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ASSESSMENT REPORT
PROSPECTUS X
CONFIDENTIAL X
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MINING DISTRICT: DAWSON
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REPORT FILED UNDER: The Sigma Group

DATE PERFORMED: 1974-1975 DATE FILED: Oct. 21, 1983

LOCATION: LAT.: 64°00'N AREA: Hunker Creek - Paradise - Hester Hill
LONG.: 139°05'W VALUE \$:

CLAIM NAME & NO.:

WORK DONE BY: M.W. Milner

WORK DONE FOR: The Sigma Group

DATE TO GOOD STANDING	REMARKS:
	PLACER PROSPECTUS

A Report on the Hester Hill

Paradise Hill

Property

by

M. W. Milner

21 October, 1983

for

The Sigma Group

Vancouver, B.C.

Introduction

The presence and location of pay channels in the White Channel gravels of Paradise Hill have been the subject of much thought. McConnell (1907) discussed the anomalous trends of decreasing values of the gravel and increasing silver content of the gold, as well as the presence of elevated pay horizons downstream from the Hester Creek limit of Paradise Hill. McConnell also discussed the absence of the paystreak for Hunker valley between Paradise and Preido hills. The paystreak may have been obscured and warrants consideration by property holders in the area.

The tectonic displacement of White Channel gravels at Paradise Hill by thrust faulting from the southwest is described by Gleason (1970) and by Hughes (1969); the coincidence of obscured pay horizon and the tectonic activity leads one to speculate on an interrelation of these phenomena and their application in the economic evaluation of the White Channel gravels of Paradise Hill.

The bedrock geology and surficial geology of the area are compiled by Milner (1977) who spent the field seasons of 1974 and 1975 in the Klondike as part of thesis research. At that time exposures on Paradise Hill were poor, mining having stopped there in 1962. Visits to the "Hester Hill" pit of the Knols-Brown-Sigma association and the

