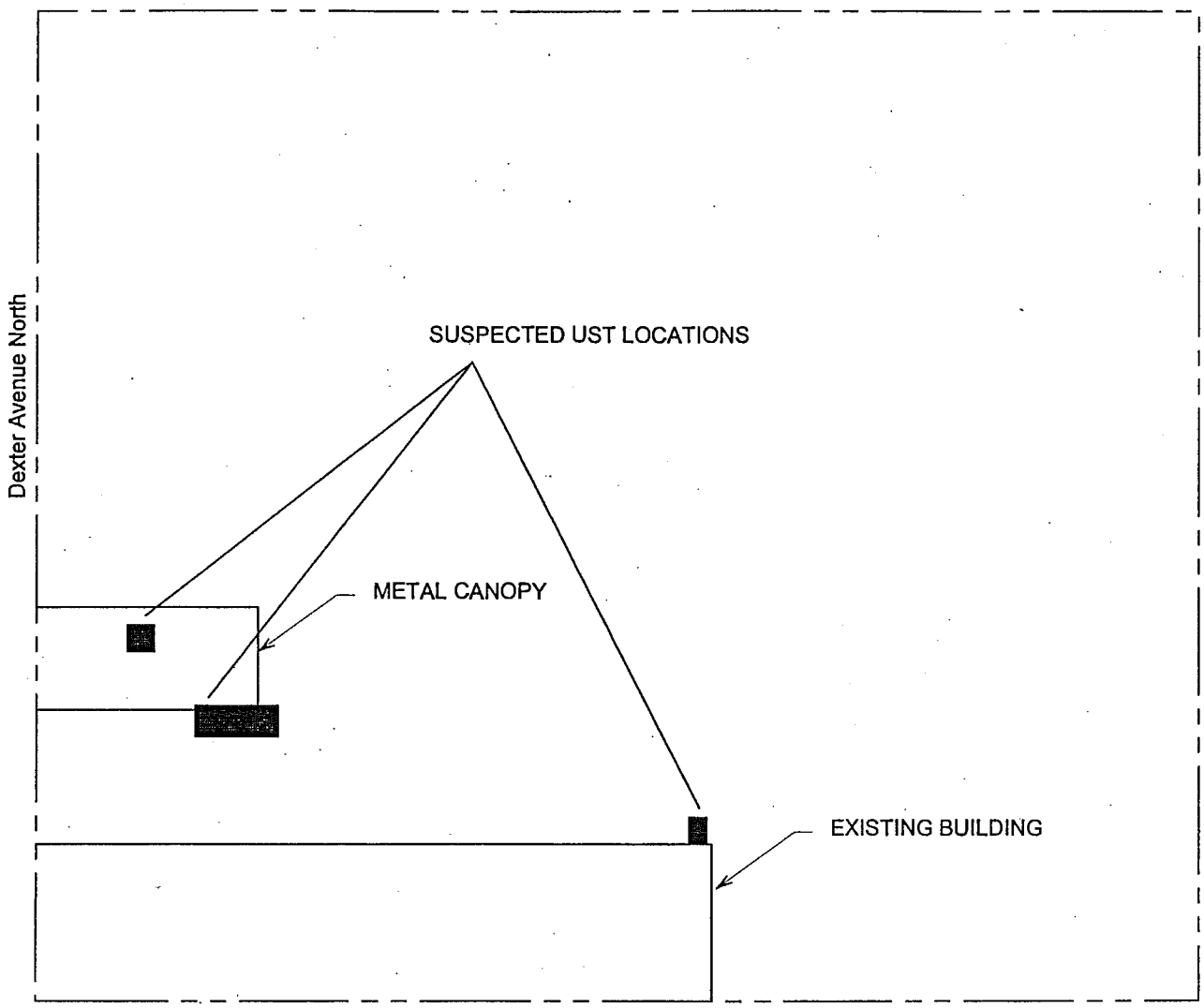
We trust this will complete your requirements for this project and look forward to working with you on future projects. If you have any further questions or need further assistance, please don't hesitate to call.

