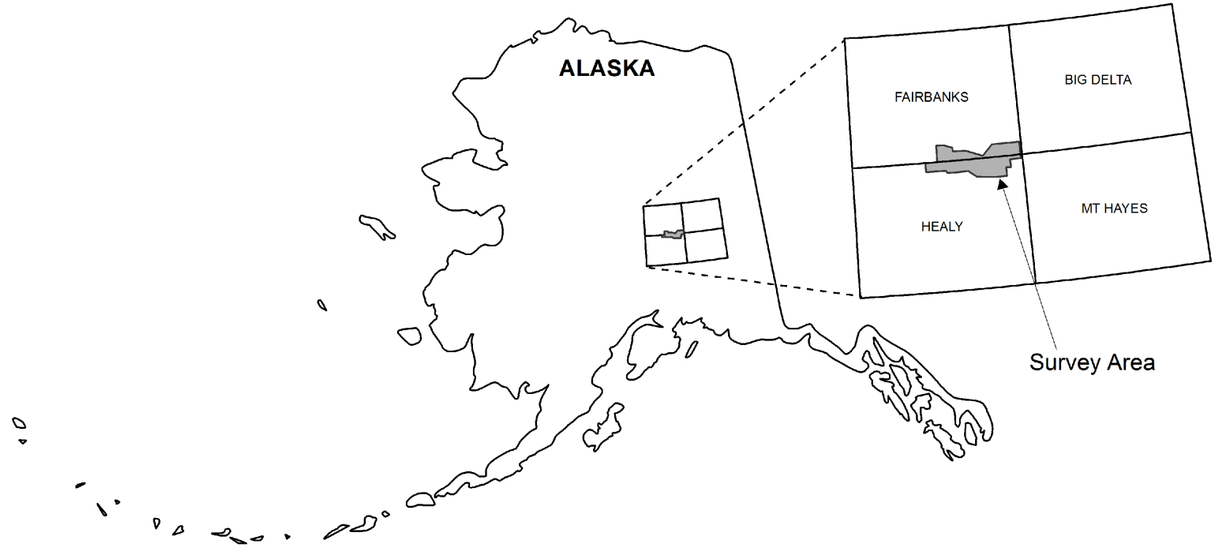
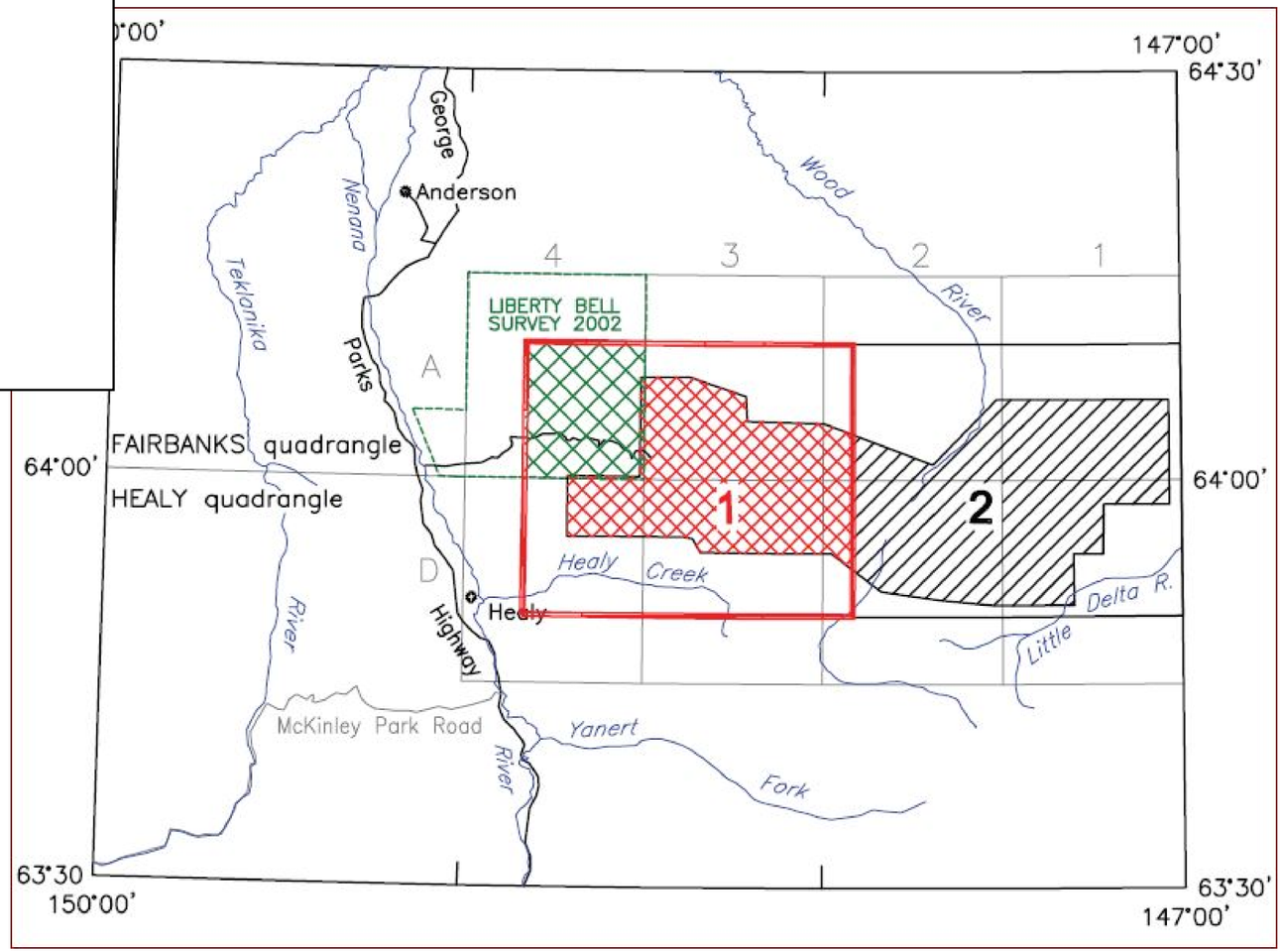
Bonnifield electromagnetic and magnetic airborne geophysical survey data compilation

State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and
Fugro Airborne Surveys Corp., and Stevens Exploration Manangement Corp.

http://dx.doi.org/10.14509/29557



Bonnifield survey area shown in relation to Fairbanks, Big Delta, Healy, and Mount Hayes 1:250,000 scale quadrangles.



Bonnifield survey location map. Showing the Bonnifield survey area (red hatched and black striped), Liberty Bell survey area, highways, rivers and relevent quadrangle boundaries.

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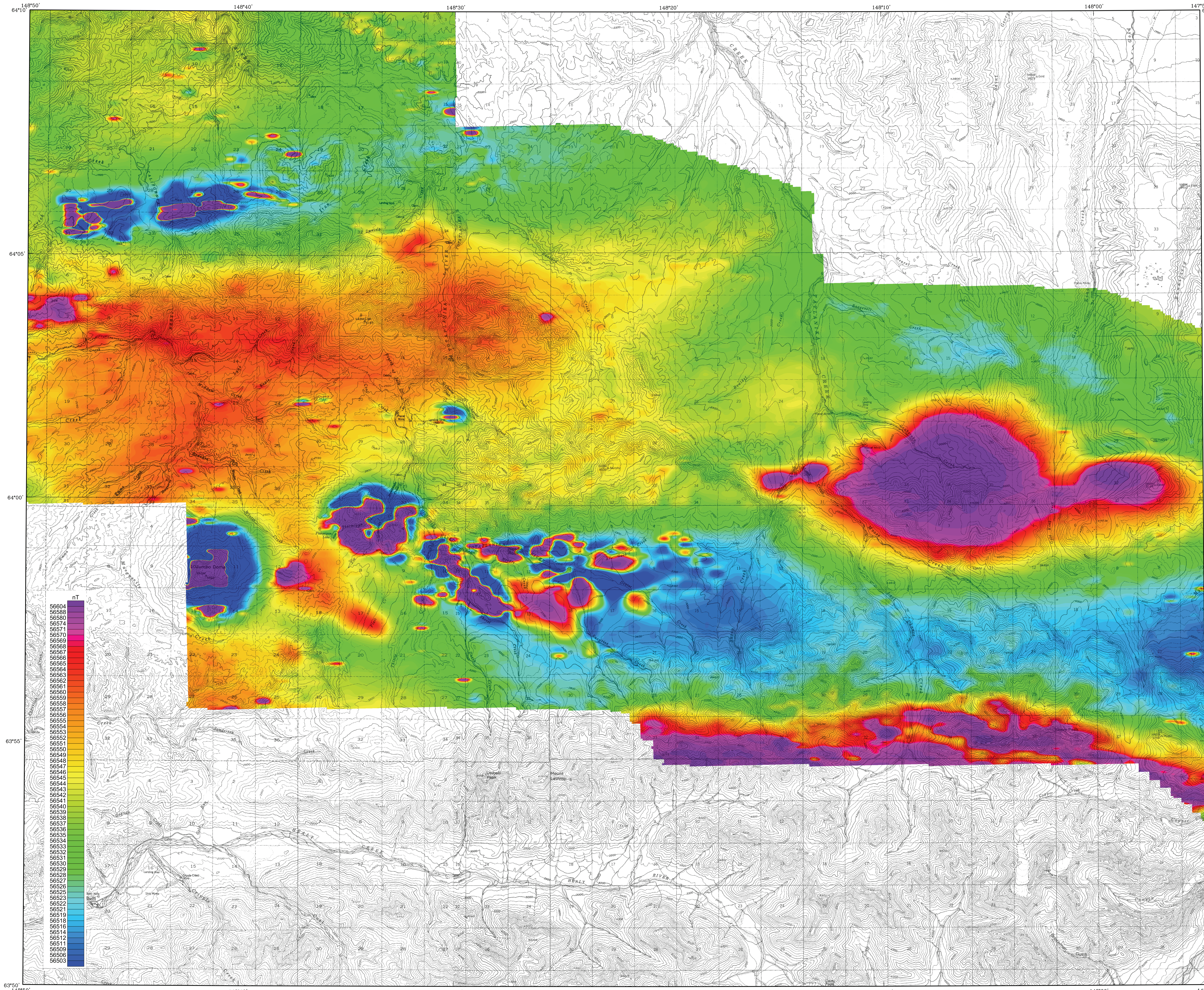
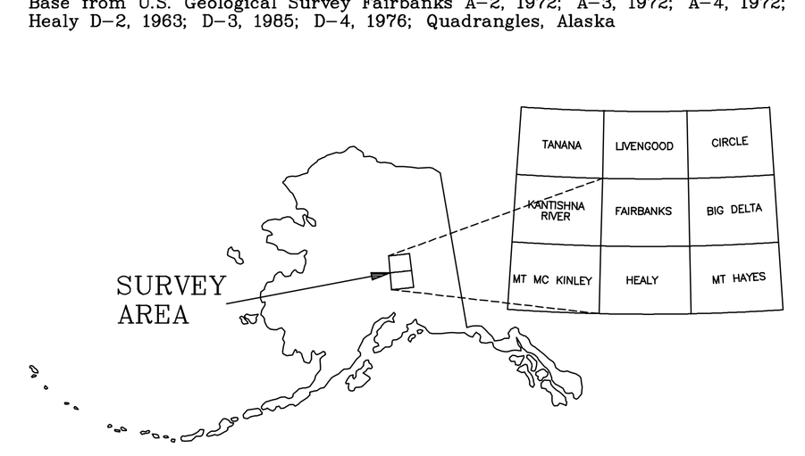
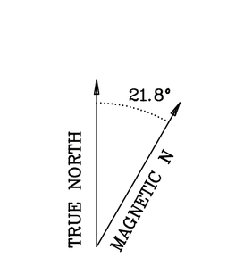


Base from U.S. Geological Survey Fairbanks A-2, 1972; A-3, 1972; A-4, 1972; Healy D-2, 1963; D-3, 1985; D-4, 1976; Quadrangles, Alaska





APPROXIMATE MEAN DECLINATION, 2006

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

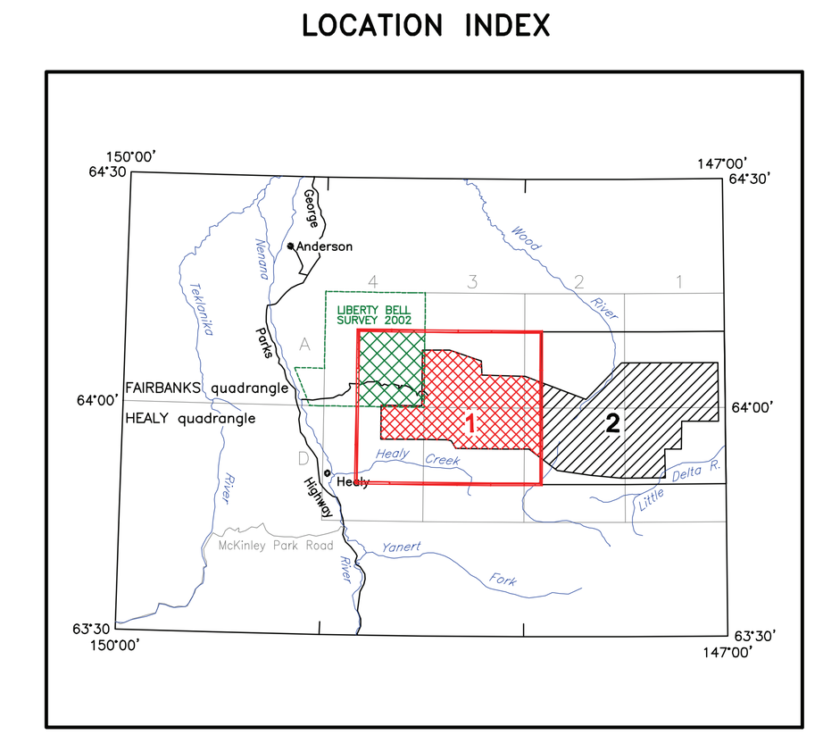
CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

TOTAL MAGNETIC FIELD OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS OF FAIRBANKS and HEALY QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2007

LOCATION INDEX



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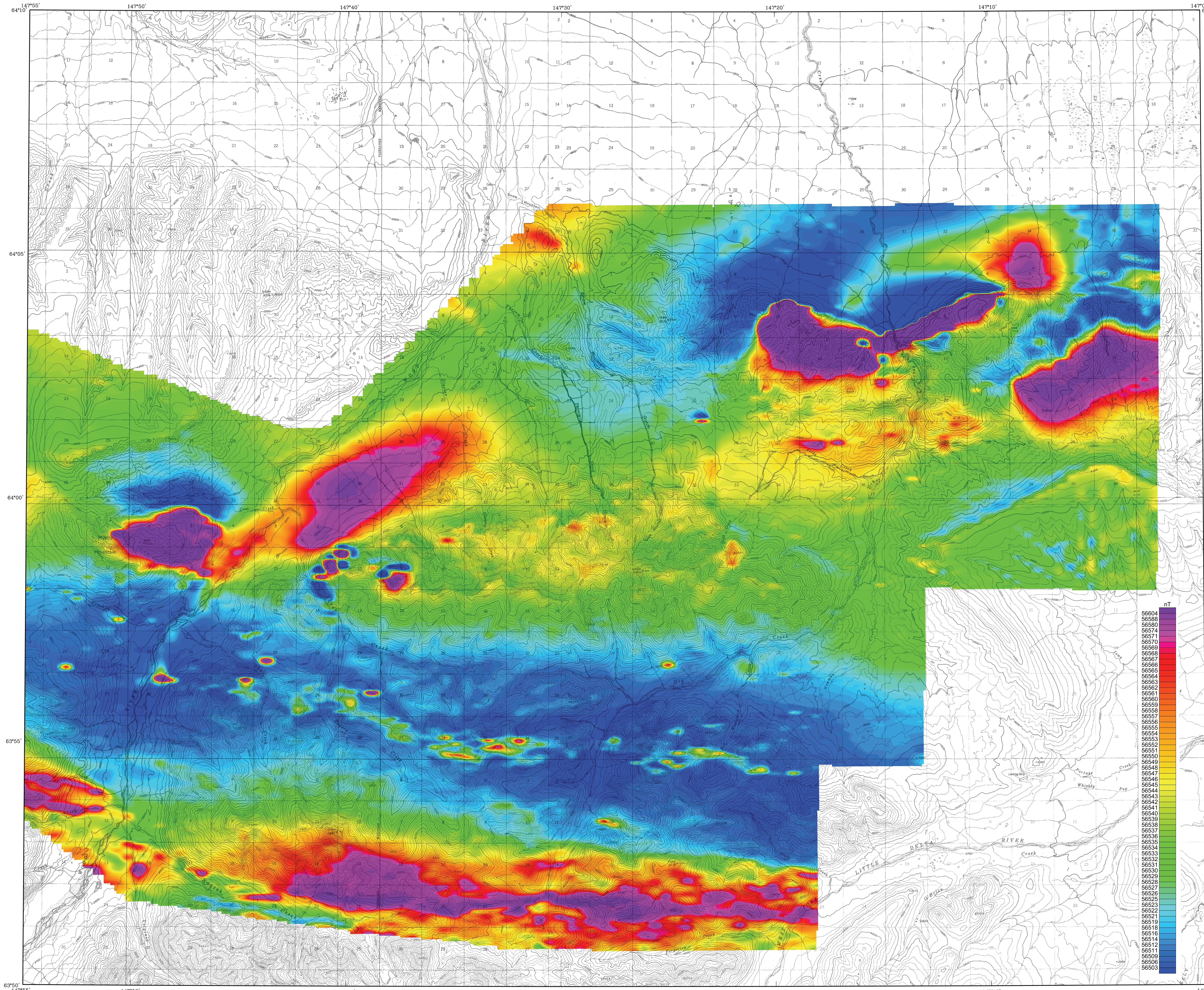

