

HIGHLIGHTS OF 1989 MINERAL INVESTIGATIONS  
IN THE WESTERN BROOKS RANGE, NORTHWESTERN ALASKA

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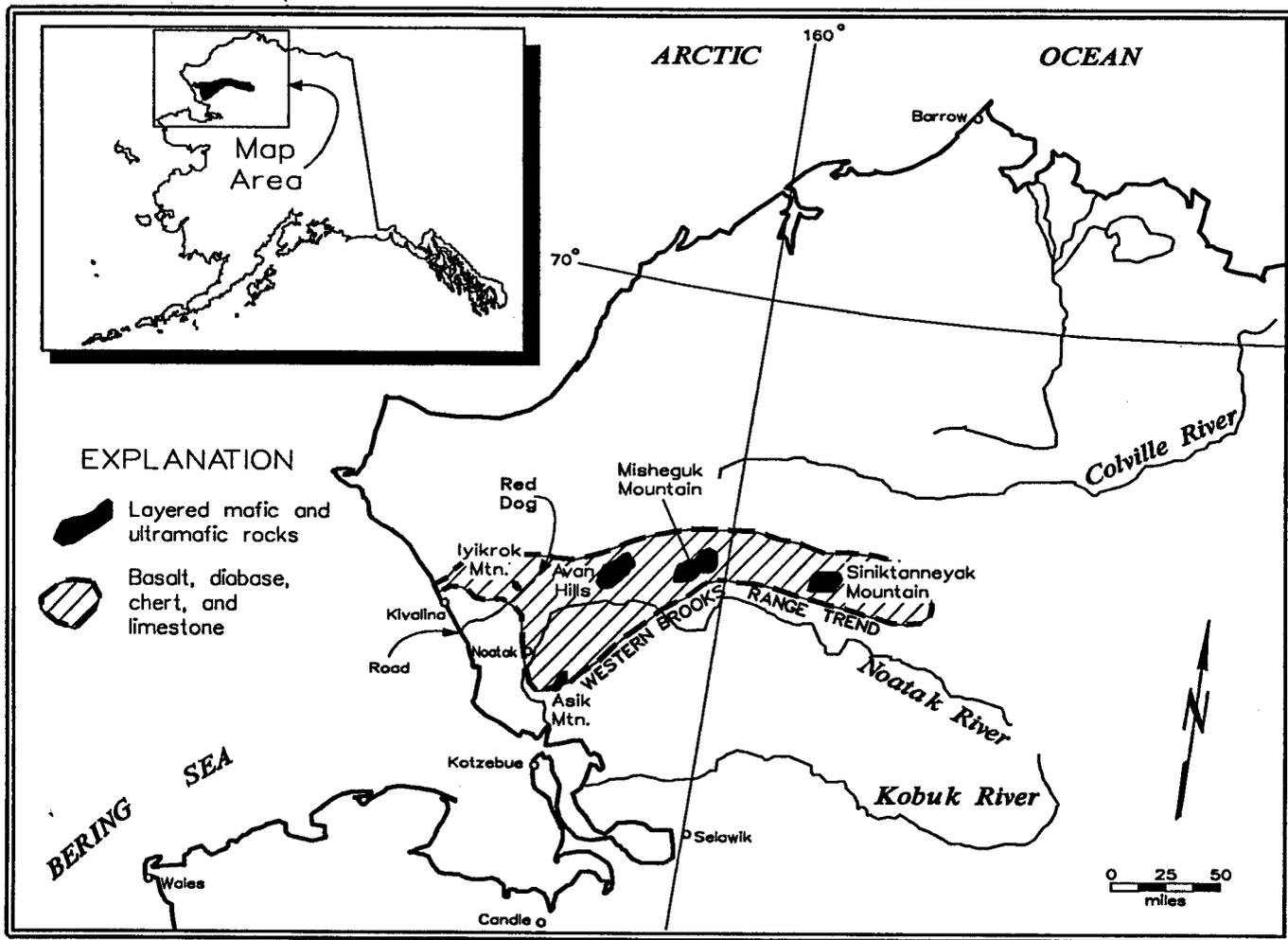
\*\*\*\*\* July 6, 1989

UNITED STATES DEPARTMENT OF THE INTERIOR

Manuel J. Lujan, Secretary

BUREAU OF MINES

T S Ary, Director



Five chromite deposits were discovered during recent strategic and critical mineral investigations conducted jointly by the Bureau of Mines, the U.S. Geological Survey, and the Alaska Division of Geological and Geophysical Surveys. The chromite deposits are all in the Avan Hills ophiolite mass in the Delong Mountains, western Brooks Range where the Bureau had previously discovered and described 59 other chromite occurrences and deposits.