Sincerely,

APOLLO GEOPHYSICS CORPORATION

Matthew C. Ringstad
President

Clyde A. Ringstad
Senior Consultant Geophysicist



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SCALE: 1" = 40 FEET

APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

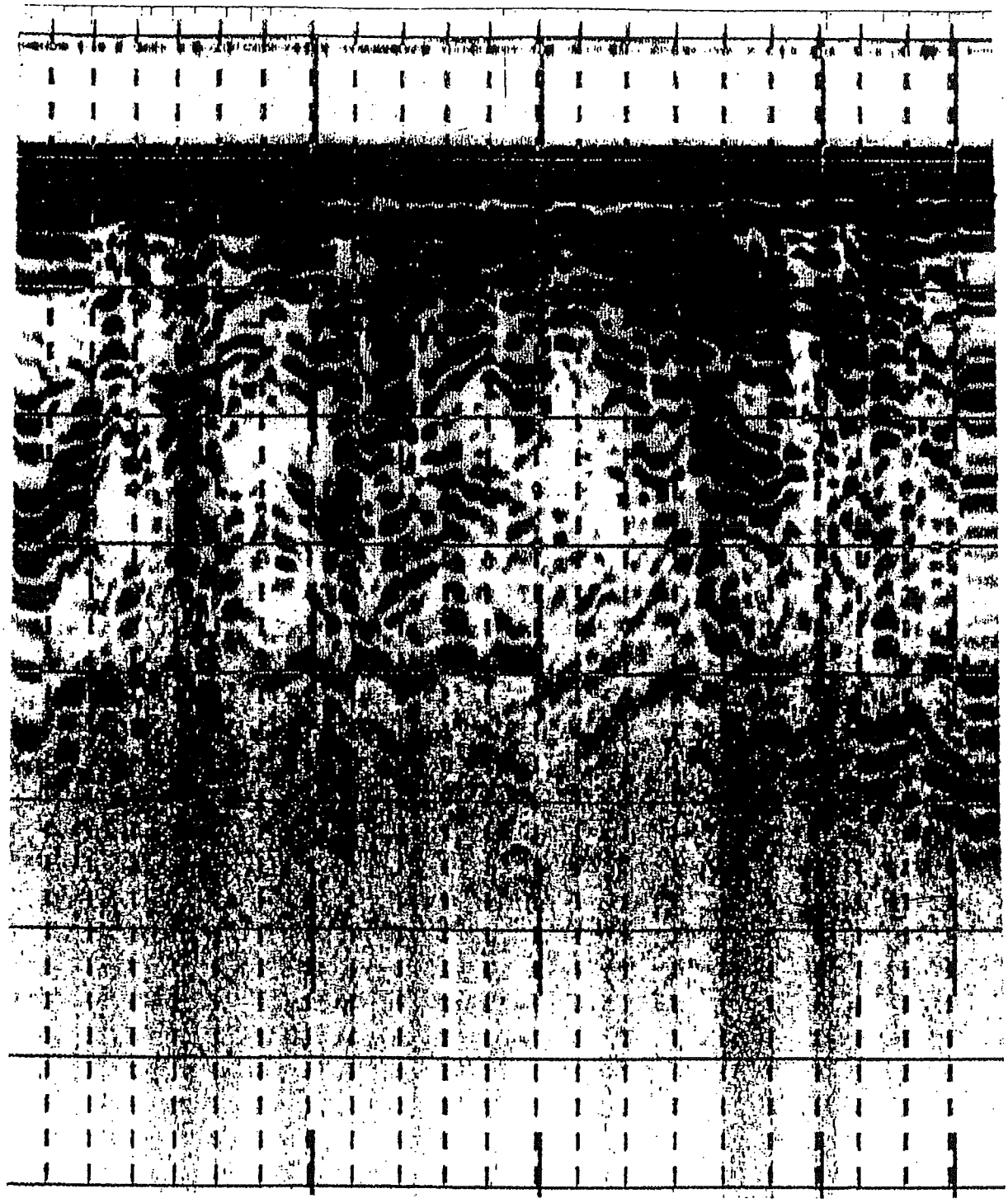
Location Map

survey completed for

Dames & Moore, Inc.

January 13, 1998

Figure 1
Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

GPR Traverse 0'

survey completed for

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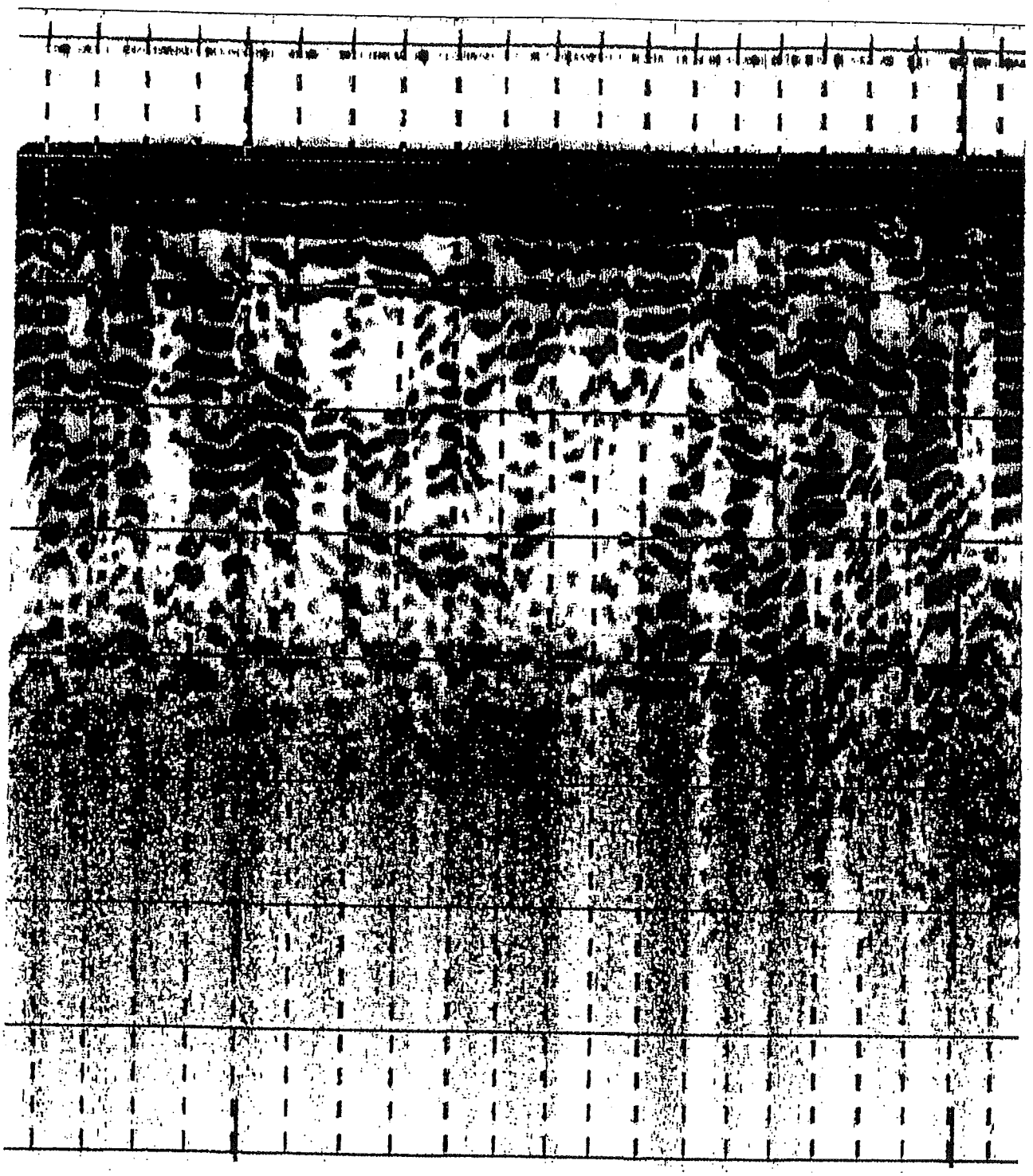
January 13, 1998	Figure 2 Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

