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(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-195		0	Geophysical Investigation of 105-DR Pluto Crib, 116-DR-4, 100 D Area	4	4/2	2	

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

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4	2	Cog.Eng. K. A. Bergstrom	<i>K.A. Bergstrom</i>	9-23-93	H6-06	EDMC	<i>(S) (1)</i>		H6-08	3	
4	2	Cog. Mgr. J. W. Fassett	<i>J.W. Fassett</i>	9-23-93	H6-06	N. M. Naiknimbalkar			H6-02	3	
		QA				IRA Clearance	<i>(2)</i>		H4-17	3	
		Safety									
		Env.									
3		Geophysical Files (2)			H6-06						
3		Central Files (2)			LB-04						

18. K. A. Bergstrom <i>K.A. Bergstrom</i> Signature of EDT Originator	19. _____ Authorized Representative Date for Receiving Organization	20. J. W. Fassett <i>J.W. Fassett</i> Cognizant/Project Engineer's Manager	21. DOE APPROVAL (if required) Ltr. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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SUPPORTING DOCUMENT

1. Total Pages 6

2. Title

Geophysical Survey of 105-DR Pluto Crib,
116-DR-4, Crib, 100 D Area.

3. Number

WHC-SD-EN-TI-195

4. Rev No.

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5. Key Words

Radar, Geophysics, Ground-Penetrating Radar (GPR)

6. Author

Name: K. A. Bergstrom

**APPROVED FOR
PUBLIC RELEASE**

V. Burkland 9/29/93

K.A. Bergstrom
Signature

Organization/Charge Code 81234/PA2AB

7. Abstract

K. A. Bergstrom, T. H. Mitchell, 1993 "Geophysical Investigation of 105-DR Pluto Crib, 116-DR-4 100 D Area, "WHC-SD-TI-195 , Rev. 0, Westinghouse Hanford Company, Richland, Washington

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10. RELEASE STAMP

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DATE SEP 30 1993
Station # 12

9. Impact Level 4

Geophysical Survey of 105-DR Pluto Crib, 116-DR-4, 100-D Area.

Objective

The objective of the survey was to verify the location of the 105-DR Pluto Crib, 116-DR-4 (Figure 1). A surface monument currently marks its location. The crib is 10 feet by 10 feet and 15 feet deep. Ground-Penetrating Radar was the geophysical method selected to conduct the investigation.

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 from site to site, was 10-14 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.

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

Grid Location

The survey boundary is a square, measuring 50 feet by 50 feet (Figure 2). Blue stakes mark the corners of the grid. One axis of the survey strikes approximately north-south. All distances were measured and posted in feet. The southwestern corner of the grid is designated E195/N120 and serves as the "origin" for the survey locations. The grid is a portion of a larger grid that was used for both the 116-DR-4 and 116-DR-7 investigations. 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 E235/N140 lies 40 feet "east" and 20 feet "north" of grid point origin, E195/N120.

Data were collected along two sets of profiles perpendicular to each other. Data spacing between profiles was less than one foot.

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 GPR data detected an anomalous zone east of E230 between N138 and N150. The zone contains large concentrations of conductive material 5 to 9 feet below the surface. The depth to which the conductive material extends was not determined. The surface monument for the pluto crib is in the middle of this zone (Figure 2). This zone is interpreted as the location of the 116-DR-4 pluto crib. Two linears were also detected in the survey grid. Both linears have the characteristics of a buried utility or pipe line.

Two additional anomalous areas were detected that have high concentrations of conductive material/debris in them. No documentation was found on the nature of either zone. The northwest zone (Figure 2) correlates with an area where the surface sediments have been stained a rusty orange. Neither of the zones appears to be geologic in origin. Both are similar in character to buried construction debris that have been characterized at other sites.