Additional chromite deposits were also previously located by the Bureau at Iyikrok Mountain and Misheguk Mountain, also in the Delong Mountains, western Brooks Range (BuMines IC 9087 & OFR 97-85).

Depending on the actual deposit grade and subsurface extent, the largest of the recently discovered chromite deposits may contain as much as 1.5 million short tons of chromite. This would make the deposit approximately equal in size to the Turner Stringer Zone, at Red Mountain on Kenai Peninsula, where 1.25 million short tons of chromic oxide ( $\text{Cr}_2\text{O}_3$ ) have been identified (IC 8990-1).

The other four, recently discovered chromite deposits in the Avan Hills, are estimated to contain from 100 to 72,000 short tons of chromic oxide, and combined with the larger chromite deposit, between ~~200~~<sup>151</sup> thousand and 1.6 million short tons of contained chromic oxide were discovered during the recent investigation. Combined with chromite deposits previously identified by the Bureau, the western Brooks Range ophiolite, together are estimated to contain between ~~720~~<sup>7</sup>,000 and 2.5 million short tons of chromic oxide.

The above estimates assume that the chromite deposits are lens-shaped, as has been demonstrated to be the case for most chromite deposits in alpine peridotites. Tonnages were calculated for deposits with thickness equal to one quarter deposit length, and for deposits with thickness equal to one half deposit length. Therefore a minimum and maximum deposit size were calculated. In cases where deposits are open on one end due to snow or

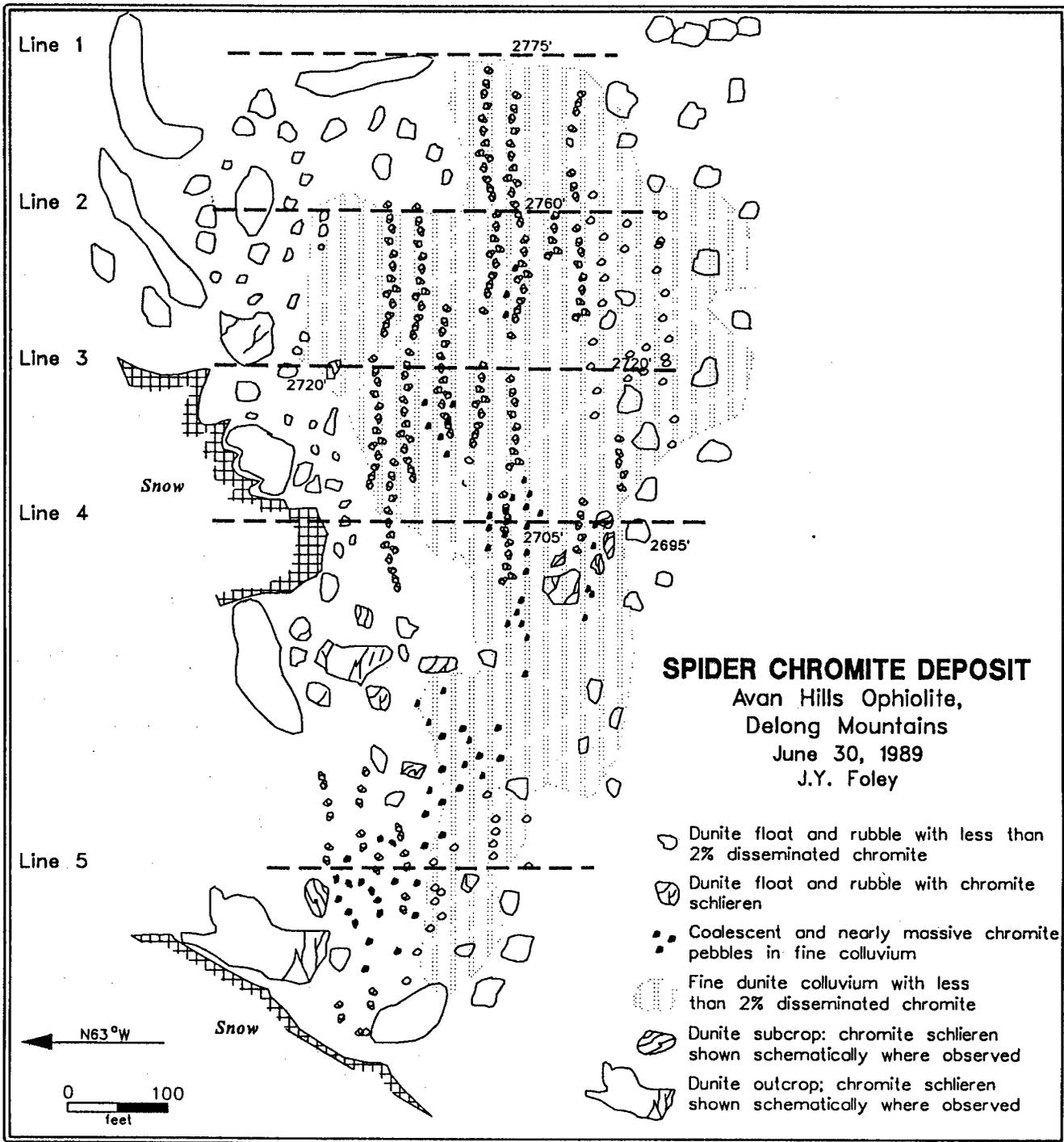
colluvial cover, the deposit length was multiplied by 1.25 for maximum deposit size calculation.

