

GEOLOGICAL SURVEY BRANCH ASSESSMENT REPORTS
DATE RECEIVED APR 12 1996

**OKANAGAN OPAL INC.**

**KLINKER PROPERTY**

GOVERNMENT AGENT

**RECEIVED**

APR - 9 1996

VERNON, B.C.

**REPORT ON GEOLOGICAL MAPPING AND BULK SAMPLING  
ON THE PROPERTY AS PART OF THE 1995  
EXPLORATION & DEVELOPMENT  
PROGRAM**

**KLINKER & EWER MINERAL CLAIMS  
NTS 82L/5E  
Lat. 50° 22' N, Long. 119° 34' W  
VERNON MINING DIVISION,  
PROVINCE OF BRITISH COLUMBIA**

- for -  
**OKANAGAN OPAL INC.,  
P.O. BOX 298,  
VERNON, B. C.**

**FILMED**

- by -  
**R. W. YORKE-HARDY, A.Sc.T.  
Y-H. TECHNICAL SERVICES LTD.**

Dates of Work : August 26, 1995 to April 4, 1996

Date of Report Completion: April 9, 1996

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

**24,370**

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## **KLINKER PROPERTY**

### **1995 GEOLOGICAL MAPPING AND BULK SAMPLING PROGRAM**

#### **Summary:**

The work conducted during the 1994 and 1995 seasons has proven the existence of a precious opal bearing lahar flow over a large area on the Klinker claims. A second lahar horizon, located at the top of the main ridge on the Klinker 2 claim also exhibits precious opal. The precious opal and much common opal is located within a sequence of Eocene Age volcanoclastic rocks. The full extent of the opal deposit is as yet undetermined and the full economic potential is not yet known. Based on the results of the 1994 and 1995 programs it is very evident that this deposit will at a minimum produce enough opal to supply the marketing needs of a small scale, vertically integrated opal cutting and marketing business targeted at the tourists visiting the Okanagan Region of British Columbia. It is conceivable, based on projections of the deposit and of the property and regional geology that precious opal is not limited to the Klinker claims but will also occur at other locations within the overall claim block and may well occur in other areas exhibiting similar geological features.

The Company's main focus is to develop a business centred around the marketing of locally mined and crafted opal jewellery by first targeting the large number of tourists visiting North Okanagan Region of British Columbia. As production levels increase the market base will be expanded to other "tourist centres" throughout British Columbia and across Canada prior to marketing Internationally. It is not expected that "rough stone" will be sold until after internal needs are met.

The Klinker Property is the first location in British Columbia, or in Canada; to yield commercial grade, precious opal gemstone material. Okanagan Opal Inc. is the first Canadian company to produce commercial grade, precious opal gemstones from Canadian material. For that matter, Okanagan Opal Inc. is the first company in Canada to undertake to produce on a commercial basis; finished "precious gemstones", of any type, from a Canadian natural resource deposit.

#### **Introduction:**

This report is prepared as an assessment report for Okanagan Opal Inc. and as such does not include proprietary interpretive information which could compromise the technical advantage presently enjoyed by the Company. Two copies are to be submitted to the British Columbia Ministry of Mines as required to support the application of work for assessment credits. No other distribution of this is authorized without the written approval of the Company.

On August 26, 1995 Okanagan Opal Inc. commenced a geological mapping and bulk sampling exploration program on the Klinker Property. The main objectives of this program were to determine by geological mapping and observation which of the many previously identified structural features "controls" or are responsible for channeling of silica rich waters into the lahar flows where the silica has been deposited as precious opal, common opal or agate; and, to provide a bulk sample of precious opal bearing material to allow for testing its potential for use in the manufacture of finished opal gemstones for the tourist based retail business which the Company is planning to develop. As of September 29, 1995 both of these major objectives had been met.

Other objectives of this program were to determine the costs related to mining and the economic value of the opal extracted. Through this evaluation it is expected that a determination of the property's potential and the economic viability of the opal deposit can be assessed. Although the work related to these costs and product value determinations are still ongoing and will not be completed for several months yet, but it is already very apparent that the rough opal mined can be cut into commercial gemstones which can be sold at a substantial value.

The 1995 bulk sampling program was deliberately targeted towards accessing and excavating or exposing parts of known surface "precious opal" occurrences in an effort to determine the distribution of precious opal contained within specific "opalized" areas and to determine the geological structures and other geologic features or physical conditions that controlled the deposition of the precious opal (and other related silica minerals).

**Location and Access:**

The Klinker Property is located some 23 kilometres north-west of the City of Vernon, British Columbia and is situated at the upper limits of McGregor Creek which drains east into Equis Creek, which in turn drains south-east into the west side of Okanagan Lake at a point 9.5 kilometres south-west of the north end of the lake.

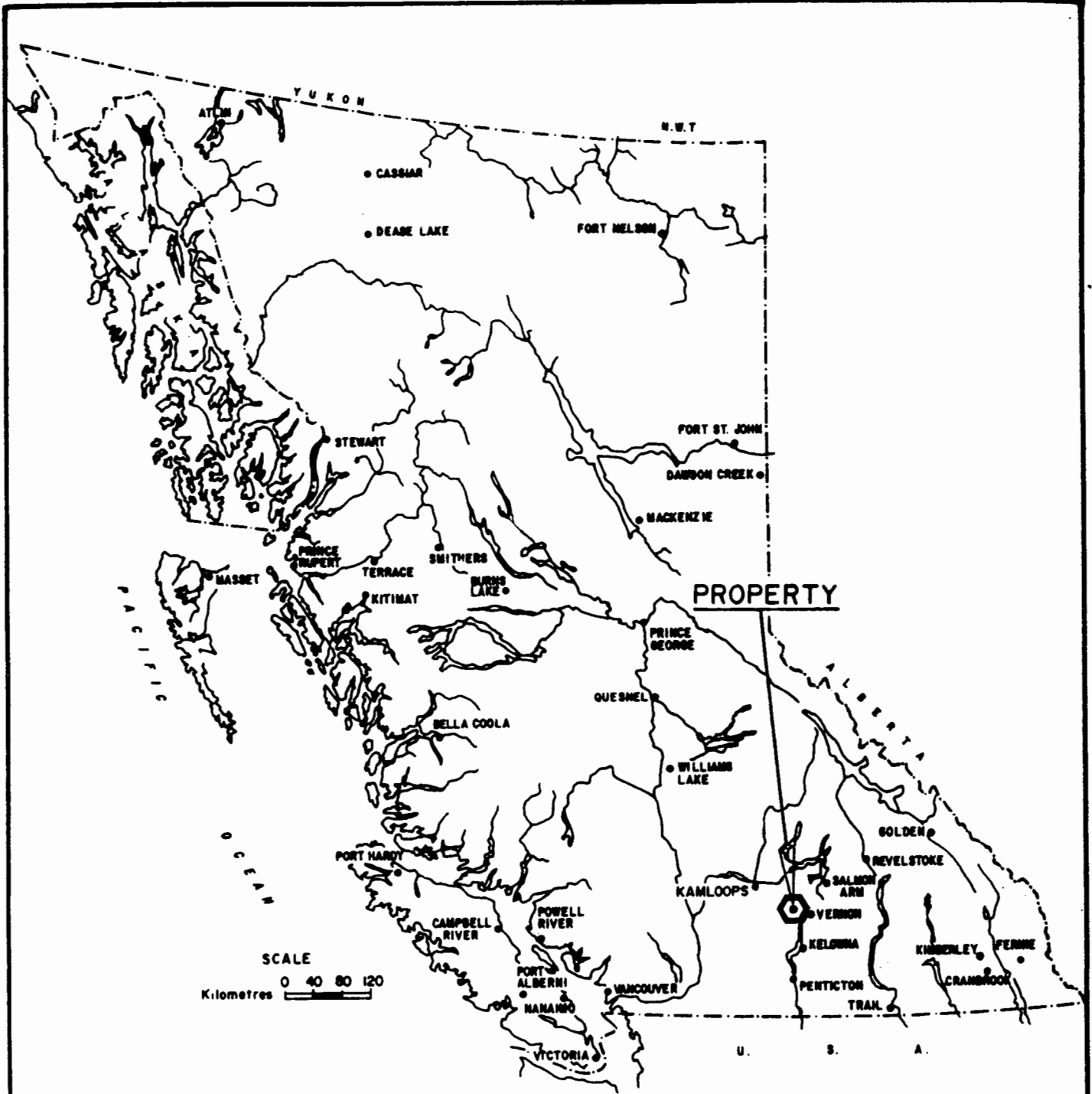
The property is accessible via the McGregor Creek forestry access road off the main Six Mile Creek Road situated some 13 kilometres south on Westside Road off Highway 97 N some 12 kilometres by road from Vernon, B. C. via Hwy. 97. The property is centred at the 10.5 kilometre mark on the McGregor Creek Road. The claims are located in the Vernon Mining Division - on map N.T.S. 82L/5E.

The property is presently accessible via two-wheel drive during the period from early June to mid-October. Snow cover commences in mid-October and lasts until May.

**Physiography and Vegetation:**

The central portion of the Klinker Property, the Klinker 1 and 2 mineral claims, are situated over the height of land separating the McGregor Creek drainage from a main tributary of the Ewer Creek drainage. These two claims cover all of the precious opal occurrences located to date; all of which occur on the south-western and western flank of the ridge separating the upper limits of McGregor Creek from Ewer Creek. This ridge reaches a maximum height of just over 1500 metres.

Other portions of the property, comprised of the Ewer 1 to 22 mineral claims and the Paul Fraction; stretches from the 9 km. marker to past the 12 km. mark on the McGregor Creek Road and covers some 1.8 km. in width; from the south side of McGregor Creek to some 500 metres north of the Ewer Creek canyon rim. Elevations range from ~1400 metres to 1500 metres along the length of the property and in McGregor Creek; and to ~1200 metres in the Ewer Creek canyon which parallels the claim block to the north.



**PROPERTY**

**KLINKER PROPERTY**

McGregor Creek Area, B. C.  
 Vernon Mining Division

**PROPERTY LOCATION MAP**

**OKANAGAN OPAL INC.**

DATE	SCALE	MAP No.
Jan. 1996	1:8,000,000	1

A large portion of the property was clear-cut logged in the late 1980's and has not to this date been reforested. Other portions of the property have been logged at various times, some evidently in the 1950's or 60's. Some small quantities of merchantable timber, mainly Douglas Fir and Lodgepole Pine, occur along steeper segments of the property. The older logged areas have developed locally into good stands of second growth timber.

