AMPHORA RESOURCES
GEOPHYSICAL REPORT ON AN
AIRBORNE MAGNETIC AND VLF-EM SURVEYS
RED REEF AND SKY CLAIMS
SKEENA MINING DIVISION
NTS: 103P/13E
LATITUDE: 55° 56'N LONGITUDE: 129° 58'W

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DATE OF WORK: JAN 29, 1990
DATE OF REPORT: MAY 15, 1990

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,001

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ILLUSTRATIONS

* Written by Woods (1988)

INTRODUCTION:

On January 29, 1990 an airborne reconnaissance magnetic and VLF-EM survey was conducted over the **Red Reef and Sky claims** by Western Geophysical Aero Data Ltd. for **Amphora Resources.**

The intention of this survey is to direct further exploration to favorable target areas and to assist in the geological mapping of the property. Approximately 8.1 line kilometers of airborne magnetic and VLF-EM data has been collected, processed, and displayed in order to evaluate this property.

LOCATION AND ACCESS

The **Red Reef and Sky claims** are located one half of a kilometre east of the Stewart airstrip (Figure 1). The claims are on the steep slope on the east side of Bear River, south of Barney Gulch and north of Silverado Creek.

There is year-round highway access to Stewart. Property access was gained by a short helicopter ride across the Bear River to the property area.

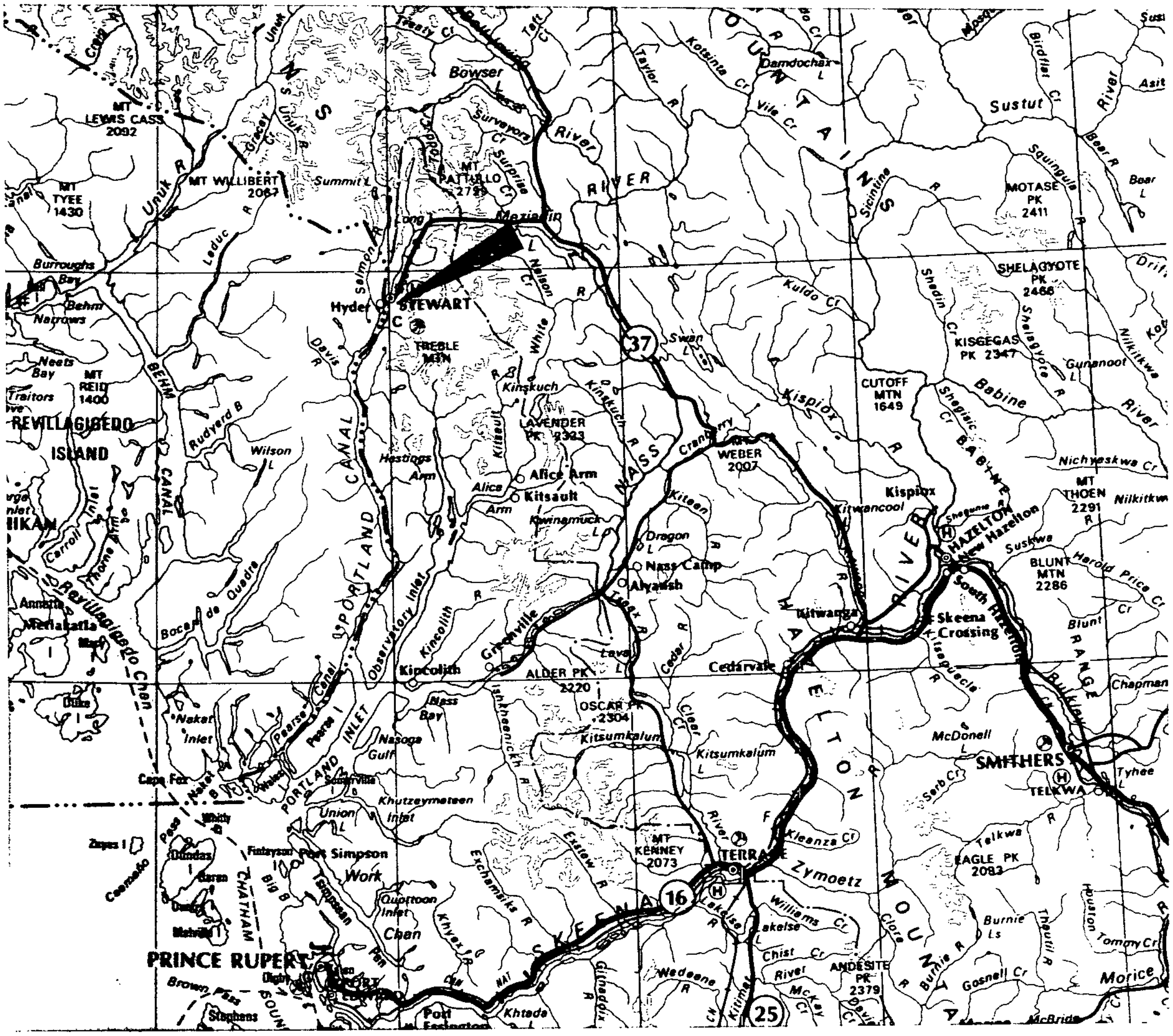
PROPERTY:

The **Red Reef and Sky claims** are located in the Skeena Mining Division (Figure 2) and are summarized as follows.

Claim Name	Record Number	Number of units	Expiry Date
Red Reef	1145	6	Feb 19,1991
Sky	2245	4	Apr 30,1991

AREA HISTORY

Mineral exploration in the Stewart-Unuk River area began in the early 1890's when placer miners on their way out of the Cariboo prospected the Unuk River and its tributaries. In 1898, an



AMPHORA RESOURCES

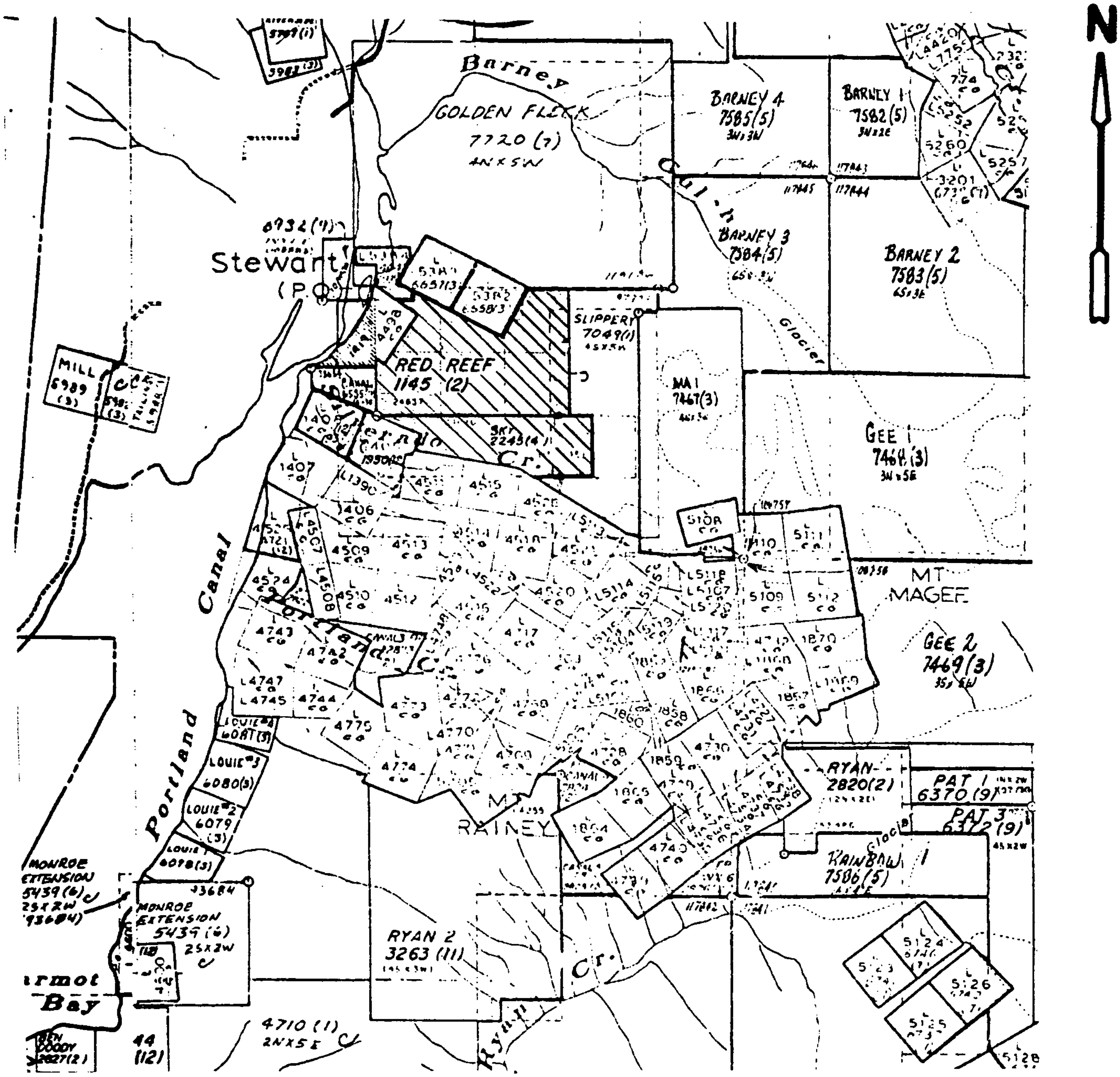
RED REEF AND SKY CLAIMS

AREA LOCATION MAP

NTS: 103P/13W

SCALE- 1:2,000,000

FIG. 1



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RED REEF AND SKY CLAIMS

CLAIMS MAP

NTS: 103P/13W

SCALE- 1: 50 000

FIG. 2

expedition of placer miners landed at the head of Portland Canal and proceed to explore the Bear River and Salmon River valleys. The discovery of mineralized float and vein material led to an influx of "hard-rock" prospectors. The townsite of Stewart was established (named after the prospecting family of "Pop", John and Bob Stewart), and by 1910 most of known mineral occurrences in the Stewart area, including the future Silbak Premier mine, had been discovered.

