START

0029757

JUL 22 1993

Station # 12

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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ER	K. A. Bergstrom	N/A
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		10. System/Bldg./Facility:
		N/A
11. Receiver Remarks:		**12. Major Assm. Dwg. No.:**
		N/A
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		14. Required Response Date:

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15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-EN-TI-124		0	Ground-Penetrating Radar Investigation for Northslope ERA, H-83-C	4	1/2	2	

16. KEY

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

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(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.
4	2	Cog.Eng. K. A. Bergstrom Ken Bergstrom 6-18-93 G6-50	EDMC (2) H6-08	3	
2	1	Cog. Mgr. J. W. Fassett J.W. Fassett 6-18-93 H6-06	J. G. Lucas H6-04	4	
		QA	F. W. Gustafson H6-04	3	
		Safety			
		Env.			
3		Geophysical Files (2) G6-50			
3		Central Files (2) L8-04			

18.	19.	20.	21. DOE APPROVAL (if required)
K.A. Bergstrom K.Bergstrom 6-18-93 Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	J. W. Fassett J.W. Fassett 6-18-93 Cognizant/Project Engineer's Manager Date	Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments

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JE 7-22-93

SUPPORTING DOCUMENT

1. Total Pages ~~6~~ 8

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Ground-Penetrating Radar (GPR) Investigation for North Slope ERA, H-83-C	WHC-SD-EN-TI-124	0

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APPROVED FOR PUBLIC RELEASE
V. Birkland 7/19/93

6. Author

Name: K. A. Bergstrom

Signature

Organization/Charge Code
81234/E63479

7. Abstract

K. A. Bergstrom and T. H. Mitchell, 1993, *Ground-Penetrating Radar Investigation for North Slope ERA, H-83-C*, WHC-SD-EN-TI-124, Rev. 0, Westinghouse Hanford Company, Richland, Washington

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Reference: WHC-CM-3-4

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Date Release Required: 8/1/93

Title: Ground-Penetrating Radar (GPR) Investigation for North Slope ERA, H-83-C

Unclassified Category: UC-

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K. A. Bergstrom Ken Bergstrom 6-18-93

Intended Audience
[] Internal [] Sponsor [X] External

Responsible Manager (Printed/Signature) — Date
J. W. Fassett J.W. Fassett 6-18-93

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

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Date Cancelled

Date Disapproved

BD-7600-062 (08/91) WEF074

Part 1

Ground-Penetrating Radar (GPR) Survey for Northslope ERA, H-83-C.

Objective

The objective of the survey was to locate two dry wells shown on drawings for the Northslope ERA site, H-83-C site (Figure 1). H-83-C was a radar tracking site for a NIKE missile installation. The buildings that previously occupied the area (Figure 2) were demolished and the remains buried on site. The dry wells are 7 feet X 7 feet and 4 feet X 4 feet according to drawings. Ground-Penetrating Radar (GPR) was selected to try and locate the dry wells among the buried debris. It is not known what the dry wells were used for or whether they were actually built.

The initial survey grid covered a 70-foot X 140-foot area. The grid was later expanded to the south and east covering an additional 70-foot X 120-foot area (Figure 3).

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 generally around 10 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 is 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

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drive. A 300 Mhz antenna was used with a recording window of 100 nanoseconds two-way travel time.

Grid Location

The survey consists of two rectangular grids measuring 70 feet X 140 feet and 70 feet X 120 feet (Figure 3). Green stakes mark the corners of the grid. The long axis of both grids strike approximately north-south. All distances were measured and posted in feet. The southwestern corner of the western grid is designated E100/N100 and serves as the "origin" for the survey locations. The letters "N" or "E" refers to a direction that trends generally north or east, respectively. The number refer to a distance in feet. For example, grid point E135/N120 lies 35 feet "east" and 20 feet "north" of grid point E100/N100.

Data were collected along two sets of profiles perpendicular to each other. Spacing was 5 feet between profiles.

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 4 summarizes survey parameters.

Results

The initial grid was selected based on the projected location of the spare parts building (Figure 2). Inspection of the data indicated that the site had considerable amounts of buried debris within the surveyed area. The debris covered an area much larger than the anticipated size of the buildings (Figure 3), hiding the original building foundation, if present, among the buried debris. The high concentration of highly reflective debris made it unlikely that the signature from a dry well would be detectable.