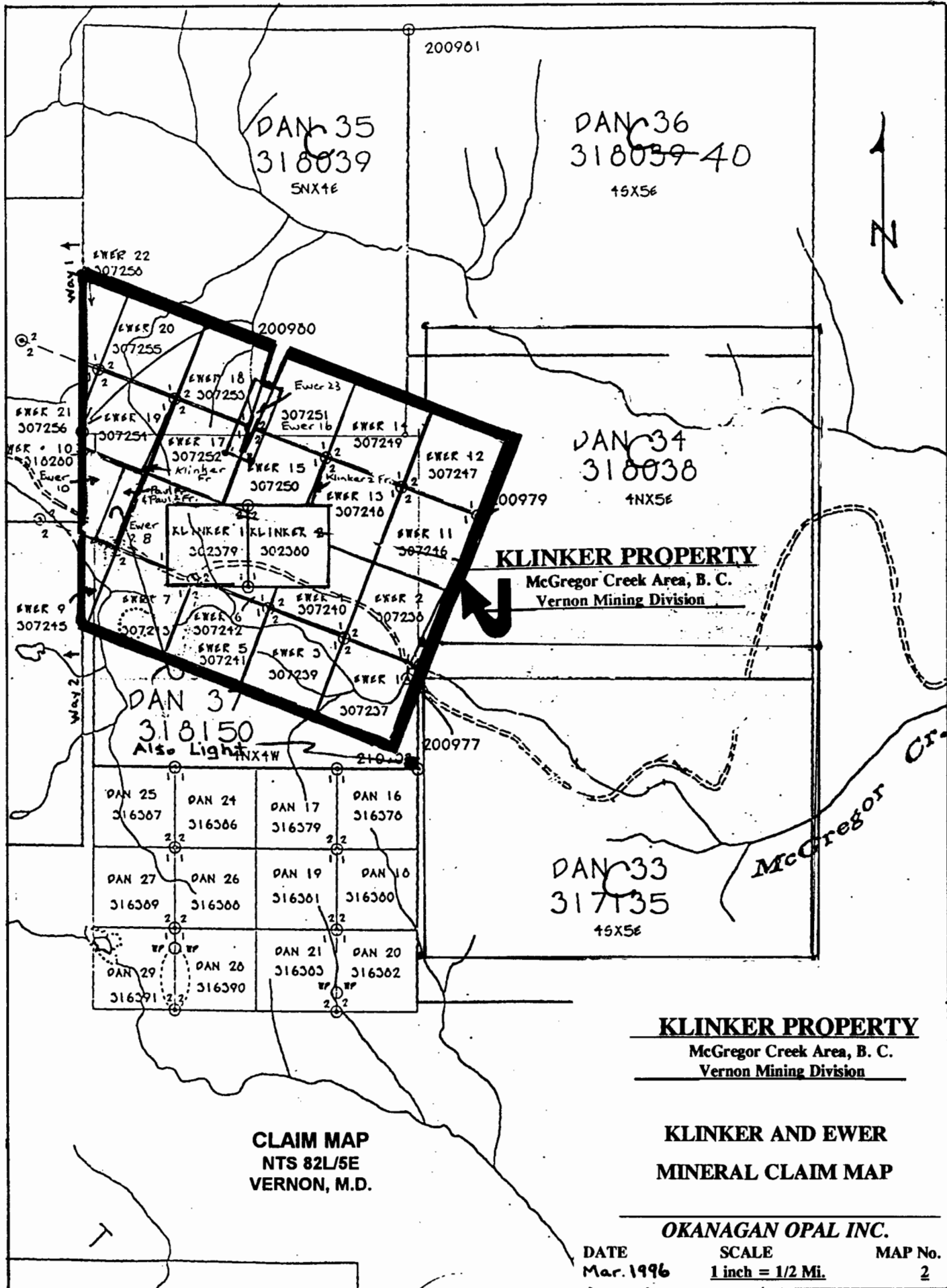
Numerous small ponds occur on the property. Many of these appear to be spring fed "fresh water" ponds rather than swamps; and are generally partial or completely grass covered areas surrounded by alder/willow brush and poplar trees. Some, particularly those ponds near the height of land on the Klinker #2 claim, retain fresh water throughout the summer season even when other ponds at lower elevation have dried up.

**Property Description:**

A list of the claims forming the Klinker Prpoerty is provided below. See also the claim map (Map #2) for further information.

Claim Name	Units	Record #	Current Expiry Date
Klinker # 1	1	302379	July 7, 2003
Klinker # 2	1	302380	July 7, 2003
Ewer # 1	1	307237	January 12, 2003
Ewer # 2	1	307238	January 12, 2003
Ewer # 3	1	307239	January 13, 2003
Ewer # 4	1	307240	January 13, 2003
Ewer # 5	1	307241	January 13, 2003
Ewer # 6	1	307242	January 13, 2003
Ewer # 7	1	307243	January 13, 2003
Ewer # 8	1	307244	January 13, 2003
Ewer # 9	1	307245	January 13, 2003
Ewer # 10	1	318280	June 9, 2003
Ewer # 11	1	307246	January 13, 2003
Ewer # 12	1	307247	January 13, 2003
Ewer # 13	1	307248	January 13, 2003
Ewer # 14	1	307249	January 13, 2003
Ewer # 15	1	307250	January 13, 2003
Ewer # 16	1	307251	January 13, 2003
Ewer # 17	1	307252	January 13, 2003
Ewer # 18	1	307253	January 13, 2003
Ewer # 19	1	307254	January 13, 2003
Ewer # 20	1	307255	January 13, 2003
Ewer # 21	1	307256	January 13, 2003
Ewer # 22	1	307258	January 13, 2003

The owners of record of the Klinker and Ewer claims are R. W. Yorke-Hardy and G. R. Grywachski; however, the claims are under option to Okanagan Opal Inc. which has earned a 100% undivided interest in the claims (subject to royalties) by performing work in accordance with an option agreement with the original owners.



**CLAIM MAP**  
NTS 82L/5E  
VERNON, M.D.

**KLINKER PROPERTY**

McGregor Creek Area, B. C.  
Vernon Mining Division

**KLINKER AND EWER  
MINERAL CLAIM MAP**

**OKANAGAN OPAL INC.**

DATE  
Mar. 1996

SCALE  
1 inch = 1/2 Mi.

MAP No.  
2

0 0.5 Mi.

The following list of claims may acquire some ground as a result of ongoing Section 35 Complaints filed by Okanagan Opal Inc.. It is not possible at this time to determine how much ground, if any, these claims may presently control or may acquire if the Section 35 Complaints are successful.

Ewer # 23	1	338119	July 16, 2003
Paul Fr.	1	326981	June 17, 2003
Paul 2 Fr.	1	333923	January 26, 2003
Klinker Fr.	1	338117	July 16, 2003
Klinker # 2 Fr.	1	338118	July 16, 2003
Light	16	342130	November 3, 1997

The Paul Fraction, Paul 2 Fr., Klinker Fr., Klinker 2 Fr., and the Light claim were staked during the 1994 and 1995 season by R. W. Yorke-Hardy and are held in trust for Okanagan Opal Inc..

The expiry dates shown herein reflect the recent application of work supported by the filing of this report on the work conducted during the 1995 season. The claims are all located in the Vernon mining Division of British Columbia. All claims have been located in accordance with the requirements of the Mineral Act of the Province of British Columbia.

**Klinker Property History:**

The ground now controlled by the Klinker and Ewer claims was once partially covered by the Rocket # 1 mineral claim which was originally staked in 1988 after an information release by Huntington Resources Ltd. regarding drill results from the "Brett Property - Whiteman Ck.". That announcement reported a 235 foot intersection of 2.03 oz/ton gold and resulted in a staking rush which blanketed the region for miles in all directions. There is only limited physical evidence of work being conducted on the Rocket #1 claim. Some trenching has been noted in the vicinity of location line for Ewer #15 and #16 but no specific information is available regarding results obtained from this work. The Rocket # 1 mineral claim forfeited as of May 20, 1991; prior to the location of the Klinker claims which were staked July 7, 1991. The Ewer claims butt up to the east side of the Way 1 and Way 2 mineral claims. These claims, also staked in 1988, are still in good standing with some new work recorded in 1994. Specific details are not yet available and little information is available regarding previous work although it is believed that exploration efforts to date have targeted epithermal style gold/silver mineralization.

The Klinker #1 and #2 mineral claims were staked in July 1991 to cover an area of fragmental volcanic rocks which contained agate and common opal suitable for lapidary use and other "scoriaceous volcanics (klinkers)" which were initially believed to have some "Landscape Use" potential. Prospecting during the summer of 1991 resulted in the determination that the scoriaceous, klinker like, rocks were a localized phenomenon caused as a direct result of intense heat created by a fire used to burn logging slash on an old landing adjacent to the McGregor Creek forest access road. Prospecting and rockhounding during August and September of 1991 resulted in the discovery of numerous occurrences of banded grey to white agate and localized occurrences of



opaque, common white and transparent, light yellow opal. These opal occurrences were found locally to occur as alternating parallel layers of thin interbanded opaque white and transparent yellow common opal. Some unique specimens of partially filled agate geodes exhibiting late stage common opal layering within the agate center were also found.

On Thanksgiving day, October 14, 1991, while rockhounding for agate and common opal the first few pieces of "precious opal" or "opal with a play of color" were discovered. This discovery was followed up by hand trenching; and some cat work which was completed during the period from late October to December 31, 1991. Numerous other pieces of precious opal, occurring as nodules infilling vesicules in fragments of volcanics and as fracture coatings and fracture fillings were found in close proximity to the first discovery. As a result the Ewer claims were staked in January of 1992 in order to cover the area surrounding the discovery site now referred to as the Discovery Zone.

In the years 1992 and 1993 only limited prospecting and rockhounding were conducted. A hydraulic jackhammer was used to break rock in the Discovery Pit and at several other locations to the northeast and up hill from the original discovery. This work resulted in the accumulation of more precious opal, common opal and agate alike. Numerous commercial grade gemstones were cut from this material and plans were made to start retail marketing of Okanagan Opal in the summer of 1993. The shop being used to carry on this retail business was destroyed by fire on July 6, 1993; resulting in the loss of all inventory and equipment.

On October 1, 1993 the company Okanagan Opal Inc. optioned the Klinker and Ewer mineral claims from the prospectors. Commencing in late October 1993, Okanagan Opal Inc. conducted an exploration program consisting of geological mapping, overburden stripping and small scale bulk sampling; which was completed in early December 1993.

As a result of the program conducted in late 1993 the Company arranged private placement financing for an extensive physical exploration program to be conducted in 1994. In addition, the Company applied for and was approved to receive a "Mineral Incentive Grant" from the British Columbia Ministry of Mines.

During the 1994 exploration season a program consisting of prospecting, geological mapping, physical work and bulk sampling was conducted. This program was successful in significantly expanding the known limits of the Company's "precious opal" deposit. In addition, the central two mineral claims, the Klinker 1 and 2, were legally surveyed and the location of some of the adjacent Ewer claim posts were also surveyed in order to define property limits around the central Klinker claims.

Preliminary results from the 1994 program suggested that opal production should be sustainable for many years. To date there are approximately two million tons of rock inferred within the defined area of interest. Of this volume it is projected that 5% to 10%, or 100,000 to 200,000 tons of rock, will be precious opal bearing. Further work is required to prove these tonnages and to determine the full economic value of the deposit based on the "precious opal" content.

Albeit that the full scale and economic potential of the property remains to be determined, there was enough volume of commercial grade opal excavated during the 1994 and 1995 season's bulk sampling programs to provide the raw material necessary to commence a small scale gemstone cutting and retail sales business. Sorting, grading and cutting of finished gemstones is ongoing at this time. The Company has produced a sufficient quality and quantity of finished "opal product" to commence a retail sales operation by May 1, 1996; in time for the commencement of the 1996 tourist season. There is presently enough opal exposed on site to support a small scale mining/gem cutting/retail sales operation for several years.