A tape and Brunton map of the Spider chromite deposit, the largest in the western Brooks Range, is included with this report. A sketch map of Harris's PGM-Cr occurrence, which contains material with up to 0.27 oz/st PGM is also included. The location of the five chromite deposits mentioned above, and the location of Harris's PGM-Cr occurrence are shown on the attached USGS 1:250,000 scale Delong Mountain and Misheguk Mountain topo sheets.

The Spider chromite deposit is exposed in outcrop, subcrop, rubble, and float. The deposit is between 2660- and 2775-ft elevations <sup>and</sup> trends Northeast across a smooth, north-striking dunite ridge. At the time of discovery the deposit was covered with snow at its south end. The chromite content of the deposit is estimated to be between 5 and 10 pct, and may actually be richer. Chromite schlieren, which are elongated, and folded magmatic segregations up to several feet long and several inches wide are abundant within the 100- to 200-ft-wide by 1060-ft-long area shown on the tape and Brunton map. The schlieren variably contain segregations of disseminated, coalescent, and nearly massive chromite. Rubble and float blocks along the ridge are aligned in linear trains, separated by parallel trains of fine colluvium. These striated soil patterns result from concentration of surface waters in fine-grained material during annual freeze-thaw cycles. Five continuous grab samples were collected along survey lines 1-5 as shown on the map. The samples were collected for table concentration and mineral characterization by SLRC and ALRC.

During previous chromium investigations treatment of chromite samples in this way has resulted in the identification of several PGM occurrences in western Brooks Range and elsewhere in Alaska, .

During the recent investigations, the PGM-Cr occurrences sampled by R.A. Harris in 1986 at Misheguk Mountain was examined. The attached sketch map



**SPIDER CHROMITE DEPOSIT**

Avan Hills Ophiolite,  
Delong Mountains

June 30, 1989

J.Y. Foley

-  Dunite float and rubble with less than 2% disseminated chromite
-  Dunite float and rubble with chromite schlieren
-  Coalescent and nearly massive chromite pebbles in fine colluvium
-  Fine dunite colluvium with less than 2% disseminated chromite
-  Dunite subcrop: chromite schlieren shown schematically where observed
-  Dunite outcrop; chromite schlieren shown schematically where observed

of that occurrence was constructed and additional samples were collected. Immediately prior to this years field work, a mineral characterization report was received from ALRC. That report confirmed the presence of <sup>\*</sup>sperrylite (Pt As<sub>2</sub>) in the high-iron chromian spinel from <sup>near</sup>Harris's occurrence. Note that the extraordinarily high PGM values, associated with clinopyroxenite in dunite are similar to values obtained in similar rocks at Dust Mountain in the Border Ranges Complex, south central Alaska. Together, these occurrences indicate that a previously unknown environment for PGM exists and deserves further work.

Because the areas described herein are within the Noatak National Preserve, administered by the National Park Service, and are closed to Mineral Entry, it is recommended that no press release be issued pertaining to these discoveries. Unlike our attempts to visit these sites in 1988, this years investigations were conducted without incident, and a productive, cooperative relationship was established and maintained with the NPS. A press release might have the adverse effect of soliciting unwanted response from various conservation and preservation groups, thereby interfering with any future mineral investigations in the Noatak National Preserve.