Mine development over the next three decades resulted in slow but steady growth of the Stewart area. In particular, the discovery of high-grade silver and gold ore at Premier in 1918 led to the development of one of the richest mineral deposits in British Columbia and the incentive for intensive exploration and development in the Salmon River basin.

Most of the small mines in the Stewart region were worked out by the 1940's except for the Silbak Premier mine which continued through to the 1970's. Total production of the Premier group consisted of 4 million ounces of gold, 41 million ounces of silver, 4 million pounds of copper, 52 million pounds of lead and 19 million pounds of zinc, making it the second largest silver producer (after Sullivan) and the third largest gold producer (after Bralorne-Pioneer and Rossland) in B.C. The development of the Granduc massive sulphide orebody in the Unuk River area northeast of Stewart and construction of the Cassiar-Stewart-Terrace highway maintained the growth and exploration activity of the Stewart area during the 1960's and 1970's. Significant discoveries in the Iskut River - Stikine River areas north of Stewart have led to an increased intensity of mineral exploration activity in recent years.

Almost all of the early mineral discoveries in the Stewart-Unuk River area have been found by prospecting gossans sighted from accessible stream or river valleys in areas of negligible vegetation. Recent discoveries have results from prospecting mineralized showings revealed by ablating glaciers (i.e. Granduc Mine). Exploration is hampered by a dense vegetation at low elevations and snow cover at high elevations. Soil geochemistry is impractical in most areas due to a lack of suitable soil cover. Hence, the best approach to mineral exploration in the stewart-Unuk River area is a combination of geological and geophysical surveying to discover unknown hidden deposits, and detailed reappraisal of known showings using geophysical and geochemical techniques together with modern geological concepts of ore genesis.

REGIONAL GEOLOGY

The Stewart-Unuk River area is composed of three distinct tectonic zones of Mesozoic to Cenozoic age along the western margin of the Cordilleran (Figure 3). From west to east they are: the Coast Plutonic Complex or Crystalline Belt, the Stewart Complex and the Bowser Basin. The Stewart Complex is a deformed belt of volcanic, volcaniclastic and sedimentary rocks of Upper Triassic to Middle Jurassic age which extend from Alice Arm in the south to the Iskut River in the north. These rocks are in intruded contact with Middle Jurassic to Eocene felsic plutonic rocks of the Coast Plutonic Complex to the west, and unconformably underlay the Upper Jurassic to Cretaceous marine clastic sedimentary rocks of the Bowser Basin to the east. The Stewart Complex is one of the most important metallogenic regions in British Columbia.

Stratigraphic nomenclature of the Stewart Complex and Bowser Basin has been adopted from Grove (1986) following modifications from Grove (1971). The oldest rocks of the Stewart-Unuk River area are the Upper Triassic volcanic conglomerates, sandstones and siltstones comprising the Takla Group near Unuk River. In the absence of correlatable fossil evidence, the distinction between these Takla Group volcaniclastics and the overlying Hazelton Group volcaniclastics in not conclusive.

The lowest member of the Jurassic Hazelton Group is the Lower Jurassic Unuk River Formation consisting of green, red and purple volcanic breccia, conglomerate, sandstone and siltstone, pillowed lava and volcanic flows, and minor crystal tuff, limestone and chert. The Unuk River Formation is uncomfortably overlain by the Middle Jurassic Betty Creek Formation of predominantly volcanic breccia, conglomerate, sandstone and siltstone, which, in turn, is unconformably overlain by siltstone, greywacke, sandstone and argillite of the Salmon River Formation. Grove (1971) referred to the Unuk River Formation as the Hazelton assemblage, and the Betty Creek and Salmon River Formation as the Bowser assemblage.

The Upper Jurassic Nass Formation overlies the Salmon River Formation to form the uppermost constituent of the Bowser basin. The Nass Formation consists of a thick sequence of marine clastic sedimentary rocks (siltstones, greywackes, sandstones).

In addition to the volcanic epiclastic and sedimentary rocks of the Unuk River, Betty Creek and Salmon River Formations, the Stewart Complex is also partially composed of their cataclastic and metamorphic equivalents. Cataclasite and mylonite are found near the intruded contract of the Late Jurassic Texas Creek granodiorite. Phyllites, schists and gneisses are confined to the intruded contact areas with the Tertiary Hyder quartz monzonite and Boundary granodiorite.

The Coast Plutonic Complex is composed of multiple phases of intrusion from Upper Triassic quartz diorite in the Unuk river area to Middle Jurassic granodiorites and Tertiary quartz monzonites in the Stewart area. Plutonic satellites of quartz monzonite, quartz diorite and granodiorite are also found toward the centre of the Stewart Complex. Dykes and sills of similar composition are found throughout the Stewart Complex but particularly in well defined zones cutting across the regional geologic trends.

Mineralization in the Stewart area is confined primarily to the Lower and Middle Jurassic Stewart Complex: Unuk River, Betty Creek and Salmon River Formations. Grove (1986) recognizes four classes of mineral deposits such as the Silbak Premier Mines, stratiform massive sulphide deposits such as the Hidden Creek Mine in the Anyox area, discordant massive sulphide deposits such as the Granduc Mine, and Tertiary porphyry copper-molybdenum deposits such as the Mitchell-Sulphurets property. The most important of these, in terms of number of deposits and quantity of ore, are the fissure and replacement vein deposits. However, in terms of exploration potential, all types of deposits have equal importance.

PROPERTY GEOLOGY

The area associated with the **Red Reef and Sky claims** is a block of Lower Jurassic South Unuk River volcaniclastic-epiclastic sediments. The South Unuk River sediments have been mapped in the property area as red, green, and purple volcanic breccia, conglomerate, sandstone and siltstone. A narrow band of concurrent-aged cataclastite and mylonite trends northwest from the southern boundary of the **Sky claims** down-slope to the east bank of the Bear River. Nearby and off property, 500 metres to the north of **Red Reef** and 500 metres south west of **Sky** are South Unuk River geological contacts with Coast Plutonic Complex, biotite developed, granodiorite stocks.

AIRBORNE MAGNETIC AND VLF-EM SURVEY:

This geophysical survey simultaneously monitors and records the output signals from a Barringer Research proton precession magnetometer and a Herz dual-frequency VLF-EM receiver. The sensors are installed in an aerodynamically stable "bird" which is towed thirty metres below a helicopter. Fixed to the helicopter skid is a shock and gimbal-mounted, downward-facing video camera. A video signal is recorded and later reviewed and

JURASSIC

HAZELTON GROUP

UPPER JURASSIC

NASS FORMATION

MESOZOIC

17 — SILTSTONE, GREYWACKE, SANDSTONE, SOME CALCARENITE, ARGILLITE, CONGLOMERATE, MINOR LIMESTONE, MINOR COAL (INCLUDING EQUIVALENT SHALE, PHYLLITE, AND SCHIST)

MIDDLE JURASSIC

SALMON RIVER FORMATION

16 — SILTSTONE, GREYWACKE, SANDSTONE, SOME CALCARENITE, MINOR LIMESTONE, ARGILLITE, CONLOMERATE, LITTORAL DEPOSITS

15 — RHYOLITE, RHYOLITE BRECCIA; CRYSTAL AND LITHIC TUFF

BETTY CREEK FORMATION

14 — PILLOW LAVA, BROKEN PILLOW BRECCIA (a); ANDESITIC AND BASALTIC FLOWS (b)

GREEN, RED, PURPLE, AND BLACK VOLCANIC BRECCIA, CONLOMGERATE, SANDSTONE, AND SILTSTONE (a); CRYSTAL AND LITHIC TUFF (b); SILTSTONE (c); MINOR CHERT AND LIMESTONE [INCLUDES SOME LAVA (+14)] (d)

LOWER JURASSIC

UNUK RIVER FORMATION

GREEN, RED, AND PURPLE VOLCANIC BRECCIA, CONGLOMERATE, SANDSTONE, AND SILTSTONE (a); CRYSTAL AND LITHIC TUFF (b); SANDSTONE (c); CONGLOMERATE (d); LIMESTONE (e); CHERT (f); MINOR COAL (g)

11 — PILLOW LAVA (a); VOLCANIC FLOWS (b)

TRIASSIC

UPPER TRIASSIC

TAKLA GROUP (?)

10 — SILTSTONE, SANDSTONE, CONGLOMERATE (a); VOLCANIC SILTSTONE, SANDSTONE, CONLOMGERATE (b); AND SOME BRECCIA (c); CRYSTAL AND LITHIC TUFF (d); LIMESTONE (e)

PLUTONIC ROCKS

CENOZOIC

OLIGOCENE AND YOUNGER

DYKES AND SILLS (SWARMS), DIORITE (a); QUARTZ DIORITE (b); GRANODIORITE (c); BASALT (d)

EOCENE (STOCKS, ETC.) AND OLDER

8 — QUARTZ DIORITE (a); GRANODIORITE (b); MONZONITE (c); QUARTZ MONZONITE (d); AUGITE DIORITE (e); FELDSPAR PORPHYRY (f)

7 — COAST PLUTONIC COMPLEX: GRANODIORITE (a); QUARTZ DIORITE (b); QUARTZ MONZONITE, SOME GRANITE (c); MIGMATITE – AGMATITE (d)

MESOZOIC

JURASSIC

MIDDLE JURASSIC AND YOUNGER ?