#### **Regional Geology:**

The geology of this region was mapped and interpreted by Read during the 1994 field seasons and is reported in the MEMPR Geological Fieldwork 1995 Report in an article titled "Industrial Mineral Potential of the Tertiary Rocks, Vernon (82L) and adjacent map areas"; and is summarized below:

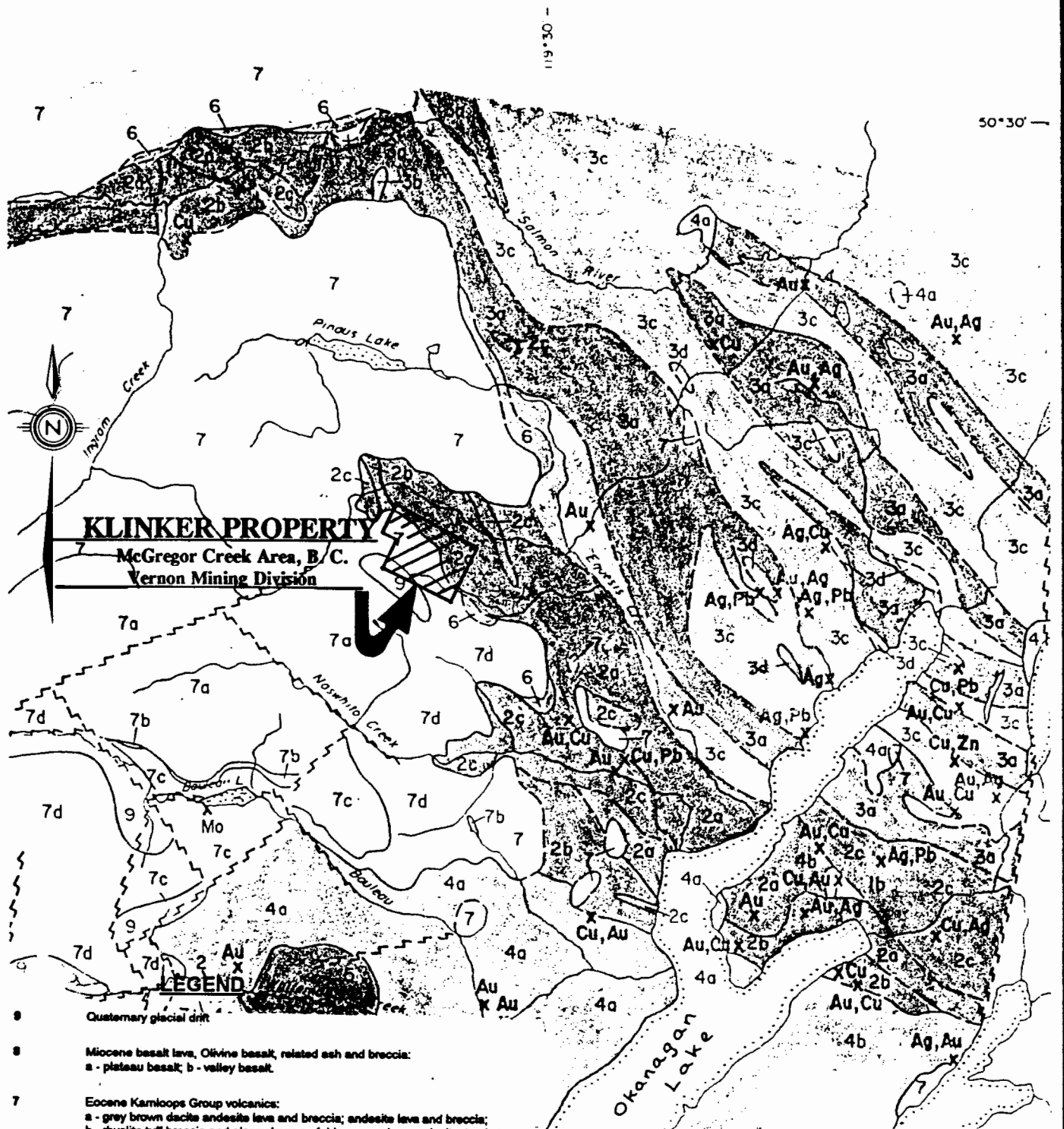
The Klinker Claims are underlain by mostly volcanic rocks of the Eocene Kamloops Group that form an upright syncline that extends 150 kilometres north-northeast from Trepanier on the west side of Okanagan Lake to the east of Kamloops. The inward dipping limbs of this syncline are exposed in crosscutting valleys including Whiteman Creek to the south and west and Ewer to the north.

The limbs of this syncline are offset by north to northeast striking high angle, west-side down normal faults with offsets up to 100 metres within an airfall tuff lens as recorded by Read 1995. Estekwalan and Tuktakamin mountains to the north of the Klinker Claims represent the highest peaks with exposures of volcanic rocks that have a minimum thickness of 600 metres.

The oldest rocks in the vicinity of the Klinker Claims are exposed in Ewer Creek to the north of the property and approximately 500 metres to the east of the Discovery Pit. These basement rocks consist of gently west dipping grey green andesite flows and lapilli tuff of the Harper Ranch Group of Late Paleozoic age that are overlain on the Klinker Claims by Eocene Dewdrops Flats Formation rocks that host precious opal. This formation consists of augite-olivine basaltic and andesitic flows, interflow breccia and minor basaltic tuff. This sequence on the Klinker Claims consists of 200 metres of mostly breccia and lahar with minor flows. The Dewdrop Flats Formation is overlain to the north and within Ewer Creek by a thin sequence of opalized tuffaceous shale and siltstone at the base of the Bouleau Member of the Kamloops Group that extends at least 4 kilometres and is up to 30 metres in thickness, Read 1995.

#### **1995 Geological Mapping**

Mapping of portions of the Klinker Claims, using a Silva Ranger Compass and Topolite Belt Chain for control, was initially carried out at a scale of 1:1000 over areas that had demonstrated the highest concentrations of common and precious opal. Information was plotted on a 1:1000 scale orthophoto of the main portion of the property. Also, interpretations of major lineations were extrapolated onto this 1:1000 orthophoto from a 1:5000 metric scale airphoto mosaic. More detailed mapping using a scale of 1:100 was conducted over the main stripped and trenched areas including the Discovery



- LEGEND**
- 9 Quaternary glacial drift
  - 8 Miocene basalt lava, Olivine basalt, related ash and breccia:  
a - plateau basalt; b - valley basalt.
  - 7 Eocene Kamloops Group volcanics:  
a - grey brown dacite andesite lava and breccia; andesite lava and breccia;  
b - rhyolite tuff breccia and glassy lava; c - feldspar porphyry andesite, trachyte and trachyandesite lavas; d - andesite and dacite lavas and breccias.
  - 6 Eocene Kamloops Group sandstone, conglomerate, shale.
  - 5 Paleocene syenite, granite and monzonite feeder stock.
  - 4 Jurassic intrusives: a - Valhalla granodiorite and granite; b - Nelson quartz diorite, granodiorite and diorite.
  - 3 Upper Triassic - Lower Jurassic Nicola and Stocan Groups: a - Nicola andesite and basalt flows, porphyritic augite andesite, breccia, tuff, agglomerate, greenstone;  
b - Nicola black shale argillite, massive siltstone, phyllite; d - Stocan conglomerate.
  - 2 Carboniferous and Permian Thompson Assemblage (may include Nicola Group):  
a - greenstone, tuff; b - siliceous argillite, volcanoclastic sandstone, quartzite, siltstone;  
c - massive crystalline white siltstone, massive crystalline white and grey limestone;  
d - conglomerate with limestone matrix.
  - 1 Mississippian (7) or older: a - Old Dave serpentine and serpentinized ultramafic intrusives; b - Chapperton Group chloritic phyllite, greenstone, micaceous schist.

**KLINKER PROPERTY**  
 McGregor Creek Area, B. C.  
 Vernon Mining Division

**REGIONAL GEOLOGY MAP**

**OKANAGAN OPAL INC.**

DATE **Jan. 1996** SCALE **1:200,000** MAP No. **3**

Zone, Bluebird Zone, Caramel Zone and Caramel Extension Zone; and, are illustrated on (Maps 5-12). Selected detailed mapping over a total of 23, one metre squares was conducted at a metric scale of 1:10 over portions of the Discovery Zone in order to estimate approximately, the percentages of clasts to lapilli tuff matrix material, the amount of vesicular clasts and the amount of agate, common and precious opal, zeolites occurring as an infilling in fractures, as amygdules or in the matrix. (See Appendix 1)

Geological mapping was conducted by geologist B. Callaghan who also devoted some time to general reconnaissance prospecting and general mapping during the program; which resulted in the identification of additional opalized host rocks (some with precious opal) which were subsequently trenched and mapped.

#### General Geology:

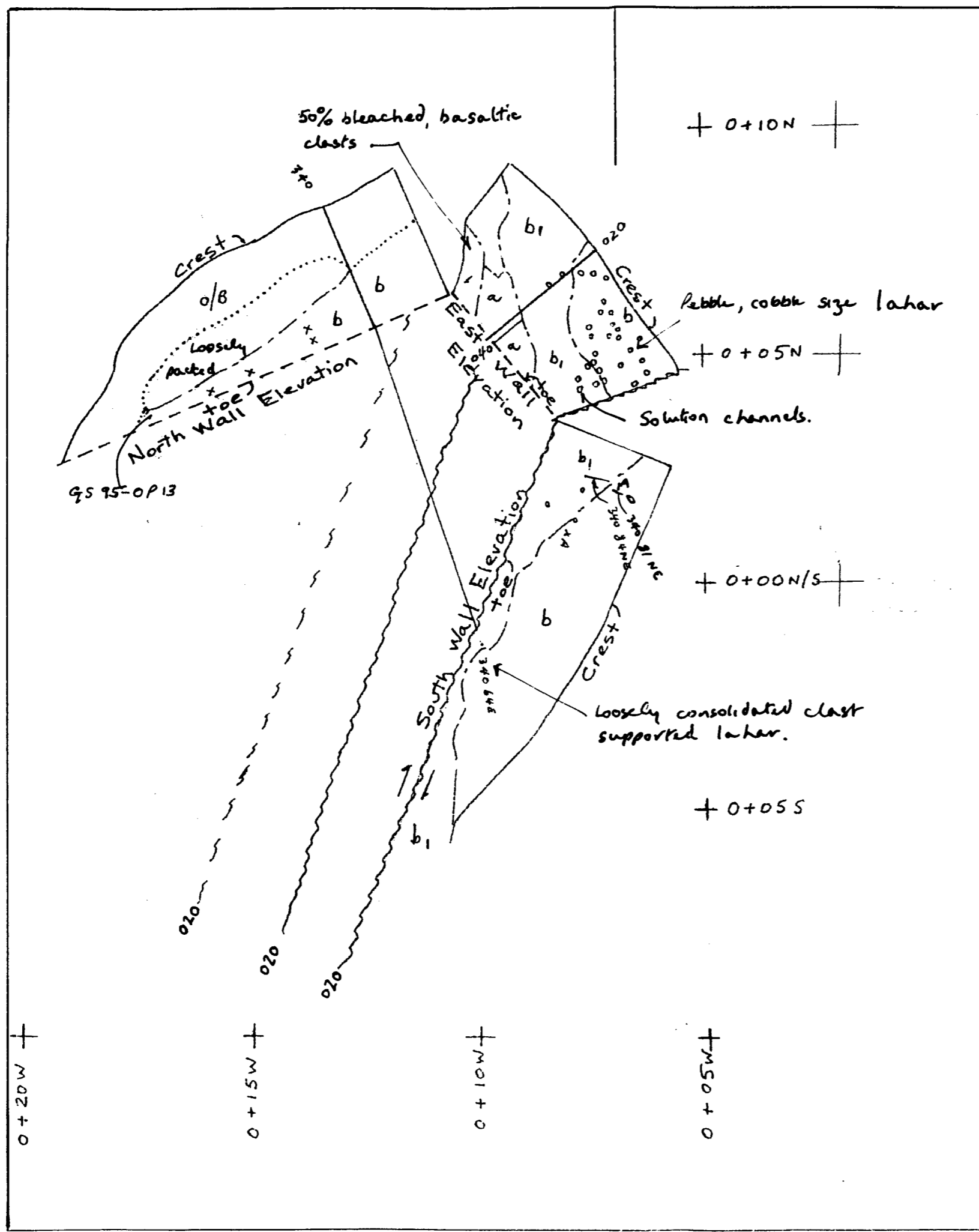
According to Read (1995) the Klinker Claims are underlain by the basal 100 metres of the Dewdrop Flats Formation of the Kamloops Group consisting of aphanitic and porphyritic augite-olivine basalt and basaltic andesite flows and tephra.

