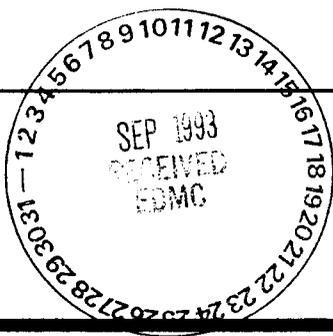


AUG 30 1993 **11**  
*Station # 12*

ENGINEERING DATA TRANSMITTAL

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Environmental Engineering 81234	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: ER	6. Cog. Engr.: T. H. Mitchell	7. Purchase Order No.: N/A
8. Originator Remarks: <i>Release to distribution</i>		9. Equip./Component No.: N/A
11. Receiver Remarks:		10. System/Bldg./Facility: N/A
		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date:



15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
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>	8/26/93	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)			L8-04						

18. <i>T.H. Mitchell</i> T. H. Mitchell Signature of EDT Originator Date: <i>8/26/93</i>	19. _____ Authorized Representative Date for Receiving Organization	20. <i>J.W. Fassett</i> J. W. Fassett Cognizant/Project Engineer's Manager Date: <i>8/9/93</i>	21. DOE APPROVAL (if required) Ltr. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
---	--	---	--

<b>SUPPORTING DOCUMENT</b>		1. Total Pages <b>6</b>
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	
<p><b>APPROVED FOR PUBLIC RELEASE</b></p> <p><i>8/27/93 N. Solis</i></p>		<p><i>T. H. Mitchell</i> Signature</p> <p>Organization/Charge Code 81234/E03095</p>

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	
<p>8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or indicate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.</p> <p><del>PATENT STATUS - This document may, since it is transmitted in advance of patent clearance, be available in confidence solely for use in the performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated for purposes other than specified above. Before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.</del></p> <p>DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.</p>	<p>10. RELEASE STAMP</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>OFFICIAL RELEASE <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">11</span></p> <p>BY WHC</p> <p>DATE AUG 30 1993</p> <p><i>Station # 13</i></p> </div>
9. Impact Level <b>4</b>	

J.S.

Date Received <b>8/27/93</b>	<b>INFORMATION RELEASE REQUEST</b>	Reference: WHC-CM-3-4
---------------------------------	------------------------------------	--------------------------

Complete for all Types of Release		
<b>Purpose</b> <input type="checkbox"/> Speech or Presentation <input type="checkbox"/> Full Paper (Check only one suffix) <input type="checkbox"/> Summary <input type="checkbox"/> Abstract <input type="checkbox"/> Visual Aid <input type="checkbox"/> Speakers Bureau <input type="checkbox"/> Poster Session <input type="checkbox"/> Videotape	<b>Reference</b> <input checked="" type="checkbox"/> Technical Report <input type="checkbox"/> Thesis or Dissertation <input type="checkbox"/> Manual <input type="checkbox"/> Brochure/Flier <input type="checkbox"/> Software/Database <input type="checkbox"/> Controlled Document <input type="checkbox"/> Other	ID Number (include revision, volume, etc.) <b>WHC-SD-EN-TI-180, Rev.0</b> <hr/> List attachments. <b>EOT 141940</b> <hr/> Date Release Required <p style="text-align: right;"><b>8/15/93</b></p>

Title <b>Geophysical Survey over a leaking pipe at U-Plant cut, 200 West Area</b>	Unclassified Category <b>UC-</b>	Impact Level <b>4</b>
---	-------------------------------------	--------------------------

New or novel (patentable) subject matter? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has disclosure been submitted by WHC or other company? <input type="checkbox"/> No <input type="checkbox"/> Yes Disclosure No(s).	Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Identify)
---	---

Copyrights? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has written permission been granted? <input type="checkbox"/> No <input type="checkbox"/> Yes (Attach Permission)	Trademarks? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (Identify)
---	---

Complete for Speech or Presentation			
Title of Conference or Meeting <b>N/A</b>	Group or Society Sponsoring <b>N/A</b>		
Date(s) of Conference or Meeting	City/State	Will proceedings be published? <input type="checkbox"/> Yes <input type="checkbox"/> No	Will material be handed out? <input type="checkbox"/> Yes <input type="checkbox"/> No

Title of Journal <b>N/A</b>
--------------------------------

CHECKLIST FOR SIGNATORIES			
Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature Indicates Approval
			Name (printed)                      Signature                      Date
Classification/Unclassified Controlled Nuclear Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Patent - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>OGC Memo 2/4/93 J.S.</u> <u>J.S.</u> <u>8/26/93</u>
Legal - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>OGC Memo 2/4/93 J.S.</u> <u>J.S.</u> <u>8/26/93</u>
Applied Technology/Export Controlled Information or International Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
WHC Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Communications	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
RL Program/Project	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>P. Pak - Review not req'd per program - J.S.</u> <u>J.S.</u> <u>8/26/93</u>
Publication Services	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>L. HERMANN J. Stone Jr</u> <u>J.S.</u> <u>8/26/93</u>
Other Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Information conforms to all applicable requirements. The above information is certified to be correct.