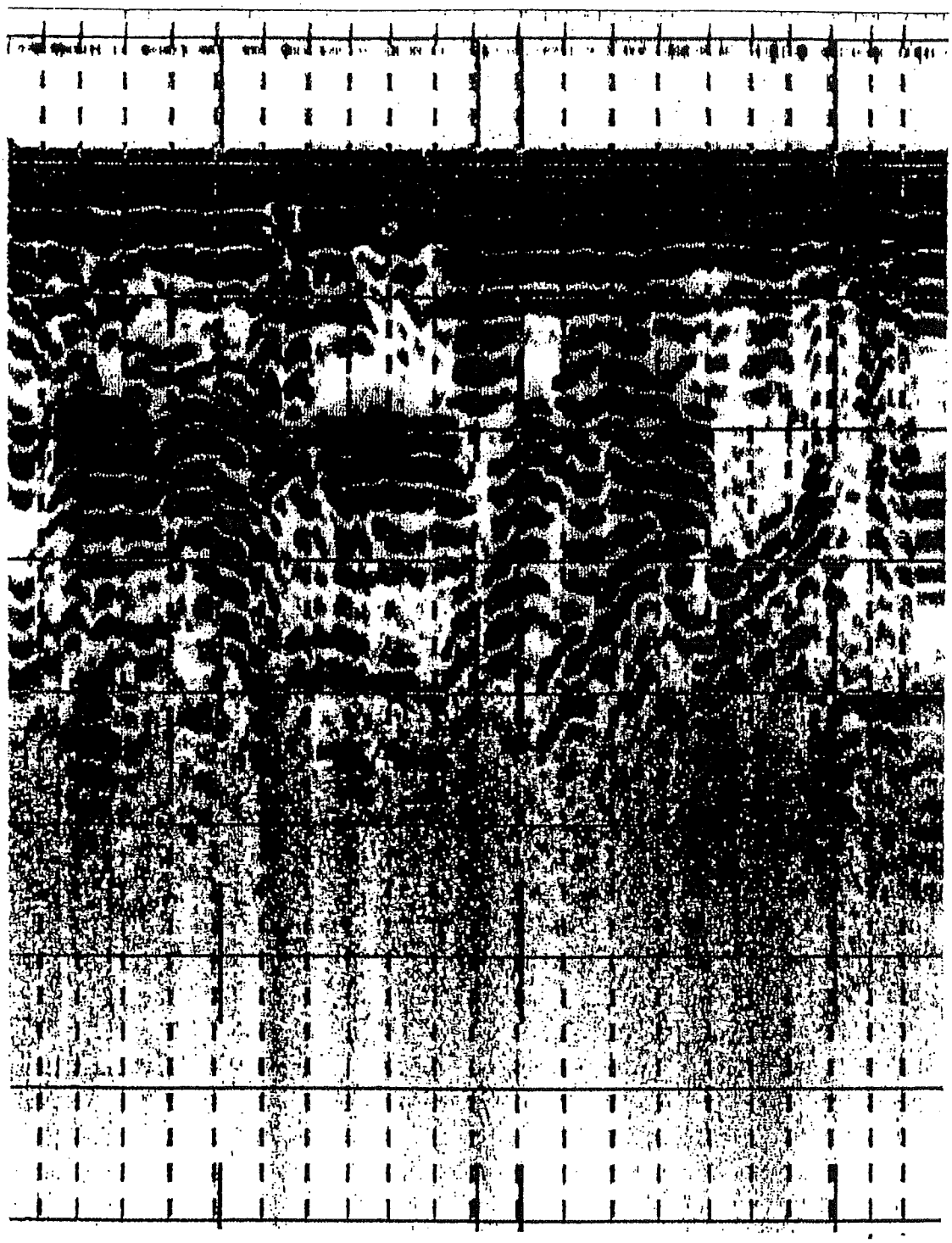
Ground Penetrating Radar Imagery

GPR Traverse 3'

survey completed for

Dames & Moore, Inc.