These volcanoclastics include a belt of predominantly northwesterly trending lahars, volcanic breccia and lapilli tuffaceous sediments and flows that are overlain by a sequence of cream colored weathered tuffaceous shale and waterlain rhyolite ash with an estimated thickness of 30 metres that contains diatoms, palynomorphs, plant and fish fossils. Locally, this sequence has been altered to a grey vitreous opaline chert that represents the base of the Bouleau Member (Read 1995). Diatomaceous earths have been exposed and sampled i.e. GS 95 Op-3 in a dug-out north and west of the Caramel Pit within the mapped area. See Map 4.

Late Paleozoic grey green meta-andesites of the Harper Ranch Group that outcrop several hundred metres to the east of the Discovery Zone and to the north of the property along the bottom of Ewer Creek form the basement underlying the Eocene, which gently dips to the west.

Precious opal exposed during excavation of the Discovery, Bluebird and Caramel Pits is hosted mostly in a mixture of high energy lahar and volcanic breccia that is differentially weathered and consists of monolithologic sediments with angular to rounded clasts of basalt, in part vesicular, aphanitic and porphyritic that range in size from approximately 5 cms. to 1.50 metres in diameter.

The clasts are supported in a green to brown locally friable, porous lapilli tuff matrix that consists of angular to sub-rounded grains including igneous rock fragments, minor hematite, manganese and sub-angular bleached fragments. The lapilli matrix material which wraps around clasts, form irregular well stratified beds that dip gently to the southwest at 15 to 22 degrees. These lapilli lenses develop locally as interbedded sequences up to 2 metres in thickness. Mappable units of interbedded lahars and tuff have been identified in each of the excavated areas as illustrated on the detailed 1:100 scale maps. Correlation of the geology between these excavated outcrops is difficult due to overburden cover and the discontinuous nature and irregularity of the locally interbedded sediments.



**LEGEND - General**

- |  |                                     |  |                              |
|--|-------------------------------------|--|------------------------------|
|  | Roads/Trails                        |  | Creek/drainage               |
|  | Ponds (year round water)            |  | Swamp                        |
|  | Topographic Contour -with elevation |  | •14867 Spot Elevation        |
|  | Claim Line                          |  | Claim Posts/L.D. Post        |
|  | Excavated rock faces                |  | Stripped Areas               |
|  | Overburden/Rock piles               |  | Crest/toe of open-cut or pit |
|  | 0+05N Grid stations                 |  | Glacial Striations           |

**GEOLOGICAL SYMBOLS**

- |  |   |  |  |
|--|---|--|--|
|  | Fault/contact lineament -interpreted from airphotos |  | Mapped fault lineament -dip of fault plane |
|  | Bedding -vertical, inclined                         |  | Joints -vertical, inclined                 |
|  | Rock outcrop outline                                |  | Contact/rock type change                   |
|  | Opal Occurrence - type code (see text or map 4)     |  | Opalized Zones                             |

**GEOLOGICAL LEGEND**

- a Lapilli tuffaceous sandstone; bedded, variably sorted.
- b High velocity lahar with sandy, tuffaceous matrix containing basaltic, scoriaceous, altered/weathered clasts
- c Purple, mostly clast supported, differentially weathered volcanic breccia (lahar) flows; scoriaceous.
- d Rusty, oxidized, limonitic, pebble/cobblesized, boulder, clast supported lahar
- z Salmon/light brown volcanoclastic with cobblesized boulders, matrix flooded with white translucent crystalline Chabazite (zeolite).
- f Fresher basaltic flow, no alteration, amygdaloidal, xenoliths.

**KLINKER PROPERTY**

McGregor Creek Area, B. C.  
Vernon Mining Division

**GEOLOGY OF THE  
1477 BENCH OPEN CUT**

(Zone 1 - See Map 4)  
KLINKER 1 AND 2 MINERAL CLAIMS

**OKANAGAN OPAL INC.**

DATE: Apr. 1996 SCALE: 1:100 MAP No. 7

Fine grained limonitic sands in mud seam.

Bedding 310°/20°SW - plunge 25NW

Precious opal occurs on fractures near solution cavities which are lined with light brown drusy (zeolite?) coatings. Solution cavities occur at the intersection of 340 and 080 fractures.

Light brown, high energy lahar with:  
 - 90% clasts 20 - 40 cms. (avg. 15 cms.)  
 - 60 - 70% bleached, vesicular.  
 - 1% solution cavities occur in the bleached altered zones along 340, 080, 020, 040 degree fractures.  
 - opal occurs around clasts.

This light brown colored lahar drapes over dark grey/blue debris flow which has chlorite and minor calcite alteration in the clasts, supported in a fine grained grey sandy matrix in which vesicles are partially infilled with white opal and agate.

Coarse grained tuffaceous sediment.

Fire opal occurs in solution cavities along 080 trending fractures in sandstone.

Fire opal with red/green flash occurs as vesicle infill in purple grey basalt clast.

Interbanded jelly opal & white opal, horizontally layered.

Turquoise blue opal with blue/green flash occurs along 040 fractures.

**DISCOVERY EAST OPEN-CUT  
Plan View**

**Opal/Agate Occurrences**

(type code see text or map 4)

- (a) - around clast
- (b) - thru clast
- (c) - in matrix
- (v) - in vesicles

**GEOLOGICAL LEGEND**

- |   |   |          |
|---|---|----------|
| a | Lapilli tuffaceous sandstone; bedded, variably sorted.  | +        |
| b | High velocity lahar with sandy, tuffaceous matrix containing basaltic, scoriaceous, altered/weathered clasts                        | + 30 E   |
| c | Purple, mostly clast supported, differentially weathered volcanic breccia(lahar) flows; scoriaceous.                                | 0 + 20 E |
| d | Rusty, oxidized, limonitic, pebble/cobblesized, boulder, clast supported lahar  | 0 + 25 E |
| z | Salmon/light brown volcanoclastic with cobblesized boulders, matrix flooded with white translucent crystalline Chabazite (zeolite). | 0 + 20 E |
| f | Fresher basaltic flow, no alteration, amygdaloidal, xenoliths.  |          |

For additional legend see map No. 5



**KLINKER PROPERTY**

McGregor Creek Area, B. C.  
 Vernon Mining Division

**GEOLOGY OF THE  
DISCOVERY EAST OPEN CUT**

(Zone 1 - See Map 4)  
 KLINKER 2 MINERAL CLAIM

**OKANAGAN OPAL INC.**

DATE: Apr. 1996 SCALE: 1:100 MAP No. 0 1a. 2

The composition of the individual lahars varies within the mapped area. Locally, bleached, salmon pink to rusty red coloured mixtures of clast supported lahar and volcanic breccia with clasts from one centimetre to five centimetres are hematized and less differentially weathered. These outcrop in the Caramel and Caramel Extension Pits and in exposures north of the Bluebird, north and east of the Discovery Zone area and the Red Rock zone. They consist of between 80 to 90% clasts set in a lapilli tuffaceous matrix. Small pebble sized clasts infill between the larger clasts. About 90% of the clasts are basaltic of which 40% are vesicular and zeolitized. Zeolitization is more prevalent in the more clast supported lahar, breccia mixtures north and east of the Caramel Zone and commonly occurs infilling vesicles rather than filling fractures. The extent of zeolitization has not been fully determined but may be related to their proximity to faulting and related fracturing. Zeolites are in close proximity to north-south faulting on the west side of the Bluebird zone and coat opalized surfaces of cavities infilled with agate.

At other locations, the lahars contain up to 50% bleached clasts as exposed in the Caramel Pit. Exposures of fresh grey-green coloured andesitic-basaltic lahar with angular to rounded clasts underlie the high energy lahars exposed at surface in the East Discovery Cut. Minor calcite infills some vesicles and may be a result of replacement of detrital grains during diagenesis of the basic material.

#### **Structural Geology and Faulting:**

The basal basaltic lahars on the Klinker Claims form a series of flows with beds striking between 300 to 320 degrees and dipping gently to the southwest at 15 to 22 degrees. Within these lahars are small sill like, fresher basaltic intrusions up to approximately four metres in width that extend from the east side of the Caramel Pit to a little north of the Bluebird Pit at approximately 2+50N, 0+60W. Samples GS 95 Op - 2, 4 represent two specimens of this flow that were taken for thin section analysis. The matrix supported lahars may represent the margins or leading edges of the flows within a sub aerial environment and are important because they appear to be the main host for the opal. Also, the areas of noticeable hematite alteration may represent the contact margins or tops of subsequent flows in a sub aqueous terraine.

Faulting may be expressed topographically in the form of minor linear troughs which are occupied by bodies of water and dense brush, vegetation cover. Exposed precious opal bearing host rocks in the Bluebird Zone and Discovery Zone are bounded to the east and west by north-south trending faults. To the east of the 1995 Discovery Cut (1477 Bench Open Cut) at approximately 0+10W 0+05N, an 010 trending right lateral strike-slip fault dips 81 degrees to the northwest and plunges approximately 25 degrees to the southwest. The slickensided surfaces are coated with manganese and minor chlorite. The amount of offset is undetermined. A strike-slip fault dips steeply to the west at the Bluebird zone. Slickensides trend 005 degrees and plunge 20 degrees to the south and are also coated with manganese and chlorite. The amount of movement here is undetermined. Similar strike-slip 020 degree faulting is evident at the 1477 Bench Open Cut associated with significant opalized host rock.

The most important fracture sets that are opal bearing include those that strike at between 300 to 340 degrees, 040 to 080 degrees, 350 to 360 degrees, and 020

degrees all having steep dips with the greatest concentrations of opal forming at the fault intersections in the hanging wall of the cross-cutting fractures. White common opal tends to form above the main precious opal horizon and can act as a marker horizon in some exposures.

