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1	WHC-SD-EN-TI-180		0	Geophysical Survey over a Leaking pipe at U-Plant cut, 200 West Area	4	1/2	1	

16. KEY		
Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

(G)		(H)		17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)								(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.		
4	1/2	Cog. Eng. T. H. Mitchell	<i>T.H. Mitchell</i>	8/20/93	G6-50	EDMC (2)			H6-08		3		
4	1/2	Cog. Mgr. J. W. Fassett	<i>J.W. Fassett</i>	8/9/93	H6-06	R. E. Rasmussen			T7-35		3		
		QA											
		Safety											
		Env.											
3		Geophysical Files (2)			G6-50								
3		Central Files (2)			LB-04								

18. <i>T.H. Mitchell</i> T. H. Mitchell Signature of EDT Originator Date: 8/20/93	19. _____ Authorized Representative Date for Receiving Organization	20. J. W. Fassett <i>J.W. Fassett</i> Cognizant/Project Engineer's Manager Date: 8/9/93	21. DOE APPROVAL (if required) Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments
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SUPPORTING DOCUMENT

1. Total Pages **6**

2. Title Geophysical Survey over a leaking pipe at U-Plant cut, 200 West Area	3. Number WHC-SD-EN-TI-180	4. Rev No. 0
5. Key Words Geophysics, Ground-Penetrating Radar	6. Author Name: T. H. Mitchell <i>T.H. Mitchell</i> Signature Organization/Charge Code 81234/E03095	

**APPROVED FOR
PUBLIC RELEASE**
8/27/93 N. Solis

7. Abstract
T. H. Mitchell, J. P. Kiesler, K. A. Bergstrom, 1993, Geophysical Survey over a leaking pipe at U-Plant cut, 200 West Area, WHC-SD-EN-TI-180, Rev. 0, Westinghouse Hanford Company, Richland, Washington

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9. Impact Level 4	

Geophysical Survey over a leaking pipe at U-Plant Cut, 200 West Area

Objective

The objective of the survey was to locate subsurface obstructions, specifically pipes or other utilities, that may affect the excavation around a ruptured underground pipe, Figure 1. The ruptured pipe location is in the 200 West area. Based upon the results of the survey, identified anomalies within the zone that might interfere with excavation were identified.

Ground-Penetrating Radar Methodology

The Ground-Penetrating Radar (GPR) system used for this work utilized a 300-megahertz (MHz) antenna to transmit the electromagnetic (EM) energy into the ground. The transmitted energy is reflected back to a receiving antenna where variations in the return signal are recorded. Common reflectors include natural geologic conditions such as bedding, cementation, moisture, and clay, or man-made objects such as pipes, barrels, foundations, and buried wires.

Depth of penetration, which varies with changes in geology, ranged from 10 to 12 feet for this survey. The method is limited in depth by transmit power, receiver sensitivity, and attenuation of the transmitted energy. Depth of investigation is also influenced by highly conductive material, such as metal drums, which reflect all the energy back to the receiver. Therefore, the method cannot "see" below such objects.

Display and interpretation of the data are similar to seismic reflection data. In some areas, interpretations can be straight forward, but often unknown parameters within a highly variable subsurface yield complex data.

Data for these surveys were collected with a Geophysical Survey Systems Inc. (GSSI) Subsurface Interface Radar (SIR)[™] System 8, model 4800 and digitally stored on a GSSI DT6000A tape drive. A recording window of 100 nanoseconds, two-way travel time, was used.

Grid Location

The survey boundary is a rectangle, measuring 50 feet by 85 feet, Figure 2. Green stakes mark the corners of the grid. The long axis of the survey strikes northwest-southeast. All distances were

[™] A trademark of Geophysical Survey Systems Inc. (GSSI).

measured and posted in feet. The southwestern corner of the grid is designated E100/N100 and serves as the "origin" for the survey locations. The letters "N" or "E" refer to a direction that trends generally north or east, respectively. The number refers to a distance in feet. For example, grid point E115/N140 lies 15 feet "east" and 40 feet "north" of grid point E100/N100.

Data were collected along two sets of profiles perpendicular to each other. Spacing between profiles was 5 feet. Due to the wash-out area between E120 and E155 and N100 to N125, profiles are not all continuous.

Quality Control

These data were collected using procedures in WHC-CM-7-7 EII 11.2, Rev. 3, Environmental Investigations and Site Characterization Manual, Westinghouse Hanford Company. The data and records are stored in the Geophysics files. Figure 3 summarizes survey parameters.