January 13, 1998	Figure 3 Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

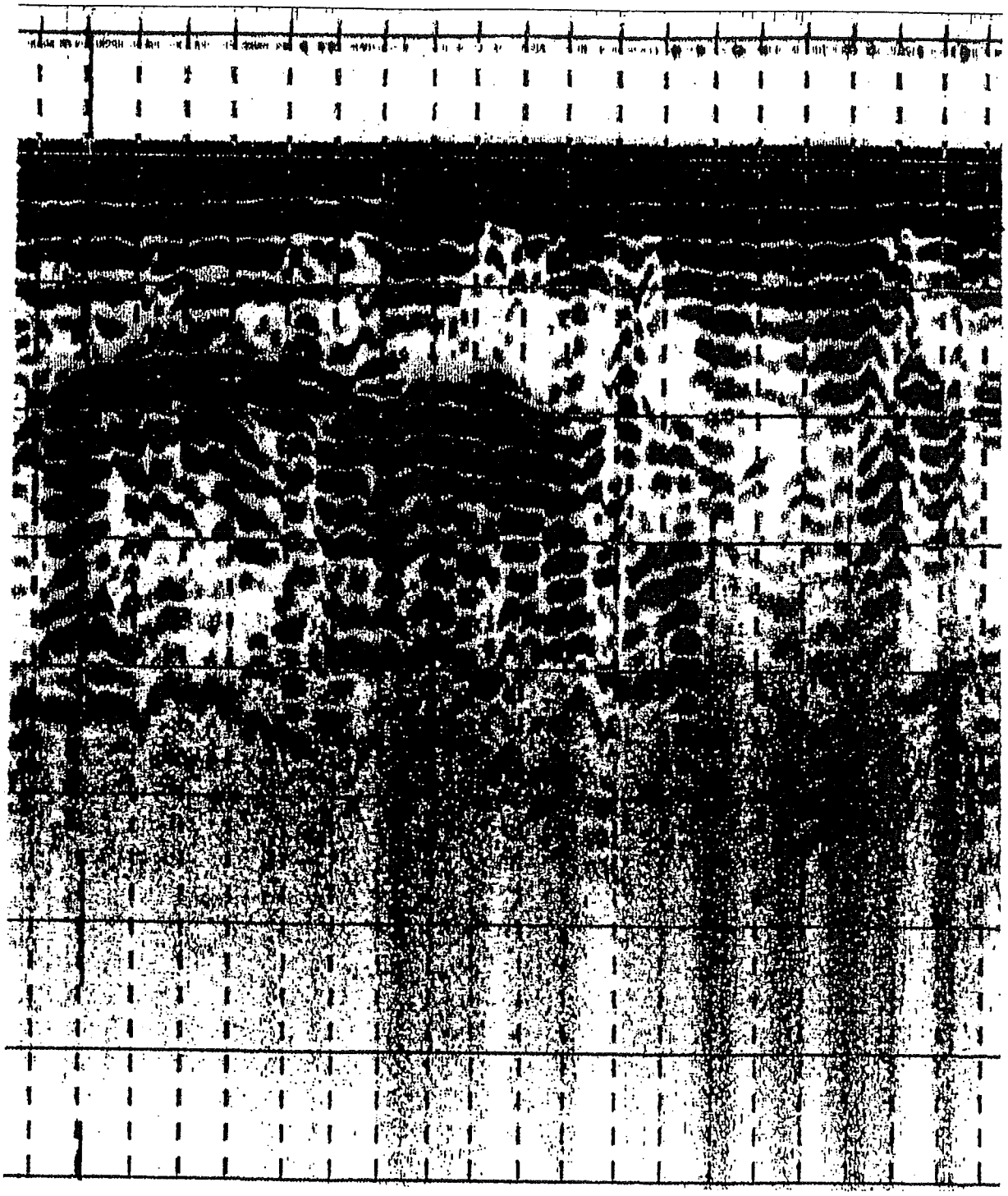
Ground Penetrating Radar Imagery

GPR Traverse 6'

survey completed for

Dames & Moore, Inc.