Silica emplacement in the form of both precious and common opal is possibly restricted by the effectiveness of the impermeable nature of fresher volcanic clasts that act as damming fronts so that most of the opal within the volcanoclastic rocks occurs as a vesicle infill within scoriaceous clasts, as a cement within the matrix and as an infill along fractures between clasts and fractures that crosscut through the clasts. Greater concentrations of opal occur at the intersection of crosscutting fractures within the more permeable highly weathered basalts in the Discovery and Bluebird Zones where more abundant voids and openings are formed by possible dissolution of the host. Some of these void spaces form up to 5% of the open cut faces in the Caramel, Bluebird and Discovery Pit at or along fault surfaces and are infilled with subhorizontal interlayered jelly opal and common white opal.

Other fractures that are infilled with precious opal appear curved, irregular and discontinuous especially in the eastern portion of the Discovery Zone area. 040 degree structures are splays off the northerly striking fractures. 080 degree fractures are crosscut by 360 degree fractures. These fracture sets are closely spaced in the thinly bedded sediments and may represent dilational fractures associated with compaction.

Discontinuous fractures infilled with agate in the Discovery Zone vary in width from a few millimetres up to 2 cms. and extend for distances up to 50 cms. Other fractures part infilled with precious and common opal appear as irregular hairline to 2 to 5 mm. northerly trending veinlets.

In the Discovery Zone, most of the clasts within the detailed mapped grid areas are composed of fresh vesicular basalt. Fresh surfaces were obtained from breaking bleached clasts. On surface, agate appears more widespread than common opal. Precious opal is restricted to the main fracture sets and vesicular clasts within, or in close proximity to the intersection of these fractures which suggests that opal formed after the deposition of the clasts (see Appendix I).

The timing of vein development has not been fully determined and is likely related to regional stresses. The formation of opal and zeolitization appears post movement as evidenced along 020 degree slickensided surfaces in the 1477 Bench open-cut and also appears post emplacement of small basaltic flows.

Possible slumping in the lahars along the exposed portion of this north/south fault may indicate that movement along the southwest dipping lahars is to the southwest and basining of these volcanoclastics is to the northwest. Also, these sequences may be volumetrically greater in the vicinity of the Klinker and Ewer mineral claims. Footwall sediments along this north easterly trending fault include purple clast supported breccia that exhibits 020 degree fracturing with minor Agate and Zeolite infillings that are void of opal.



Silica veining is largely single stage with minor second stage veining that exhibits internal stratification of the silica. The plane of deposition is not parallel to bedding attitudes of the lahars but is instead sub horizontal suggesting deposition at some time after formation and tilting of the lahars. The veins appear irregular and discontinuous having varying thicknesses.

Vein deflection and ponding around clasts is evident with very minor detexturing. Veins are clean walled other than extensive manganese coating fracture surfaces and solution channels both through and around the clasts.

Evidence of pure agate nodules found on surface more abundantly to the south and east of the Discovery zone might be a result of their erosion from the lahars hosting agate and opal or from younger overlying tuffaceous shales and waterlain rhyolite ash sequences.

Mapping and prospecting has determined that the lahar debris flow, the main opal host rock, extends beyond the limits of Klinker claims. Known opal occurrences are noted on Map # 6 with the main concentrations, and all known precious opal occurrences; being in the vicinity if the Discovery, Bluebird, Caramel and Caramel Extension zones.

The surface area encompassing all of these zones measures up to 280 metres by 110 metres. Geological mapping indicates that the lahar unit is dipping at 20 to 30 degrees to the southwest and it is therefore inferred that the thickness of the lahars in this area averages some 30 to 35 metres. With an average measured strike length of 250 metres, a calculated thickness of 30 metres, an assumed 80 metre width (determined by using a one-third length to width ratio) and finally using a factor of 0.33 cubic metres per tonne, it is inferred that some 1.8 million tonnes of lahar, debris flow, material is contained within this area. Of the 20,000 to 30,000 square metre total surface area, a total of 7,150 square metres have been stripped. Of the stripped area some 2,000 to 2,100 square metres is known to contain precious opal and is assumed to be potentially economic. This indicates that some 28% of the stripped area contains precious opal. On a preliminary basis this suggests that some 5% to 10% (2,000 square metres) of the total 20,000 to 30,000 square metre area encompassing the four main zones contains some precious opal. This then suggests that some 90,000 to 180,000 metric tonnes of precious opal bearing rock could occur within this area.

Additional precious opal occurrences have been noted to the east near the top of the hill within the Red Rock and Tripod zones and at one intermediate site.

**1995 Bulk Sampling Program:**

The excavation process relating to the 1995 bulk sampling program was conducted over a three week period utilizing a mid-sized tracked excavator complete with interchangeable hydraulic rock-breaker and buckets. This piece of equipment would first break the rock with the hydraulic hammer attached and would then detach the breaker, install the clean-up or digging bucket and excavate the broken rock. A 7753 Bob Cat complete with tracks and equipped with interchangeable hydraulic rock-breaker & buckets, a hand-held hydraulic chipping hammer and various hand tools were also used to break and remove rock.

The 1995 bulk sampling program commenced with the establishment of the 1477 Bench Level commencing at the base of the original ramp which accessed the "Discovery Pit" established over the period from 1991 to 1993 and the 1480 Bench Level cross-cut across the Discovery Zone established in 1994. Prior to beginning the excavation process it was necessary to complete the removal of overburden and loose surface material commenced in 1994 and included the relocation of overburden material stripped and piled in the 1994 program. The 1477 Bench was then commenced and excavated by alternately breaking rock with the hydraulic hammer and relocation of that broken rock (development muck) to temporary "waste rock" dump established to the south of the work area. As the 1477 Bench was expanded eastward the height at the face slowly increased due to the gentle slope of the side hill.

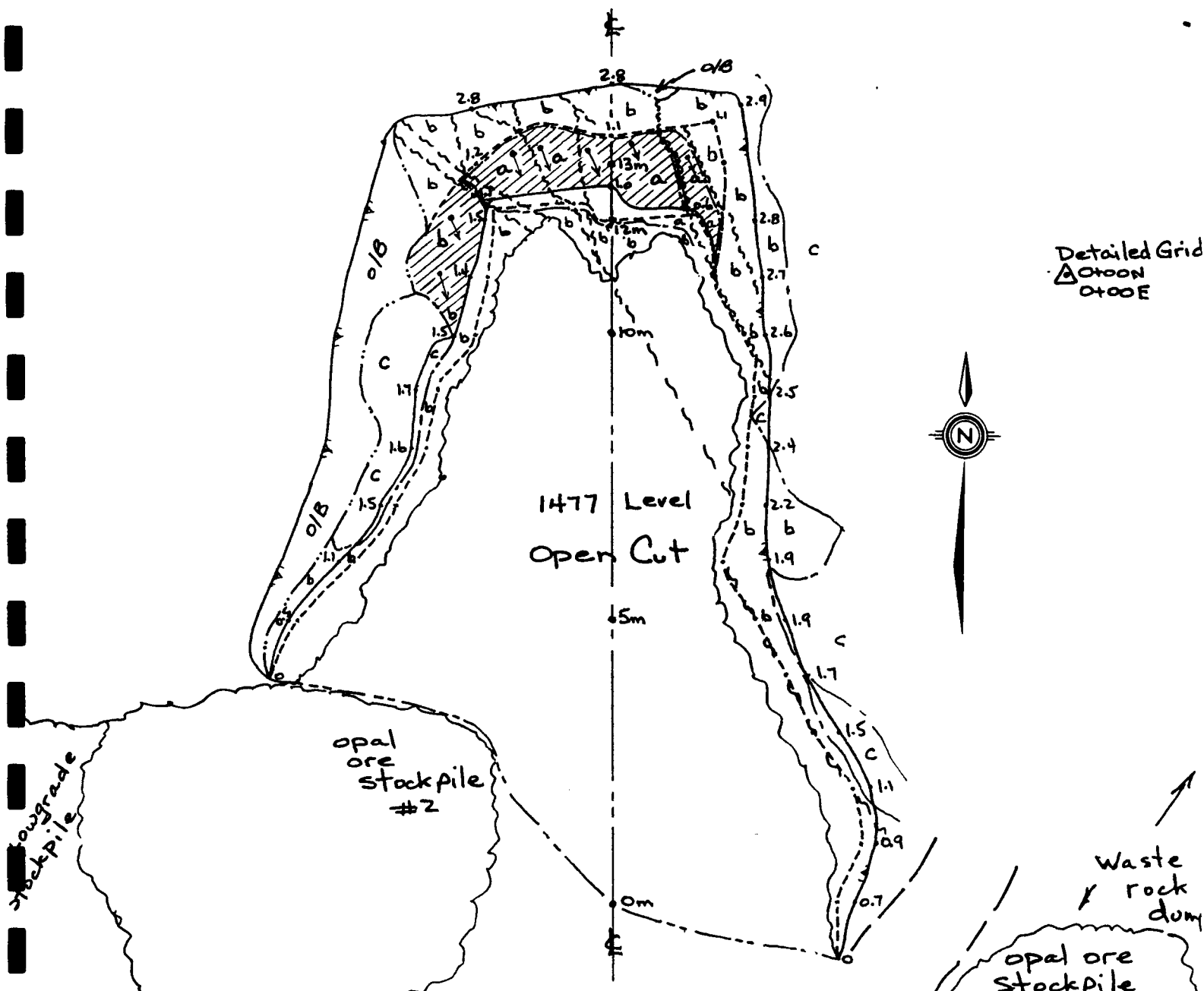
After the 1477 Bench development had advanced a distance of some three to four metres the height of the face increased to 1 metre. The rock in the face at this point was seen to contain varying amounts of white and jelly common opal, agate and sporadic precious opal. By the time the 1477 Bench had advanced 5 metres the width had been expanded from ~6 metres to ~9 metres and the face height had reached an average of 1.5 metres and the opal content was seen to be increasing. This material was all stockpiled to the north of the open-cut development area and is labelled as "lowgrade" material to be used as "tourist material".

As the face was advanced to the 9 metre mark the height had increased to ~2.5 metres it was noted that more common and noticeably increased amounts of precious opal was appearing along the south wall of the open-cut and part way across the face. This material was stockpiled on top of the waste rock base established to the south of the entrance to the open-cut. At the toe on the south wall, at the face, a 020° fault was encountered which displayed slickensides.

Numerous "water channel cavities" lined with Zeolite crystals and partially filled with white, opaque common opal were noted in the face and along the south wall fault plane. A change of the rock type from lahar to a lapilli tuff (sandstone) unit, dipping ~30° SW was noted near the floor of the trench along the south wall.

On September 5, 1995 the next advance of the face was made. At this time the face was broken back an additional 1 to 1.5 metres to the east. As the face was peeled off on the southern half of the face a large piece of blue base-colored common opal was noted approximately 0.75 metres down from the crest. Further to the north on the face several pieces of crystal and semi-crystal precious opal exhibiting bright "red multi-color" play of colors were noted. The south wall of the open-cut broke out along the 020° degree fault line. The lahar rock unit adjacent to the fault line was noted to be heavily "opalized" with white, opaque common opal near the crest grading with depth into semi-crystal and crystal precious opal. Only the top 1.5 metres had broken out of the face at this time with the floor of the cut breaking out along the previously encountered 30 degree dipping sandstone bed.