Results

The survey was bounded on the southwest side by the railroad cut. The "washout" also limited the survey area, prohibiting continuous profiles through the washout zone, Figure 2. A back-filled excavation boundary is evident in the data, trending north-south. The excavation boundary, at the surface, is about 25 feet wide, trending through the washout zone. Within the excavation zone, several anomalies are observed. No pipes can be positively identified, but there are subtle indications of two linear features within the excavation zone. One is roughly centered within the excavation boundaries at about an 11-foot depth below the surface. The second possible linear feature is parallel to and less than five feet south of the first feature and buried about nine feet below the surface. No linear features outside the mapped excavation boundaries are observed.

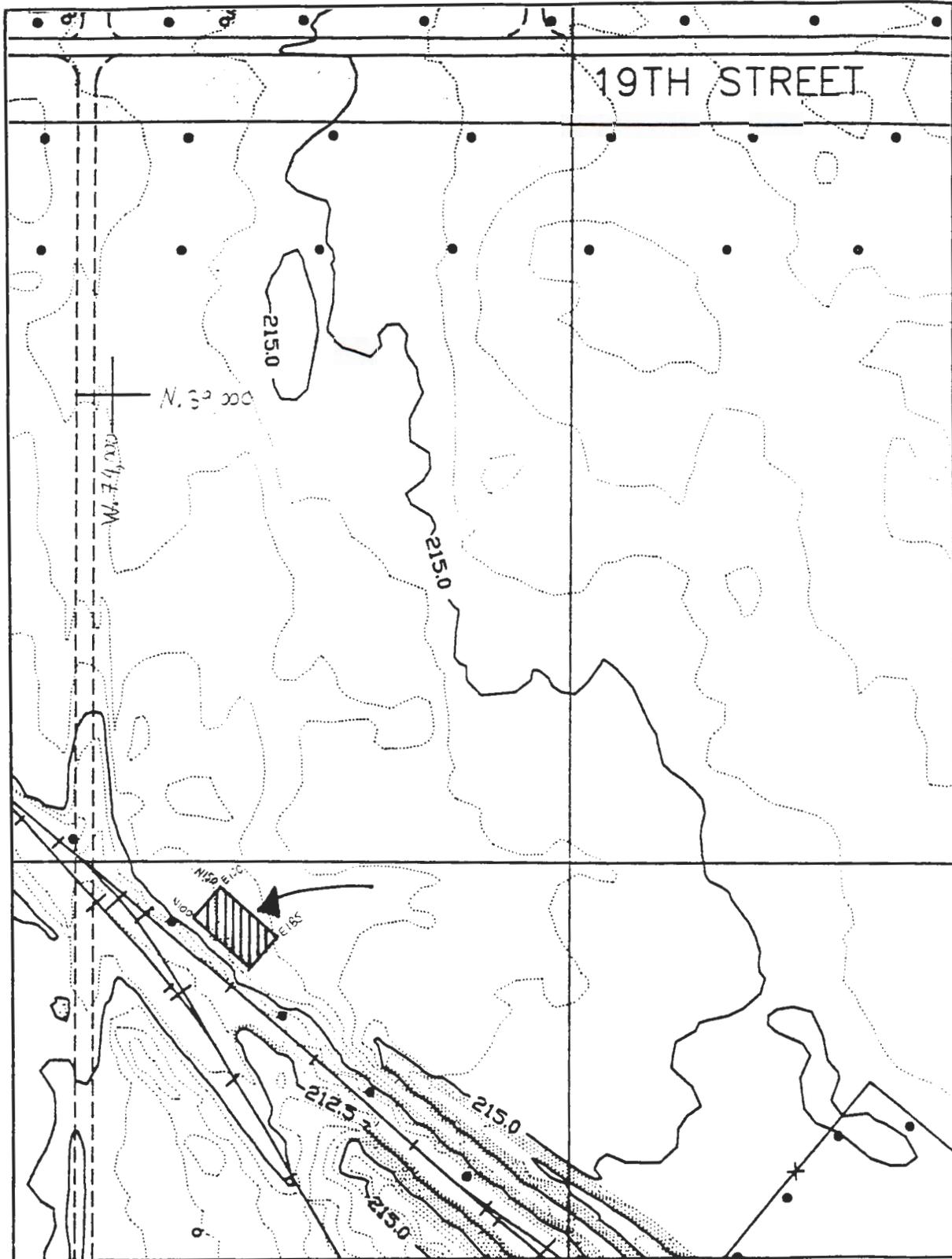
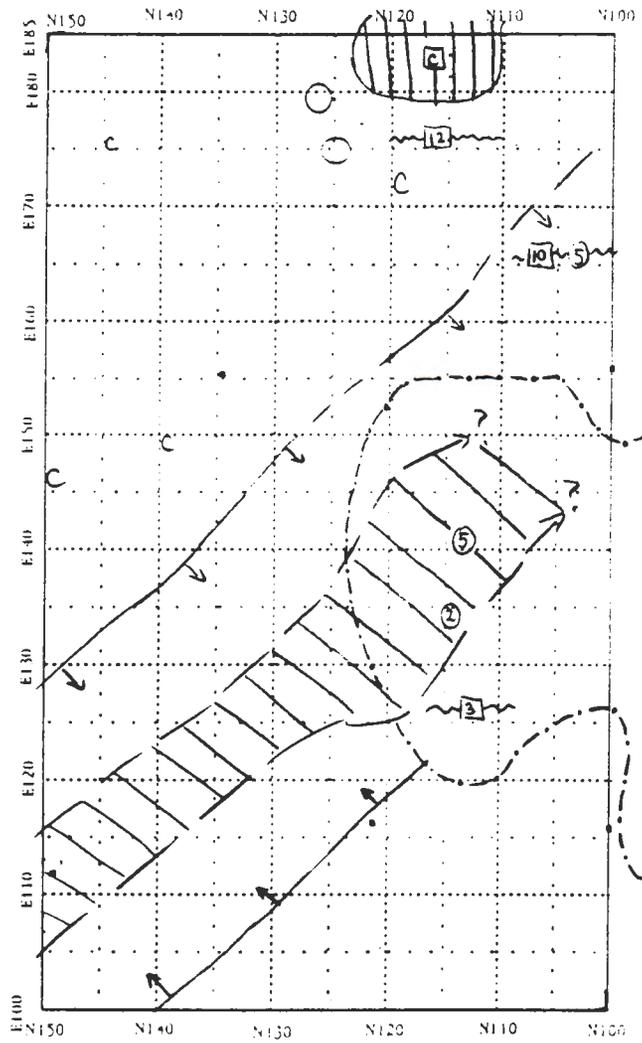