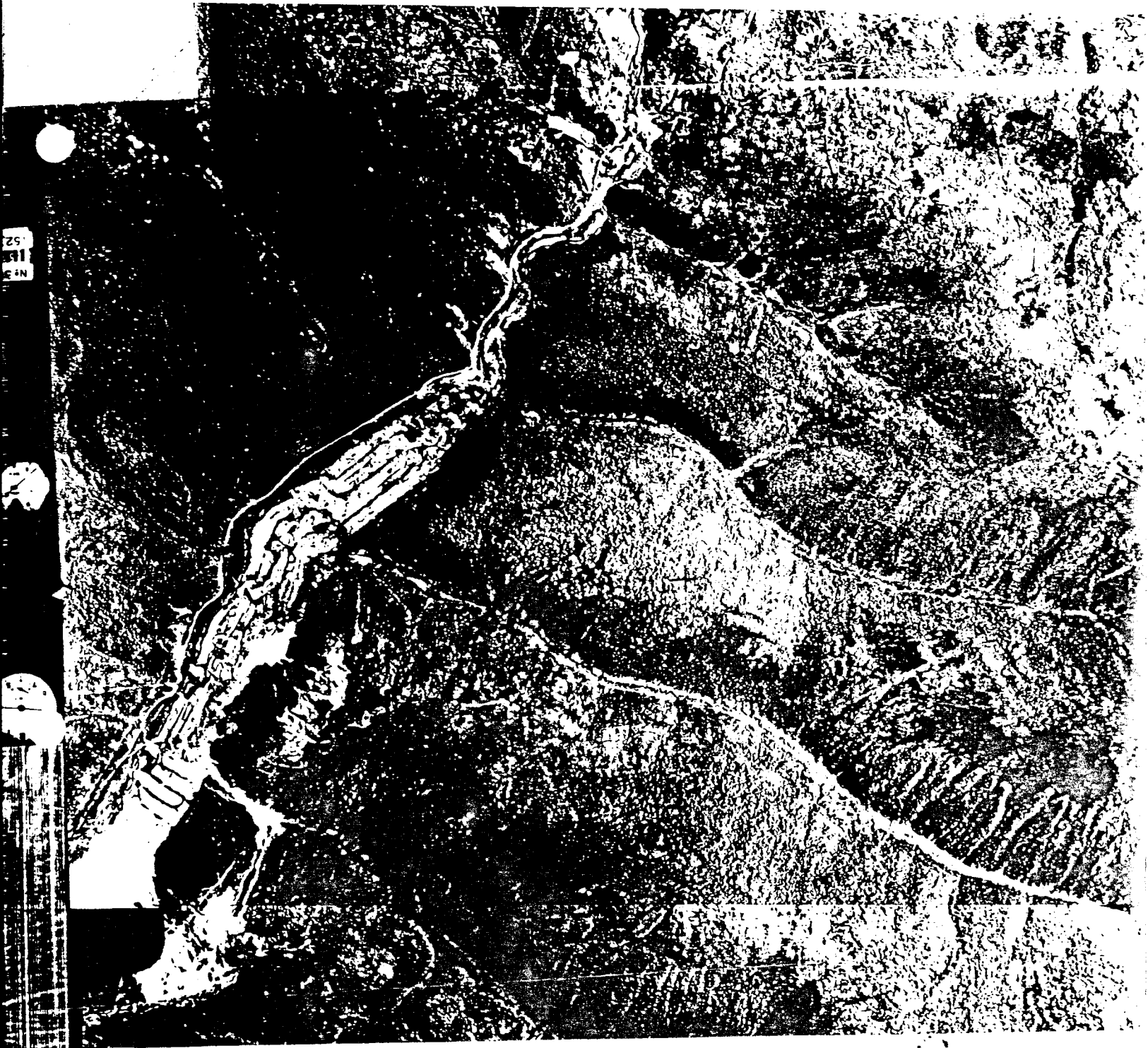


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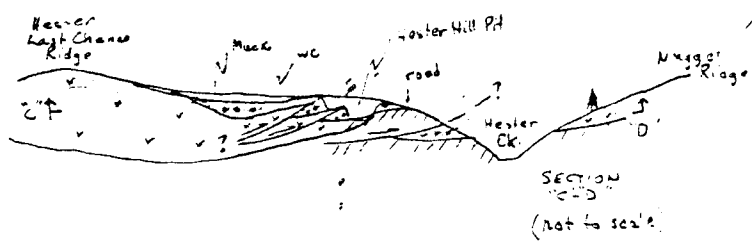
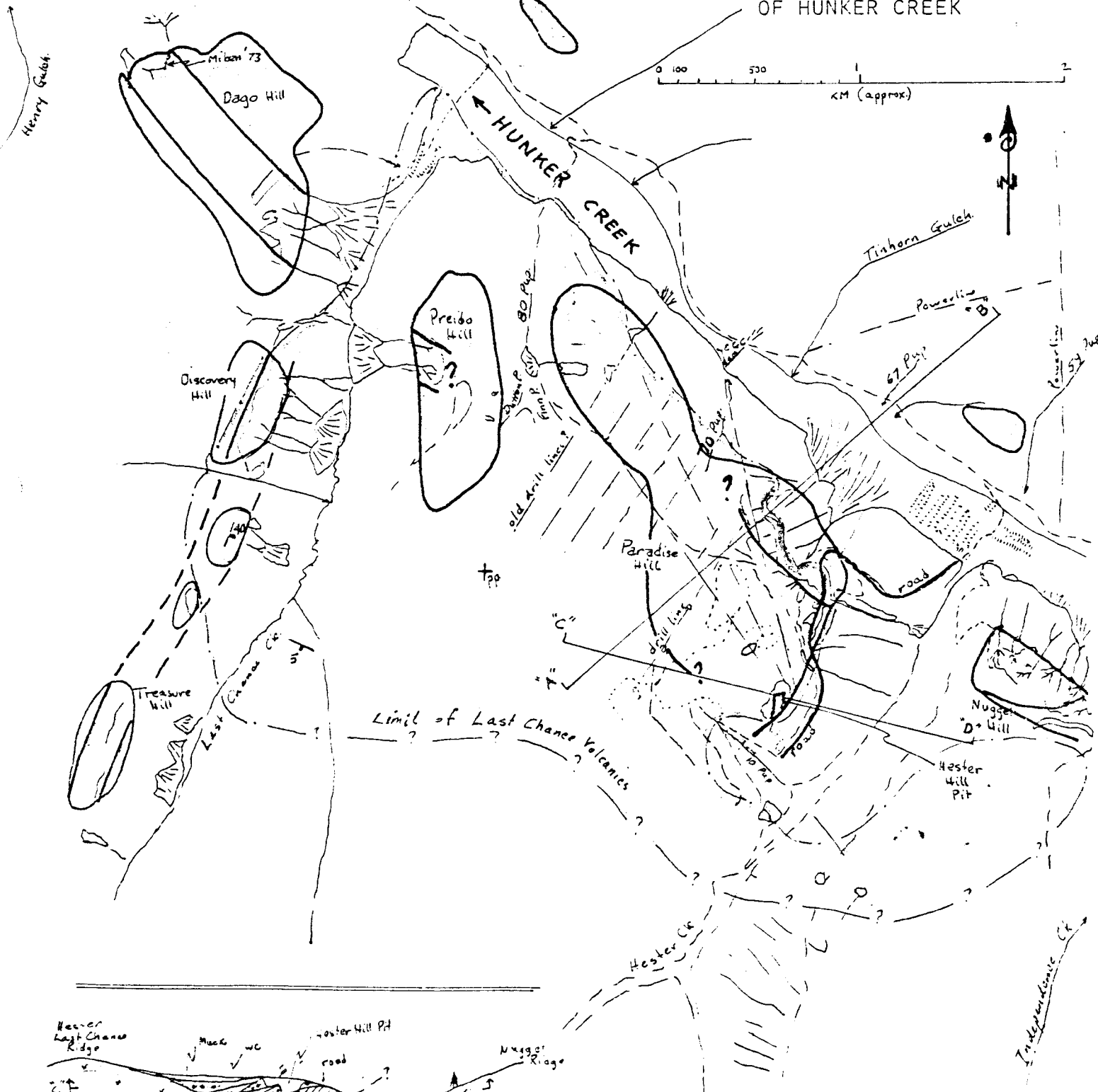
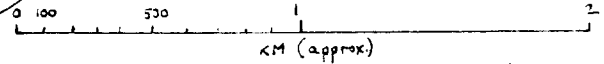
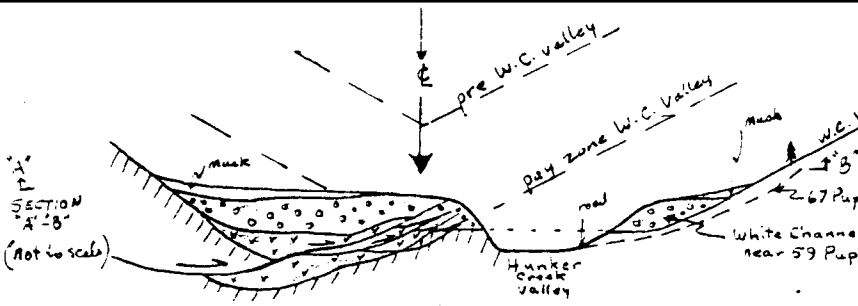
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AIRPHOTO INTERPRETATION
AND COMPILATION
OF THE
LAST CHANCE-HESTER INTERVAL
OF HUNKER CREEK