January 13, 1998	Figure 4 Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

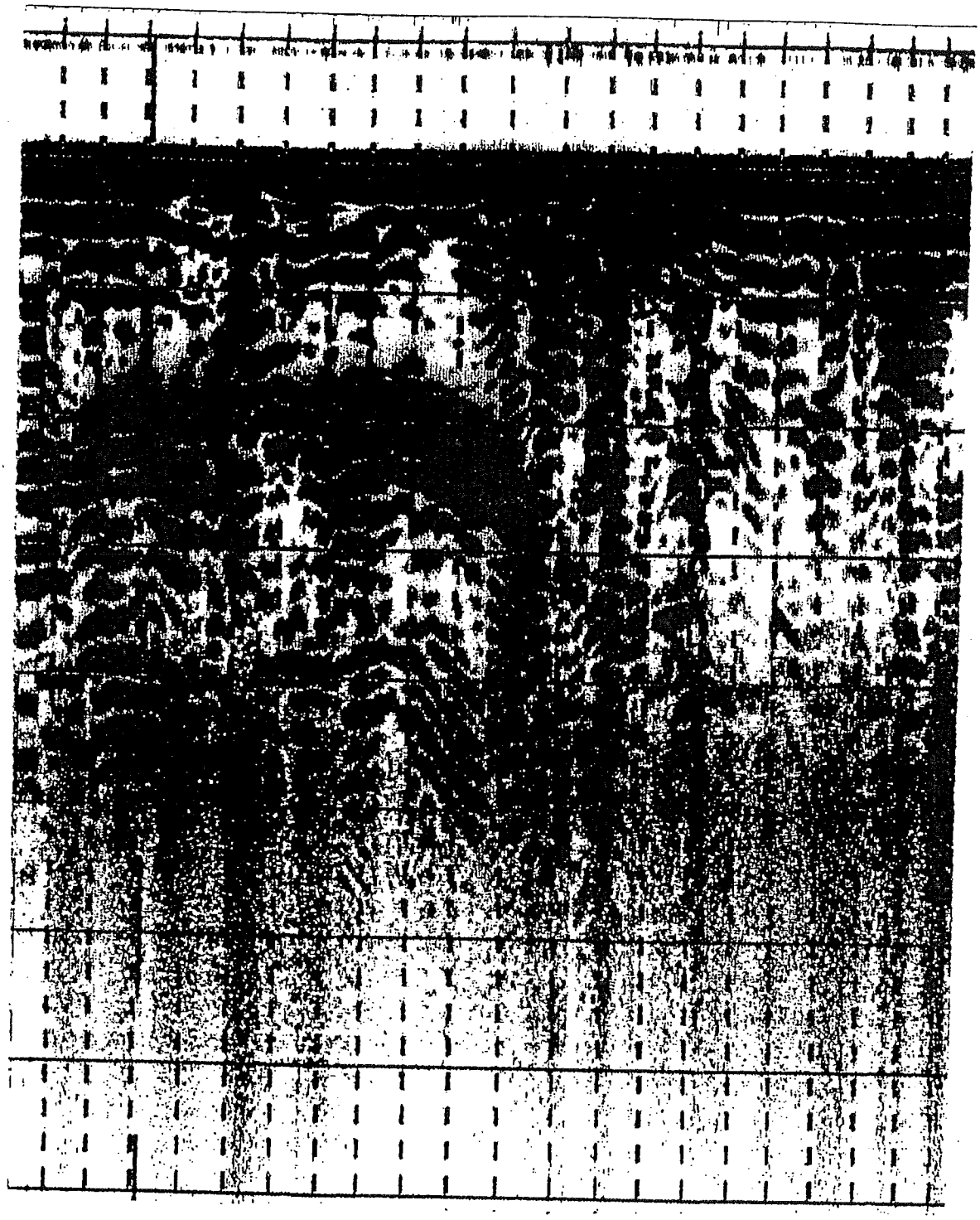
Ground Penetrating Radar Imagery

GPR Traverse 9'

survey completed for

Dames & Moore, Inc.

January 13, 1998	Figure 5 Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

GPR Traverse 12'