Based on the results from the initial grid, the survey was expanded to the south and east in an attempt to locate buried utilities and the generator building. The objective was to locate features on the drawing from which the location of the dry wells could be scaled from. Figure 3 shows the interpretation of the data overlain by the drawing. From this information possible locations of the dry wells were determined.

Key features that were identified in the eastern extension were two linears (Figure 3) interpreted to be an underground water line and underground communications line. Another key feature was a

"slab like" reflector that is interpreted to be the floor of the generator building. Based on these findings the interpreted locations of the dry wells were inferred by indirect evidence.

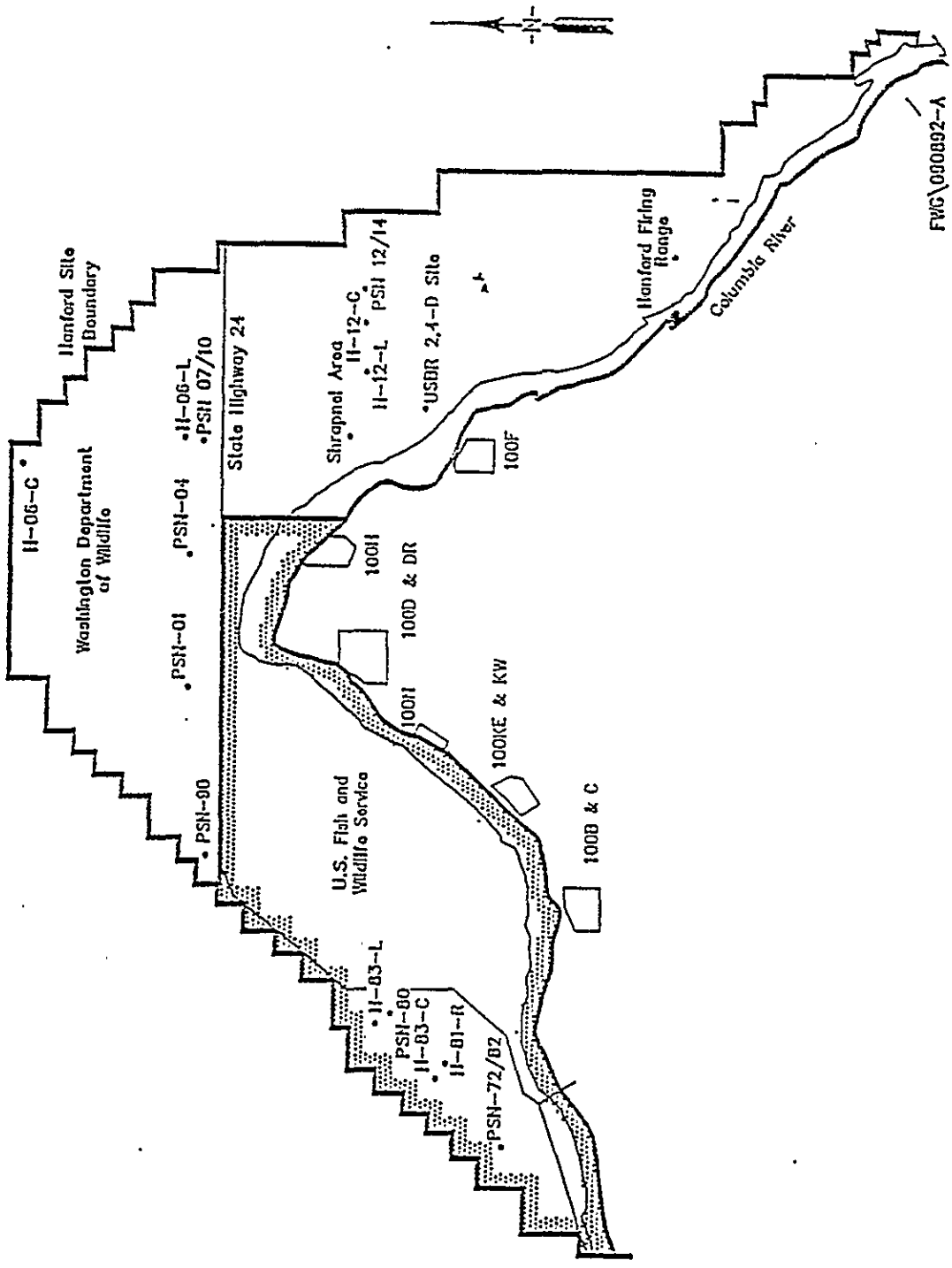

Figure 1. Location of North Slope Sites being Investigated.