On September 6, 1996 the broken material was dug out with the excavator and stockpiled at the north entrance to the open-cut from where it can be readily transported for processing through the sorting plant. The face was then washed down to examine the geology and to inspect the rock for more opal. During the washing



Detailed Grid  
 Δ 0100N  
 0100E



**GENERAL LEGEND**

- Crestline of open-cut
- Toeline of open-cut
- 2.2 Height of open-cut wall
- Bedding Plane surface - dip direction
- Geological contact
- Fault
- O/B Overburden

**ROCK TYPE LEGEND**

- a Tuffaceous sandstone / Lapilli Tuff
- b High Velocity Lahar w/ tuffaceous sandy matrix; basaltic scoriaceous clasts up to 80 cms.
- c Loosely consolidated, clast supported lahar

**KLINKER PROPERTY**

McGregor Creek Area, B. C.  
 Vernon Mining Division

**1995 BULK SAMPLING PROGRAM**

1477 BENCH OPEN CUT

**KLINKER 1 AND 2 MINERAL CLAIMS**

**OKANAGAN OPAL INC.**

DATE: Apr. 1996 SCALE: 1:100 0 MAP No. 8

down process it became very evident that a very large amount of precious opal was present at this particular location. In the bright sunlight the lower south-half of the face and the lower portion of the newly exposed area along the south wall were aglow with multi-colors. The opal was seen to be concentrating along 340° bearing fractures and along fractures parallel and sub-parallel to the main 020° fault the plane of which was now well exposed and formed the south wall. At the intersection of these fracture systems concentrations of crystal opal weighing several grams to a few ounces were noted; although much of this material had some fractures which would reduce the size of solid gemstones that could be cut from it. Over the balance of the day numerous buckets of broken lahar and sandstone material containing very spectacular opal were collected for transport to Vernon.

Over the next several days the balance of the material adjacent to and on top of the sandstone bed, which now formed the floor of the open-cut, was excavated using a chipping hammer and hand tools. The broken material was hand-cobbed at the face where select material was placed into buckets for transport to town. The remaining material was systematically processed by "hand-cobbing" through the sorting plant.

Having completed the excavation of the precious opal bearing material and the geological mapping of this section of the open cut, the excavator was then utilized to complete the removal of rock from the north half of the open cut where only small concentrations of common opal and some agate occur. It was also noted that the top few inches to one foot of rock ahead of the open-cut excavation and along the top of the south wall was very weathered and broken with little evidence of opal or other silica minerals; so this material was scraped off and discarded prior to advancing the face further eastward.

Next, the excavation of the vein on the south half of the open-cut was moved ahead to avoid dilution of the opal bearing material with the non-opal bearing rock occurring on the north half of the open-cut. In total the open-cut was excavated over a length of 12.5 to 13.5 metres.

In all some 315 tonnes of material was excavated out of the 1995 open-cut on the 1477 Bench. Of this material some 52 tonnes was classed as "opal ore". This 52 tonnes was hand-cobbed down to some 12 tonnes of concentrated material contained in 80 three-gallon buckets which were transported to Vernon for further processing.

## **OPAL GRADING AND EVALUATION**

### **Overview:**

Unlike at most other mineral exploration and mining sites there is no commercial analytical procedures available to determine and control 'the grade' of the rock containing opal or precious opal. Precious opal, as with other gemstones, is evaluated based on visual characteristics, optical properties and physical properties; versus chemical properties.

There is still another major variance from traditional pre-development evaluation. Opal deposits are not fully "economically evaluated" prior to commencement of mining. In Australia, the world's major opal producing country, the main predetermining factors are:

1. Where opal horizons or concentrations occur; and,
2. Whether or not "color occurs" or is believed to occur in the opal horizon.

This work is often accomplished by conducting a drilling program utilizing a percussion or chum drill from which the cuttings are examined. After the existence of "precious opal", or often even just the existence of a favorable horizon is noted exploratory drilling is halted. Having established only the existence or probable existence of a precious opal horizon work begins to open and extract the opal bearing rock units. Typically either "strip mining" or "shaft/drift" mining techniques are used to access the opal bearing horizon. Mining techniques vary from using boring machines to hand mining methods to extract the opal bearing material.

The excavated material is then processed, often by hand washing and/or autogenous milling; to clean and extract the precious opal from the base rock (matrix). The liberated rough solid opal is sorted and graded by hand prior to selling. Still other material is just hand sorted and cleaned to be sold as "opal in matrix" and "boulder opal".

Most often the Australian opal miners sell the cleaned and graded, rough, precious opal material in the rough form. The buying and the subsequent manufacture of finished stones is conducted by a wide variety of International buyers.

A system has been created by which samples collected during exploration, and bulk sampling can be evaluated. In turn, these samples can be utilized to assist in the economic evaluation of the Okanagan Opal deposit. As this evaluation process takes place "commercial to gem grade opal" finished product is created which has a defineable market value; and this product can be sold to create a cash flow which will help to offset the ongoing business development costs.

#### **Evaluation and Processing Techniques:**

Final processing of the hand-cobbed "mine run opal ore" material commenced with detailed sorting and grading. During this process the previously selected material is sorted into two major classifications:

1. **Cutable Material** - rock containing precious opal which can be cut into some form of finished gemstone; ie. solids, boulder pieces, doublets or triplets.
2. **Specimens** - rock containing some precious opal but opal which is not "cutable", or other lesser valued but "commercial" material such as common opal, agate and agate geodes, zeolite crystal clusters.

The cuttable "precious opal" material is stored in buckets/containers in preparation for cutting. Each individual piece of the cuttable material from these buckets is handled individually as each piece must be examined and segregated for a specific cutting procedure. The general procedures are listed below however the specific selection criteria and cutting techniques are beyond the scope of this report.

1. Solid opal pieces (pieces with little or no host rock) is carefully examined to determine whether they will be best cut into solids, backed doublets or triplets. Any cracked material will be made into doublets or triplets if the cracks cannot be cut out or stabilized.
2. Matrix opal or opal in matrix (with host rock attached or included in host rock) is selected for creation of boulder solids, capped "boulder doublets" or triplets.
3. Precious opal chips are collected for use in chip jewellery.

At this time the specimen material is of low priority from the overall economic point of view as there is a "relatively finite and potentially limited market for specimens"; as opposed to there being "a relatively unlimited market for opal jewellery items".

The specimen pieces are graded according to value and/or potential use and are stored. As required for sale and as "tourist or collectors items" increases these specimens can be further evaluated and/or further worked into "polished specimens" as warranted.

**Evaluation of 1995 Bulk Sampling Program:**

Preliminary estimates made in November 1995 suggested that the 52 tonnes of "opal ore" mined during the 1995 program had a "mine run" value of some \$20,000 to \$25,000. Sorting, grading and cutting which has taken place since October suggests that the initial estimates are within reason and perhaps low. As of mid January 1996 approximately one-third of the hand-cobbed material had been processed and the processing is ongoing. About two-thirds of the hand-cobbed material had been sorted and seven buckets of "cutting rough" and 4 buckets of specimens remained unprocessed; this representing the yield from about one-third of the hand-cobbed rough. Thirty-one buckets of hand-cobbed mine run rough are yet to be sorted and should yield a similar amount of cutting rough.

As of late January, and since October 1995, some 300 cut stones had been finished and an additional 80 doublets had been lapped and glued for final cutting; and 140 pieces had been flat lapped in preparation for gluing. This represented some 520 opal stones not counting polished specimens. It is expected that after final processing of all material some 1200 to 1500 "finished stones" will have been created from the material mined in 1995.

### Opal Processing:

Opal bearing material is first re-sorted and graded into two broad classes; cuttable material and specimen material. At this stage of development the cuttable classification includes anything that can be utilized in the manufacture of a finished gemstone.

Gemstones are classified as solid, matrix, boulder, doublet or triplet pieces (refer to Opal Identification and Value; Paul B. Downing, Ph. D.; 1993; or Opal Cutting Made Easy; Paul B. Downing, Ph. D.; 1984). Specimens include all other pieces exhibiting uncuttable precious opal and various, interesting pieces of common opal. Some common opal is also cuttable into commercial gemstones; particularly that material which is transparent with an orange to amber base color.

Price evaluation of the sorted commercial grade rough opal material could take place after the sorting, cleaning and grading of the mine run rough has been completed. This is the first time when an assessment of value can be made based on what can be made from the rough. Since "Okanagan Opal" has not yet been proven to the international market place it would not command a top market price. The price, or value of opal is controlled by many factors; but, as with all gemstones, opal is evaluated and priced based on the quality of the finished gemstones which can be made from the rough.

Paul Downing, an opal expert and a noted author of books on opal is a director of Okanagan Opal Inc.. He (see Opal Identification and Value; Paul B. Downing, Ph. D.; 1993) has established a five to one ratio between the value of rough opal and the value of the finished opal cut from that rough. This ratio is conveniently equivalent to the ratio of "five carats to the gram"; which are the weight units used to weigh finished and rough opal respectively. In simple terms, a low yield of one to two carat per gram of rough should be expected from rough and therefore the price or value of

rough should be 20% or one-fifth of the price or value of the finished stone that can be made from the rough; thus leaving adequate value to cover the cost of cutting, waste loss and risk while providing for a profit.

Opal is a difficult stone to value and there are many factors which influence the market value. The main factors affecting value are:

- a. Type of Opal,
- b. Brightness of Fire,
- c. Base Color,
- d. Fire Color,
- e. Fire Pattern,
- f. Rarity,
- g. Cut,
- h. Consistency of Fire.

Note: Please refer to *Opal Identification and Value* by Paul B. Downing, Ph.D.; 1993 for full details as they are too extensive to summarize herein.

All of these factors must be considered in the determination of the value of finished opal stones that have been cut from material mined from the Klinker claims.

A basic system for evaluating the Okanagan Opal deposit has been established as part of the 1994 Klinker Project. It has been determined that the following steps must be taken in order to evaluate this deposit:

1. Taking any sample block of rock, first measure the volume and calculate a weight for the material to be removed as a sample;
2. Remove the sample volume of material and sort to collect all opal contained;
3. Grade the opal bearing material into two classifications - cuttable and specimen;
4. Sort all cuttable material into its proper type classification - ie. solid, boulder or composite (doublet or triplet) stones;
5. Process all cuttable material into finished "gemstones";
6. Grade and price the finished gemstones and determine the total value of finished stones;
7. Sort and grade the specimens and determine a total value for all of the specimens;
8. Add together the total price of the finished stones made from the cuttable material and the total price of the specimen material to determine gross value of the block of rock sampled;
9. Delineate areas of equal "opal grade" by visual and physical inspection and sampling;
10. Combine and average the value of the various sample blocks within each specific grade zone and determine a weighted average value;

Having eventually sampled and evaluated numerous blocks of material an overall determination of grade or value of the exposed blocks of opal bearing material can be established.

The following Opal Description Tables (Table 1 & 2) show the great variety occurring just in the base color of the opal found at the Okanagan Opal site. These have been broken down into two groups; precious and common (non-precious).

Each of these groups contains commercial grade opal which can become part of the gross value of the sample and the deposit. Only after determining the value of the finished stones can the value of the rough be determined. Paul Downing has determined the retail market value of the first forty-eight (48) finished opal stones crafted from rough material sorted from rock excavated from the Company's opal deposit. These stones have been cut from "Okanagan Opal" rough extracted from the Klinker claims during the 1994 program or from late 1993 work. The value of these finished stones and others presently being cut will be used to provide a basis upon which the value of the Okanagan Opal deposit can be evaluated. The finished stones will also provide an inventory base for the retail portion of the business.