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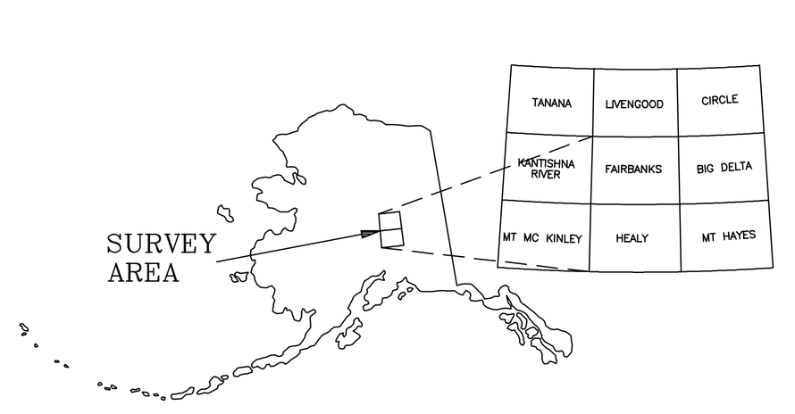

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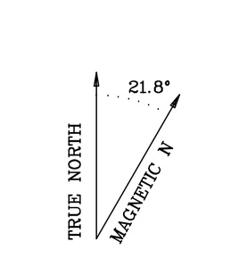

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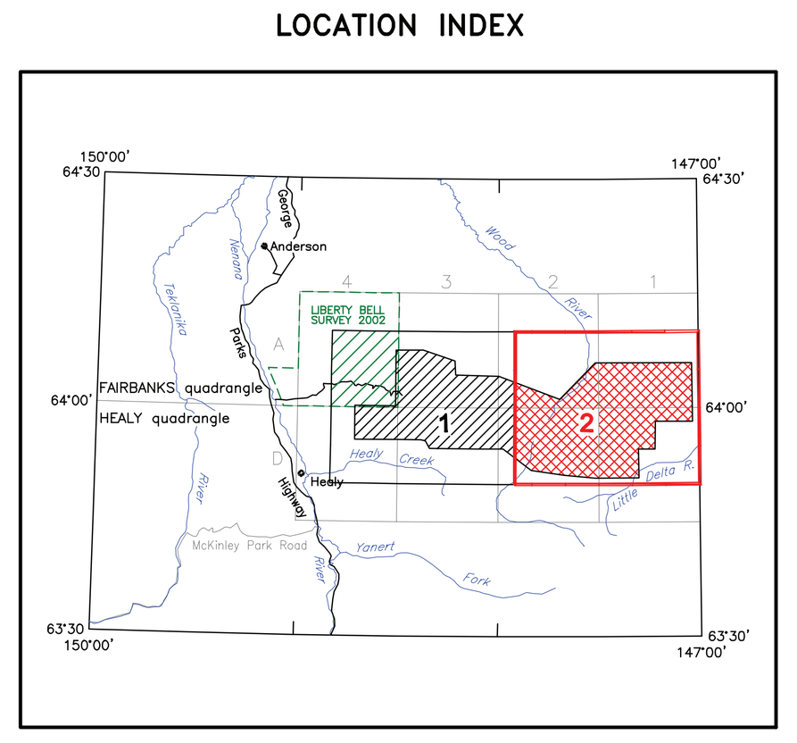

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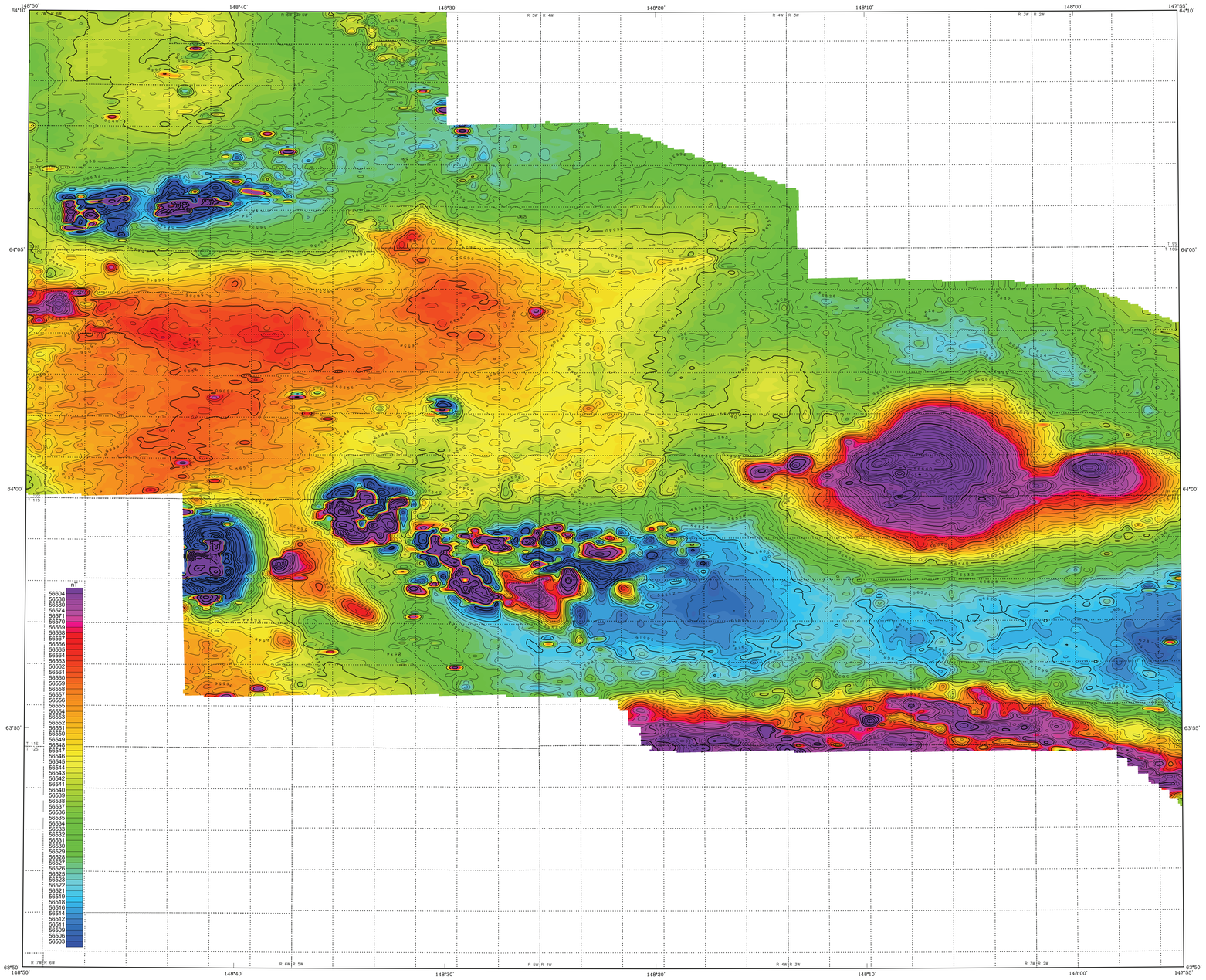

Section outlines from U.S. Geological Survey Fairbanks A-2, 1972; A-3, 1972; A-4, 1972; Healy D-2, 1963; D-3, 1965; D-4, 1976; Quadrangles, Alaska

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by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
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MAGNETIC CONTOUR INTERVAL

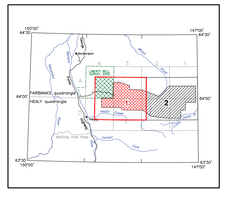
100 nT

20 nT

4 nT

2 nT

LOCATION INDEX



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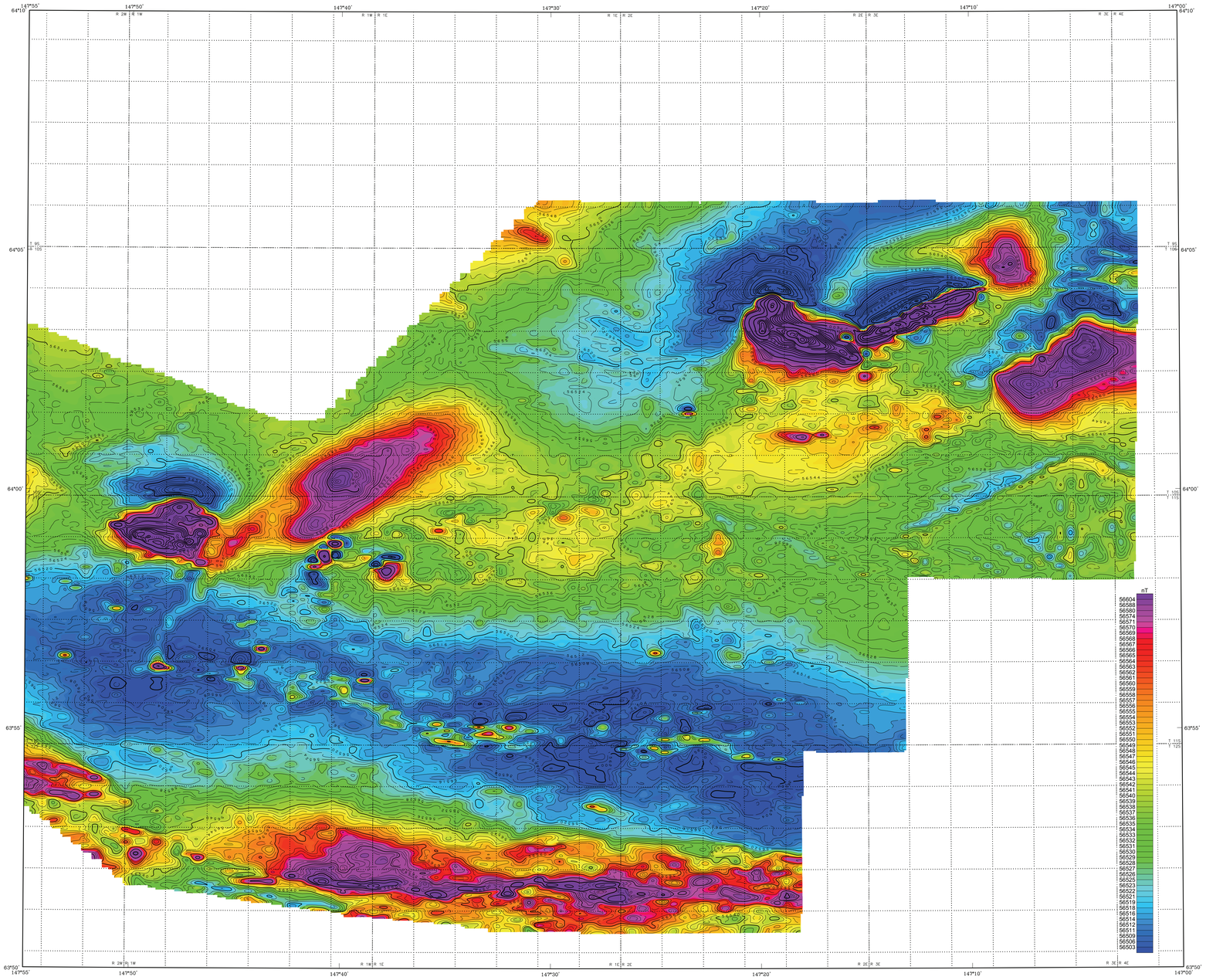

Section outlines from U.S. Geological Survey Fairbanks A–1, 1949; A–2, 1972; Healy D–1, 1975; D–2, 1953; Quadrangles, Alaska

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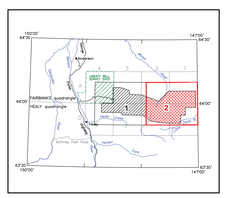

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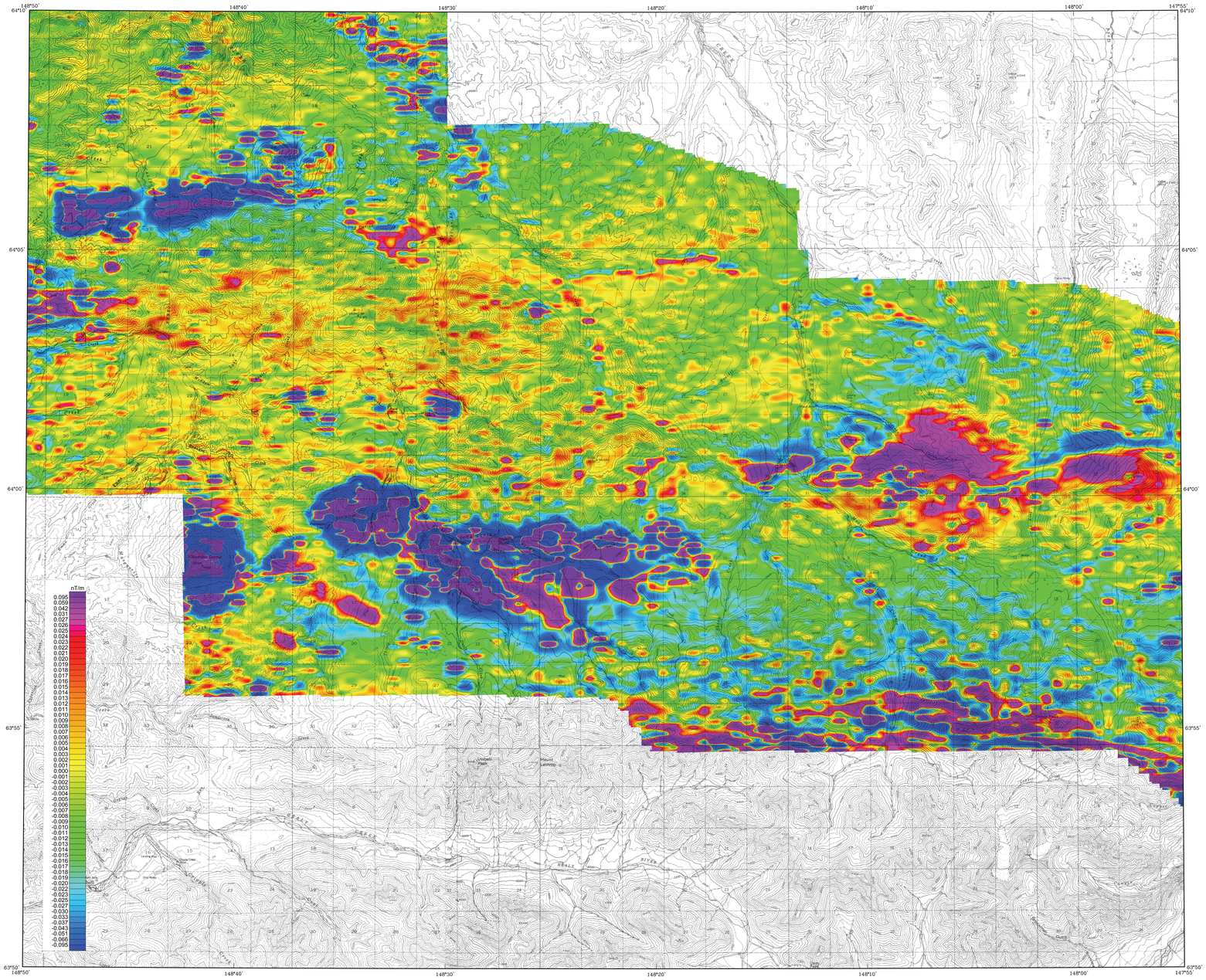

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1 0 1 2 3 4 MILES

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CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS OF FAIRBANKS and HEALY QUADRANGLES

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COLOR BAR HISTOGRAM

Approximately 98% of the first vertical derivative of the magnetic field for the entire Bonnifield Mining District dataset lie within the range displayed on the color bar. Data values actually range from -9.532 nT/m (dark blue) to about 19.291 nT/m (magenta). Actual values can be seen in digital publication GPR 2007-1.