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Paradise Hill cut of Tamarack Mining provided considerable new data to the consideration of the geology of these deposits.

Purpose and Scope

This brief report is to summarize the geology of the Paradise Hill area with specific application to the "Hester Hill" property, its potential and possible direction of exploration and development.

History of Mining

In the early days, about the time of McConnell, mining was by open cut methods at the margins of the White Channel exposures and by tunnels from the margins as well as shafts from the surface to the high grade gravels at the base of the gravel section. This generation of mining was largely without geological prejudice and prospecting was thorough; the presence or intensity of hand mining reflected the degree of mineralization encountered. These signs have been used most recently as a guide to ore.

In the declining phase of the first period of mining and in the last 20 years the technology of hydraulic mining, in part restricted by the conflict of tailings disposal and valley floor mining, has reopened the prospects of White Channel terrace mining. Unlike the early hand mining

this new technology was limited by the cost requirement of transporting ore to the margin of the terrace for effective sluicing and tailing disposed; this restricted areas of interest to the terrace margin. Hence the exploration associated with the more modern mining was restricted to known ore zones and to the margins of terraces.

Documentation of exploration is poor. McConnell summarizes the stratigraphy much of which had to be hearsay as shafts were too numerous for him to have visited many. The most reliable information comes from John Gould who continues to mine on Nugget Hill where his father and family mined in the early years. He recalls the numerous workings acquired and promoted by Lou Perunovic to become the "Hester Hill" pit and the descriptions of pits dug on the Paradise-Nugget area that encountered the brown "gumbo" bedrock that characterises the area afflicted by thrust faulting.

The Yukon Consolidated Gold Corporation hydraulic cut on Paradise Hill in the 1960s was based on drilling near the known paystreak on Paradise Hill. The drill interpretation would not have incorporated fault interpretation as these displacements were not recognized at that time. Profiles would have assumed approximately horizontal bedrock and the drill data would have been used for immediate mine planning at the face of the hydraulic

cut. The appearance of bedrock high in the face as the first thrust was encountered, as described by Hughes (1964) and Gleeson (1970), probably resulted in a new economic factor that ended mining in that direction. This information, compiled in a sketch map of the area, warrants further consideration on a larger scale if any serious exploration evolves for the Hester channel or the Hunker channel within the faulted White Channel gravels of Paradise Hill.