PRECIOUS OPAL								
DESCRIPTION			OPAQUE		TRANSLUCENT		TRANSPARENT	
BASE COLOR		CODE	1		2		3	
BLACK		A	n/a		n/a		faces up black	
							with play of color	
ORANGE		B	n/a		n/a		orange base color	
							with play of color	
RED		C	n/a		n/a		n/a	
AMBER		D	n/a		amber		amber	
					with play of color		with play of color	
YELLOW		E	n/a		yellow		yellow base color	
					with play of color		with play of color	
CLEAR		F	n/a		semi-clear		clear	
					with play of color		with play of color	
WHITE		G	white base color		semi-white		n/a	
			with play of color		with play of color			
GREEN		H	n/a		n/a		n/a	
SALMON/PINK		I	n/a		n/a		n/a	
CARAMEL		J	caramel		caramel		n/a	
			with play of color		with play of color			
BROWN		K	brown		brown		faces up brown	
			with play of color		with play of color		with play of color	
BLUE		L	blue		blue		n/a	
			with play of color		with play of color			

TABLE 1

COMMON OPAL (no play of color)					
DESCRIPTION		OPAQUE	TRANSLUCENT	TRANSPARENT	
BASE COLOR	CODE	4	5	6	
BLACK	A	black base color	black base color	faces up black	
ORANGE	B	orange base color	orange base color	orange base color	
RED	C	n/a	red base color	red base color	
AMBER	D	n/a	amber	amber	
YELLOW	E	n/a	yellow base color	yellow base color	
CLEAR	F	n/a	semi-clear	clear	
WHITE	G	white	semi-white	n/a	
GREEN	H	green	n/a	n/a	
SALMON/PINK	I	salmon/pink	n/a	n/a	
CARAMEL	J	caramel	caramel	n/a	
BROWN	K	brown	brown	n/a	
BLUE	L	blue	n/a	n/a	

TABLE 2

PRECIOUS OPAL - GRADING CHART - cut stones											
SAMPLE NUMBER	OPAL TYPE				Base Color Code	DESCRIPTION OF COLOR/PATTERN	Brightness Code	Weight (carats)	Size mm.	Price Information RETAIL (CDN \$)	Other Comments
	SOLID OPAL	BOULDER OPAL		% Opal							
		MATRIX	VEIN								
# 1		doublet		80%	off white	Green multi-clr. - Broad Flash	4.5		8x10	\$40	pendant - directional
# 2		doublet		20%	crystal	Green/Orange - Flash	3		8x10	\$20	pendant or ring
# 3		doublet		25%	crystal	Green - Flash	2.5		10x12	\$20	pendant
# 4		doublet		70%	white	Red multi-color - Flash	4		13x18	\$100	pendant
# 5		doublet		20%	white	Green/Red - Flash	3.5		13x18	\$40	pendant - earring (match with #17 or #6)
# 6		doublet		15%	white	Red multi-color - Flash	3		13x18	\$25	pendant - earring (match with #17 or #5)
# 7		doublet		15%	white	Green multi-color - Flash	4		13x18	\$30	pendant
# 8		doublet		20%	white	Green multi-clr. -Rolling Flash	3.5		13x18	\$30	pendant
# 9		doublet		50%	blue	Green/Blue - Flash	2.5		8x10	\$40	pendant or ring
# 10		doublet		80%	semi-cryst	Green/Orange - Flash	3.5		8x10	\$60	pendant or ring
# 11		doublet		90%	semi-cryst	Green/Blue - Rolling Flash	4		8x10	\$40	pendant
# 12		doublet		60%	semi-cryst	Green/Blue - Rolling Flash	4.5		10x12	\$95	pendant
# 13		doublet		60%	crystal	Red/Green - Flash	2		10x12	\$20	ring
# 14		doublet		60%	semi-cryst	Red multi-clr. - Rolling Flash	3		10x12	\$40	pendant
# 15		doublet		30%	semi-cryst	Green/Blue - Flash	2		10x12	\$20	pendant or ring
# 16		doublet		90%	semi-cryst	Green/Blue - Flash	4		10x14	\$155	pendant
# 17		doublet		30%	white	Red multi-clr. - Rolling Flash	3.5		13x18	\$60	pendant or ring or earrings w/ #5 or #6
# 18		doublet		90%	semi-cryst	Green/Blue - Flash	3.5		13x18	\$245	pendant
# 19		triplet		100%	crystal	Blue/Green - Flash	4		5 Rnd.	\$15	matching pair - earrings
# 20		doublet		80%	white	Green/Blue - Flash	4		6x8	\$40	pendant
# 21		triplet		100%	crystal	Green/Orange - Flash	2		8x10	\$20	pendant
# 22		doublet		40%	semi-cryst	Green multi-color - Flash	4		8 Rnd.	\$40	pendant
# 23		doublet		80%	white	Red multi-clr. - Rolling Flash	4.5		4x6	\$40	pendant
# 24		doublet		30%	blue	Green - Flash	3		6x8	\$25	ring -silver

CHART 1

PRECIOUS OPAL - GRADING CHART - cut stones											
SAMPLE NUMBER	OPAL TYPE				Base	DESCRIPTION OF COLOR/PATTERN	Brightness Code	Weight (carats)	Size mm.	Price	Other Comments
	SOLID OPAL	BOULDER OPAL		% Opal	Color Code					Information RETAIL (CDN \$)	
		MATRIX	VEIN								
# 25	yes			100%	white	Red multi-color - Rolling flash	3	2.3	7x13 ff	~\$320.	Pendant/Ring - custom set in gold
# 26	yes			100%	white	Red multi-color - Flash	3	0.8	6x8	\$70	Ring - set in gold
# 27	yes			100%	white	Red multi-color - Flash	3	1	6x8	\$70	Ring - set in gold
# 28	yes			100%	white	Red multi-color - Flash	3.5	0.6	5x7	\$245	Ring - set in gold
# 29	yes			100%	white	Red multi-color - Flash	3	0.35	5 Rnd.	\$25	Pendant/Ring - set in 4*6 gold
# 30	yes			100%	orange	Red multi-color - Flash	3	0.35	4x6	\$40	Pendant - set in gold
# 31	yes			100%	white	Red/Green - Flash	3	0.05	4x6	\$50	Ring
# 32	yes			100%	white	Red multi-color - Flash	3	0.55	4x6	\$25	Ring/Pendant
# 33	yes			100%	orange	Green/Red - Flash	3	0.3	4x6	\$25	Pendant - silver
# 34	yes			100%	white	Green - Flash	2	0.3	3x6	\$20	Ring - marquise - silver
# 35	yes			100%	off white	Red - Flash	3	0.3	3x6	\$30	Ring - marquise - silver
# 36	yes			100%	white	Red multi-color - Flash	2	0.4	4x6	\$20	Ring - silver
# 37	yes			100%	off white	Green - Rolling Flash	4	0.5	4x8	\$60	Pendant - gold
# 38			doublet	100%	White	Red - Flash	3		4x6	\$30	Pendant - silver
# 39		yes		30%	semi-cryst	Green/Blue - Broad Flash	5		large	\$150	wire wrap
# 40			yes	60%	Orange	Red multi-color - Flash	3.5		large	\$100	wire wrap
# 41		yes		30%	White	Red/Green - Broad Flash	4		large	\$75	wire wrap - directional
# 42			doublet	90%	Orange	Red multi-color - Flash	3.5		large	\$75	wire wrap - directional
# 43			yes	30%	semi-cryst	Red multi-color - Flash	3.5		med large	\$75	wire wrap - horizontal - pin??
# 44			triplet	40%	semi-cryst	Orange/Green - Flash	3.5		very large	\$125	wire wrap
# 45			triplet	50%	crystal	Green/Orange - Flash	4		very large	\$100	wire wrap
# 46			yes	80%	white	Green/Red - Flash	2.5		very large	\$75	wire wrap
# 47			yes	50%	semi-cryst	Green/Orange - Flash	4		large	\$200	custom set in gold
# 48			yes	60%	Orang/wht	Red multi-color - Flash	4		very large	\$350	custom set in gold

CHART 2

The following Opal Grading Chart has been developed in order to catalog finished (cut) stones and thereafter to tabulate the determined description and overall value of finished opal gemstones. The description and value of the above reference cut stones are shown on these charts (Charts 1 & 2).

**ECONOMIC CONSIDERATIONS:**

In the considerations discussed herein before there has been not been any attempt to determine the full extent of opal occurrences nor the overall potential for opal production on the Klinker Property. There are other opal occurrences known to exist on the property and some of these are known to contain "some precious opal". Further exploration is expected to expand the overall potential.

**CONCLUSIONS & RECOMMENDATIONS:**

The target areas for extensive precious opal formation include those areas underlying zones exhibiting the most intense fracturing related to north-south faulting at or near the contact margins of the northwest trending high energy lahars with porous lapilli tuff matrix material. These areas may represent the roots of major fractures with greater concentrations of precious opal. The careful and close consideration of the geological factors discussed herein will help in developing more areas with precious opal as recognition of the more favourable environments are determined.

Following and prospecting these series of north-south sub-parallel lineaments to the northwest of the Klinker 1 & 2 mineral claims in the vicinity of the contact between lahars and tuffaceous shales and waterlain rhyolite ash sequences would also be good target areas for precious opal occurrences.

Restrictive controls for the precipitation of opal include the vertical extent of the northeast trending fractures, thickness, porosity and amount of matrix material within the volcanoclastic sediments. These factors may help to explain why and where the greatest opal concentrations occur.

Further exploration and prospecting to determine the extent of diatomaceous earth's found on the Klinker claims is important, as they may be the original source for the silica in the formation of opal. Further study should include looking at air photo lineaments to identify the intersection of 020 and 340 degree structures in porous, permeable lahars with impermeable horizons that have a high density of fracturing. Estimates of silica in the lahars also helps in identifying favourable areas for the concentration of opal but it is more important to identify those areas that actually have an indication of precious opal. This would provide the basis for further exploration and possible mining.

Zeolites appear mostly as infillings of vesicles and as a matrix cement but not as a fracture infilling. The greatest concentration of zeolites appear peripheral to the main areas of intense fracturing including the Discovery, Bluebird and Caramel zones, although minor emplacement occurs in close proximity to opal formation in these zones.

Further geological mapping and prospecting should be conducted in order to delineate areas exhibiting silica mineral emplacement and to identify the structural controls related to each emplacement. A detailed airphoto linear feature interpretation survey will assist in determining the location of fractured zones.

It is not possible to assess the grade and value of an opal deposit by drilling. Percussion and diamond drilling could have a limited application for opal exploration; this being to define and trace the vertical projection of the opalized fracture systems. Drilling could also be utilized to assist in geological mapping and rock volume determinations by assessing the true thicknesses of the various rock units.

The only sure method of determining the economic potential of each opalized structure or zone appears to be to conduct bulk sampling tests similar to the one conducted on the 1477 Bench Level open-cut. Once excavated, the opalized rock can be processed into finished stones to determine what can be created from the opal. Once in the finished state it is possible to determine a finite value. It is only after conducting a series of bulk sample tests that an overall assessment of the deposit can be made.