GRANODIORITE (a); DIORITE (b); SYENODIORITE (c); MONZONITE (d); ALASKITE (e)

LOWER JURASSIC AND YOUNGER ?

DIORITE (a); SYENOGABBRO (b); SYENITE (c)

TRIASSIC

UPPER TRIASSIC AND YOUNGER ?

DIORITE (a); QUARTZ DIORITE (b); GRANODIORITE (c)

HORNBLENDE PREDOMINANT . . . . H
BIOTITE PREDOMINANT . . . . B

METAMORPHIC ROCKS

TERTIARY

3 — HORNFELS (a); PHYLLITE, SCHIST (b); SOME GNEISS (c)

JURASSIC

2 — HORNFELS (a); PHYLLITE, SEMI-SCHIST, SCHIST (b); GNEISS (c); CATACLASITE, MYLONITE (d); TACTITE (e)

TRIASSIC

1 — SCHIST (a); GNEISS (b); CATACLASITE, MYLONITE (c)

HORNBLENDE OR AMPHIBOLE DEVELOPED . . . . H
BIOTITE DEVELOPED . . . . B
POTASSIUM FELDSPAR DEVELOPED . . . . K

AREA UNMAPPED

SYMBOLS

- ADIT
- ANTICLINE (NORMAL, OVERTURNED)
- BEDDING (HORIZONTAL, INCLINED, VERTICAL, CONTORTED)
- BOUNDARY MONUMENT
- CONTOURS (INTERVAL 1,000 FEET) — 5000 —
- FAULT (DEFINED, APPROXIMATE)
- FAULT (THRUST)
- FAULT MOVEMENT (APPARENT)
- FOLD AXES, MINERAL LINEATION (HORIZONTAL, INCLINED)
- FOSSIL LOCALITY — F
- GEOLOGICAL CONTACT (DEFINED, APPROXIMATE)
- GLACIAL STRIAE
- GRAVEL, SAND, OR MUD
- HEIGHT IN FEET ABOVE MEAN SEA LEVEL — •6234′
- INTERNATIONAL BOUNDARY
- JOINT SYSTEM (INCLINED, VERTICAL)
- MARSH
- MINING PROPERTY
- RIDGE TOP
- SCHISTOSITY (INCLINED, VERTICAL)
- SYNCLINE (NORMAL, OVERTURNED)
- TUNNEL
- VOLCANIC CONE

Compilation and geology by E. W. Grove, 1964 to 1970, with assistance by N. H. Haimila and R. V. Kirkam, 1966 and James T. Fyles, 1967. Geology of the Alice Arm area by N. C. Carter, 1964 to 1968.

AMPHORA RESOURCES

RED REEF AND SKY CLAIMS

PROPERTY GEOLOGY MAP

NTS: 103P/13W

SCALE- 1:100 000

FIG. 3

correlated with a recent air photograph in order determine the precise locations of the flight paths. The elevation of the helicopter above the ground is recorded by a radar altimeter and monitored by the pilot and navigator in order to maintain a constant ground clearance.

A computer records readings of the magnitude of the earth's magnetic field and of the fields induced by two powerful VLF-EM transmitters (located in Cutler, Maine and Seattle, Washington). This data, the time and date it was observed, radar altimeter values, and survey fiducial points are all superimposed on the video image and recorded on both video cassettes and 3.5 inch computer diskettes.

Data quality is assured by the survey operator monitoring a real-time display of direct and unfiltered recordings of all the geophysical output signals while a navigator directs the helicopter pilot from an air photograph.

Magnetic (Figures 5 & 6) data is useful for mapping the position and extent of regional and local geological structures which have varying concentrations of magnetically susceptible minerals. Many lithological changes correlate with a change in magnetic signature.

VLF-EM data is useful for mapping conductive zones. These zones usually consist of argillaceous graphitic horizons, conductive clays, water-saturated fault and shear zones, or conductive mineralized bodies. The VLF-EM data is presented as contoured total field data overlain by quadrature (out-of-phase component) profiles. Conductors are located at inflection points or a change in sign (cross-over) of the quadrature component over a local total field VLF-EM high.

In a typical VLF-EM survey, satisfactory conductor coupling and imaging occurs only within 45° of the primary field selected (in the direction of the transmitter). For maximum coupling, and in turn, imaging, a transmitter should be selected in the same direction as geologic strike.

DATA PROCESSING:

The video image, with superimposed line and fiducial identification, recording times, and the recorded data, is correlated with both the navigator's and operator's field notes and topographic features observed from an air photograph. The "recovered" flight paths are digitized to obtain relative x and y positions which are then combined with the data. Subsequently, all geophysical data is filtered to remove spurious noise bursts and chatter, and then plotted as flight path profiles and contour maps for each of the sensors.

Both the total field magnetometer signal and the total field and quadrature components of VLF-EM signal are sensitive to topographic changes and bird oscillations. Short wavelength (less than 200 meters) oscillations, are attenuated by filtering the VLF-EM data with a digital low-pass filter. Long wavelength effects (anomalies greater than 2000 metres), attributed to broad topographic features, are also removed from both the VLF-EM channels by high-pass filtering.

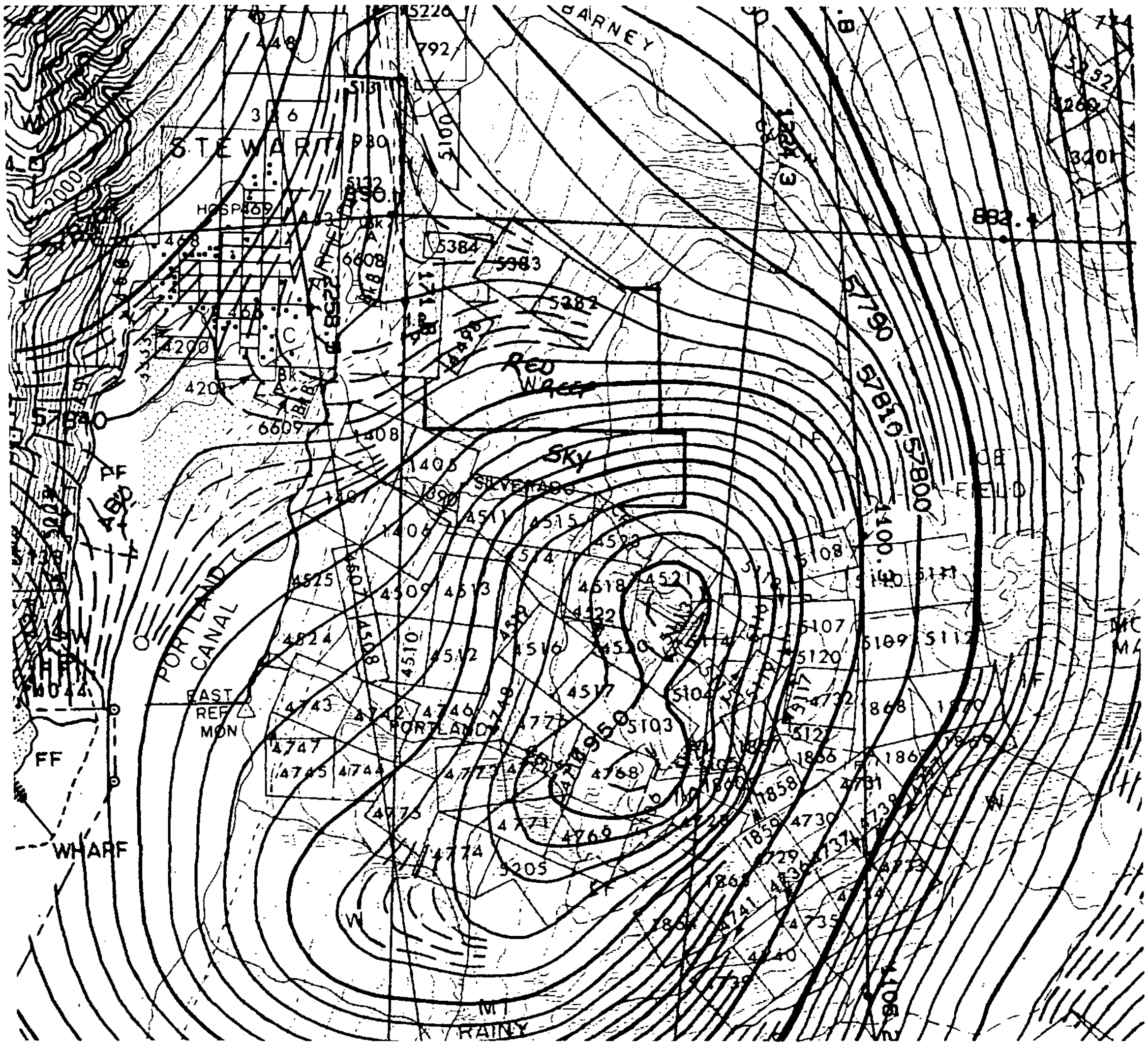
DISCUSSION OF RESULTS:

The **Red Reef and Sky claims** were surveyed on January 29, 1990. Over 8.1 line kilometers of airborne magnetic and VLF-EM survey data have been recorded and evaluated for this property. Survey lines were flown approximately north-south on a Hughes 500D helicopter with an average spacing of 200 metres. The geophysical survey data were recorded on average three times per second for an effective sample interval of 15 metres. The sensors were towed below the helicopter with an average terrain clearance of 30 metres where possible.