Bedrock geology

A compilation geological sketch map is presented based on McConnell (1905), Bostock (1930), Milner (1977), Hughes (1969) and Gleeson (1970) and that should include Debicki (1983). The bedrock underlying younger deposits is a distinctive black, graphitic phyllite and quartite sequences known as the Nasina Group. Ultramafic rocks, dark green to brown in color, are incorporated in these basement rocks and occur in a number of places probably along weak zones into which they intruded or along which they have been emplaced by early faulting. Other younger, intrusive rocks, occurring mainly northeast of Hunker Creek, are light grey in color and are quartz-feldspar rhyolite porphyries. An ancient valley that existed before the development of the White Channel valley is evident in the area. It was infilled by sedimentary and volcanic rocks that

now outcrop southwest of Hunker Creek from Nugget Hill to and including the downstream portion of the valley of Last Chance Creek. Those rocks, the Last Chance Volcanics (for lack of a better name), were truncated by the erosion that formed the valley in which the White Channel gravels were deposited. The relatively soft nature of both the black "Nasina" rocks and the brown "Last Chance" rocks are responsible for the relatively broad White Channel valley in the Hester-Last Chance interval of Hunker Creek.

White Channel geomorphology

The White Channel gravels are described by McConnell (1907), Gleeson (1970), Hughes et al. (1972), Milner (1977), and are being studied by Morrison (1983?). The valley floor on which the White Channel is deposited resulted from the entrenchment of drainage in late Tertiary time (3 to 1.5 million years ago) to a level that is about 50 metres above the present valley floor. The White Channel gravel, thicker than would normally be expected, is the result of crustal tilting or uplift northwest of the Klondike Goldfields that, in effect caused packing of gravels in the stream analogous to the packing of sediment in sluice boxes in which the gradient was too low. This tilting undoubtedly occurred over some time, but it ended at the time that glacial outwash from the oldest recognized glaciation flooded into the

mouths of Hunker and Bonanza drainage, as well as along the valley of Indian River. The White Channel sediments were entrenched by the modern stream to a level of the former bedrock floor by the time 1.3 million years ago, as witnessed by a volcanic ash of that age (Westgate, 1978) that occurs on the highest terrace cut below the level of the White Channel bedrock (Milner, 1977).

Tributary streams, to the White Channel master valley are recognised by McConnell through the distribution of white gravels or the walls of modern valleys such as Last Chance Creek. The left bank benches there are clearly part of a tributary stream that joins White Channel Hunker Creek on Dago Hill. Like other left bank tributaries to Hunker Creek, such as Henry Gulch, the gold has a low fineness value. Hester Hill channel is the same with silverrich gold representing a channel from Hester Creek. A similar tributary channel on Nugget Hill, with unique, tributary gold, was recognized in the early years (John Gould, pers. com.). The morphology of tributary channels is not easily recognisable because of the drowning of the former topography that occurred during the accumulation of the White Channel gravels. In particular, the final phase of deposition of the upper White Channel gravel which was accompanied by alluvial fans from the mouths of tributaries, crowded even the master channel of Hunker Creek to the right side of the valley.

Aside from this derangement of drainage the paystreaks should be identified by now. The model developed from the White Channel gravel on Bonanza Creek where bedrock is hard and homogeneous, paystreak apparently evolved along the centre-line of the old valley axis. Subsequent derangement of stream channels and entrenchment of modern drainage displays the same shift to the right due to the crowding of tributaries and preservation of paystreaks on the terraces. Where cut by tributary streams the pay zone dissected is reworked to make a secondary valley bottom pay zone fading with distance downstream. When the master valley primary pay streak is reworked by the entrenching stream no primary pay remains on the walls of the valley and the secondary, valley floor paystreak is rich. Following this Bonanza Model, the pay zone should continue from the Paradise pay directly to Preido then Dago hills. As McConnell points out, there is no valley floor pay zone rich enough to explain the apparent absence on the terrace nor is there reason, nor room enough, on the right limit White Channel Hills to suspect a primary paystreak there. The bedrock faults are the most probable answer--barring that then the smoothness of the Last Chance Volcanics as a placer surface could explain local low grade reaches if contiguous rich zones could be found.