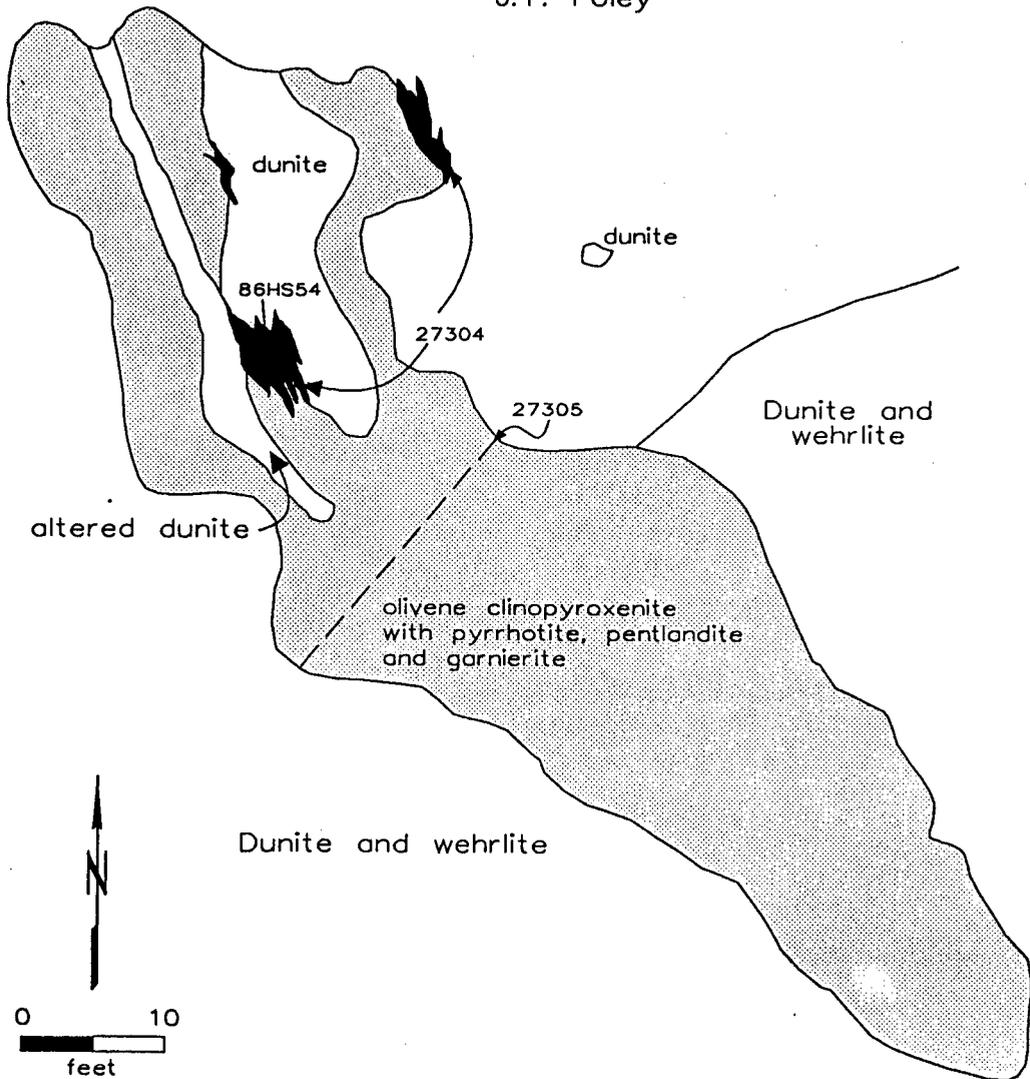
\* W1325750 collected in 1987 from ridge to west of Harris' occurrence.

# Harris's PGM-Cr Occurrence

Misheguk Mountain Ophiolite

June 26, 1989

J.Y. Foley



## Deposit Tonnage Estimates

### Spider Chromite Deposit:

Low estimate	High estimate
1060 feet long	1060'
x 150 feet wide (average)	x 150'
x 250 feet thick (deep) (i.e. $.25 \times \text{length}$ )	x 500' (i.e. $.5 \times \text{length}$ )
39,750,000 ft <sup>3</sup>	79,500,000 ft <sup>3</sup>
$\div 9.7 \text{ ft}^3/\text{st}$	$\div 9.7$
4,097,938 st	8,195,876 st
x .05 (pct chromite)	x .10 (10 pct chromite)
204,897 st chromite	819,588 st chromite
x .65 ( $\frac{\text{Cr}_2\text{O}_3}{\text{chromite}} = .65$ )	x .65
<u>133,183 st Cr<sub>2</sub>O<sub>3</sub></u>	<u>532,732 st Cr<sub>2</sub>O<sub>3</sub></u>

\* Deposit is open on south end, therefore:

$$1060 \times 1.25 = \begin{array}{l} 1325 \text{ feet long} \\ \times 150 \text{ " wide} \\ \times 750 \text{ " thick (}.5 \times \text{length)} \end{array}$$

$$14,906,000 \text{ ft}^3$$

$$\div 9.7 \text{ ft}^3/\text{st}$$

$$1,490,625 \text{ st chromite}$$

$$\times .65$$

$$\underline{\underline{968,906 \text{ st Cr}_2\text{O}_3}}$$

Max at 10 pct  
chromite.