The abrupt topographic changes due to the erosional effects of creeks on the property contribute up to an additional 190 metres of ground-to-sensor separation in places (Figure 11). In any airborne geophysical survey an increase in the ground-to-sensor distance by five metres is noteworthy and by ten metres is significant. The effect of separation increases of this magnitude upon the magnetic and VLF-EM responses is a marked reduction in measured intensity. Increased sensor-ground separation attenuates the geophysical response and results in the appearance of a mappable magnetic or VLF-EM low. In many geological settings the location of creeks and rivers correspond to the surface expression of fault and shear zones, or lithological contacts and are likely areas to observe significant VLF-EM conductors. In part, the VLF-EM response, and to a less extent the magnetometer response, may have been "over-printed" or attenuated in these areas by increased separation effects thus masking conductors that might be observed on a ground survey.

VLF-EM conductors corresponding to Seattle and Annapolis transmitters have been interpreted and numbered on the Geophysical Interpretation Map (Figures 12). Overall, both the Annapolis and Seattle transmitters have equally good responses on this survey. Good conductors exhibit strong in-phase crossovers, the quadrature usually lags by up to 90 degrees or mirrors the in-phase response, and the total field is a local high. Conversely, for poor conductors, the quadrature response nearly mimics the in-phase and there are no strong in-phase crossovers and, in some cases, no associated total field anomalies. Poor conductors may be associated with conductive overburden, weathered bedrock, and conductive effects in swampy areas.

The GSC magnetic data (Figure 4) shows the area 750 metres south of the southeast corner of the **Sky claims,** between Silverado and Portland Creeks, corresponds to local magnetic high.



AMPHORA RESOURCES

RED REEF AND SKY CLAIMS

GSC AEROMAGNETIC MAP

NTS: 103P/13W

SCALE- 1: 50 000 FIG. 4

The magnetic signature of the data recorded on the **Red Reef and Sky claims** is complex. Along the northern edge of the survey area there is a increase in the magnetic level northward. The magnetic contours in this area are nearly parallel to the east-west trending A3-S3 conductor pair. Conductor A3 and the westward portion of S3 correspond to a ravine/creek. A geological interpretation of these geophysical signatures and the airphoto information is that in this area there is a east-west trending fault or mineralized zone corresponding to or adjacent to the creek, in the South Unuk River volcaniclastic-epiclastic sediments. The magnetic response on the north side of conductor A3 could be due to increase in more mafic, more magnetic, volcaniclastic sediments or a strongly magnetized body lying off-property to the north. Southward, on Lines 2 and 3, there is a central magnetic high associated with a VLF-EM low. Further south on the **Sky claim** there is a steep magnetic gradient increasing to the south. On Lines 1-3, trending SEE 100 metres north of the southern **Sky** claim boundary, is a narrow, elongated magnetic high. Interpreted faults have been located parallel to magnetic contours. Conductor pair S1-A1 appear to be adjacent to and coincident with erosional features. Conductors S2-A2 do not correspond to any apparent lineations on the airphoto overlay.

CONCLUSIONS AND RECOMMENDATIONS

The **Red Reef and Sky claims** are located in an Lower Jurassic volcaniclastic - epiclastic sedimentary sequence. The volcanic and shallow marine material have been bisected by narrow zone of metamorphic rocks. Tertiary granodiorite stocks are located to the north and southwest within 500 meters of claim boundaries. The airborne geophysical signatures plotted (Figures 5 to 10) display steep magnetic gradients and strong VLF-EM conductors. The potential geological contacts and faults within the volcanic and shallow marine sediments have interpreted on Figure 12.

On this survey abrupt geophysical sensor to ground separations were encountered over the deep erosion chutes on **Red Reef and Sky claims.** Three strong conductor pairs have been located on the property adjacent to areas of rapid magnetic change and nearly coincident with the steep erosion features. A geologic model proposed by the Author is that the South Unuk River sedimentary rocks have been highly stressed and in turn fractured. Along the faults sulphide mineral enrichment in fissure or replacement veins may have occurred. This geologic setting may produce the VLF-EM conductors interpreted (Figure 12). The magnetic data shows steep magnetic gradients where the magnetic level increase to the south and the north with a local high in the centre of the survey area. The significant change in magnetic levels encountered may be due to either magnetic mineral concentration changes within the South Unuk River sediments or an intrusion of more magnetic igneous material below surface. The narrow band of cataclastite and mylonite trending southeast across the property apparent on Figure 3 was not interpretable from the geophysical and geological data available. The nearby igneous stocks may be the source and driver of hydrothermal solutions.

The position and presence of the faults, geological contacts, and/or mineralization should be verified with the interpreted conductors on the **Red Reef and Sky claims.** A more complete picture of the local geology is necessary to interpret the geophysical data both lithologically and structurally. It is recommended that a follow-up search of all sources for additional geological information and past work on these and adjacent claims be undertaken. Subsequent to this search effort a program of geological mapping should be undertaken on the property.

Following the study of available literature and past work in the area, the airborne data should be re-interpreted with the compiled geological information. A follow-up program of ground geophysical surveying should be completed over those airborne geophysical anomalies which correlate with those mapped areas of mineralogical and geological interest.

Respectfully submitted,

Jeffrey C. Murton, B.Sc., P.Geoph.(APEGGA)

REFERENCES

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Woods, D.V., and Hermary, R.G., 1988, Geophysical Report on the Chris 1-4 Claims, Skeena Mining Division, 15 July, 1988

STATEMENT OF QUALIFICATIONS

NAME:	MURTON, Jeff C.
PROFESSION:	Geophysicist
EDUCATION:	B.Sc - Geophysics Major University of British Columbia
PROFESSIONAL ASSOCIATIONS:	Society of Exploration Geophysicists Association of Professional Engineers, Geologists, and Geophysicists of Alberta
EXPERIENCE:	1984-88 - Geophysicist, Interactive Graphics with Western Geophysical Company of Canada Ltd. in Calgary, Alberta. 1988 - Geophysicist with White Geophysical Inc.

INSTRUMENT SPECIFICATIONS

BARRINGER AIRBORNE MAGNETOMETER

Model:	M 1041
Type:	Proton Precession
Range:	20,000 to 100,000 gammas
Accuracy:	+ 1 gamma at 24 V d.c.
Sensitivity:	1 gamma throughout range
Cycle Rates:	Manual: Pushbutton single cycle
	External: Actuated by a contact closure (short) longer than 10 microseconds
	Continuous: 1.114 seconds with external pins shorted
	Internal: 1 second to 3 minutes in 1 second steps
Outputs:	Analogue: 2 channels, 0 to 99 gammas or 0 to 990 gammas at 1 m.a. or 100 mV full scale deflection
	Digital: Parallel output 5 figure 1248 BCD, TTL compatible
	Visual: 5 digit numeric display directly in gammas
Size:	Instrument set in console
	19" x 3.5" x 10"
Weight:	10.6 lbs.
Power Requirements:	28 ± 5 volts dc, @ 1.5 amps - polarizing 4 amps
Detector:	Noise cancelling torroidal coil installed in air foil

INSTRUMENT SPECIFICATIONS

HERZ TOTEM - 2A VLF-EM SYSTEM

Primary Source:	Magnetic field component radiated from VLF radio transmitters (one or two simultaneously)
Parameters Measured:	Total field, vertical quadrature, horizontal quadrature and gradient
Frequency Range:	15 kHz to 25 kHz; front panel selectable for each channel in 100 Hz steps
Sensitivity Range:	130 µV m to 100 mV at 20 kHz, 3 dB down at 14 kHz and 24 kHz
VLF Signal Bandpass:	-3 dB at +/- 80 Hz; < 4% variation at ±50 Hz
Adjacent Channel Rejection:	300 to 800 Hz = 20 to 32 dB; 800 to 1500 Hz = 32 to 40 dB; > 1500 Hz > 40 dB (for < 2% noise envelope)
Out of Band Rejection:	10 kHz to 2.5 Hz = 5 x 10^{-4} Am to 5 x 10^{-1} Am < 2.5 kHz rising at 12 dB octave 30 kHz to 60 kHz = 5 x 10^{-4} Am to 8 x 10^{-3} Am > 60 kHz rising at 6 dB octave (for no overload condition)
Output Span:	±100% = ±1.0 V
Output Filter:	Time constant 1 sec. for 0% to 50% or 10% to 90% noise bandwidth 0.3 Hz (second order LP)
Internal Noise:	1.3 µV m rms (ambient noise will exceed this)
Sferics Filter:	Reduces noise contribution of impulse filter
Electric Field Rejection:	<0.5% error for 20 m tow cable
Controls:	Power switch, frequency selector switches (Line and Ortho), meter switch (Total Quad), and sferics filter switch
Displays:	Meters (Line and Ortho), sferics light, overhead light

HERZ TOTEM - 2A VLF-EM SYSTEM - PAGE 2

Inputs:	Power: 23 to 32 V DC; fused 0.5 Amps
	Signal: Sensor upper; sensor lower
Outputs	Total, quad, gradient, multiplexed (line and ortho)
	Audio monitor, stereo line and ortho
Dimensions and Weight:	Console: 480 mm wide x 45 mm high x 340 mm deep, 3.8 kg
	Sensor and Preamplifier Assembly: 150 mm diameter x 460 mm long, 1.5 kg

INSTRUMENT SPECIFICATIONS

DATA ACQUIISITION UNIT

Model:	HP-3852A
Mainframe Supports:	Eight function module slots
	Data acquisition operating system
	System timer
	Measurement pacer
	Full alphanumeric keyboard, command and result displays
Number of Channels:	20 channel relay multiplexer HP44708A/H
Voltmeter:	5½ to 3½ digit intergrating voltmeter HP44701A measures:
	DC voltage
	resistance
	AC voltage
	Range ±30V, ±0.008%, +300uV
	Intergration Time 16.7 msec
	Number of converted digits 6½
	Reading rate (readings/ sec) 57
	Min-Noise rejection (dB) Normal Mode Rejection at 60 Hz ±0.09% 60
	DC Common Mode Rejection with 1 KΩ in low lead 120
	Effective Common Mode Rejection at 60 Hz ±0.09% with 1 KΩ in low lead 150
Communication:	HPIB interface with Compaq
Power Requirements:	110/220 Volts AC at 60/50 Hz
Dimensions:	45.7 cm x 25.4 cm x 61.0 cm
Weight:	9.5 kg.