The fault movement could have either obscured the paystreak or dispersed it downstream into gravels above the

level of the primary paystreak. The burial hypothesis is the most reasonable because of the factor of timing. The observed faults cut the gravels with bedrock and overlying gravels on the southwest having been thrust over more easterly bedrock. Pursued from the foot-wall side the upthrust block would appear like bedrockrim. The basal gravels in the hanging wall, at the leading edge of the bedrock of the thrust, would appear to be elevated or high level pay zones--as McConnell described. If, on the other hand, the miner were descending through the gravel he could intercept the basal gravels of overthrust side pay and not penetrate the bedrock of the hanging wall to the level of the central valley pay in the basal gravels of the footwall side of the fault. The angle of the thrusts the amount of throw and the direction of movement have yet to be determined. Where best exposed on Paradise Hill, there are small thrusts of about 30 degrees dip and a throw of less than 10 metres but there are also masses of Last Chance volcanics with complex low angle imbricate thrusts containing slices of gravel, all above a basal White Channel horizon which it buries by 20 metres of overthrust bedrock. There is much to be gained from solving the puzzle of stacked thrusts for buried paystreaks.

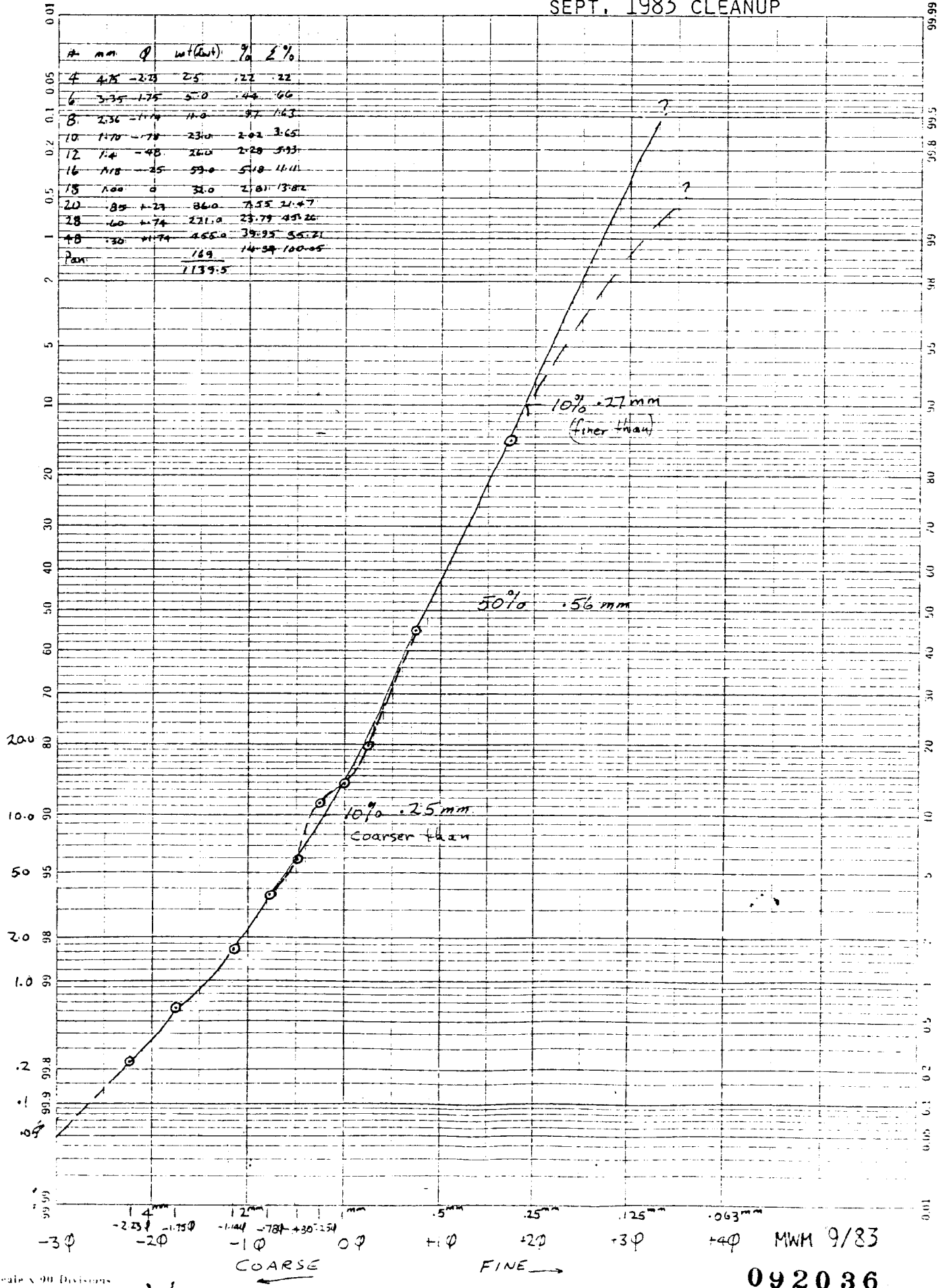
The structure and stratigraphy of Hester Hill is well hidden. Bedrock, the black Nasina type, with presumed ancient, low angle fault characteristic of this rock type,