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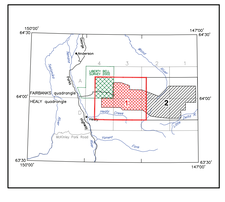

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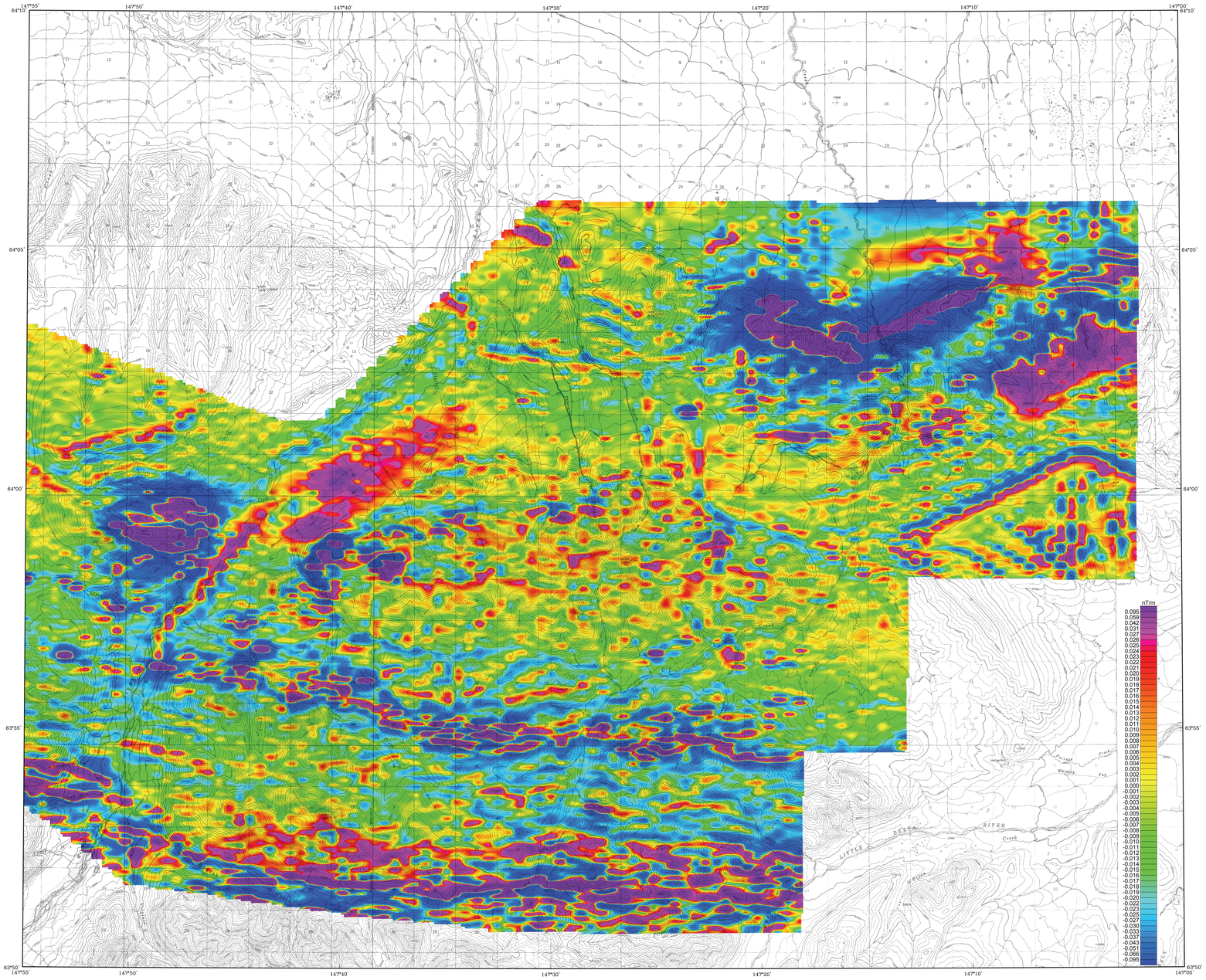

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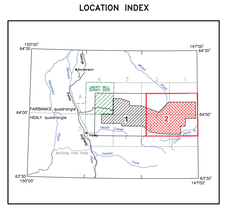

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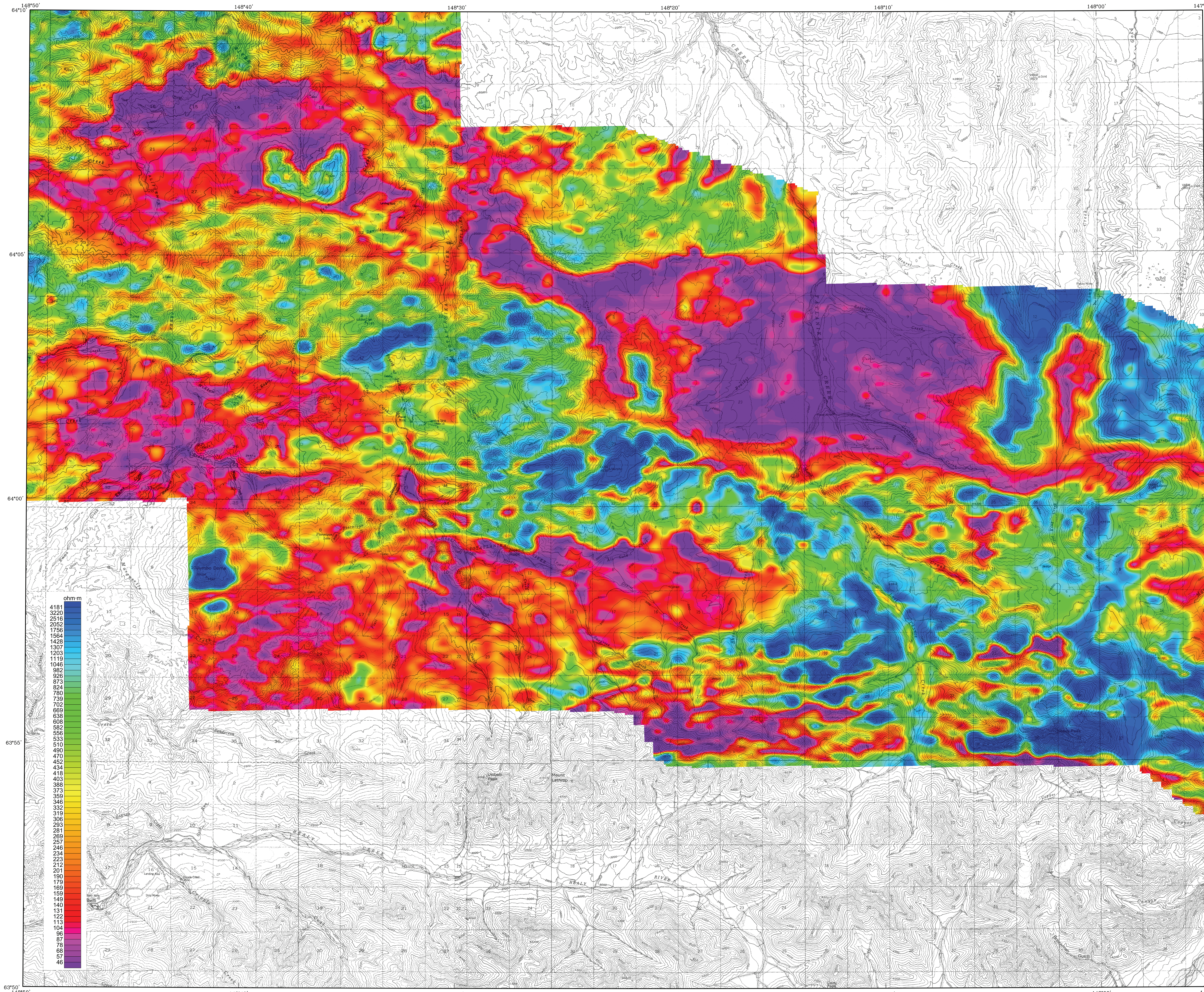

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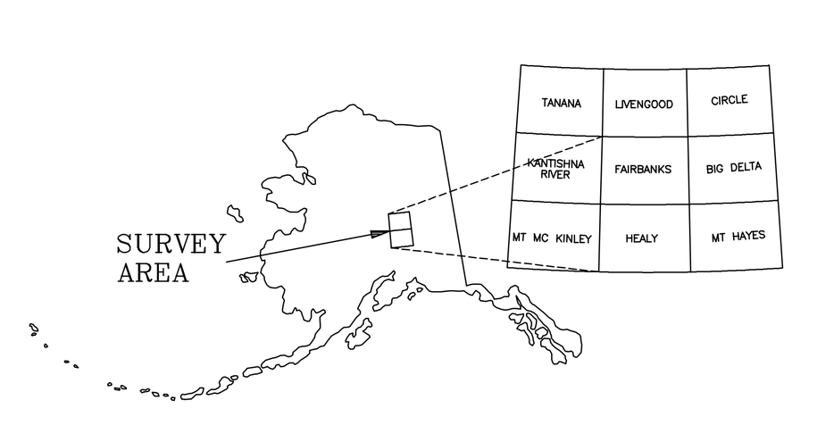

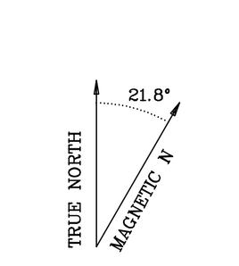

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56,000 Hz COPLANAR APPARENT RESISTIVITY OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

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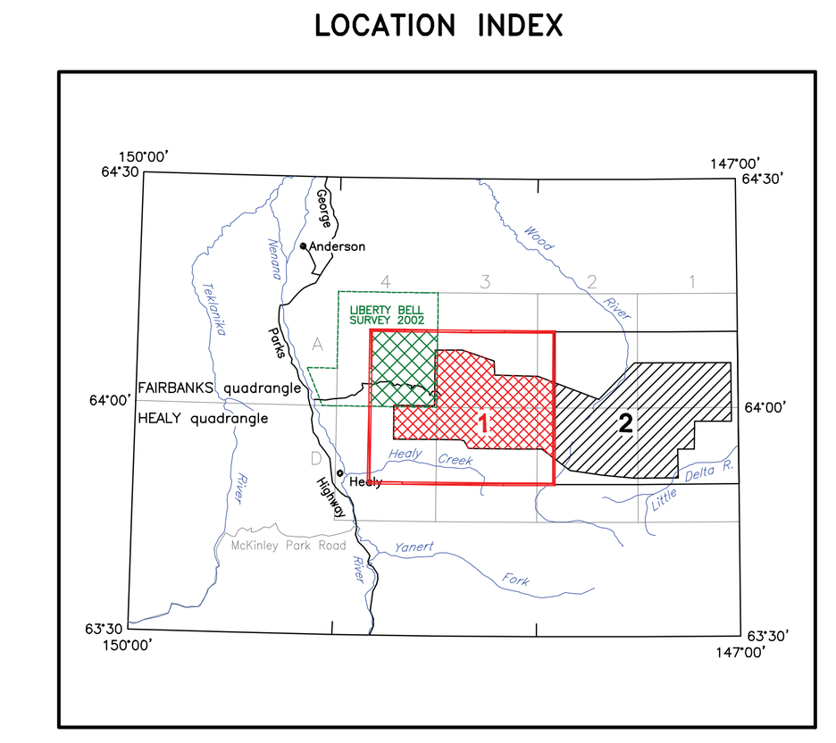

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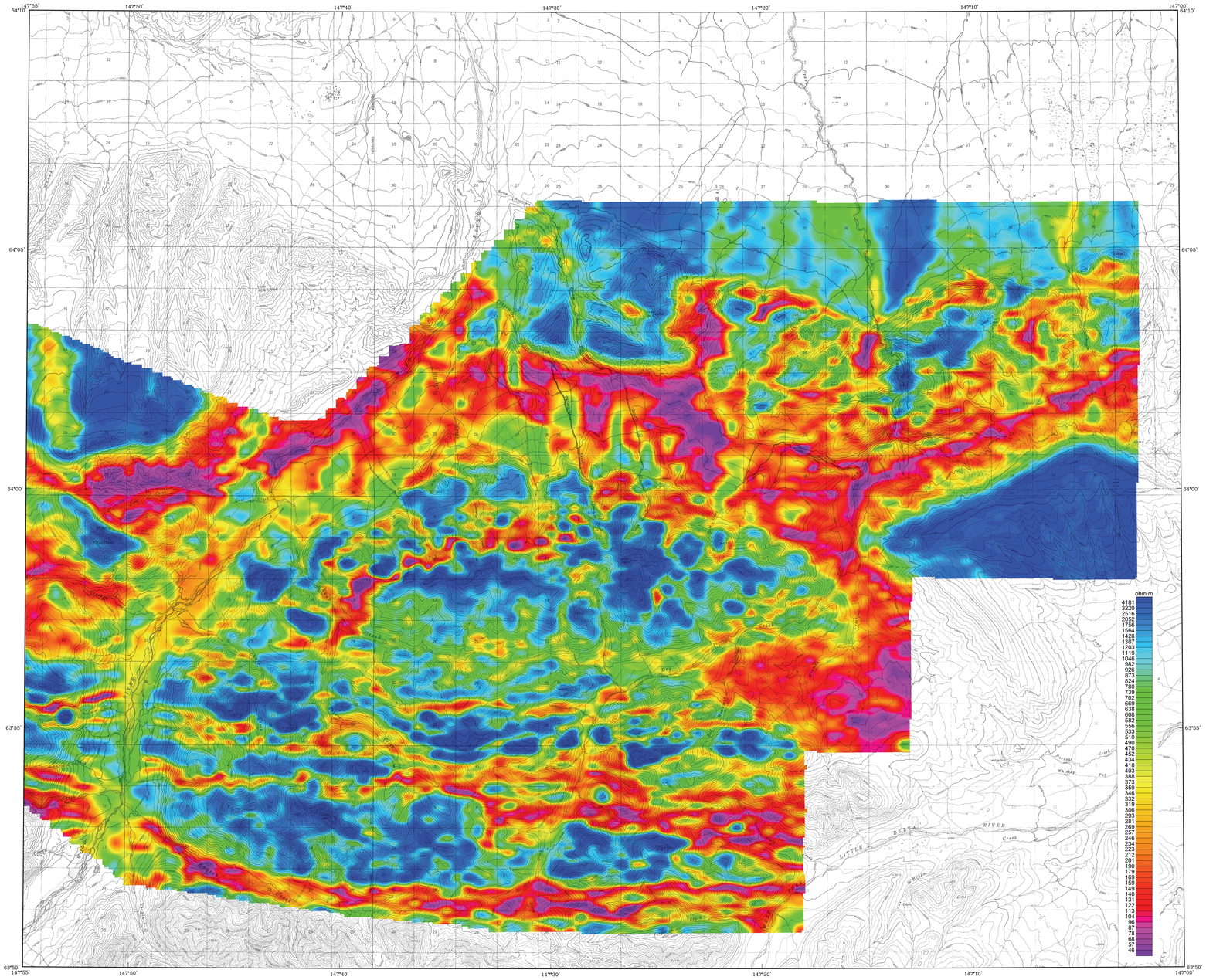

Base from U.S. Geological Survey Fairbanks A-1, 1949; A-2, 1972;
Healy D-1, 1975; D-2, 1963, Quadrangles, Alaska

APPROXIMATE MEAN DECLINATION, 2006

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

56,000 Hz COPLANAR APPARENT RESISTIVITY OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS OF FAIRBANKS and HEALY QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.