survey completed for

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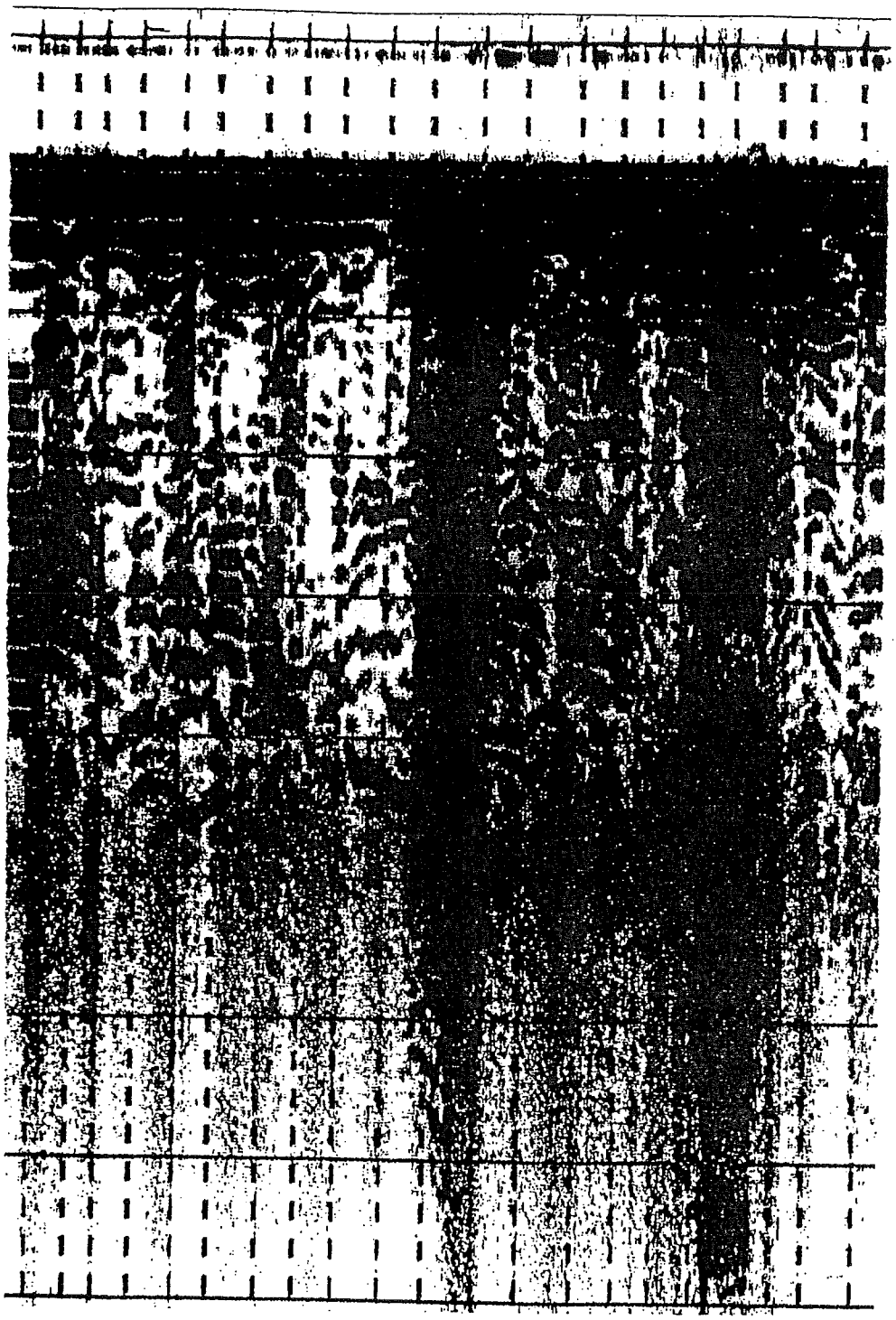
Figure 6
Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

GPR Traverse 15'

survey completed for

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Figure 7
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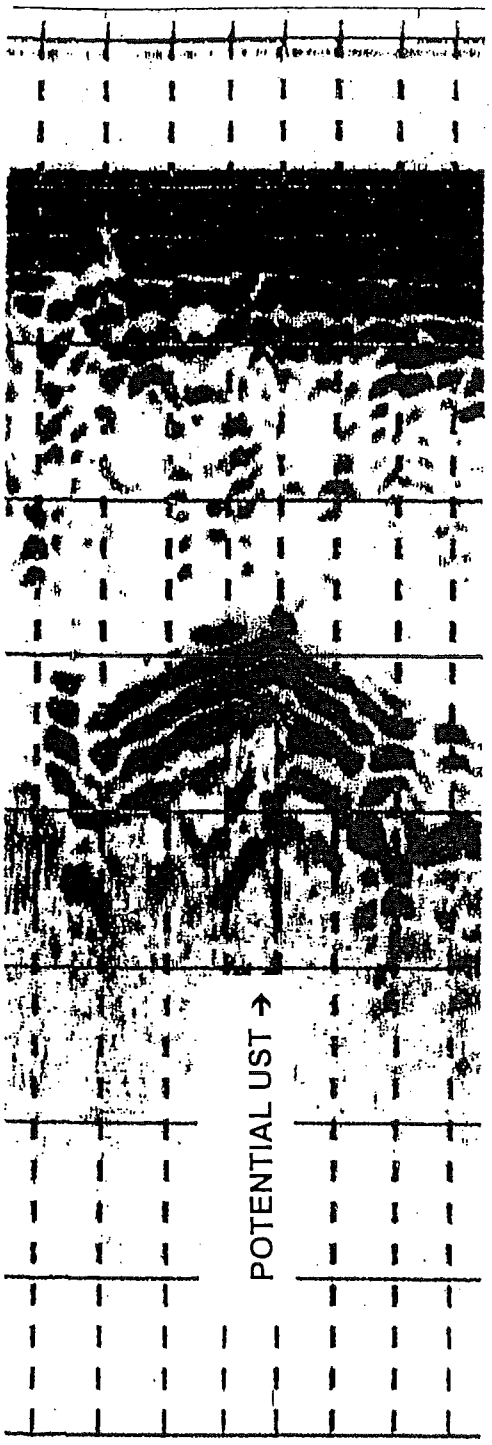

APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

Southeast Corner of the Metal Canopy

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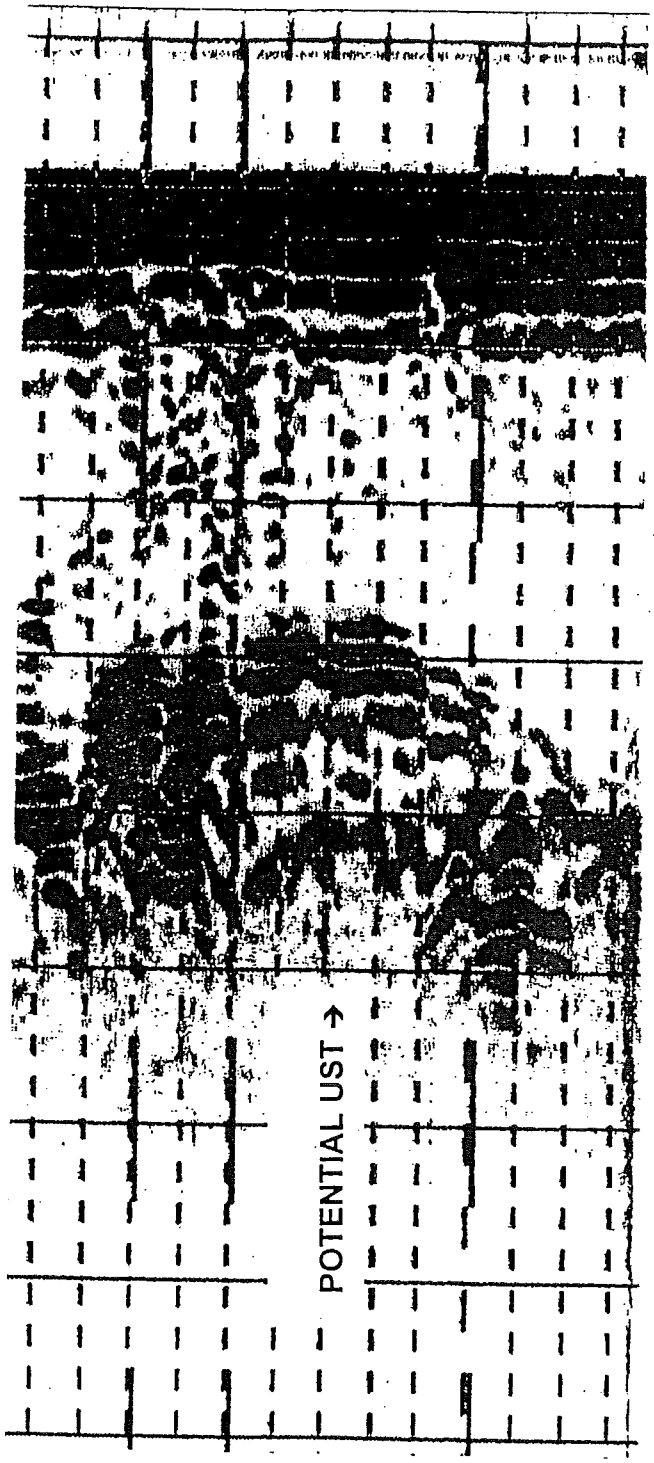
January 13, 1998	Figure 8 Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

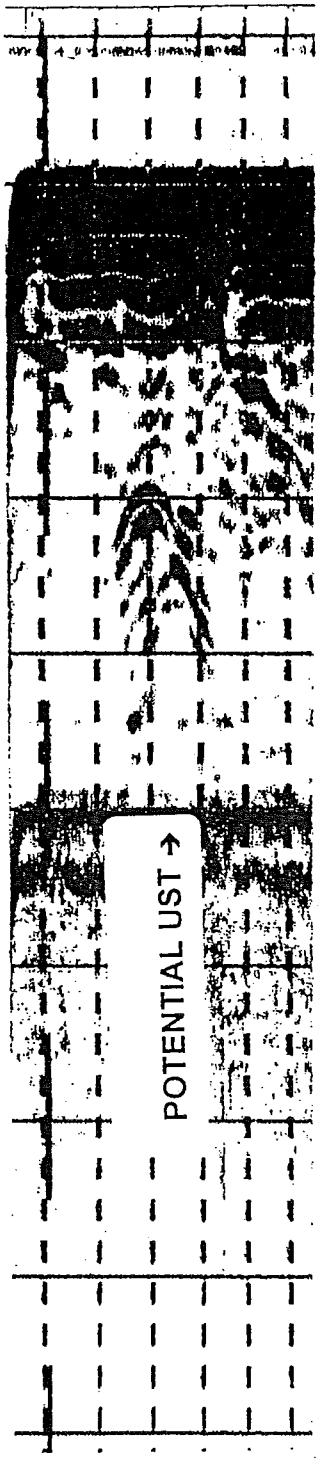
Southeast Corner of the Metal Canopy

survey completed for

Dames & Moore, Inc.