Harris #1, 89 HS 137 = WB 27343

$$\begin{aligned} \text{Low } 2m & (\times 3.281 \text{ ft/m}) \\ & = 6.56 \text{ ft wide} \\ & \times 82 \text{ ft long} \\ & \times 20 \text{ ft thick } (.25 \times \text{Length}) \\ & \underline{11,296 \text{ ft}^3} \\ & \div 9.7 \text{ ft}^3/\text{ton} \\ & \underline{1164 \text{ st}} \\ & \times .08 \text{ (8 pct chromite)} \\ & \underline{93 \text{ st chromite}} \\ & \times .65 \\ & \underline{60 \text{ st Cr}_2\text{O}_3} \end{aligned}$$

$$\begin{aligned} \text{High} \\ & 123 \text{ ft} \times \\ & \times 6.6 \text{ ft} \\ & \times 61 \text{ ft } (.5 \times \text{length}) \\ & \underline{49520 \text{ ft}^3} \\ & \div 9.7 \\ & \underline{5105 \text{ st}} \\ & \times .10 \text{ (10 pct chromite)} \\ & \underline{510.5 \text{ st chromite}} \\ & \times .65 \\ & \underline{332 \text{ st Cr}_2\text{O}_3} \end{aligned}$$

Harris #2, 89 HS 138 = WB 27341

$$\begin{aligned} \text{Low } 350 \text{ ft long} \\ & 50 \text{ ft wide} \\ & \underline{87.5 \text{ ft thick}} \\ & \underline{1,531,250 \text{ ft}^3} \\ & \div 9.7 \\ & \underline{157,861 \text{ st}} \\ & \times .10 \\ & \underline{15,786 \text{ st chromite}} \\ & \times .65 \\ & \underline{10,260 \text{ st Cr}_2\text{O}_3} \end{aligned}$$

$$\begin{aligned} \text{High} \\ & 437.5 \text{ ft long} \\ & \times 75 \text{ ft wide} \\ & \underline{218.75} \\ & \underline{7,177,625 \text{ ft}^3} \\ & \div 9.7 \\ & \underline{739,961 \text{ st}} \\ & \times .15 \\ & \underline{110,994 \text{ st chromite}} \\ & \times .65 \\ & \underline{72,146 \text{ st Cr}_2\text{O}_3} \end{aligned}$$

Tom's #1, 89TL143

trends  $\approx 30^\circ W$ , dips  $45^\circ NE$

5-10 pct chromite

$$\begin{array}{r} \text{Low} \\ 300 \text{ L} \\ 100 \text{ W} \\ \underline{75 \text{ T}} \\ 2,250,000 \text{ ft}^3 \\ \div 9.7 \\ \hline 231,959 \text{ st} \\ \times 0.05 \\ \hline 11,598 \text{ st chromite} \\ \times 0.65 \\ \hline 7,539 \text{ st} \end{array}$$

$$\begin{array}{r} \text{High} \\ 300 \text{ L} \\ 100 \text{ W} \\ \underline{150 \text{ T}} \\ 4,500,000 \text{ ft}^3 \\ \div 9.7 \\ \hline 463,918 \text{ st} \\ \times 0.10 \\ \hline 46,392 \text{ st chromite} \\ \times 0.65 \\ \hline 30,155 \text{ st } \text{Cr}_2\text{O}_3 \end{array}$$

Tom's #2

$$\begin{array}{r} 50 \times 50 \\ \times 25 \text{ deep (thick)} \\ \hline 62,500 \text{ ft}^3 \\ \div 9.7 \\ \hline 6443 \text{ st} \\ \times 0.05 \\ \hline 322 \text{ st chromite} \\ @ 12.5 \text{ ft thick,} \\ 105 \text{ st } \text{Cr}_2\text{O}_3 \end{array}$$

$$\begin{array}{r} 50 \times 50 \times 25 \\ = 62,500 \text{ ft}^3 \\ \div 9.7 \\ \hline 6443 \text{ st} \\ \times 0.10 \\ \hline 644 \text{ st chromite} \\ \times 0.65 \\ \hline 418 \text{ st } \text{Cr}_2\text{O}_3 \end{array}$$