2007

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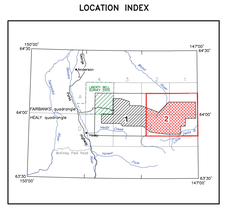
LOCATION INDEX



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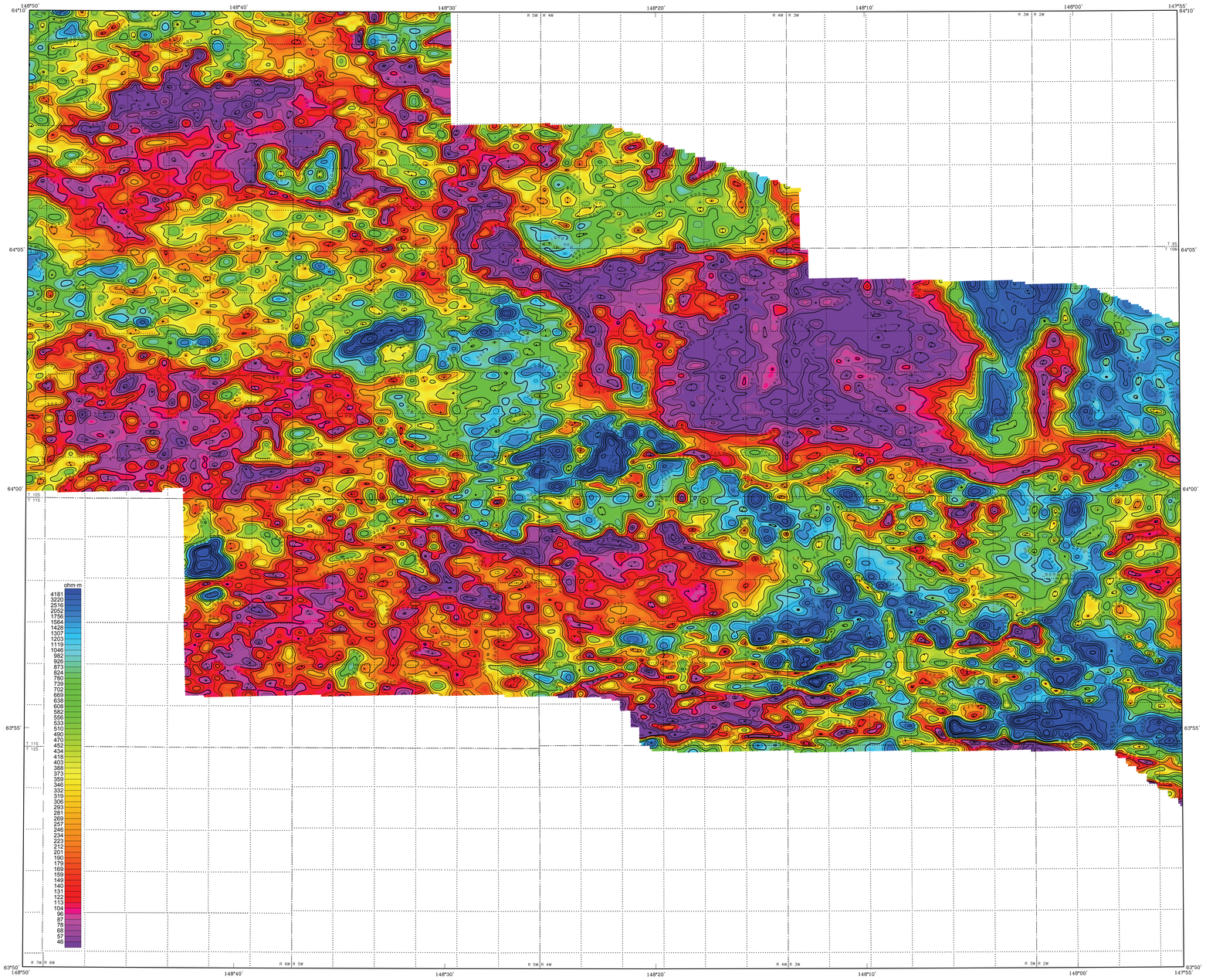

Section outlines from U.S. Geological Survey Fairbanks A–2, 1972; A–3, 1972; A–4, 1972; Healy D–2, 1963; D–3, 1965; D–4, 1976; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

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by
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2007

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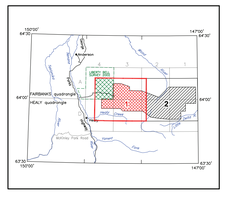
RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm–m at 10 intervals per decade

. . . . . resistivity low

LOCATION INDEX



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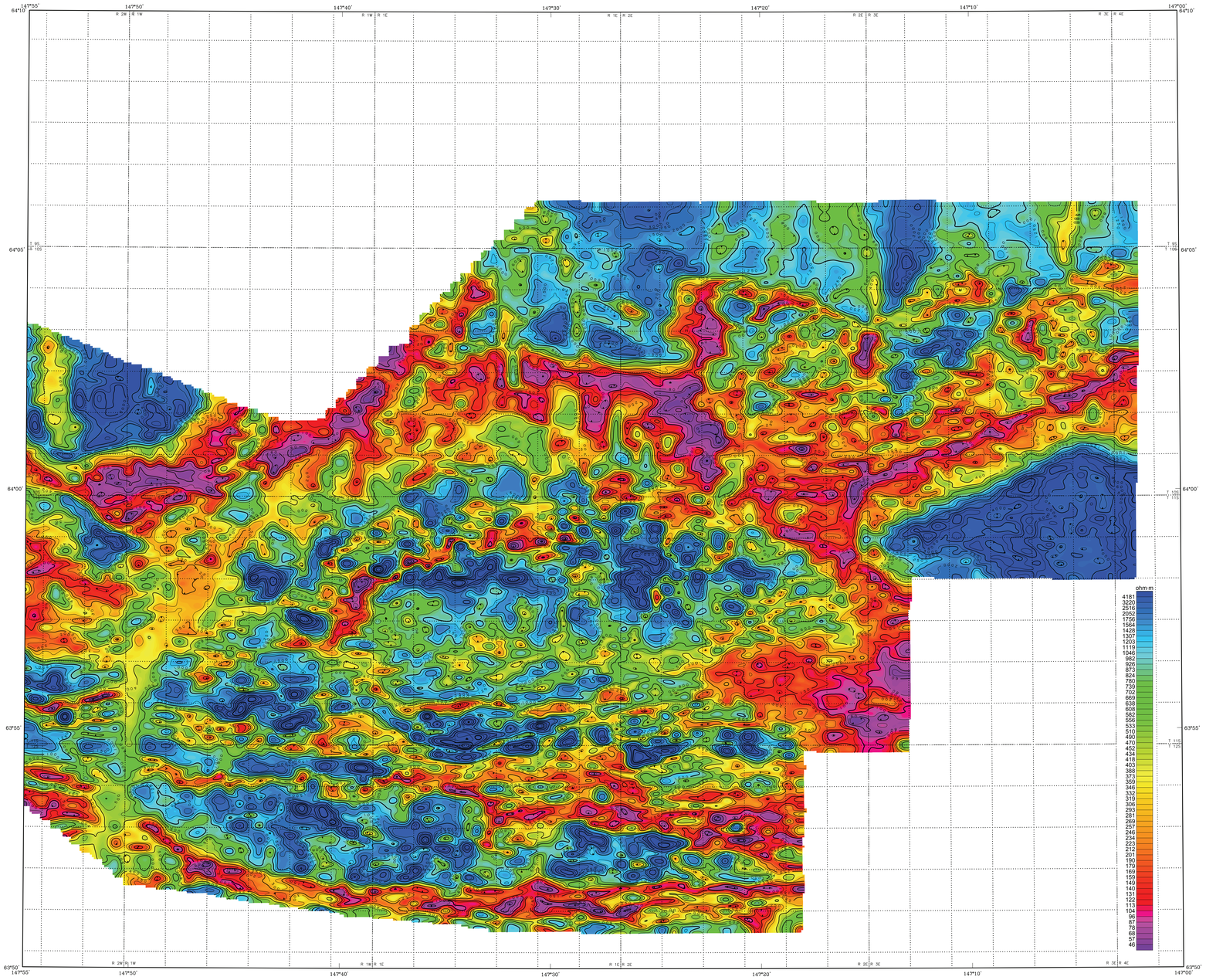

Section outlines from U.S. Geological Survey Fairbanks A-1, 1949; A-2, 1972; Healy D-1, 1975; D-2, 1963, Quadrangles, Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

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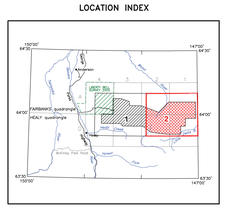
RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

LOCATION INDEX



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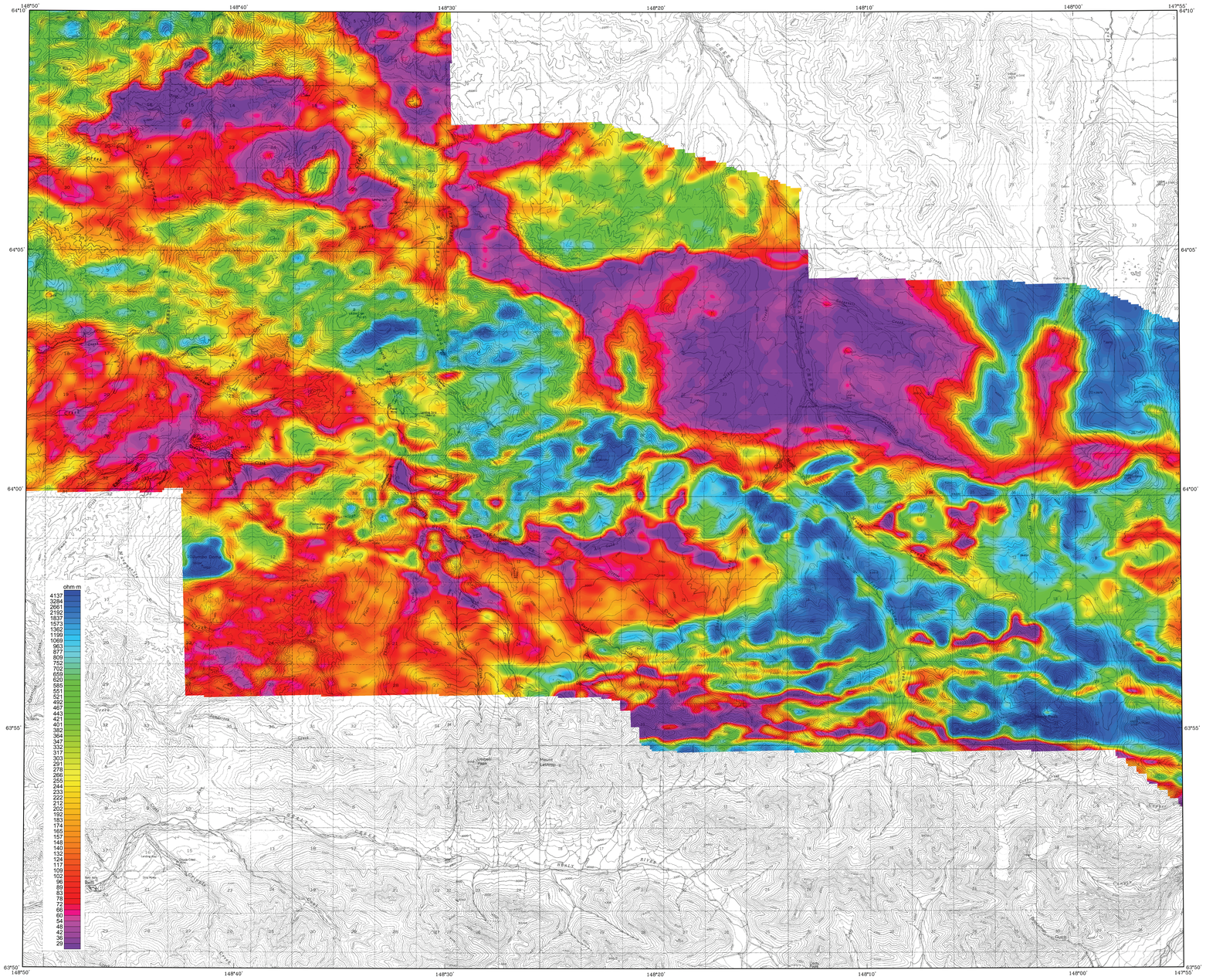


Base from U.S. Geological Survey Fairbanks A-2, 1972; A-3, 1972; A-4, 1972; Healy D-2, 1963; D-3, 1985; D-4, 1978; Quadrangles, Alaska

APPROXIMATE MEAN DECLINATION, 2006

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

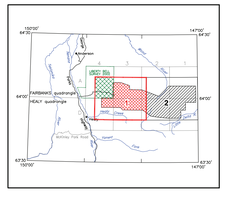
CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

7200 Hz COPLANAR APPARENT RESISTIVITY OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS OF FAIRBANKS and HEALY QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2007

LOCATION INDEX



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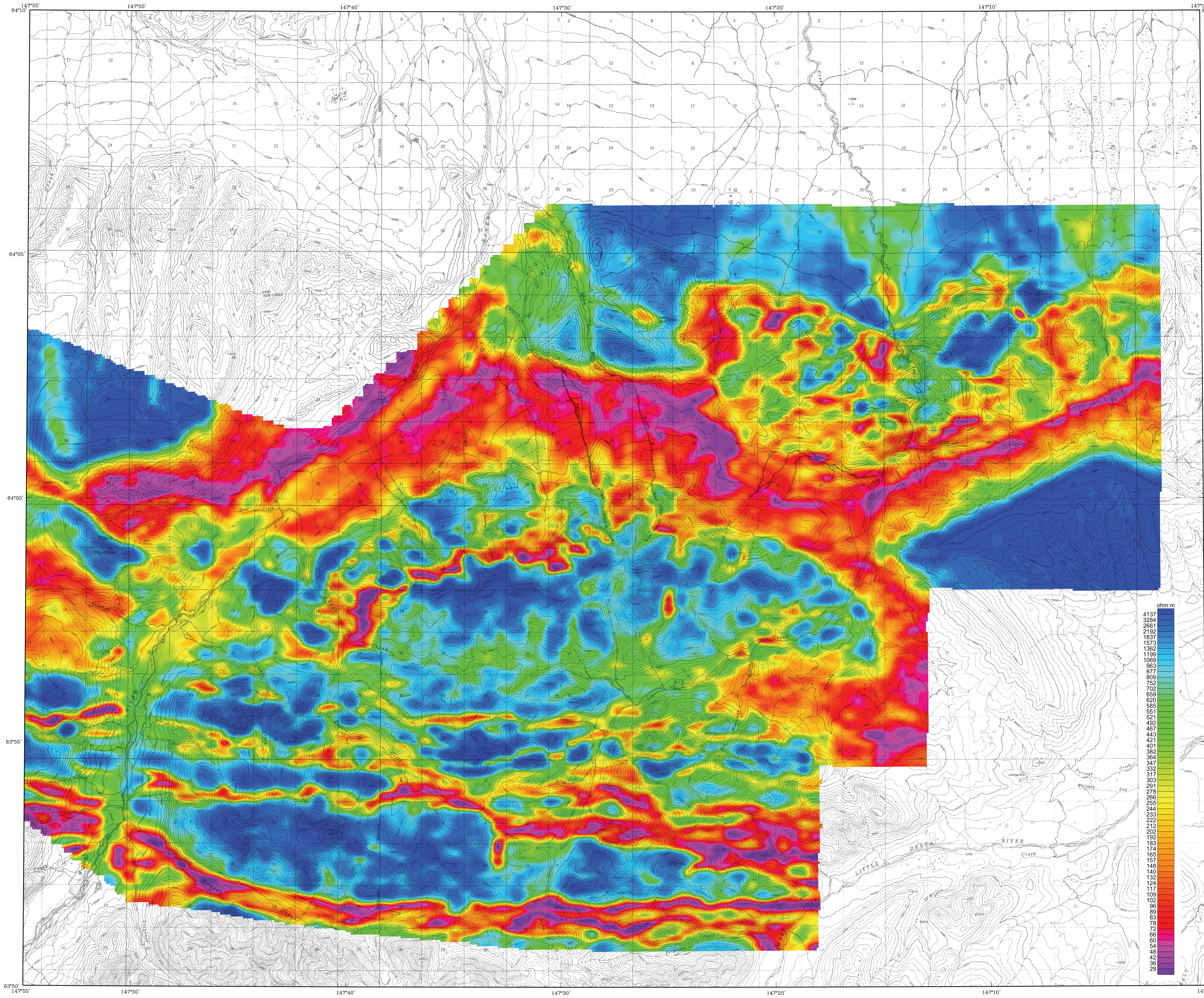
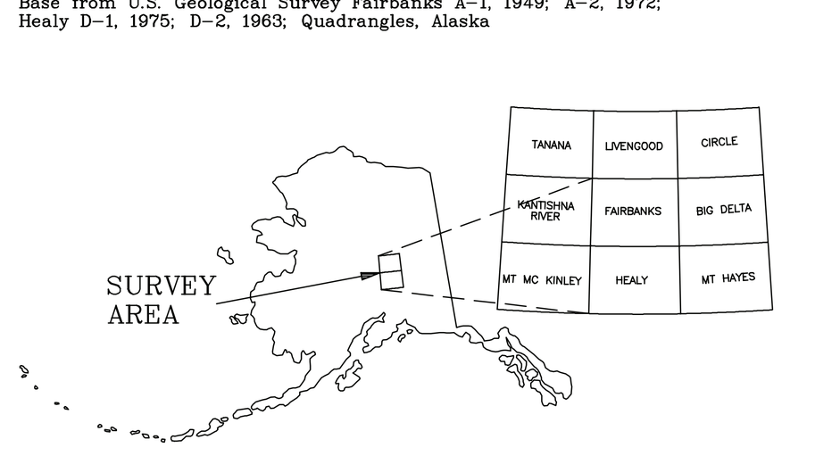
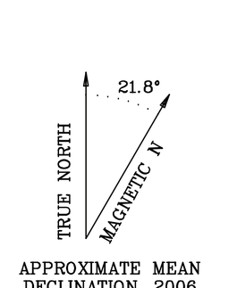