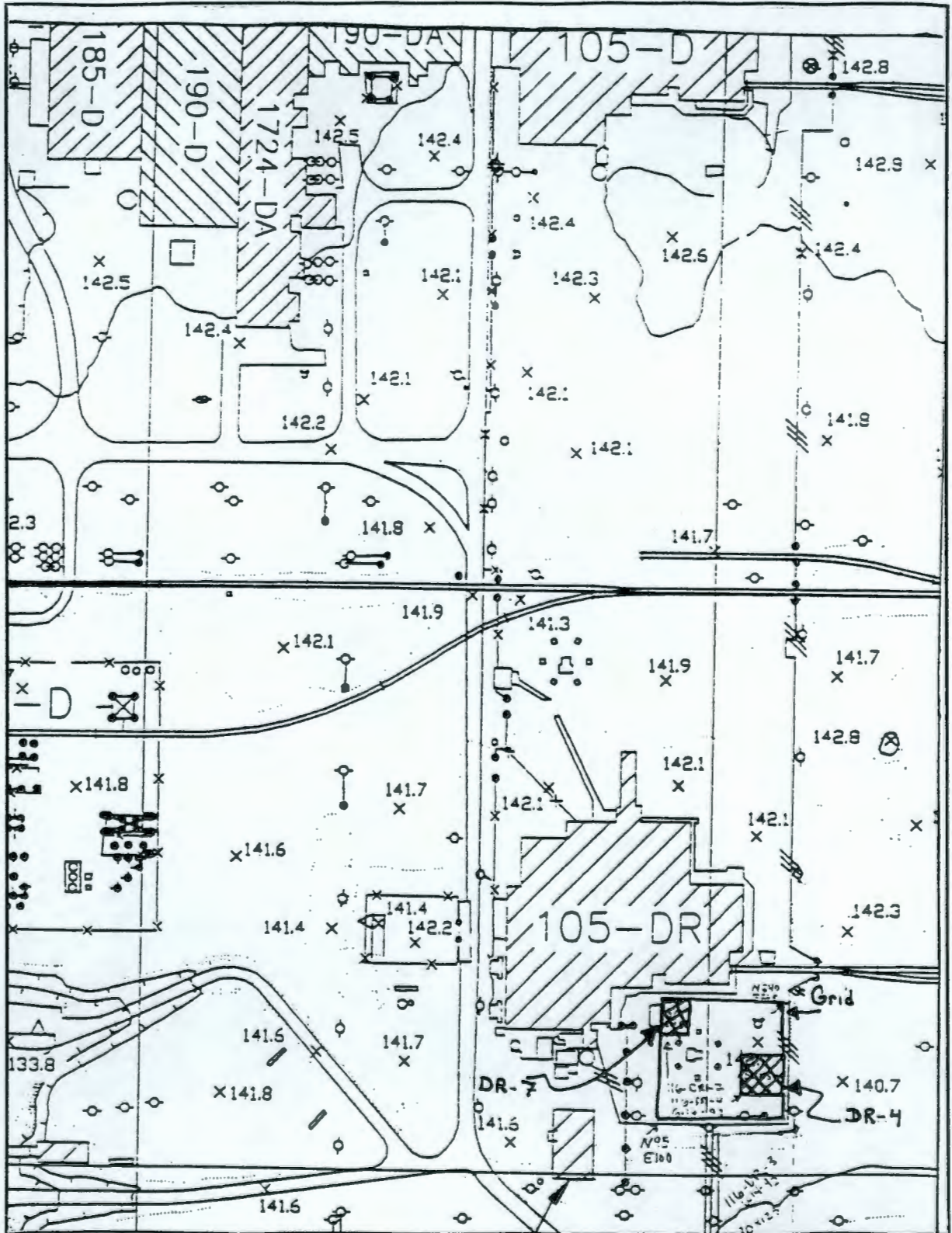


Figure 1. Location Map

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

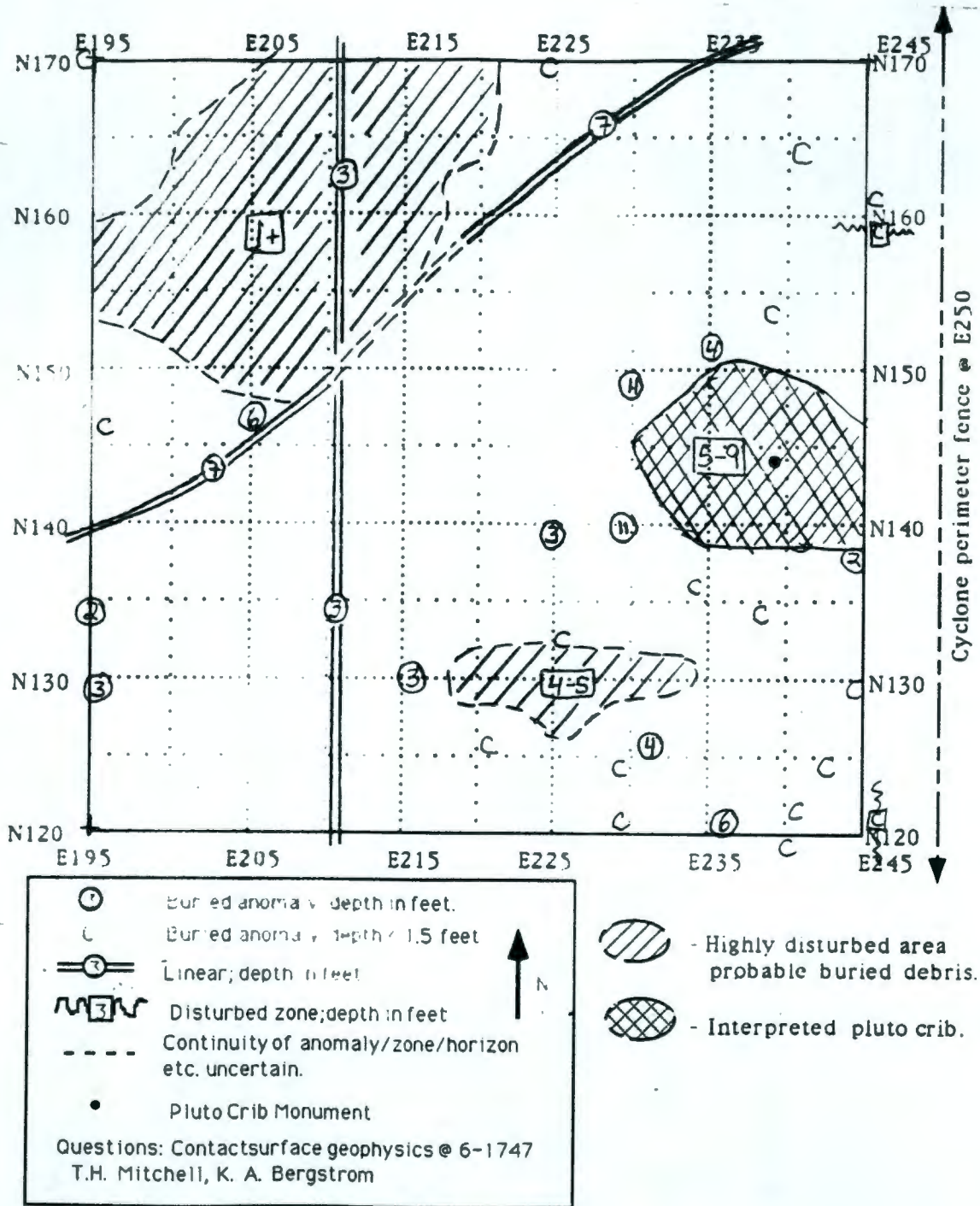


Figure 2 . 116-DR-4 PlutoCrib Interpretation summary

GROUND PENETRATING RADAR (GPR) SURVEY

Team Geophysics, Westinghouse Hanford Operations

TITLE: 116-DR-4 Pluto Crib	DATE: 6-16-93
LOCATION: Southwest of 105 DR reactor. Just inside of perimeter fence.	
CLIENT: N.M. Naiknimbalkar	DATA COLLECTED BY K.A. Bergstrom & 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>50 X 50'</u> NO. OF PROFILES: <u>42</u> TOTAL FOOTAGE COLLECTED: <u>2200</u>	
PARAMETERS: Two sets of perpendicular profiles; Data was collected on both sides of survey marks in both directions, leaving less than 1 foot between profiles.	
DATA TAPE NO.: <u>93-16</u> RECORDS LOCATION: <u>Geophysical field files</u>	
TAPE ADDRESS : <u>26829-46855</u> CALIBRATION ADDRESS: <u>58241-58943</u>	
INTERPRETED BY : <u>T.H. Mitchell</u> REVIEWED BY : <u>K. A. Bergstrom</u>	
INTERPRETATION DELIVERED TO <u>Naiknimbalkar/Spicer</u> DATE : _____	
OBJECTIVE(S): Locate 116-DR-4 Pluto Crib outside of 105-DR reactor.	
NOTES: Antenna pulled by hand at 1-2 mph. 50-meter cable. Pulled on south and east side of survey marks. Crib size= 10 x 10 x 15	

Figure 3. Survey Parameters

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Date Received: 9/24/93 DS	INFORMATION RELEASE REQUEST	Reference: WHC-CM-3-4
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Title Geophysical Investigation of 105-DR Pluto Crib, 116-DR-4, 100 D Area.	Unclassified Category UC-	Impact Level 4
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)	
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Title of Journal
N/A

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Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature Indicates Approval
			Name (printed) Signature Date
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Information conforms to all applicable requirements. The above information is certified to be correct.							
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