Figure 1. Location Map

Contour Interval 0.5 meters
1 centimeter = 20 meters
1:2000
From H-13 series topographic maps





⊙	Buried anomaly, depth in feet
c	Buried anomaly, depth < 1.5 feet
⌚	Disturbed zone, depth in feet
- - -	Continuity of anomaly/zone/horizon etc uncertain
└	Possible excavation boundary
■	Surface cultural feature
○	Concrete "pad"
- - -	Washout boundary
▨	Zone with anomalies typically ranging from 8-12 feet below the surface
⊖	Disturbed surface zone

Questions: Contact surface geophysics @ 6-1747
T.H. Mitchell, K. A. Bergstrom

○ Telephone Pole

RR Track

Figure 2. Interpretation Summary for U-Plant Cut

GROUND PENETRATING RADAR (GPR) SURVEY

Team Geophysics, Westinghouse Hanford Operations

TITLE: U-Plant Cut, 200W	DATE: 6-17-93
LOCATION: Pipe Washout near U-plant, 200 West.	
CLIENT: Bob Rasmussen	DATA COLLECTED BY J.P. Kiesler & T.H. Mitchell
EQUIPMENT USED: GSSI System 8, model 4800 Calibrator Model P731 Digital Tape Recoder DT6000A	ANTENNA(S) USED: 100 ___ 300 <u>XX</u> 100 BISTATIC ___
	LOG BOOK: EFL 1052
	TIME WINDOW (NS): 100
PROCEDURES FOLLOWED: WHC-CM-7-7 EII 11.2, REV. 3	
GRID : <u>85X50'</u> NO. OF PROFILES: <u>27</u> TOTAL FOOTAGE COLLECTED: <u>1600</u>	
PARAMETERS: Two sets of perpendicular profiles; five feet between profiles. All profiles aren't continuous because of washout. Had to work around it.	
DATA TAPE NO.: <u>93-15</u> RECORDS LOCATION: <u>Geophysical field files</u>	
TAPE ADDRESS : <u>49997-61975</u> CALIBRATION ADDRESS: <u>61851-61975</u>	
INTERPRETED BY : <u>T.H. Mitchell</u> REVIEWED BY : <u>J. P. Kiesler</u>	
INTERPRETATION DELIVERED TO <u>Bob Rasmussen</u> DATE : <u>6-24-93</u>	
OBJECTIVE(S): To map out pipes around wash out area	
NOTES: Antenna pulled by hand at 1-2 mph. 50-meter cable. Pulled on south and east side of survey marks.	