Base from U.S. Geological Survey Fairbanks A-1, 1949; A-2, 1972; Healy D-1, 1975; D-2, 1963; Quadrangles, Alaska

SCALE 1:63,360

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL



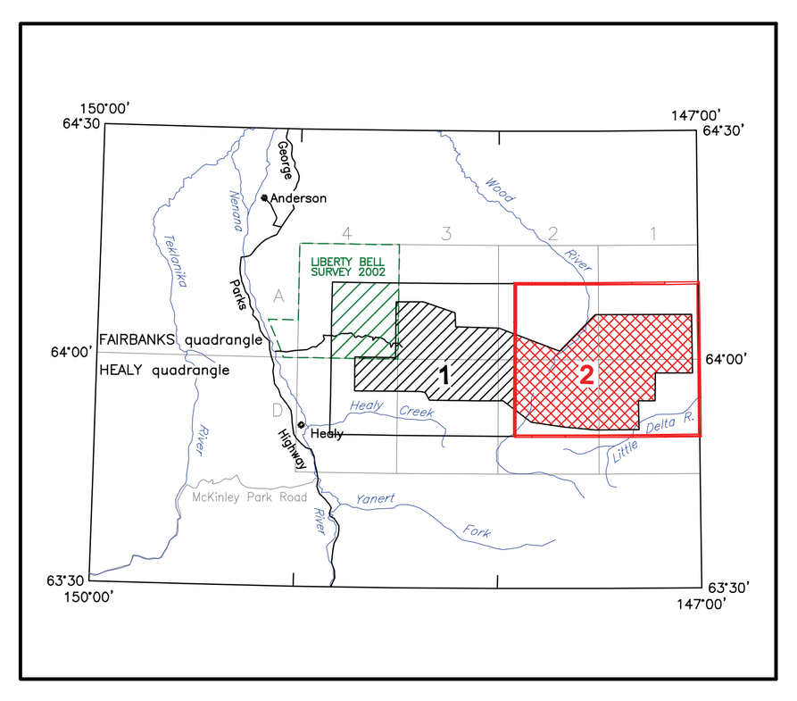


7200 Hz COPLANAR APPARENT RESISTIVITY OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS OF FAIRBANKS and HEALY QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2007

LOCATION INDEX



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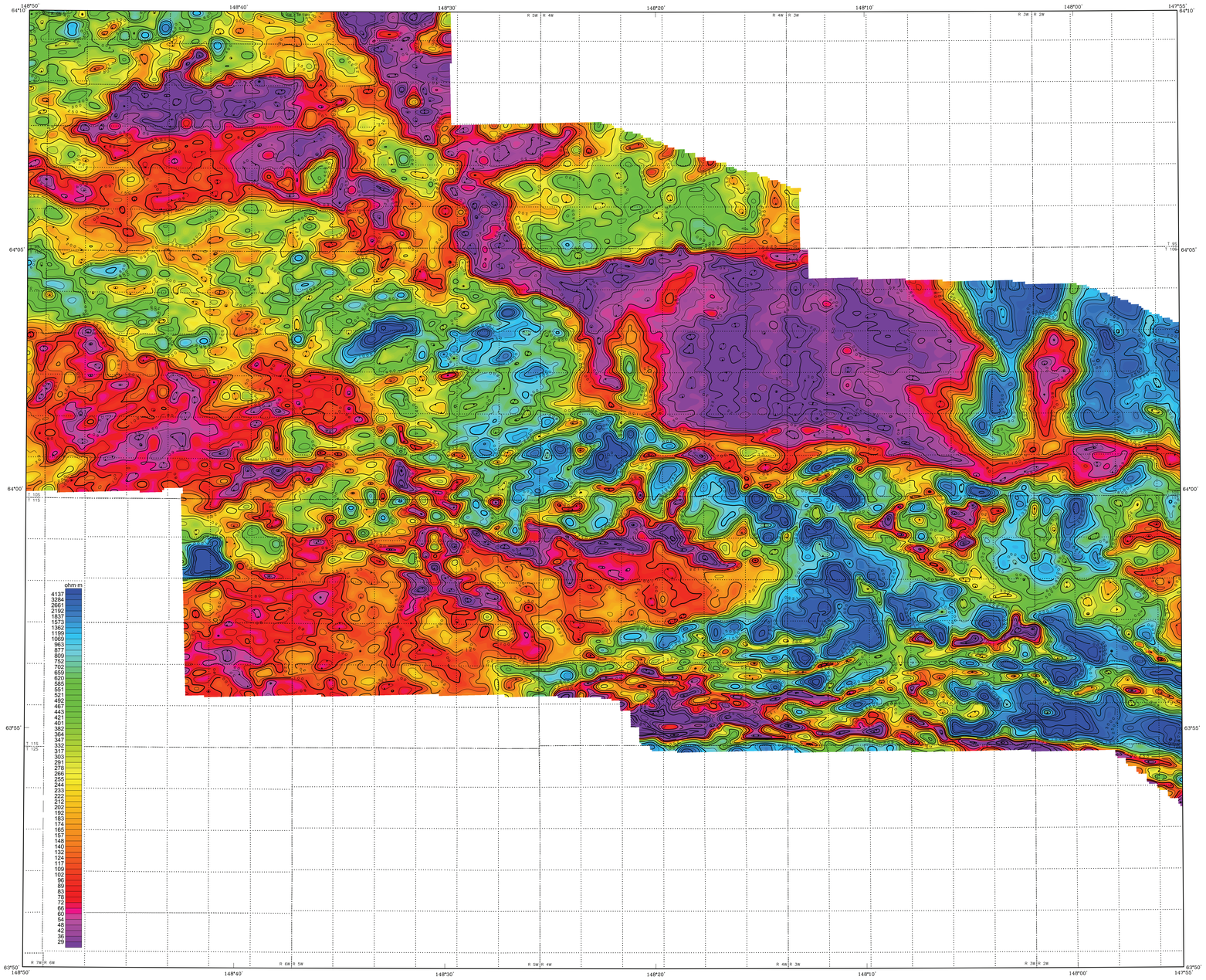

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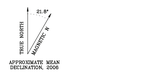

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

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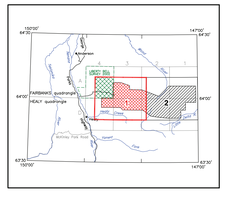
RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

LOCATION INDEX



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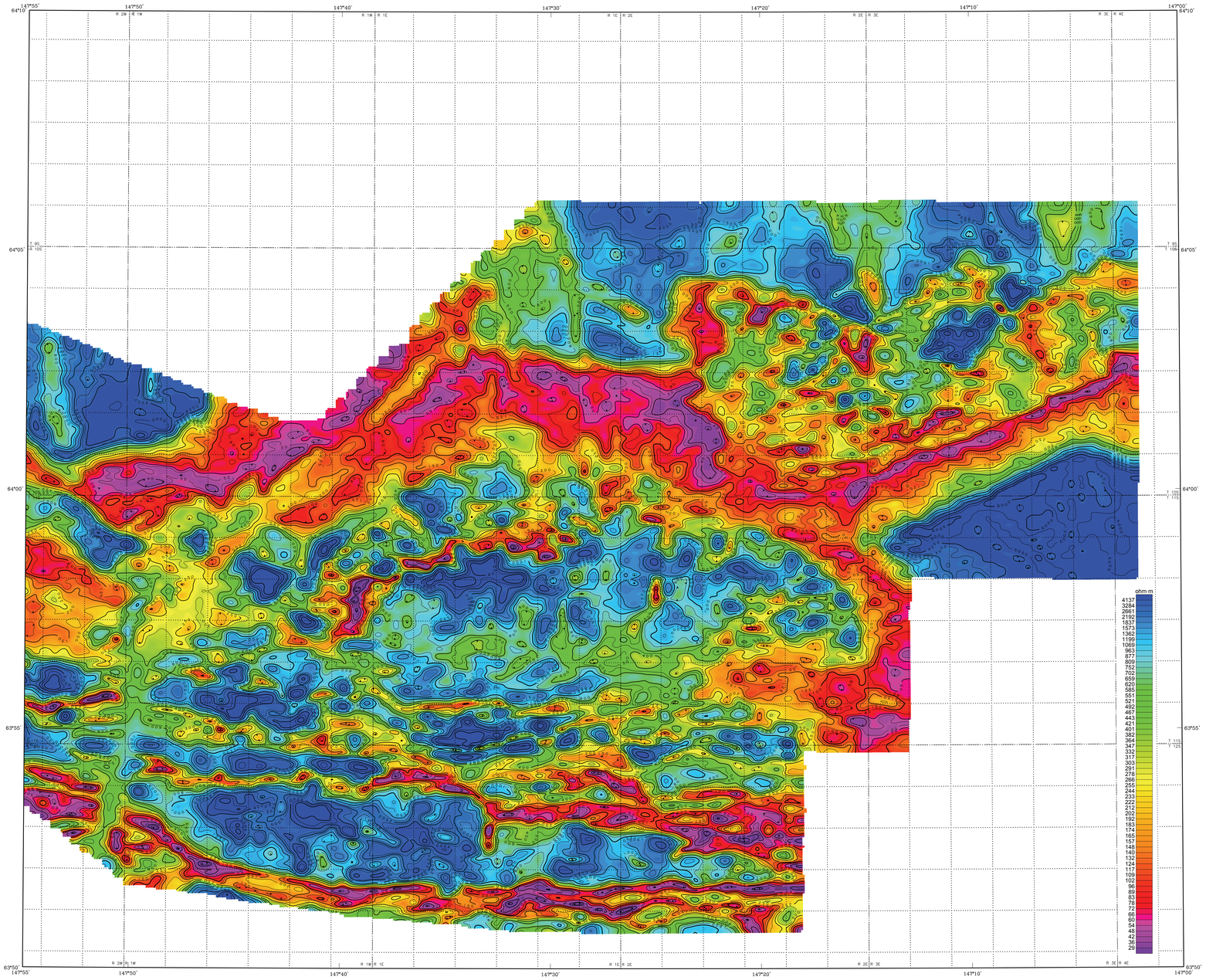

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RESISTIVITY

The DIGHEM^V EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil–pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil–pairs operated at 900, 7200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 7200 Hz using the pseudo–layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

Akima, H.,1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no.4, p.589–602.

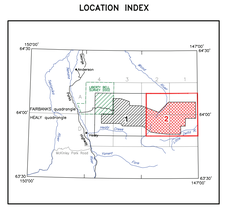
RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm–m at 10 intervals per decade

. . . . . resistivity low

LOCATION INDEX



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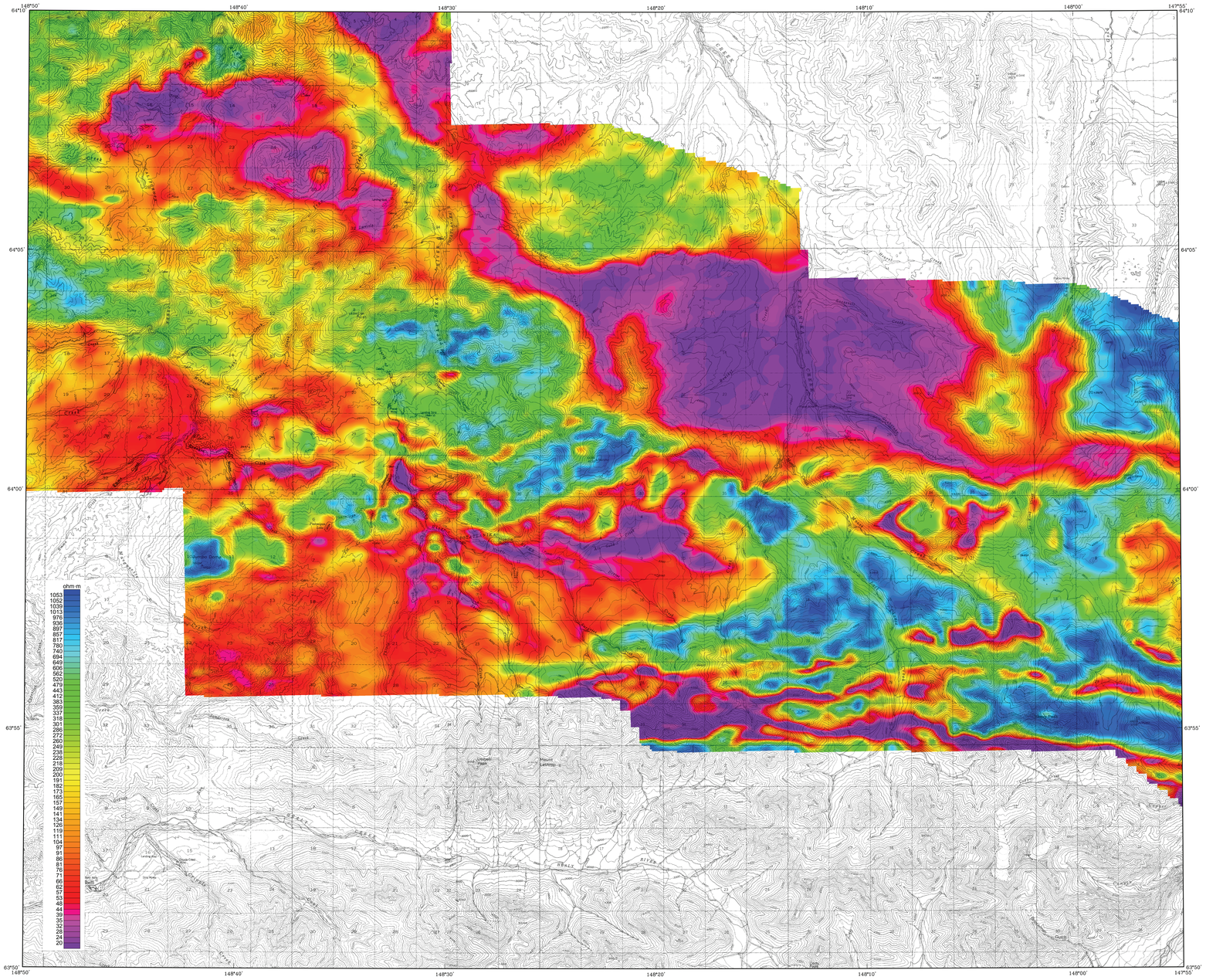

Base from U.S. Geological Survey Fairbanks A-2, 1972; A-3, 1972; A-4, 1972; Healy D-2, 1963; D-3, 1985; D-4, 1978; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

900 Hz COPLANAR APPARENT RESISTIVITY OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS OF FAIRBANKS and HEALY QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2007

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The geophysical data were acquired with a DIGHEM^V Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS350B-3 Squirrel helicopter at a mean terrain clearance of 200 feet along N-S (0°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

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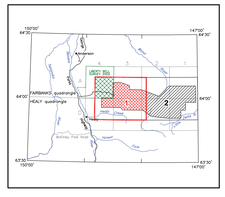