is well displayed at the top of the slope overlooking Hester Creek and also in this position near 10 Pup, exposed in the slot cut for bulldozing ore to the second, lower washplant. A veneer of red or yellow channel gravel, with in places lenses of White Channel, covers this bedrock. Away from Hester Creek, the gravel thickens as the bedrock decreases in elevation to the floor of the 1982 pit. Further northwest, stripping encountered shallow, possibly upthrust, bedrock. No attempt was made to test below this obstruction. Gravel section in the northwest limit of the pit shows secondary clay seams that in many places show a common trend dipping into the hill, northwest, away from Hester Creek. These features are here interpreted as thrust faults in the gravel. The extension of the Hester Hill channel appears to be northward away from the headwaters of Hester Creek. The channel in all likelihood is overthrust and buried. The lowest level of the channel floor might be expected to step down as it continues in a northward direction. Drilling is warranted in conjunction with detailed geological mapping as mining continues.

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GRANULOMETRY OF HESTER HILL GOLD SEPT. 1983 CLEANUP



Incidental observations on Quaternary crustal movements,
central Yukon Territory¹

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After Dr. Souther's excellent synthesis (Souther 1970) I hesitate to throw in a few snippets of information that I cannot fit into the regional picture. The first of these relates to the age of latest movement in the vicinity of Tintina Trench. Near Dawson in the Klondike District the White Channel gravels, probably Pliocene in age, lie on high bedrock benches developed on rocks as young as Eocene. Hydraulic mining on such benches on Bonanza and Hunker Creeks in 1960 and 1961 exposed fault structures that carried slices of Eocene and older rocks into the White Channel gravel. The fault planes dip west-southwest away from the southwest-trending Tintina Trench that lies east to the northeast. I have examined the exposures with Chris Gleason and several other members of the Geological Survey of Canada. There was general agreement that structures resulted from tectonic movement, rather than local gravity movement or permafrost activity. The evidence suggests late Pliocene or early

Pleistocene activity perhaps related to tectonic activity along Tintina Trench.

Bedrock terraces along Yukon River suggest that there has been as much as 800 ft (244 m) of upwarp. The terraces are near river level about 100 miles (~160 km) upstream from Dawson, about 500 ft (~152 m) above river level at Dawson, attain 800 ft (244 m) above river level below Fortymile River, then further downstream begin to converge with river level again. Gravel on the terraces is probably early Pleistocene, suggesting early Pleistocene or later upwarp.

I might add to Dr. Souther's comments on volcanism that several volcanic ash deposits older than White River ash (about 1400 years) have been found in central and southwestern Yukon. Some at least of these are older than the limits of radiocarbon dating. This agrees with Dr. Souther's comment that there have been frequent ash falls right through to the present.

¹Presented at the Symposium on Recent Crustal Movements, Ottawa, Canada, March 17-18, 1969.

SOUTHER, J. G. 1970. Volcanism and its relationship to recent crustal movements in the Canadian Cordillera. *Can. J. Earth Sci.* 7 (this volume).

Temperance hill immediately below Goldbottom creek is covered by a triangular patch of gravel extending up Goldbottom for a distance of 4,000 feet and down Hunker creek for 1,700 feet. The gravels are thin, seldom exceeding thirty feet, and averaging less than twenty-five feet in thickness. They are less compact than usual, and as a result of this most of the gold has settled down close to bedrock. The Temperance hill gravels measure altogether 1,590,580 cubic yards of which 788,750 cubic yards are considered to be workable.

Temperance hill has been a steady producer on a moderate scale since the early days of the camp, and is still of considerable economic importance. Some ground rivalling in richness that on the best Bonanza hills occurred along the rim at the junction of Goldbottom and Hunker valleys. This is now largely worked out but portions of the hill still contain good values, occasionally exceeding 50 cents to the cubic yard. The back gravels as usual proved lean. Three small hydraulic plants operating with water obtained from tributaries of Goldbottom creek are at work on the hill.

From Temperance hill down stream to Nugget hill above Hunker creek the central portion of the old high level channel, including the paystreak, has been destroyed. Portions of the rim gravels have been preserved at various points, some of which carry moderate values. An hydraulic plant has been installed to work two small areas below Bee gulch. These were estimated to contain 859,200 cubic yards of gravel.