References Available to Intended Audience <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  Transmit to DOE-HQ/Office of Scientific and Technical Information <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  Author/Requestor (Printed/Signature) <u>T. H. Mitchell</u> <u>T.H. Mitchell</u> Date <u>8/26/93</u> Intended Audience <input type="checkbox"/> Internal <input type="checkbox"/> Sponsor <input checked="" type="checkbox"/> External Responsible Manager (Printed/Signature) <u>J. W. Fassett</u> <u>J.W. Fassett</u> Date <u>8-9-93</u>	<b>INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP</b> Stamp is required before release. Release is contingent upon resolution of mandatory comments. <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 100px; height: 100px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> <p style="font-size: 2em; margin: 0;">NS</p> <p style="font-size: 1.2em; margin: 0;">8/27/93</p> </div> </div>
Date Cancelled	Date Disapproved

## **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)<sup>™</sup> 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

---

<sup>™</sup> 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.

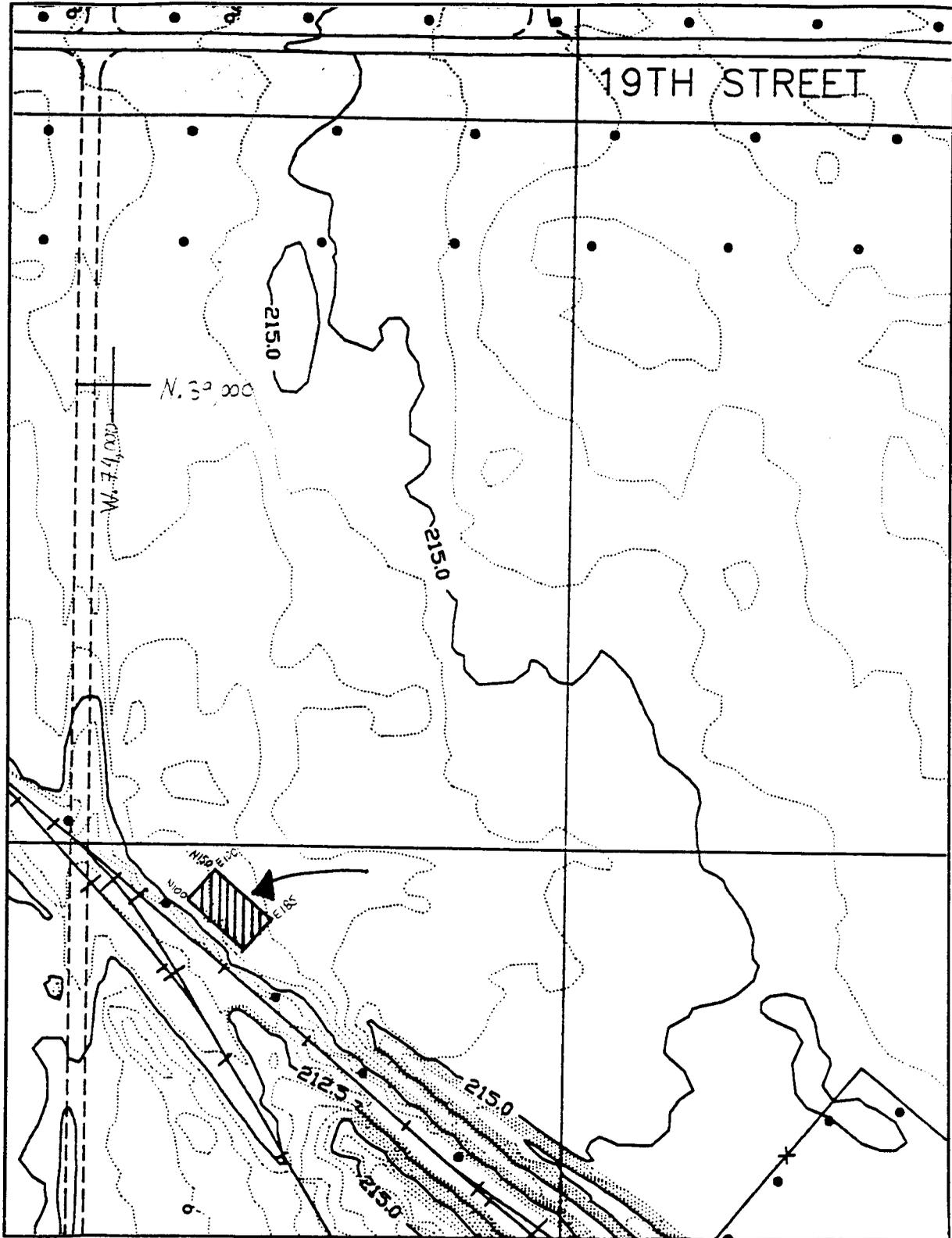


Figure 1. Location Map

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



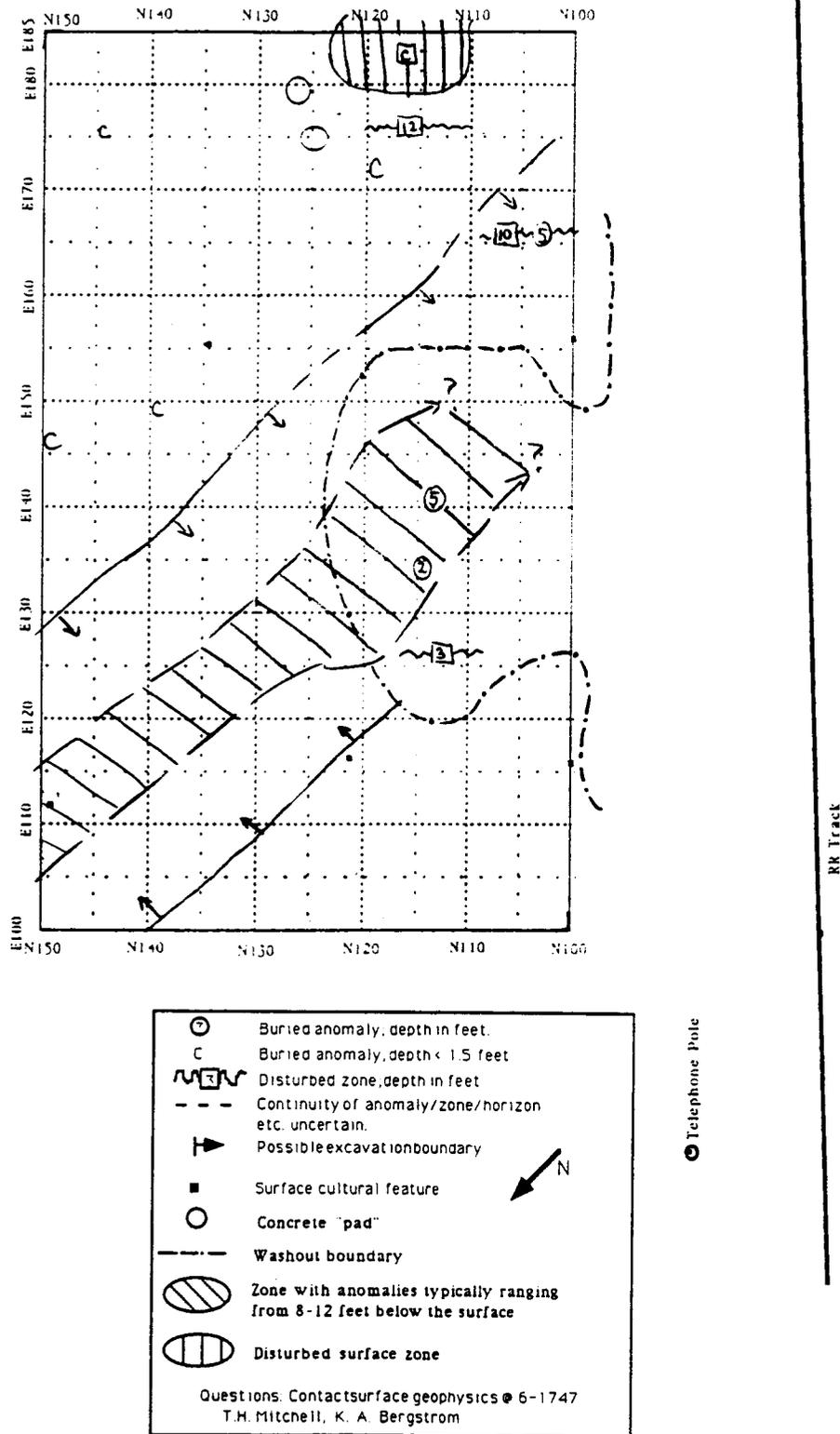


Figure 2. Interpretation Summary for U-Plant Cut

## 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.		