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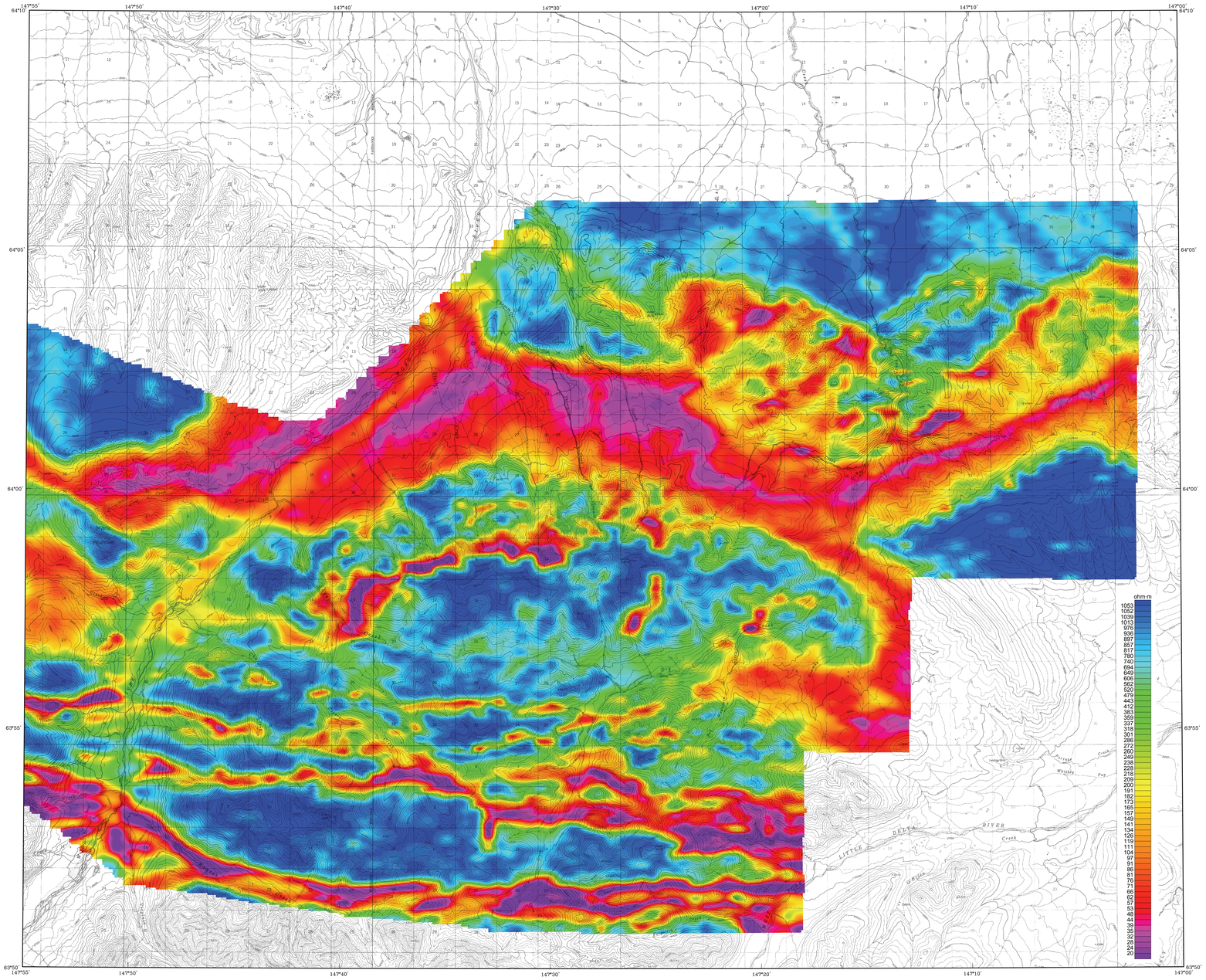

Base from U.S. Geological Survey Fairbanks A-1, 1949; A-2, 1972;
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SCALE 1:63,360

1 0 1 2 3 4 MILES

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CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

APPROXIMATE MEAN
DECLINATION, 2006

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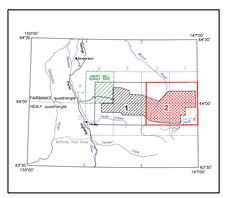

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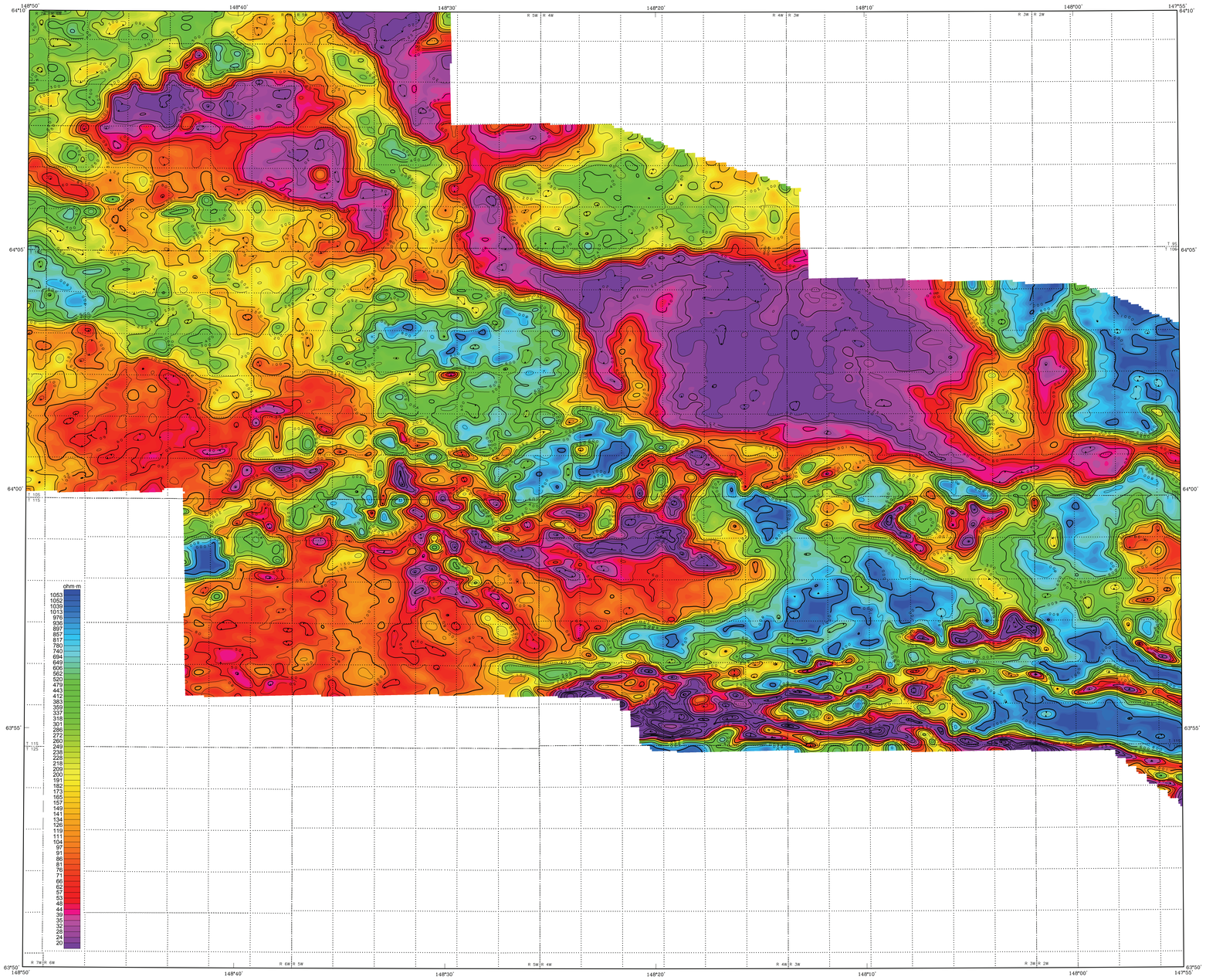

Section outlines from U.S. Geological Survey Fairbanks A-2, 1972; A-3, 1972; A-4, 1972; Healy D-2, 1963; D-3, 1985; D-4, 1978; Quadrangles, Alaska

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Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

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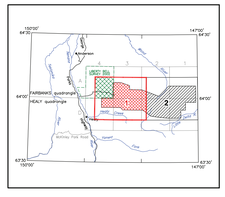

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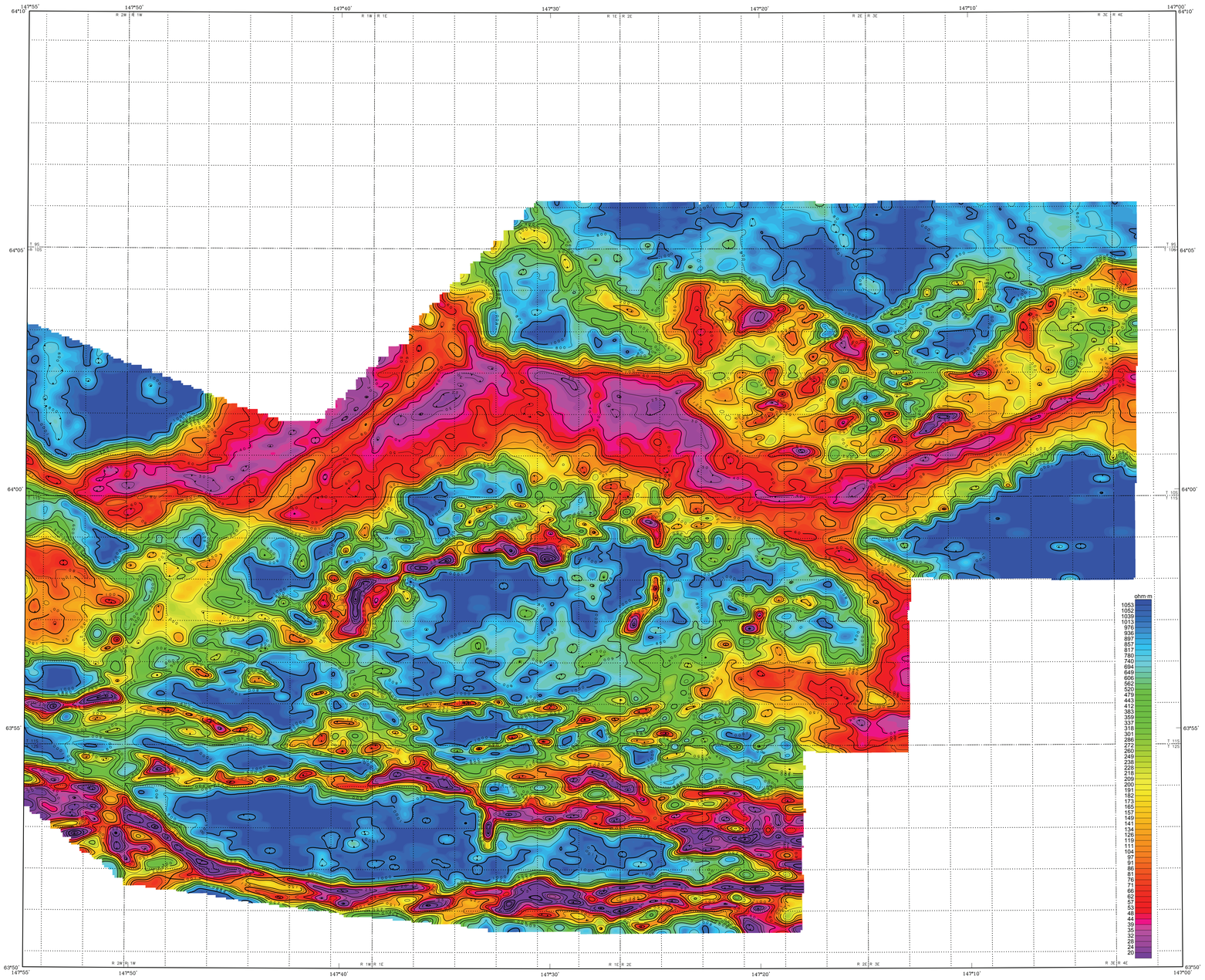

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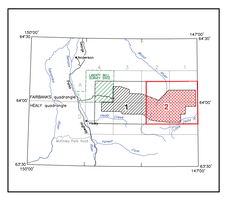
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

LOCATION INDEX



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INTERPRETATION MAP OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS OF FAIRBANKS and HEALY QUADRANGLES

Interpretation by Ruth Pritchard
Fugro Airborne Surveys Corp.
2007

The interpretation is based on the geophysical parameters with reference to geological maps, which were supplied by the State of Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

LEGEND

- F1 — Fault
- A1 — EM Conductor
- C1 — Inferred Contact
- M1 — Magnetic Zone
- R1 — Resistivity Zone
- Rh1 — Resistivity High Zone
- Zone A — Highly Conductive Zone

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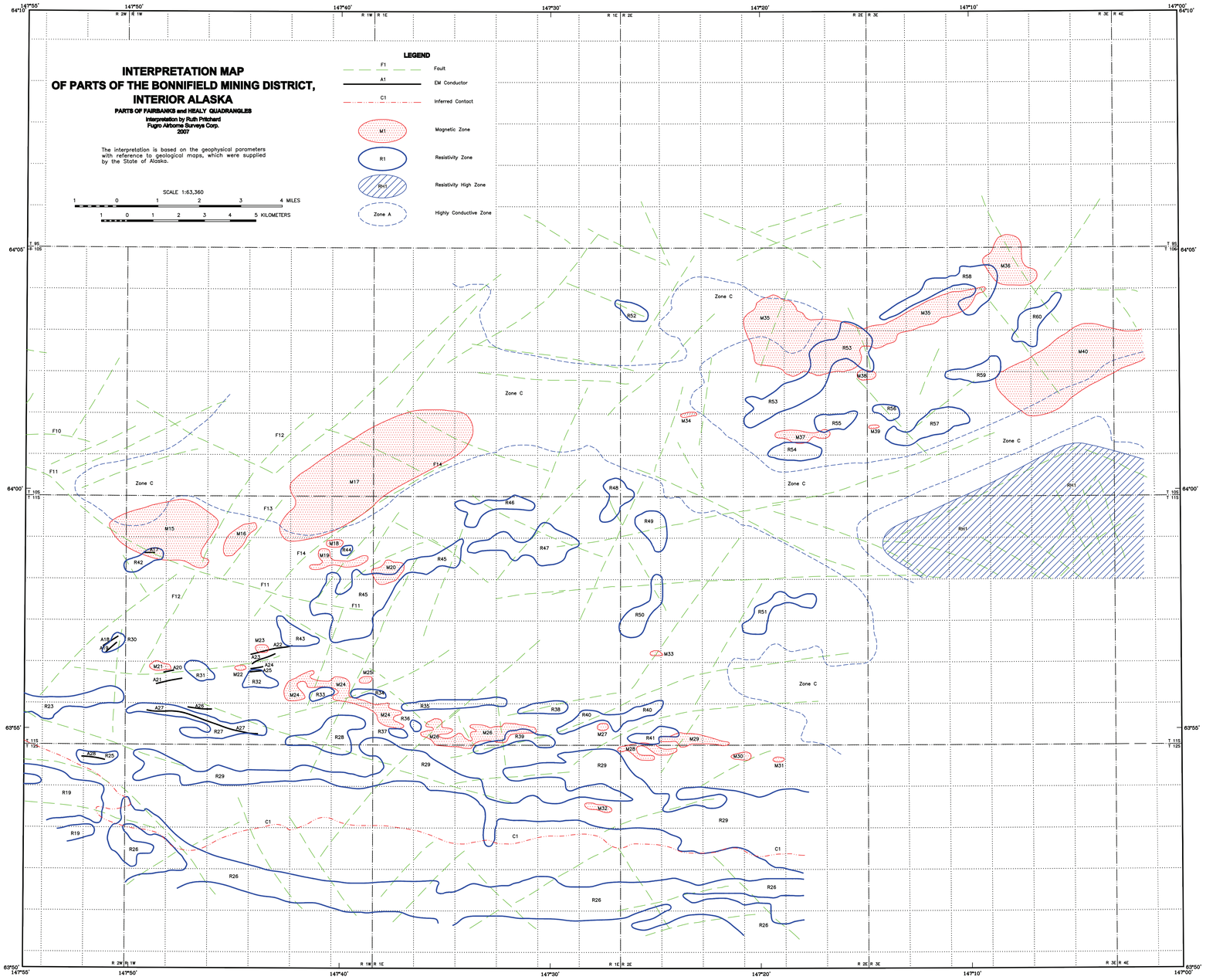
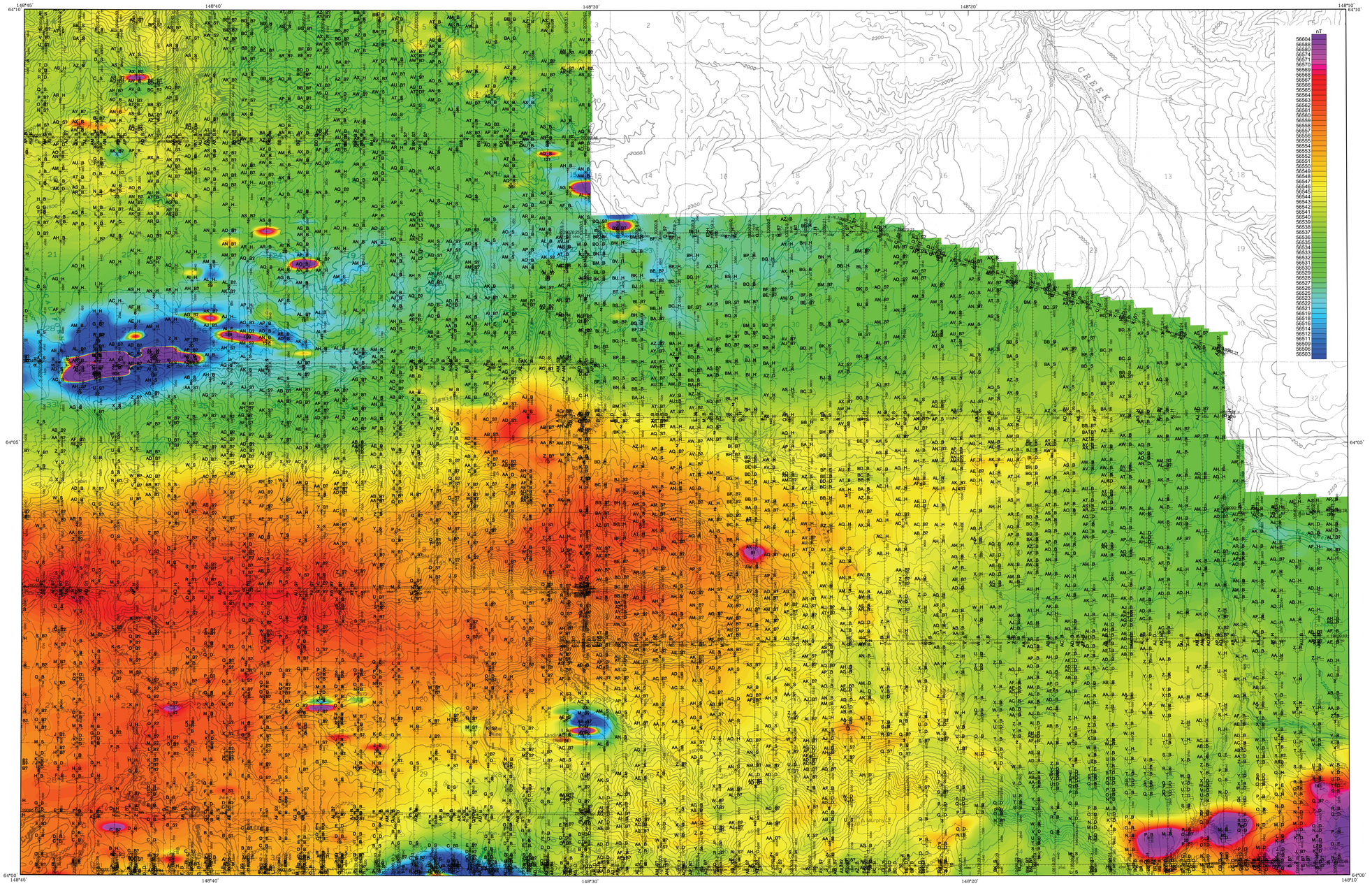


ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

GEOPHYSICAL REPORT 2007-2-2a
PARTS of FAIRBANKS A-3 and A-4 QUADRANGLES



Base from U.S. Geological Survey Fairbanks A-3, 1972; A-4, 1972; Quadrangles, Alaska

SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

TOTAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS of FAIRBANKS A-3 and A-4 QUADRANGLES

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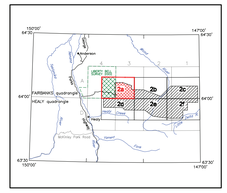
2007

LOCATION INDEX FOR 1:31,680



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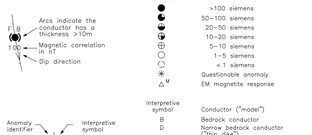
ELECTROMAGNETIC ANOMALIES



Anomaly	Conductance
●	>100 siemens
◕	50–100 siemens
◑	20–50 siemens
◔	10–20 siemens
⊖	5–10 siemens
○	1–5 siemens
○	< 1 siemens
✳	Questionable anomaly
$\triangle^M$	EM magnetite response

Interpretive symbol	Conductor ("model")
B	Bedrock conductor
D	Narrow bedrock conductor ("thin dike")
S	Conductive cover ("horizontal thin sheet")
H	Broad conductive rock unit, deep conductive weathering, thick conductive cover ("half space")
E	Edge of broad conductor ("edge of half space")
L	Culture, e.g., power line, metal building or fence

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM^V EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial–coil pairs operated at 1000 and 5500 Hz while three horizontal coplanar–coil pairs operated at 900, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The type of conductor is indicated on the aeromagnetic map by the interpretive symbol attached to each EM anomaly. Determination of the type of conductor is based on EM anomaly shapes of the coaxial– and coplanar–coil responses, together with conductor and magnetic patterns and topography. The power line monitor and the flight track video were examined to locate cultural sources.

TOTAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 cesium magnetometer with a Scintrex CS3 sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) adjusted for regional variations (or IGRF gradient, 2005, updated to November 2006) using altimeter adjusted IGRF, (3) leveled to the tie line data, and 4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

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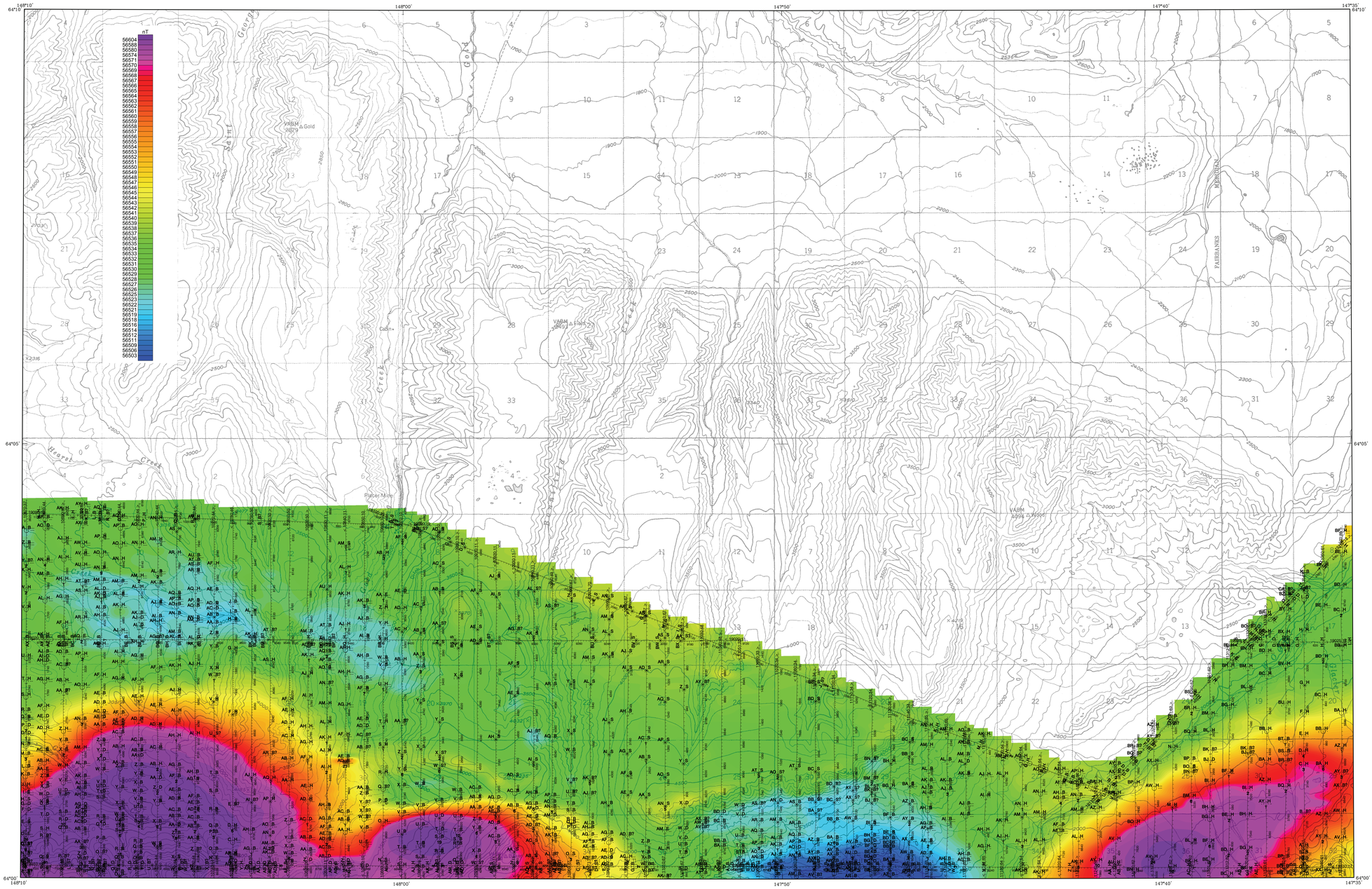
GEOPHYSICAL REPORT 2007-2-2b
PARTS of FAIRBANKS A-2 and A-3 QUADRANGLES



Base from U.S. Geological Survey Fairbanks A-2, 1972; A-3, 1972; Quadrangles, Alaska

SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

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2007

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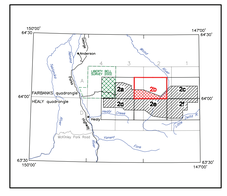

TRUE NORTH
21.8°
MAGNETIC
APPROXIMATE MEAN DECLINATION, 2006

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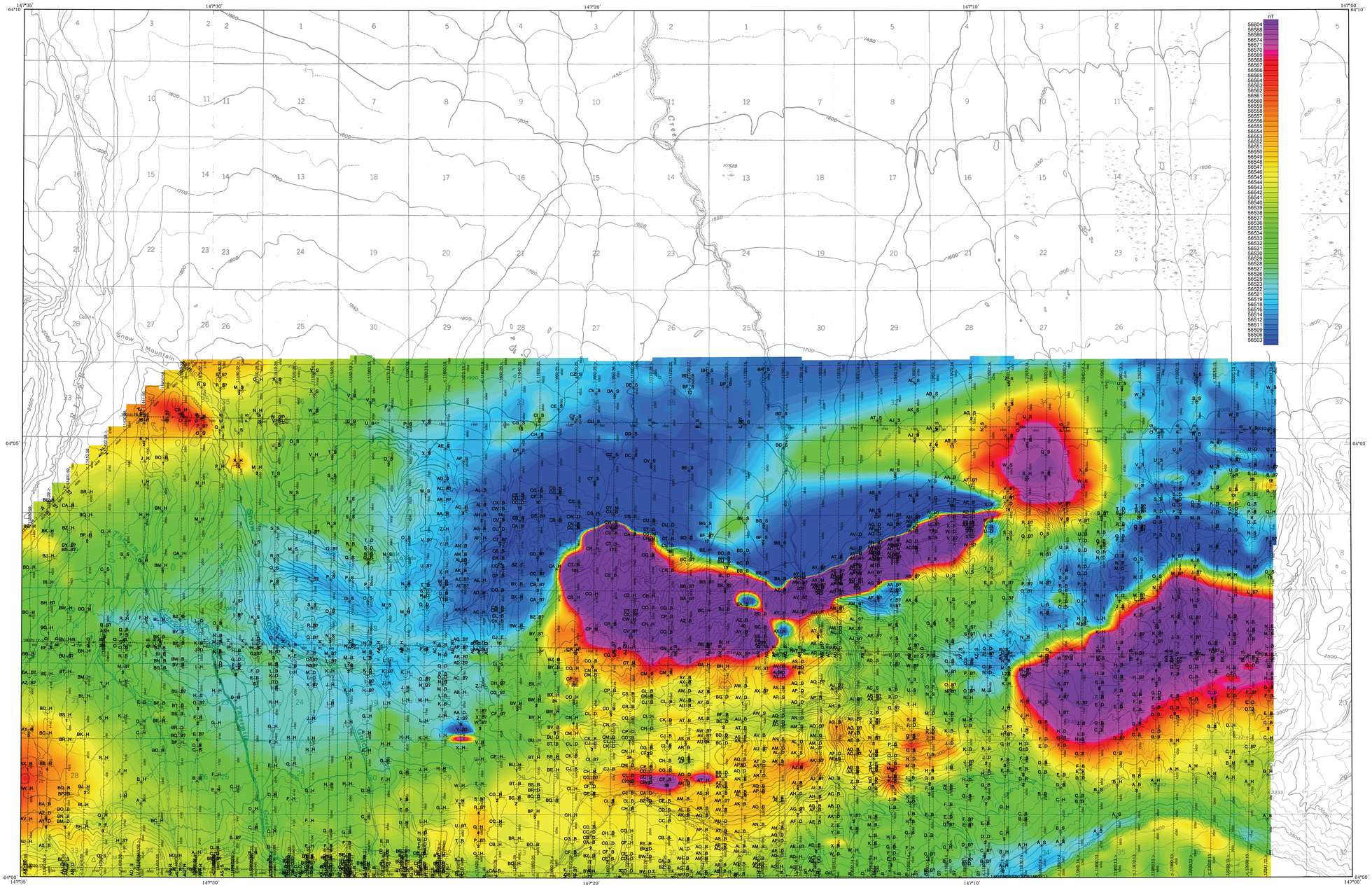
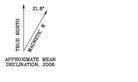
ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

GEOPHYSICAL REPORT 2007-2-2c
PARTS of FAIRBANKS A-1 and A-2 QUADRANGLES



Base from U.S. Geological Survey Fairbanks A-1, 1949; A-2, 1972; Quadrangles, Alaska



SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

TOTAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS of FAIRBANKS A-1 and A-2 QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2007

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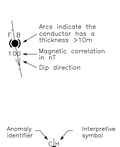

Anomaly	Conductance
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△ W	EM magnetite response

Interpretive symbol	Conductor ("model")
B	Bedrock conductor
D	Narrow bedrock conductor ("thin dike")
S	Conductive cover ("horizontal thin sheet")
H	Broad conductive rock unit, deep conductive weathering, thick conductive cover ("half space")
E	Edge of broad conductor ("edge of half space")
L	Culture, e.g., power line, metal building or fence

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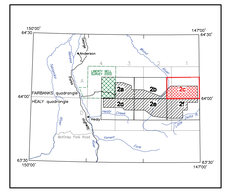
LOCATION INDEX FOR 1:31,680



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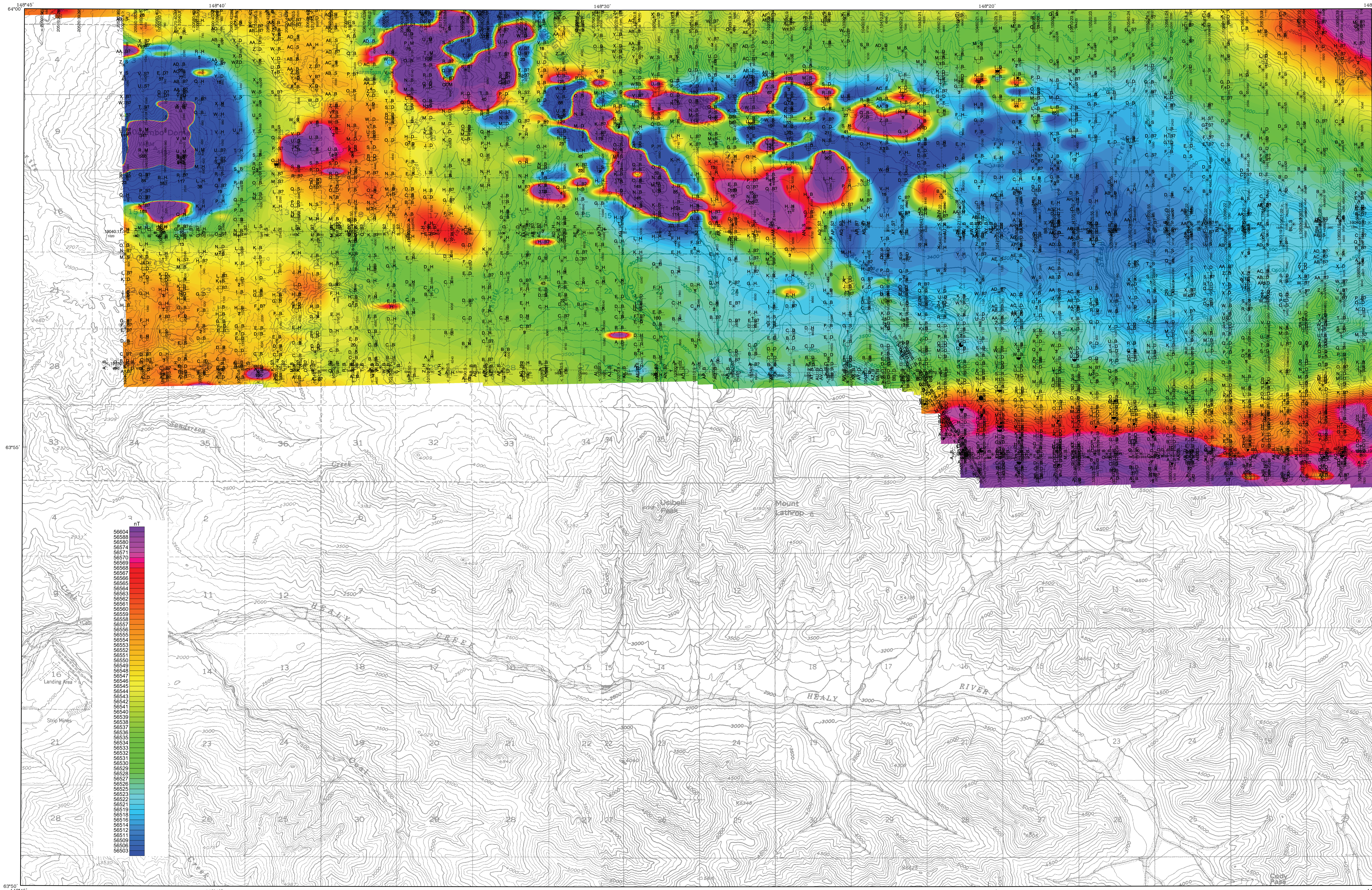
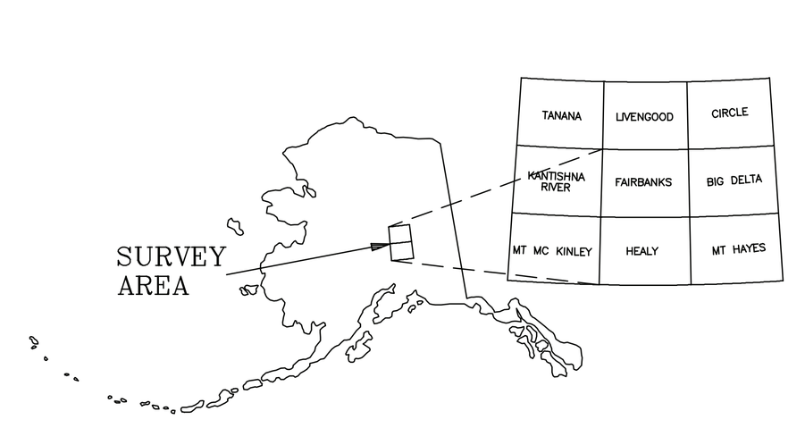
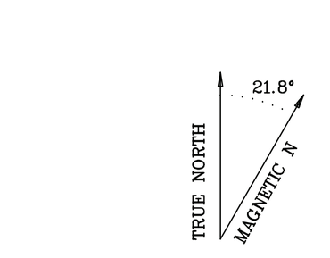