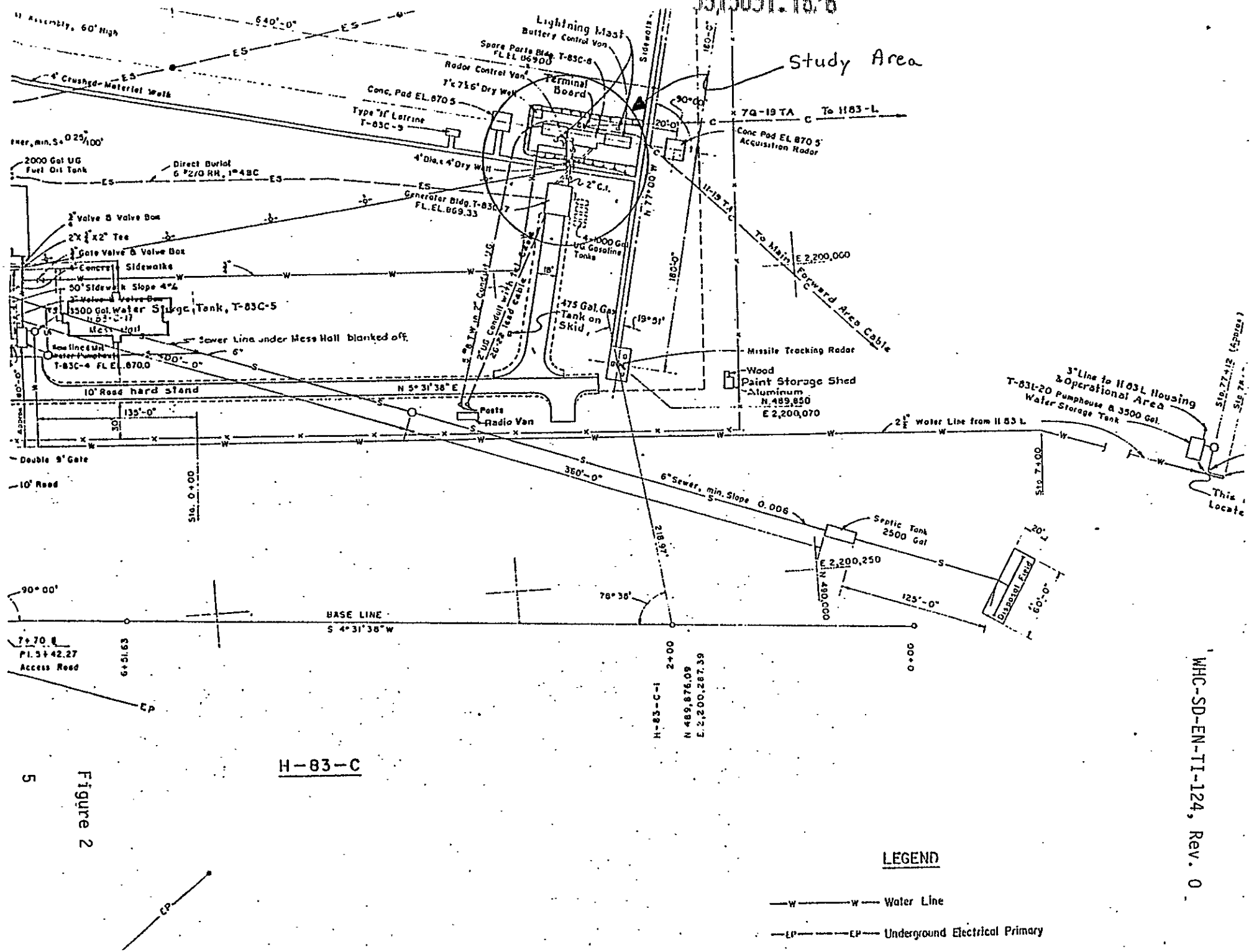
Study Area
Lightning Mast
Spare Parts Bldg. T-83C-8
Radar Control Van
Terminal Board
Conc. Pad EL. 870.5
Type "H" Latrine T-83C-9
4' Crushed-Material Walk
2000 Gal UG Fuel Oil Tank
Direct Burial 6 #2/0 RH, 1#4BC
4" Dia. x 4' Dry Well
Generator Bldg. T-83C-7 FL. EL. 869.33
2" C.I.
4-1000 Gal UG Gasoline Tanks
2" Valve & Valve Box
2"x2"x2" Tee
2" Gate Valve & Valve Box
4" Concrete Sidewalks
50' Sidewalk Slope 4%
3500 Gal. Water Storage Tank, T-83C-5
Mess Hall
6" Sewer Line under Mess Hall blanked off.
Sewage Lift Pumphouse T-83C-4 FL EL. 870.0
10' Road hard stand
N 5° 31' 38" E
475 Gal. Gas Tank on Skid
2" UG Conduit with 1#4 & 2#2 Cable
Missile Tracking Radar
Wood Paint Storage Shed
Aluminum
N 489,650
E 2,200,070
Posts
Radio Van
To Main Forward Area Cable
E 2,200,000
3" Line to H 83 L Housing & Operational Area
T-83L-20 Pumphouse & 3500 Gal. Water Storage Tank
2" Water Line from H 83 L
Double 9' Gate
10' Road
6" Sewer, min. Slope 0.006
Septic Tank 2500 Gal
E 2,200,250
N 489,000
Disposal Field
BASE LINE
S 4° 31' 38" W
Access Road
H-83-C-1
N 489,876.09
E 2,200,287.39
H-83-C
LEGEND
Water Line
Underground Electrical Primary