INSTRUMENT SPECIFICATIONS

CONTROLLER AND RECORDING SYSTEM - SPECIFICATIONS

Type:	Compaq Portable II
	An 80286 microprocessor
	640 Kbytes of RAM
	2 three and a half inch 720 Kbyte drives one 20-Megabyte fixed disk drive
	Monochrome, dual-mode, 9-inch internal monitor
	Asynchronous communications interface
	Parallel interface
	Composite-video monitor interface
	RGB monitor interface
	RF modulator interface
	Two expansion slots
	Real-time clock
	An 80287 coprocessor
	A HPIB Interface Card
Data Storage:	3 1/2 inch diskettes in ASCII
	Roland 1012 printer for printed output
	Beta I video cassettes
Power Requirements:	115 Volt AC at 60 Hz
Weight:	11 kg
Dimensions:	45 cm x 25 cm x 30 cm

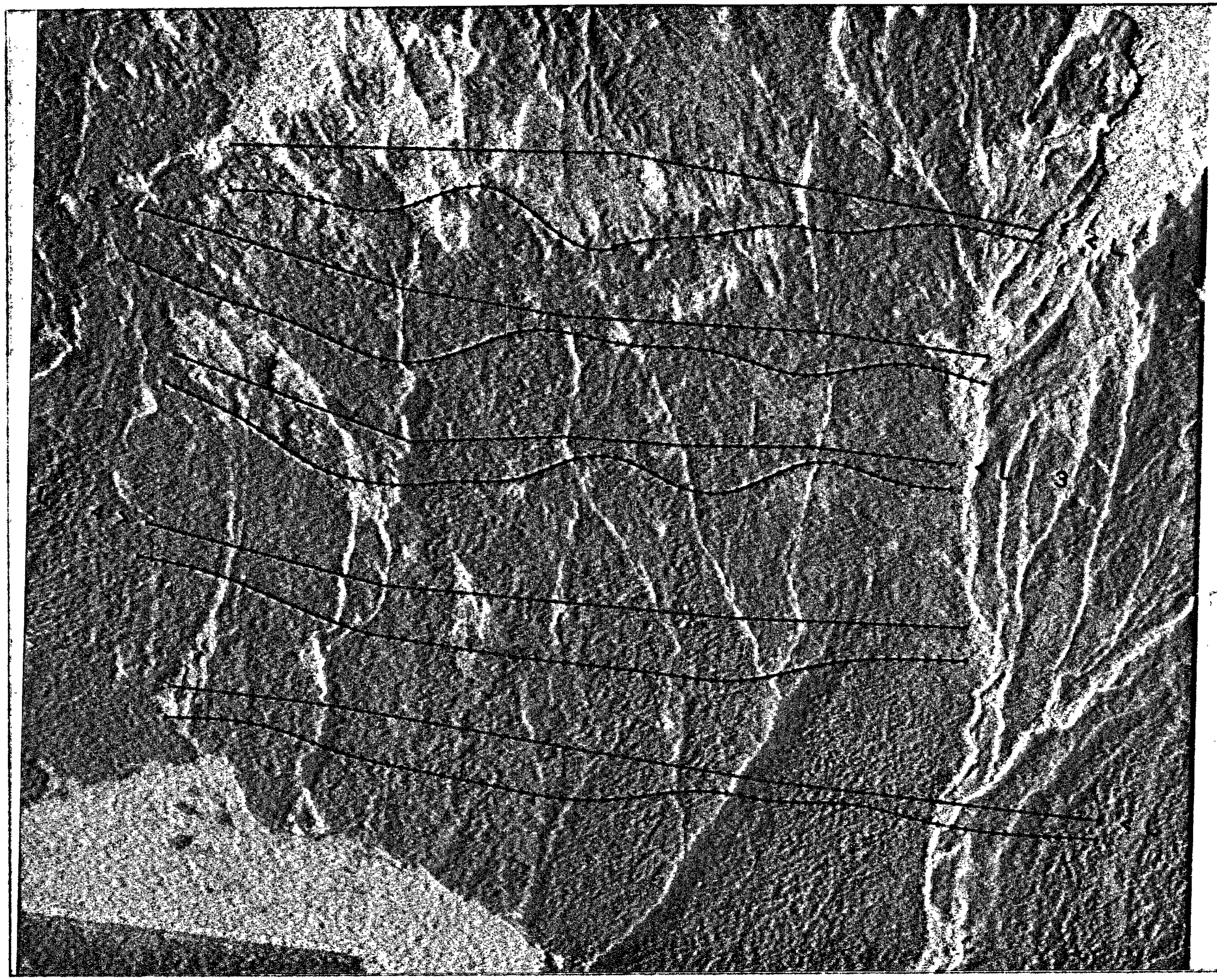
INSTRUMENT SPECIFICATIONS

FLIGHT PATH RECOVERY SYSTEM

T.V. Camera:	Model: RCA TC2055 Vidicon
	Power Supply: 12 volt DC
	Lens: Variable, selected on basis of expected terrain clearance
	Mounting: Gimbal and shock mounted in housing, mounted on helicopter skid
Video Recorder:	Model: Sony SLO-340
	Power Supply: 12 volt DC / 120 volt AC (60Hz)
	Tape: Betamax ½" video cassette - optional length
	Dimensions: 30 cm X 13 cm X 35 cm
	Weight: 8.8 Kg
	Audio Input: Microphone in - 60 db low impedance microphone
	Video Input: 1.0 volt P-P, 75 unbalanced, sync negative from camera
Altimeter:	Model: King KRA-10A Radar Altimeter
	Power Supply: 0-25 volt (1 volt/1000 feet) DC signal to analogue meter, 0-10 v (4mv/ft) analogue signal to data acquisition unit
	Mounting: Fixed to T.V. camera housing, attached to helicopter skid

COST BREAKDOWN:

DESCRIPTION	TOTAL
Red Reef and Sky claims survey totals	
Mobilization and demobilization, 2 men, Brent Robertson and Gerald MacKenzie....................	$ 122.54
Airborne geophysical surveying (January 29, 1990) (8.1 km @ $97.85/km)	$ 792.59
Data processing and report charges	$ 684.87
Subtotal	**$ 1,600.00**



GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,001

+ TOTAL FIELD: BASE LEVEL = 57,400 nanoTesla
SCALE = 100 nanoTesla/cm

AMPHORA RESOURCES

RED REEF AND SKY CLAIMS

MAGNETOMETER: TOTAL FIELD PROFILES

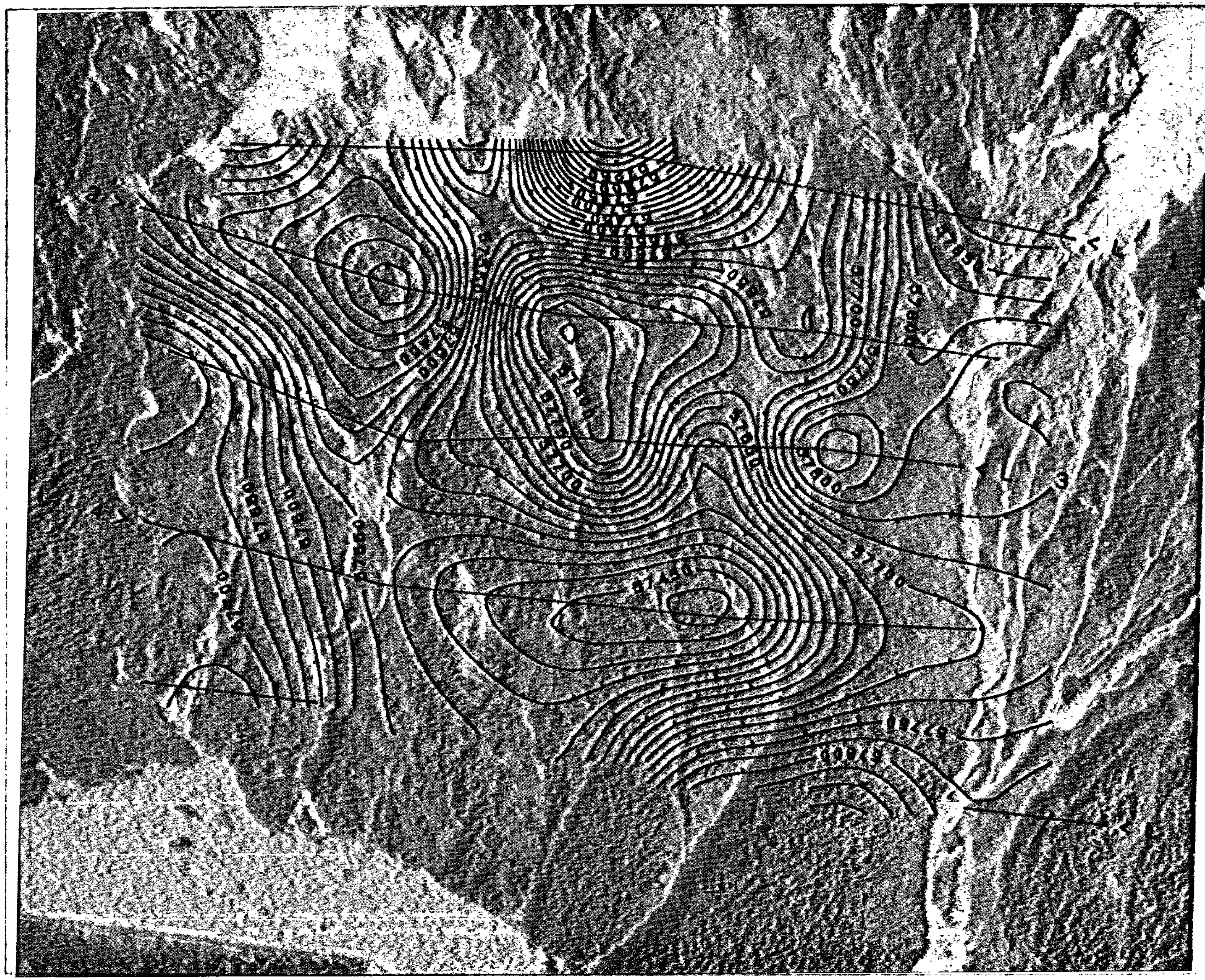
LOW-PASS FILTERED BARRINGER MAGNETOMETER

Scale 1: 10000.0

0 200 400 600 800 1000 M

Date: APR/90	Survey Date: JAN/90	Fig. 5

WESTERN GEOPHYSICAL AERO DATA LTD.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

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AMPHORA RESOURCES

RED REEF AND SKY CLAIMS

MAGNETOMETER: CONTOURED TOTAL FIELD

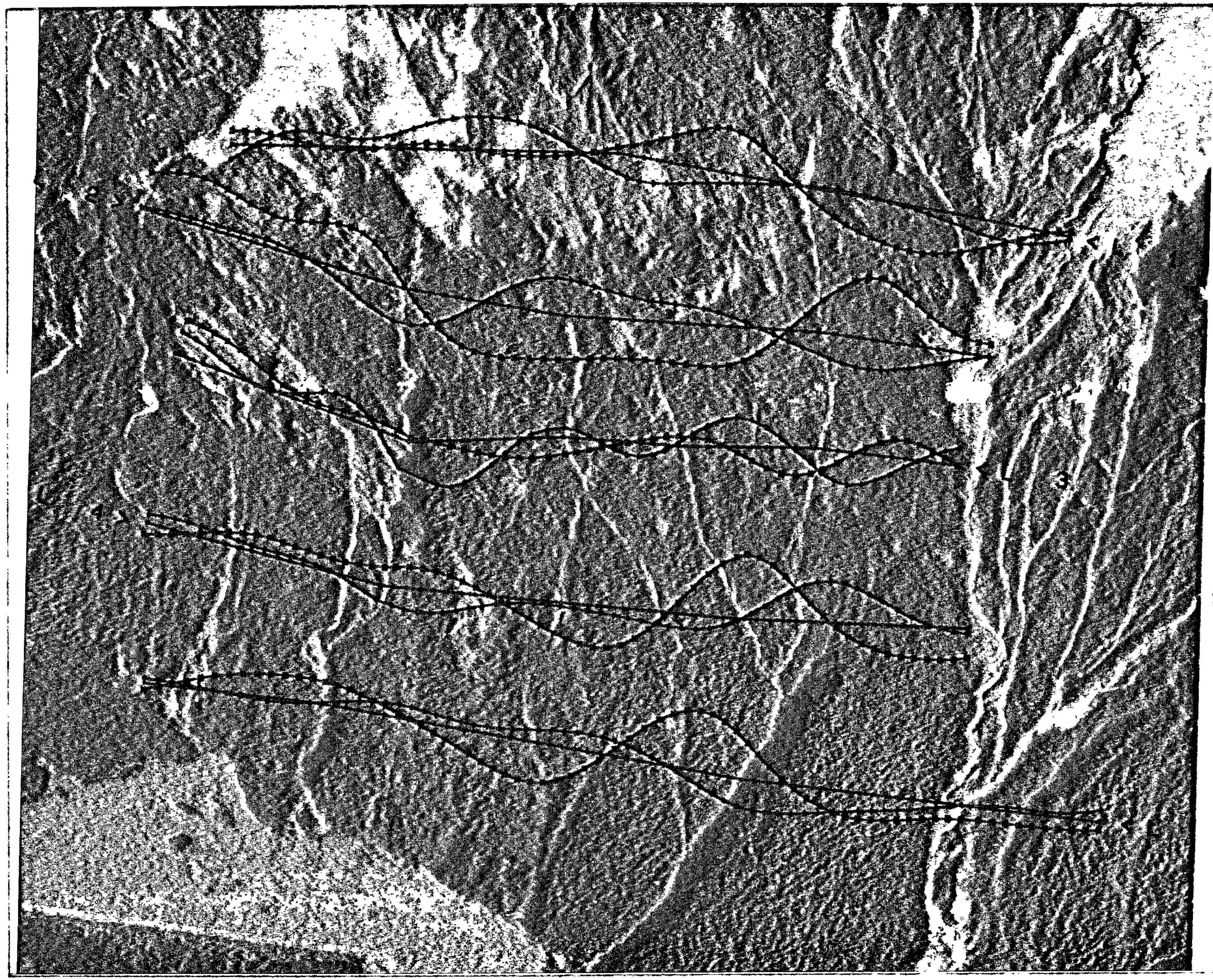
25 nanoTesla Contour Interval

Scale 1: 10000.0

0 200 400 600 800 1000 M

Date: APR/90	Survey: JAN/90	Fig. 6

WESTERN GEOPHYSICAL AERO DATA LTD.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

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x TOTAL FIELD: BASE LEVEL = 0 % SCALE = 10 %/cm
+ QUADRATURE: BASE LEVEL = 0 % SCALE = 10 %/cm

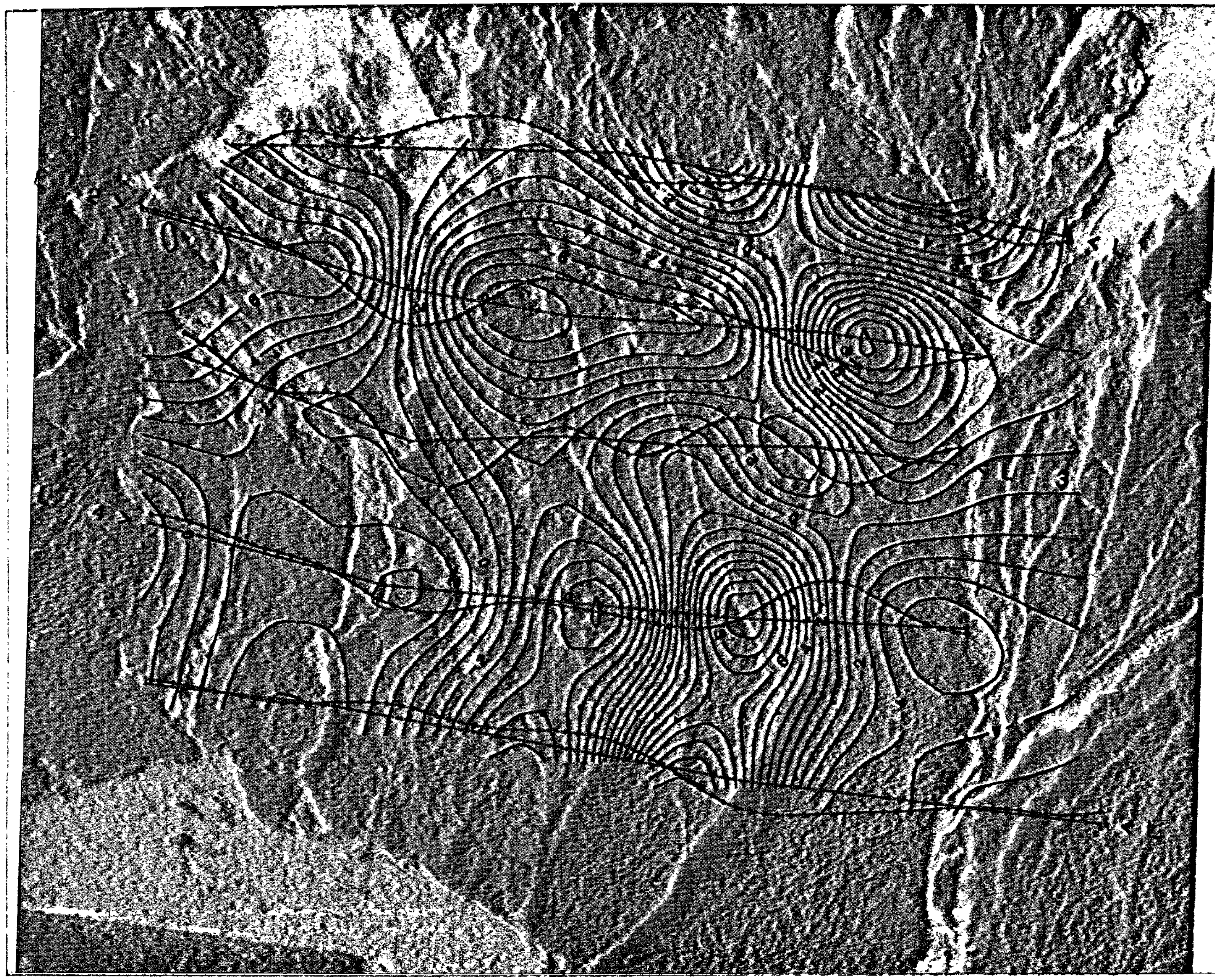
AMPHORA RESOURCES

RED REEF AND SKY CLAIMS
VLF-EM: SEATTLE TRANSMITTER
TOTAL FIELD AND QUADRATURE PROFILES
Scale 1: 10000.0

0 200 400 600 800 1000 M

Date: APR/90	Survey Date: JAN/90	Fig.7

WESTERN GEOPHYSICAL AERO DATA LTD.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,001