Base from U.S. Geological Survey Healy D-3, 1960; D-4, 1976. Quadrangles, Alaska

SCALE 1:31,680

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





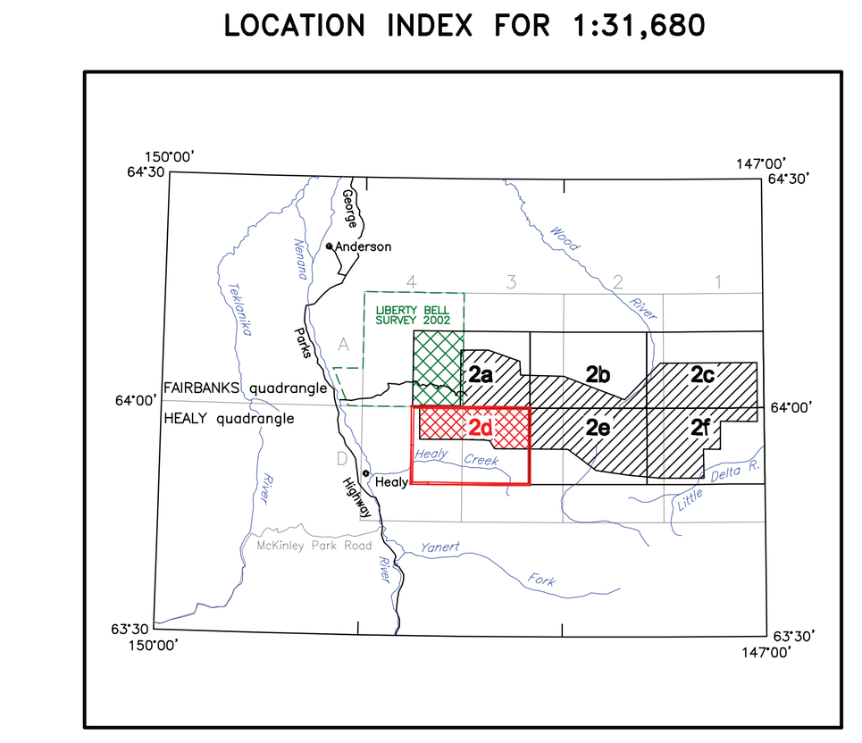
APPROXIMATE MEAN
DECLINATION, 2006

TOTAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF PARTS OF THE BONNIFIELD MINING DISTRICT, INTERIOR ALASKA

PARTS of HEALY D-3 and D-4 QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2007

LOCATION INDEX FOR 1:31,680



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F B — Arcs indicate the conductor has a thickness >10m
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Dip direction

Anomaly	Conductance
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✳	Questionable anomaly
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Anomaly identifier; Interpretive symbol (C H)

Depth is greater than
· 15 m
: 30 m
⁝ 45 m
⁞ 60 m

Inphase and quadrature of coaxial coil is greater than
. 5 ppm
.. 10 ppm
... 15 ppm
.... 20 ppm

Interpretive symbol	Conductor ("model")
B	Bedrock conductor
D	Narrow bedrock conductor ("thin dike")
S	Conductive cover ("horizontal thin sheet")
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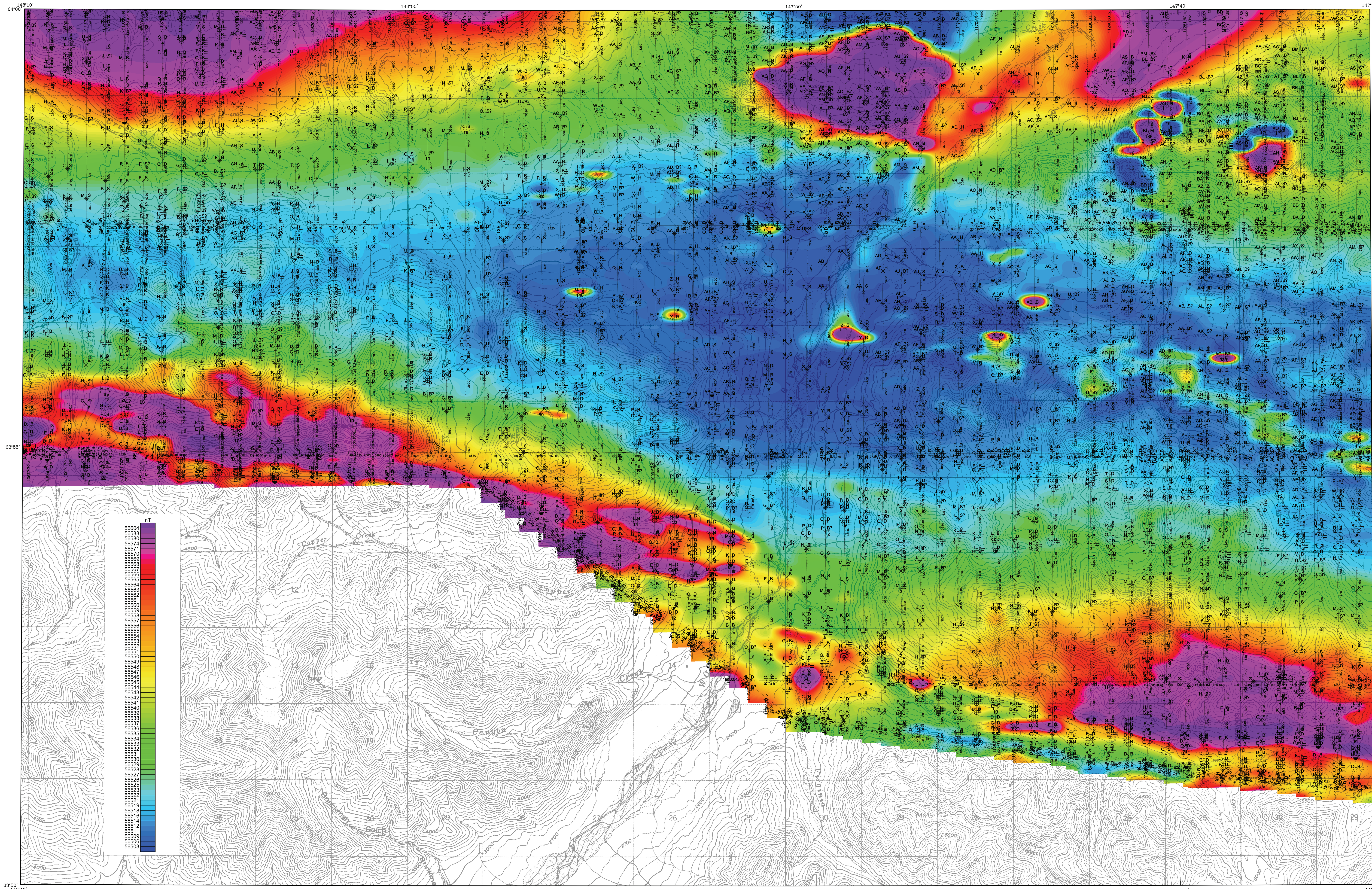
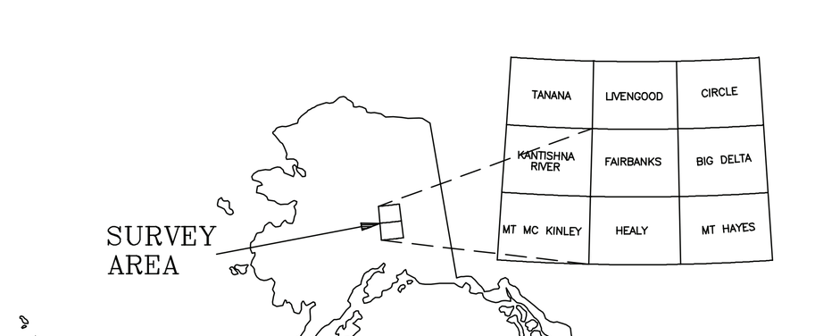


Base from U.S. Geological Survey Healy D-2, 1963; D-3, 1985; Quadrangles, Alaska



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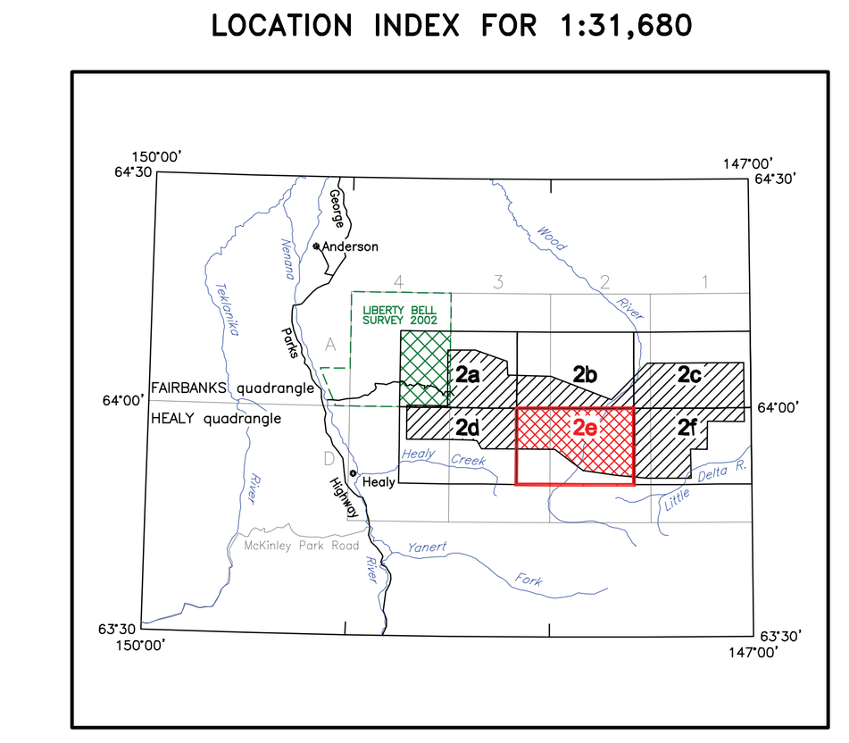
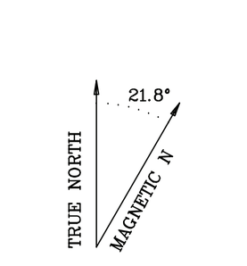
PARTS of HEALY D-2 and D-3 QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2007

LOCATION INDEX FOR 1:31,680





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GEOPHYSICAL REPORT 2007-2-2f
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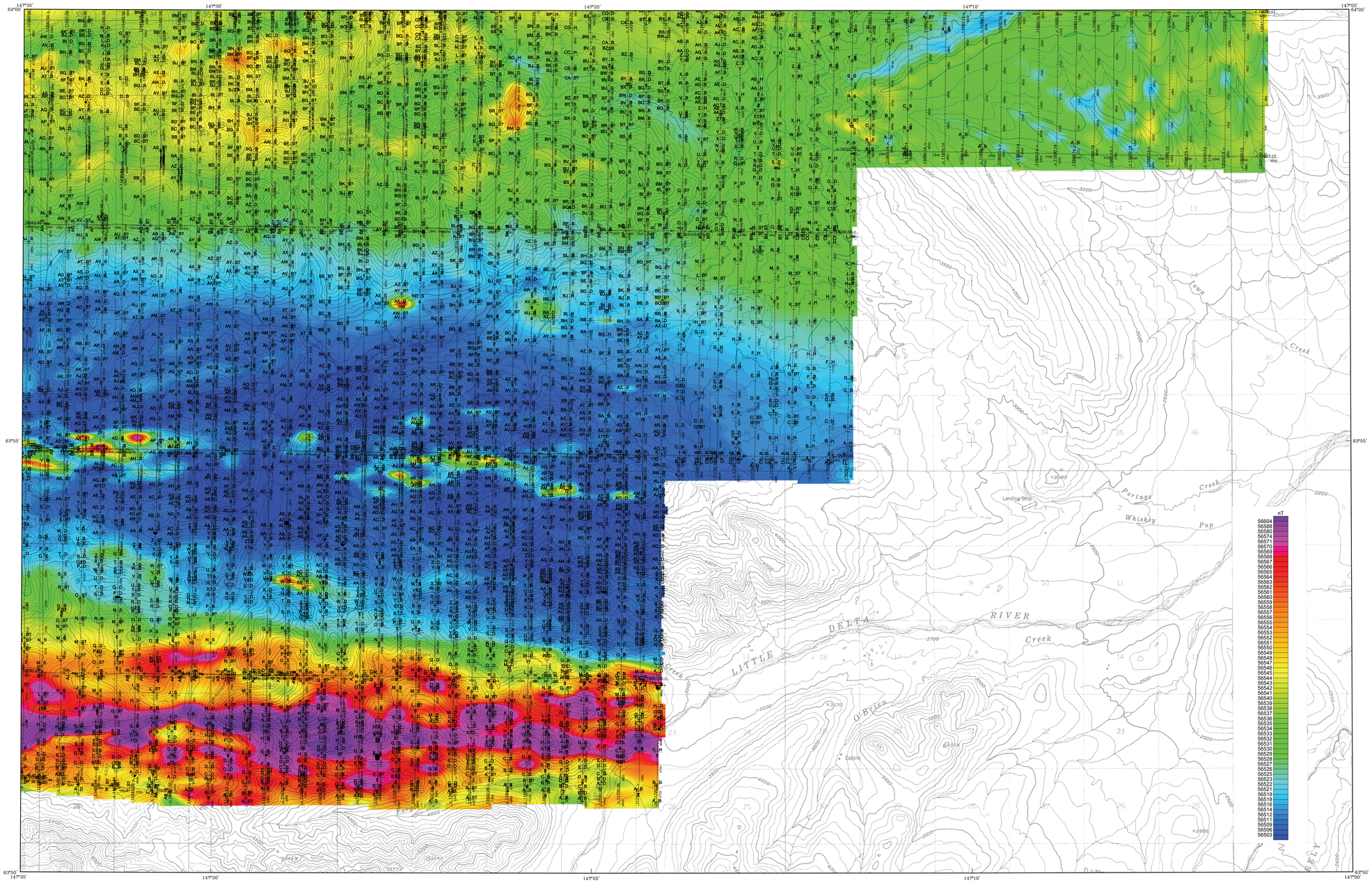

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2007

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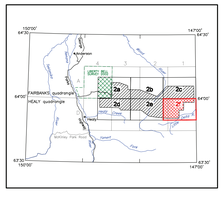

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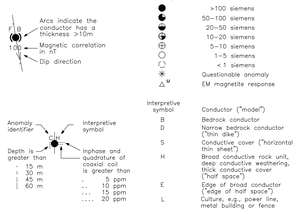

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