January 13, 1998

Figure 9
Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

Northeast Corner of the Existing Building

survey completed for

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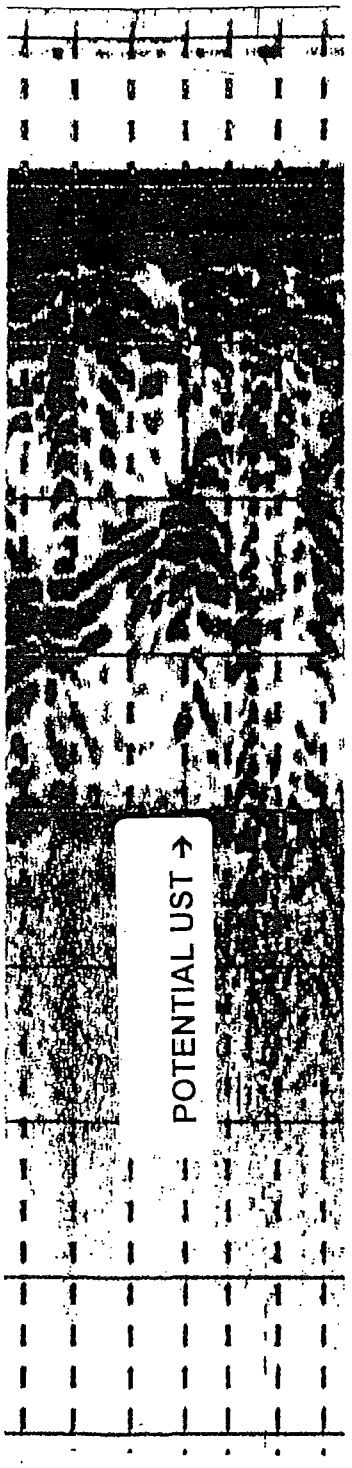
Figure 10
Project 98-103



APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

Northeast Corner of the Existing Building

survey completed for

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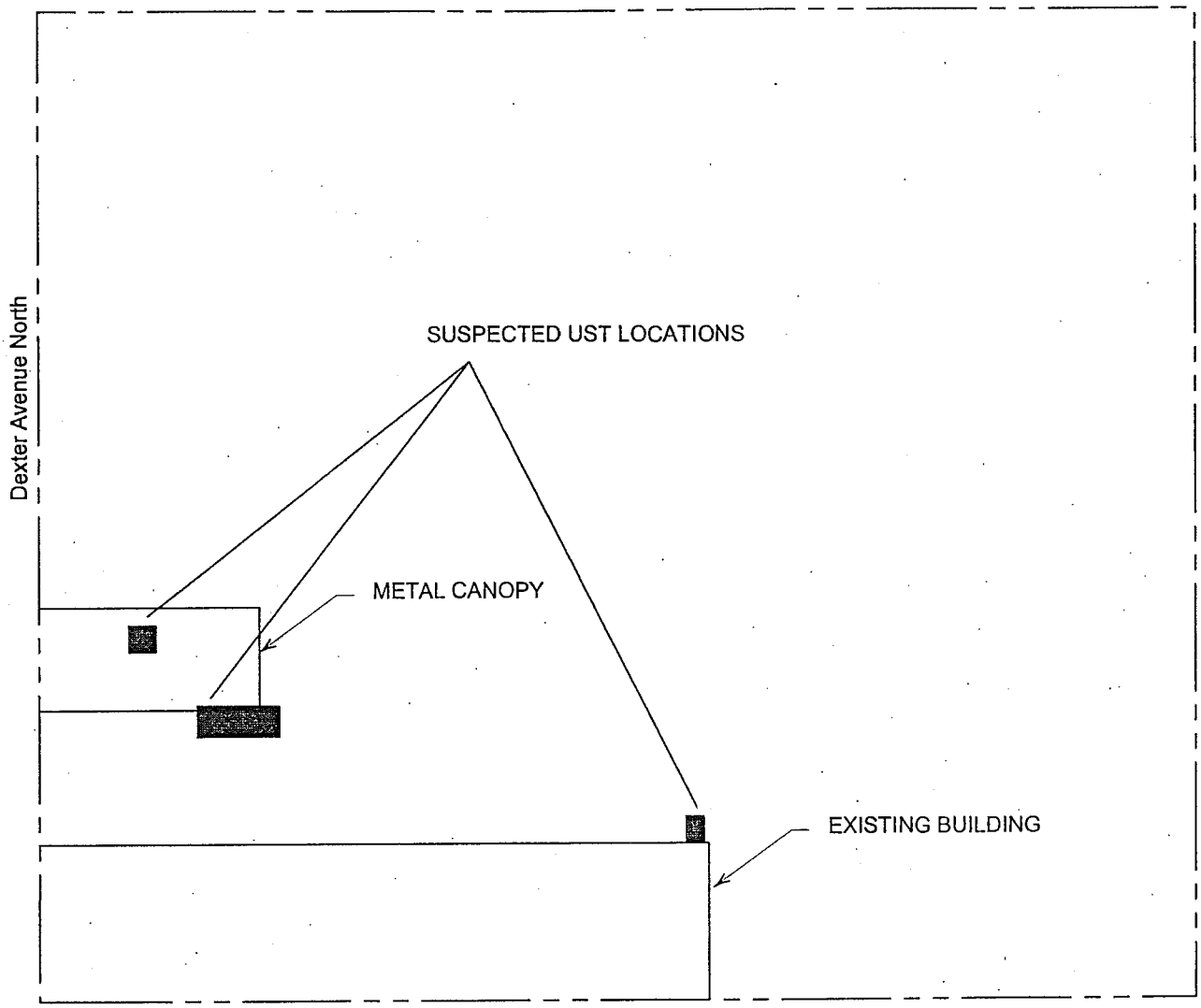
January 13, 1998	Figure 11 Project 98-103



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SCALE: 1" = 40 FEET

APOLLO GEOPHYSICS

UST Locate - Diamond Transport Property - Seattle, Washington

Ground Penetrating Radar Imagery

Location Map

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Figure 1
Project 98-103