+ QUADRATURE: BASE LEVEL = 0 % SCALE = 10 %/cm

AMPHORA RESOURCES

RED REEF AND SKY CLAIMS

VLF-EM: SEATTLE TRANSMITTER

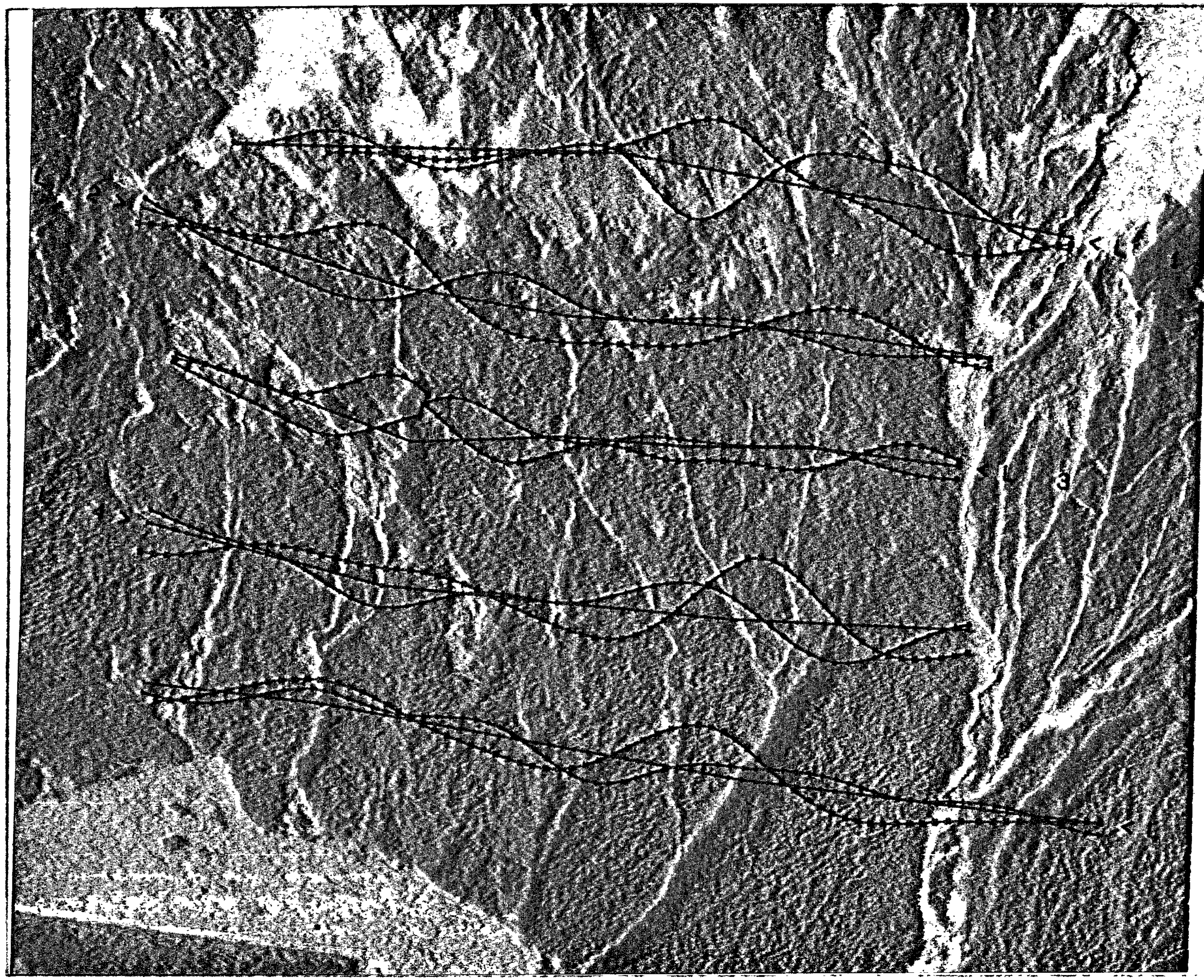
Contoured Total Field With Quadrature Overlay

Scale 1: 10000.0

0 200 400 600 800 1000 M

Date: APR/90	Survey: JAN/90	Fig.8

WESTERN GEOPHYSICAL AERO DATA LTD.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,001

x TOTAL FIELD: BASE LEVEL = 0 % SCALE = 10 %/cm
+ QUADRATURE: BASE LEVEL = 0 % SCALE = 10 %/cm

AMPHORA RESOURCES

RED REEF AND SKY CLAIMS

VLF-EM: ANNAPOLIS TRANSMITTER

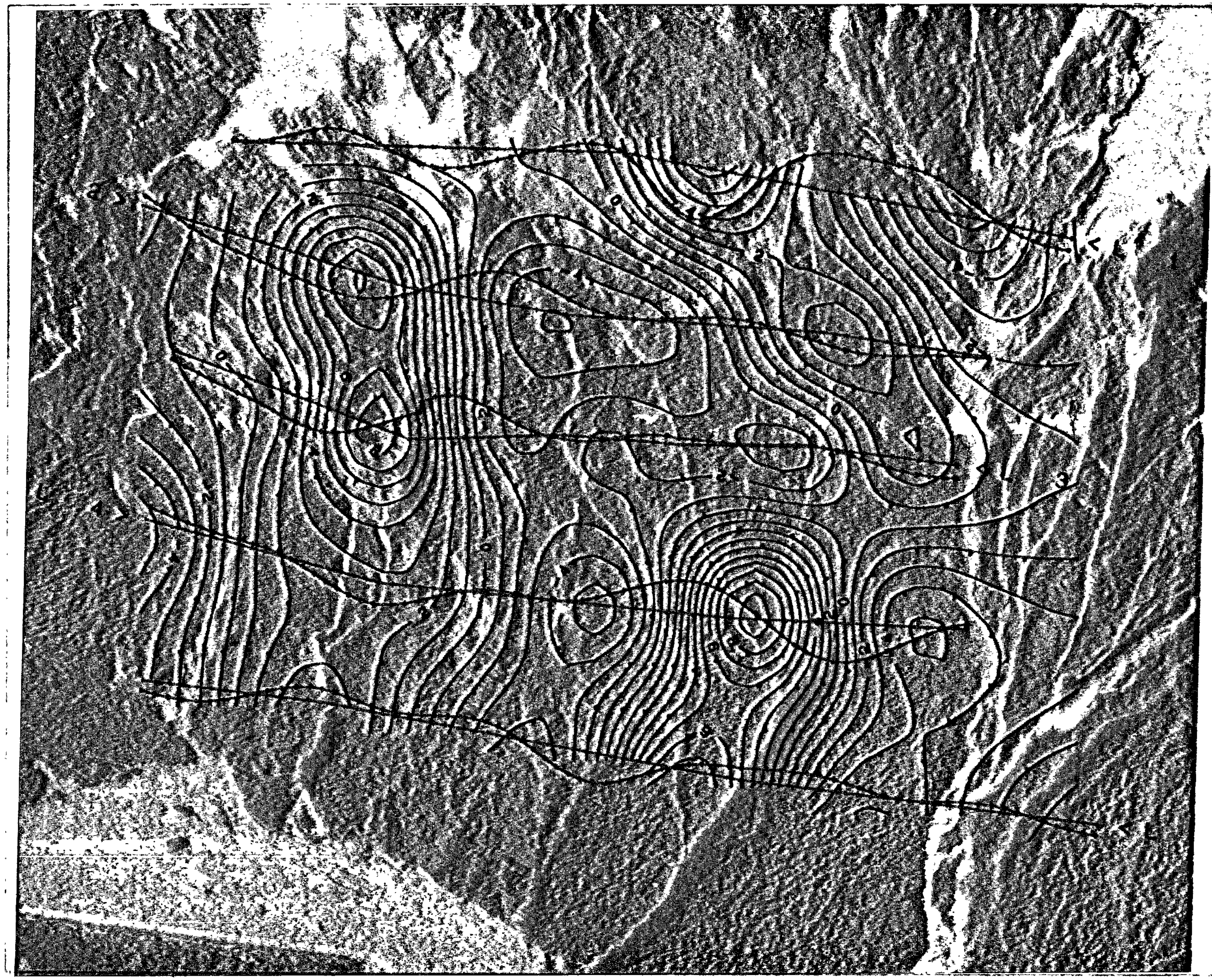
TOTAL FIELD AND QUADRATURE PROFILES

Scale 1: 10000.0

0 200 400 600 800 1000 M

Date: APR/90	Survey Date: JAN/90	Fig.9

WESTERN GEOPHYSICAL AERO DATA LTD.