Figure 2

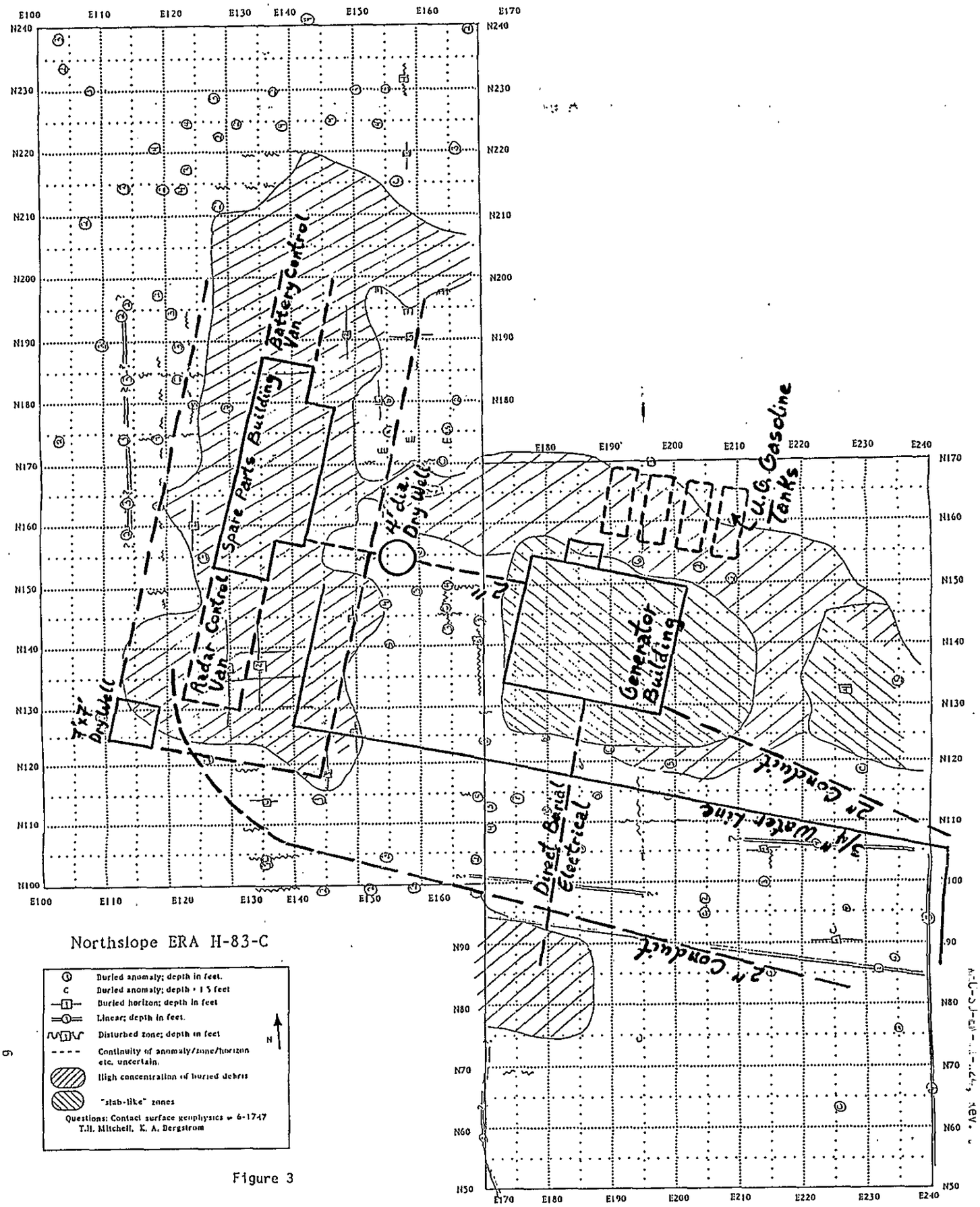
E100
E110
E120
E130
E140
E150
E160
E170
E180
E190
E200
E210
E220
E230
E240
N240
N230
N220
N210
N200
N190
N180
N170
N160
N150
N140
N130
N120
N110
N100
N90
N80
N70
N60
N50
Battery Control Van
Spare Parts Building
Radar Control Van
Dry Well
Dry Well
U.G. Gasoline Tanks
Generator Building
2" Conduit
3/4" Water Line
Direct Burial Electrical
2" Conduit
Northslope ERA H-83-C
Buried anomaly; depth in feet.
Buried anomaly; depth + 1.5 feet
Buried horizon; depth in feet
Linear; depth in feet.
Disturbed zone; depth in feet
Continuity of anomaly/zone/horizon etc. uncertain.
High concentration of buried debris
"slab-like" zones
N
Questions: Contact surface geophysics @ 6-1747
T.H. Mitchell, K. A. Bergstrom

Figure 3

GROUND PENETRATING RADAR (GPR) SURVEY

Team Geophysics, Westinghouse Hanford Operations

TITLE: Northslope ERA, H-83-C Site	DATE: 1-27-93& 2-3-93
LOCATION: Walukee Slope NIKE Missle Site H-83-C	
CLIENT: John Lucas	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 XX 100 BISTATIC ____
	LOG BOOK: EFL 1029
	TIME WINDOW (NS): 100
PROCEDURES FOLLOWED: WHC-CM-7-7 EII 11.2, REV. 3	
GRID : 70'X140' / 70'x120' NO. OF PROFILES: 84 TOTAL FOOTAGE COLLECTED: 7680	
PARAMETERS: Two sets of perpendicular profiles; five feet between profiles.	
DATA TAPE NO.: ERA 93-1 / ERA 93-2 RECORDS LOCATION: Geophysical files	
TAPE ADDRESS :0-65205 / 0-14300 CALIBRATION ADDRESS: 42971-43831 / 13495-14300	
INTERPRETED BY : K. A. Bergstrom REVIEWED BY : T.H. Mitchell	
INTERPRETATION DELIVERED TO John Lucas DATE : 2-10-93draft	
OBJECTIVE(S): To locate two dry wells shown on drawings.	
NOTES: Antenna pulled by hand at 1-2 mph. 50-meter cable. Pulled on south and east side of survey marks. ** Portion of site covered with sage brush. * Surface debris covering significant portion of site.	

Figure 4