At Nugget hill the paystreak of the old channel bends to the left and is again partly preserved. The upper part of the hill is lean but good values were obtained from the lower portions. The gravels are shallow, averaging about twenty-five feet in depth, and measure altogether 1,608,300 cubic yards. The workable gravels were estimated at 1,200,000 cubic yards. Nugget hill has been fairly well prospected but very little mining has been done on it owing to the difficulty of obtaining water. A small hydraulic plant is now in operation.

Summary of workable Gravels in upper Hunker Hills

Whisky hill	199,400 cu. yds.
Delhi hill	869,450 "
Temperance hill	788,750 "
Williams concession	859,200 "
Nugget hill	1,200,000 "
	<u>3,916,800</u> "

Estimated average grade, 25.2 cents per cu. yd.
Total valuation, \$988,000.

Hill Gravels between Hester and Last Chance Creeks

A wide band of White Channel gravel borders the left limit of Hunker creek continuously except when cut across by Eighty pup from Hester creek down to Last Chance creek, a distance of over two miles. The deposits of the old valley in this stretch were originally over a mile in width in places. They have been partially destroyed as the present Hunker valley has been sunk through them. The preserved portion on the left limit has a width of from 800 to 3,000 feet, an average depth of about sixty feet, and contains

altogether 25,850,000 cubic yards of material. A few small areas occur also on benches on the right limit but are unimportant.

The upper portion of the gravel area on the left limit from Hester creek down to Seventy pup is known as Paradise hill, and is the most important stretch of hill gravels on Hunker creek, with the possible exception of Dago hill.

The Paradise hill gravel area has a length of 2,500 feet, and an average width of 1,500 feet. The gravels have an average depth of about sixty feet, and measure altogether, including the muck and slide material which cover them, on the back rim, 7,786,000 cubic yards. The workable gravels are estimated at 5,285,000 cubic yards.

The average grade proved somewhat difficult to determine on account of the exceedingly irregular distribution of the gold through the gravel and the absence of a satisfactory section across the paystreak. It is estimated at 23 cents per cubic yard, and the gold contents of the workable gravels at \$1,215,500. This figure is based partly on mining returns and partly on a systematic sampling of all the available shafts and hydraulic cuts in the area. The best values occur in the upper part of the hill. Towards Seventy pup the gold diminishes both in quantity and coarseness.

Considerable mining, both by the drifting and hydraulic methods, has been done on Paradise hill, and two small hydraulic plants are now in operation.

The wide belt of White Channel gravels extending from Seventy pup to Eighty pup, a distance of 3,400 feet, is low grade everywhere so far as known. No definite paystreak has yet been located, although numerous shafts have been sunk for that purpose to bedrock throughout the area. The absence of a hill paystreak is somewhat remarkable as the bordering creek gravels are also lean, showing that it has not been destroyed. The gravels between the two pups have a depth in places of over a hundred feet and a total volume of 11,234,000 cubic yards. The gravels assumed to be workable include a small area below Seventy pup measuring 1,500,000 cubic yards, estimated at 13 cents per cubic yard, and portions of the rim gravels along Eighty pup. The latter are roughly estimated at 1,000,000 cubic yards, with a grade of 15 cents per cubic yard. The probable production of the hill is estimated at \$345,000. No mining has been done on the hill.

Preido hill between Eighty pup and Last Chance creek is also comparatively low grade as a whole, but contains some gravels carrying good values in coarse gold on the Last Chance slope. The Preido hill gravels cover an area of 474,000 square yards, have a maximum depth of ninety feet, an average depth of forty-three feet and a total volume of 6,828,000 cubic yards.

The best values occur in a belt crossing the centre of the hill, 1,600 feet wide on the Last Chance slope and 1,100 feet on the Eighty pup slope. Samples from shallow shafts and hydraulic cuts along the Last Chance rim indicated an average grade of 35 cents per square foot of bedrock. Those obtained from the Eighty pup slope were much lower, averaging only 15 cents per square foot of bedrock. The zone defined above contains 3,093,530 cubic yards of gravel, estimated to average 15 cents per cubic yard, a total valuation of \$464,000. This estimate is based on the assumption that the values obtained at the rims continue to the centre of the hill.

	Workable Gravels. cu. yds.	Values. \$
Paradise hill.....	5,285,000	1,215,500
Hill between Seventy and Eighty pups.....	2,500,000	345,000
Preido hill.....	3,093,530	464,000
	<u>10,878,530</u>	<u>\$2,024,500</u>
Average grade, 18.6 cents per cubic yard.		