EOLOGICAL BRANCH
SSESSMENT REPORT

20,001

+ QUADRATURE: BASE LEVEL = 0 % SCALE = 10 %/cm

AMPHORA RESOURCES

RED REEF AND SKY CLAIMS

VLF-EM: ANNAPOLIS TRANSMITTER

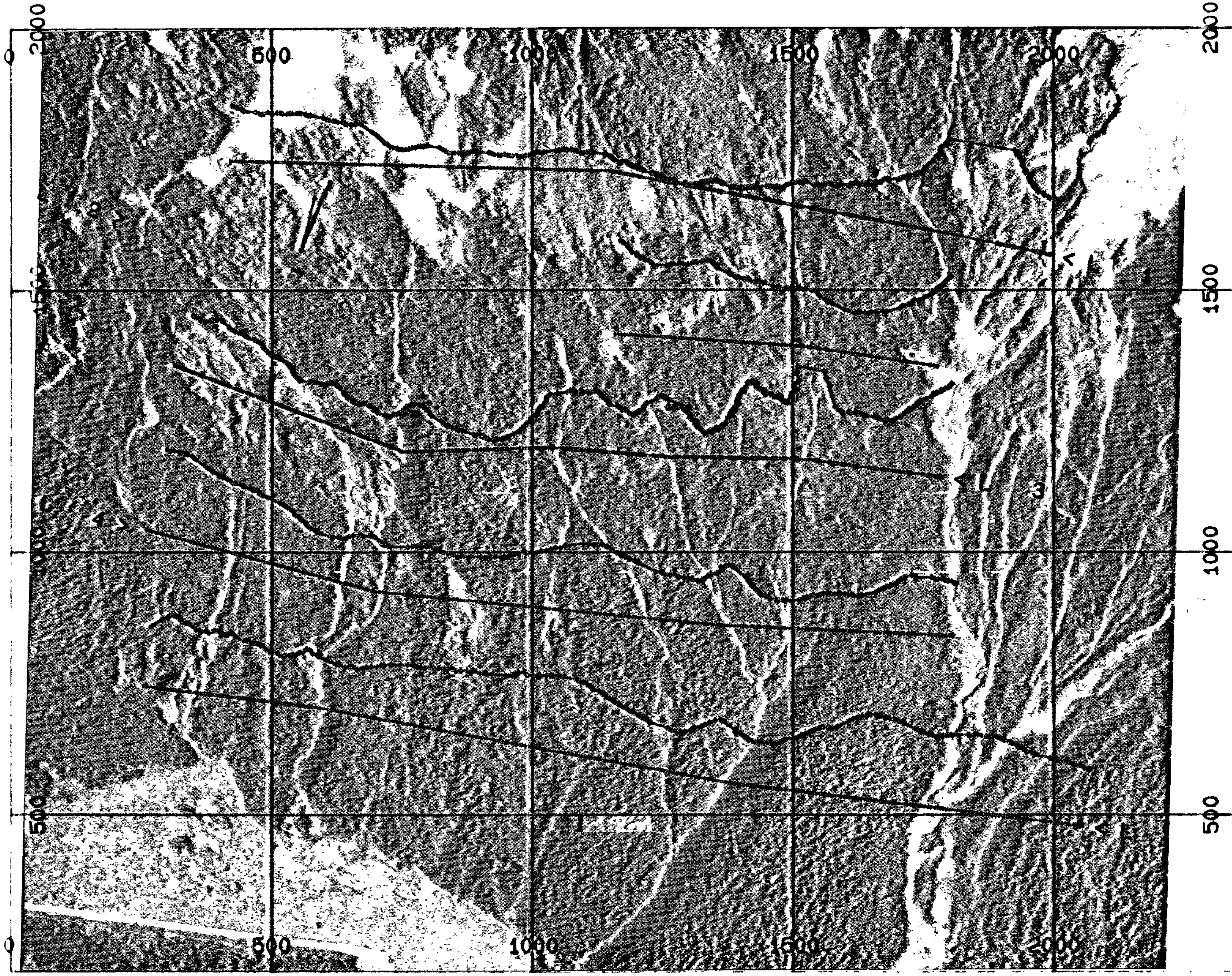
Contoured Total Field With Quadrature Overlay

Scale 1: 10000.0

0 200 400 600 800 1000 M

Date: APR/90	Survey: JAN/90	Fig.10

WESTERN GEOPHYSICAL AERO DATA LTD.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,001

AMPHORA RESOURCES

RED REEF AND SKY CLAIMS
RADAR ALTIMETER PROFILES

BASE LEVEL = 50 metres, SCALE = 100.0 metres/cm

Scale 1: 10000.0

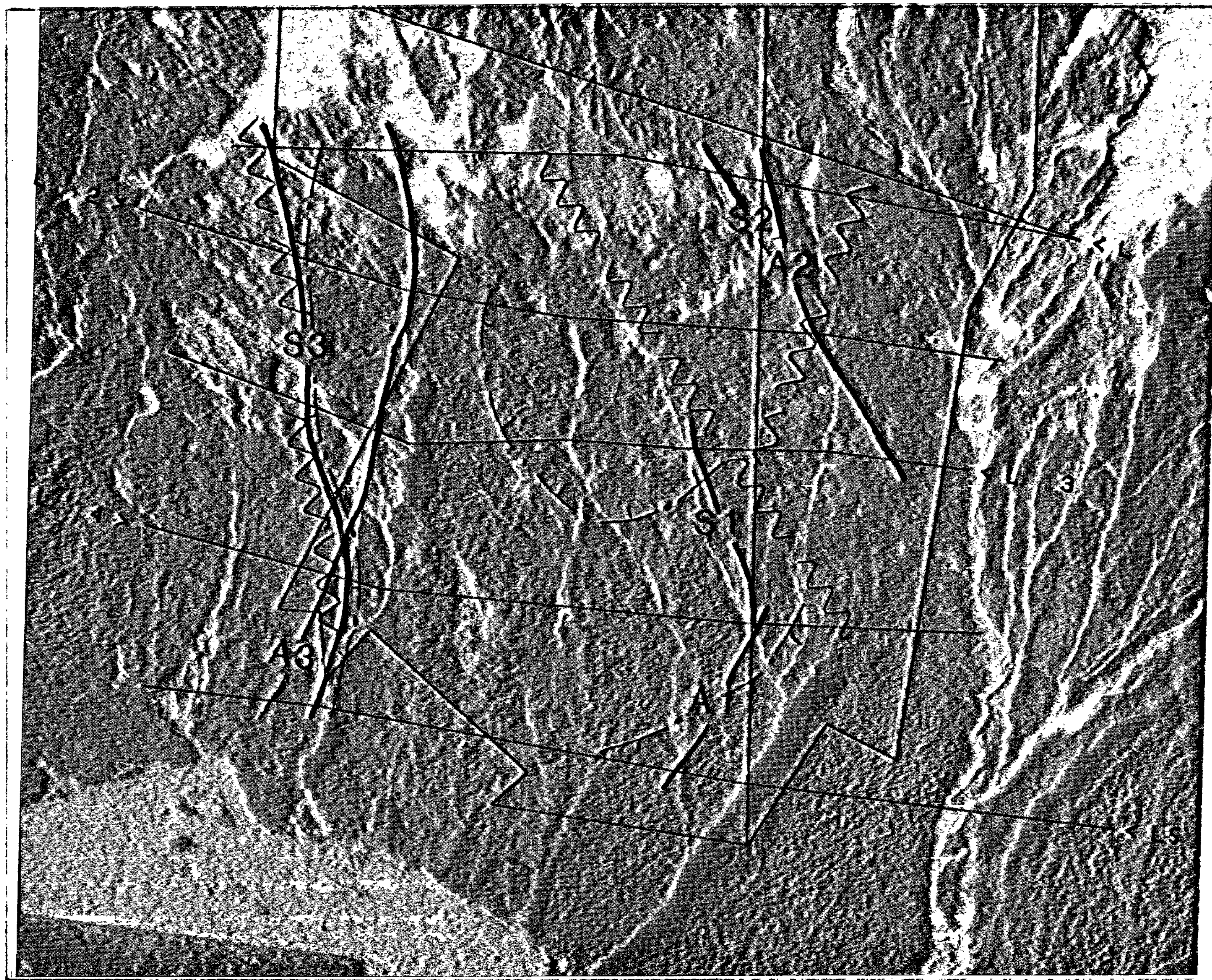
0 200 400 600 800 1000 M

Date: 3 APR/90	Survey Date: JAN/90	Fig. 11

WESTERN GEOPHYSICAL AERO DATA LTD.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,001



ANNAPOLIS TRANSMITTER

SEATTLE TRANSMITTER

AREA OF ELEVATED MAGNETIC LEVELS

POTENTIAL GEOLOGIC CONTACT

—SX— SEATTLE CONDUCTOR

INTERPRETED FAULT

—AX— ANNAPOLIS CONDUCTOR

AMPHORA RESOURCES

RED REEF AND SKY CLAIMS

GEOPHYSICAL INTERPRETATION MAP

With Flight-Line and Claim Boundary Overlay

Scale 1: 10000.0

0 200 400 600 800 1000 M

Date: APR/90	Survey: JAN/90	Fig.12

WESTERN GEOPHYSICAL AERO DATA LTD.