Last Chance and Lower Hunker Creeks White Channel Gravels

Dago hill below the junction of Last Chance and Hunker creeks is covered by a large and important body of high level gravels. The gravel area deposit has a maximum depth of 100 feet, an average depth of 68.5 feet and covers a triangular shaped area 862,000 square yards in extent. The total volume of gravels on the hill measures 19,639,000 cubic yards.

Dago hill is crossed diagonally by a well defined coarse gold paystreak, 3,700 feet in length and from 300 to 500 feet in width. The workable gravels have an estimated width of 600 feet (as the main paystreak is fringed with gravels carrying some values), and measure 6,423,000 cubic yards. The average grade calculated from the values obtained in sampling two sections across the paystreak is estimated at 19 cents per cubic yard.

In addition to the gravels on and bordering the main pay streak, portions of the rim gravels along Last Chance creek, roughly estimated at 750,000 cubic yards with a grade of 15 cents per yard, can probably be worked.

Total quantity of workable gravels, 7,173,000 cubic yards.

Estimated average grade, 18.6 cents per cubic yard.

Probable production, \$1,332,870.

Last Chance creek is bordered on the left limit for one and a third miles along Dago hill by a number of small areas of rich hill gravels. Considerable mining has been done on all the areas and a couple of them have been worked almost completely away. The two most important areas at present are Treasure and Discovery hills. These still contain 2,173,000 cubic yards of gravel, estimated to average 24.1 cents per yard. Probable production, \$524,000.

From Dago hill the White Channel deposit crosses the present Hunker valley to Australia hill, a small gravel-covered plateau separating Hunker creek from the Klondike river above their junction. The White Channel gravels on Australia hill cover an area of 1,586,000 square yards, have a thickness in places of over a hundred feet and a volume of 35,947,000 cubic yards. They are overlaid, as on Lovett hill at the mouth of Bonanza creek, by barren Klondike river gravels. The latter overlap the White Channel gravels on the Klondike river side. The portion resting on White Channel gravels has a thickness of 130 feet and a volume of 39,200,000 cubic yards.

Australia hill, although the largest both in extent and volume of gravels of all the Hunker hills, has so far proved of little economic importance. No definite paystreak crossing the hill has been located, and the chances are that none exist as the hill, apart from our own sampling, has been fairly

well prospected. Coarse gold was found at one point near the mouth of Hattie gulch, and pay values are reported to have been found in a drift farther up the creek. The drift at the time of our visit was inaccessible. Samples from the rim near-by carried only light values. While some production may be expected from Hattie gulch, no definite statement in regard to the amount can be given. It is placed at \$150,000, but this figure can only be regarded as a rough guess and may be largely exceeded.

Summary of Hunker Creek workable Hill Gravels

	Volume. cu. yds.	Values. \$
Upper Hunker hills.....	3,916,800	988,000
Hills between Hester and Last Chance creek.....	10,878,500	2,024,500
Hills below Last Chance creek (exclusive of Australia hill).....	9,346,000	1,856,870
Australia hill.....		150,000?
	<u>24,141,300</u>	<u>\$5,019,370</u>

Estimated average grade (exclusive of Australia hill), 20.17 cents per cubic yard.

Total quantities of White Channel Gravels and overlying Klondike Gravels along Hunker Creek

	cu. yds.
Small hills above Hester creek.....	5,378,600
Hills between Hester and Last Chance creeks.....	25,850,000
Dago hill.....	19,639,000
Last Chance hills.....	2,950,000
Australia hill { White Channel gravels.....	35,946,770
{ Klondike River gravels.....	39,200,000
Small hills, not measured, estimated at.....	3,000,000
Total.....	<u>131,964,370</u>

Klondike River High Level Gravels

High level gravels, usually at an elevation of from 200 to 300 feet above the valley flats, occur at various points along the Klondike river. These gravels differ altogether in character and appearance from the White Channel gravels of the creeks. The pebbles are smaller and more rounded, and consist mostly of slate, diorite and quartzite derived from the mountains of the Ogilvie range.

The Klondike river gravels as a rule carry only light values, but below the mouth of Bonanza creek they have been enriched and in places contain gold in commercial quantities.

The two most important areas of these gravels discovered so far occur on benches bordering the Klondike river at its mouth. These two areas contain approximately 4,780,000 cubic yards of gravel considered to be workable. The grade based on a somewhat hurried sampling of the various cuts and shafts is estimated at 20 cents per cubic yard. Probable production, \$956,000.

PRELIMINARY
 GEOLOGICAL SKETCH
 OF THE
 PARADISE-HESTER HILL AREA
 (ERRORS MAY BE UP TO 200')