**Bibliography:**

- |                               |  |
|-------------------------------|--|
| Downing, Paul B. (1984)       | Opal Cutting Made Easy   |
| Downing, Paul B. (1993)       | Opal Identification and Value.   |
| Downing, Paul B. (1994)       | Opal Market News, Volume 1, Number 2.  |
| Yorke-Hardy, Robert W. (1995) | Internal Report - Technical Report on the Property<br>"Exploration & Development - 1994".  |
| Read, Peter B. (1995)         | Industrial Mineral Potential of the Tertiary Rocks,<br>Vernon (82L) and Adjacent Map Areas. Part of<br>Geological Fieldwork 1995 - A Summary of Field<br>Activities and Current Research (Paper 1996-1). |

Statement of Costs

Project Expenses -

Summary of costs of 1995 Program:

Project Management and Administration -----	\$ 11,250
Y-H Technical Services Ltd. -- 45 days @ \$250/day	
Sub Contract and Wages -----	\$ 11,050
Camp Watchman/Equipment Operator -- Henry Teichroeb -- 45 days @\$150/day	
General Labour & Opal Sorting -- Dan Want -- 13 days @ \$100/day	
Mark Garbutt -- 9 days @ \$100/day	
Chris Yorke-Hardy -- 16 days @ \$100/day	
Matt Yorke-Hardy -- 5 days @ \$100/day	
Geological Mapping -----	\$ 7,125
Brian Callaghan -- 28.5 days @ \$250/day	
WCB & Insurance -----	\$ 1,459
Equipment Contract -----	\$ 22,134
Excavator -- \$11,834 include. GST	
BobCat -- 40 days @ 250/day	
ATV -- 30 days @ \$10/day	
Vehicle Rental -- 50 days @ \$75/day -----	\$ 3,750
Gas/Fuel -- 50 days @ \$15/day-----	\$ 750
Camp, Food & Supplies -- 45 days @ \$150/day -----	\$ 6,750
Field Supplies and Materials -----	\$ 750
Radio/Cell Phone Rentals -----	<u>\$ 250</u>
Fieldwork Total -----	\$ 65,268
Report Preparation Costs:	
Management and Administration -----	\$ 3,000
-- report writing	
Y-H Technical Services Ltd. -- 12 days @ \$250/day	
Geologist -- map preparation/drafting -----	\$ 2,400
-- report writing	
Brian Callaghan -- 12 days @ \$200/day	
Report Typing & Copying -----	<u>\$ 350</u>
Report Prep. Total -----	\$ 5,750
Total Costs -----	\$ 71,018





# Y-H TECHNICAL SERVICES LTD.

Mining Exploration & Drafting

Supplies & Service

P.O. BOX 298 • VERNON, B.C. • V1T 6M2

TELEPHONE (604) 542-5173 • FAX (604) 542-7115

## Certificate of Qualifications

I, Robert W. Yorke-Hardy, of Vernon British Columbia, do hereby certify that:

1. I am a Mining Technologist residing at 330 Stepping Stones Road, Vernon, British Columbia. I am the owner/operator of Y-H Technical Services Ltd. of P.O. Box 298, Vernon, B.C., an exploration services company. In total I have accumulated 29 years of experience in Mining/Mining Exploration and related industries. Y-H Technical Services Ltd. provides management services to Okanagan Opal Inc. on the Klinker Project.
2. I am a graduate of the British Columbia Institute of Technology, Burnaby, British Columbia and a registered charter member of the Association of Applied Science Technologists and Technicians of British Columbia. I have practiced my profession for 26 years.
3. This report is based on work performed by myself, under my direction or others while in my presence. The total value of the work performed has been detailed in the foregoing Cost Statement. This sum is to be considered as eligible expenses incurred on the Klinker Project and they are therefore submitted in support of the Notice of Work filed in January 1996.
4. This report is based on knowledge and experience gained over the period 1991 to the present. I am familiar with the geology of the McGregor Creek area and surrounding district.
5. I am a claim title holder of record on the Klinker and Ewer mineral claims. These claims are under option to Okanagan Opal Inc. which is a company in which I own a controlling interest.

Y-H Technical Services Ltd.,

  
R. W. Yorke-Hardy, A.Sc./T.

April 8, 1996

## STATEMENT OF QUALIFICATIONS

I, Brian Callaghan reside at 989 Curtis Road, Kelowna, B.C..

I graduated from Brandon University, Manitoba in 1980 with a Bachelor of Science Degree in Geology.

I have worked continuously as a Geologist since 1980.

I am presently self employed as a Geological Consultant.

Under contract with Y-H Technical Services Ltd., of Vernon, B. C., I mapped the geology associated with the "Opal Deposit" on the Klinker Property located at the headwaters of McGregor Ck. during the period from August, 1995 to October, 1995. I am familiar with the geology of the Klinker Opal deposit having conducted preliminary geological investigations on this project during 1993 and 1994.

I have no interest, direct or indirect, in the Klinker Property, Okanagan Opal Inc., or Y-H Technical Services Ltd.; nor do I expect to receive any.

Sincerely,

Brian Callaghan, B.Sc., Geology

**APPENDIX I**

## Detailed Mapping

### Overview:

At the recommendation of a visiting consulting Engineer who was examining the Klinker Opal Property on behalf of a group of investors who had provided funds to the project a program of detailed mapping was undertaken. The Engineer's objective for this detailed mapping was to determine the distribution of "silica minerals" within the mapped areas and to extrapolate this information over the remaining portions of the Discovery Zone and the property in an effort to define "silica mineral zoning" which in turn would define "opalized zones". A total of 23 one metre squares were mapped in the Discovery Zone.

### Method:

The one metre squares were located over and tied in to an established mapping grid located over the Discovery Zone. The 23 squares which were mapped covered areas of stripped and cleaned rock exposures. Each mapped square was located so it was centered over established grid co-ordinates located at five metre centers. Each square was mapped at a scale of 1:10 in order to provide a detailed picture of the clasts and matrix of the lahar and to identify silica minerals.

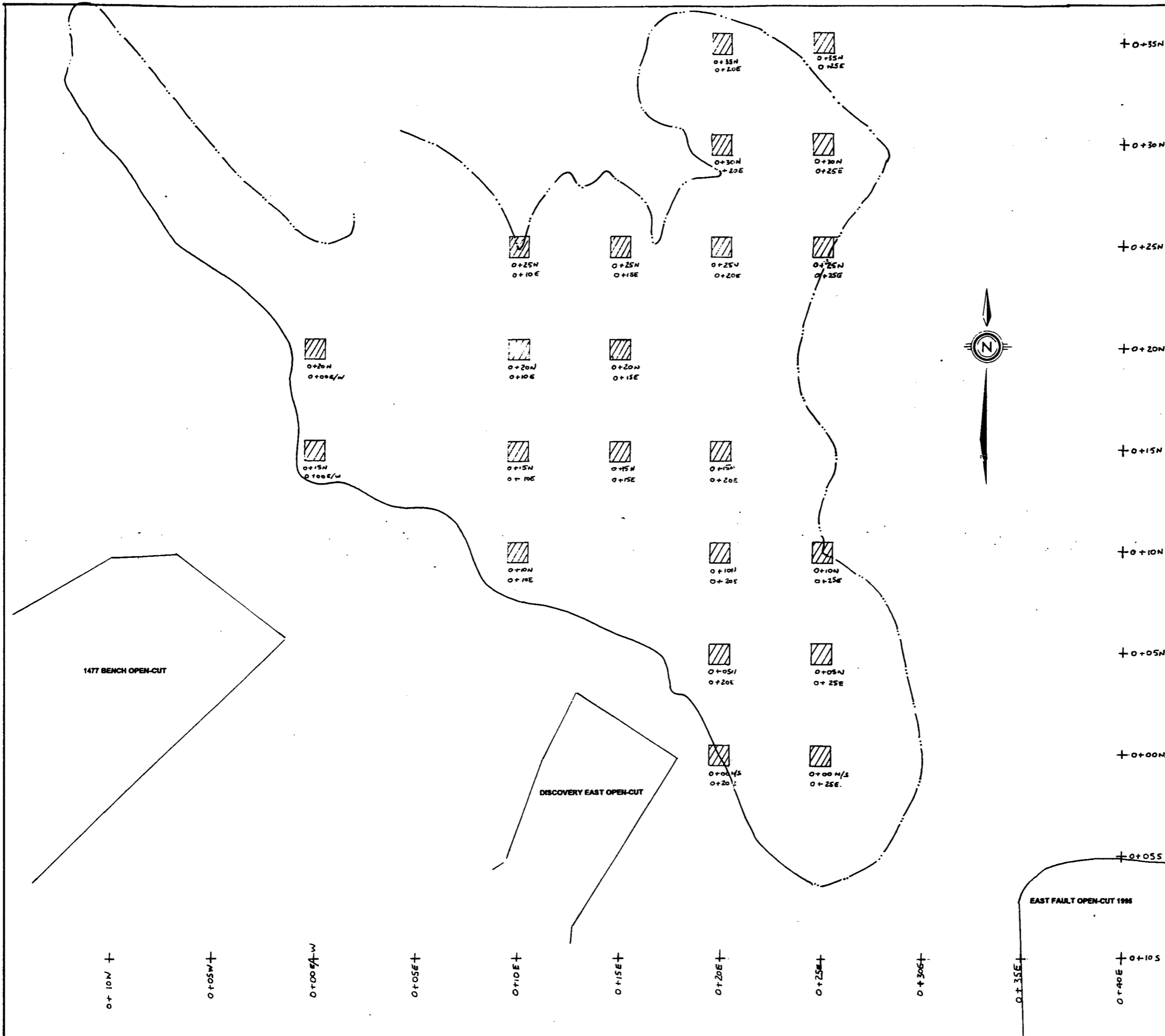
### Expectations and Results:

It was expected that this mapping would provide an indication of those areas with the highest concentrations of silica minerals, particularly precious opal, common opal and agate. These silica rich areas would then be targeted for bulk sampling.

As a result of the five metre square sampling pattern and because of the random nature of the opal occurrences the highest concentrations of exposed silica, including precious opal, already located within the Discovery Zone did not fall within the idealized sample grid of one metre squares.

### Recommendations and Conclusions:

The Engineer's involvement in the project was terminated at the request of Okanagan Opa Inc. and he failed to complete a report on the project and the detailed mapping was discontinued after completing those squares located in the Discovery Zone. It is suggested by Okanagan Opal Inc. that the economic potential of the property can be more accurately determined by understanding the structural controls for the silica emplacement and by identifying and estimating silica mineral contents in those areas that have the greatest concentrations of silica minerals along the extension of faults. The method employed in the detailed mapping test would not work unless a much closer sample spacing was used; which would be prohibitively expensive compared to other methods already developed and employed by Okanagan Opal Inc..



+0+35N  
 +0+30N  
 +0+25N  
 +0+20N  
 +0+15N  
 +0+10N  
 +0+05N  
 +0+00N/S  
 +0+05S  
 +0+10S

0+10N +    0+05N +    0+00N/W  
 0+05E +    0+10E +    0+15E +    0+20E +    0+25E +    0+30E +    0+35E +    0+10S +

**KLINKER PROPERTY**  
 McGregor Creek Area, B. C.  
 Vernon Mining Division

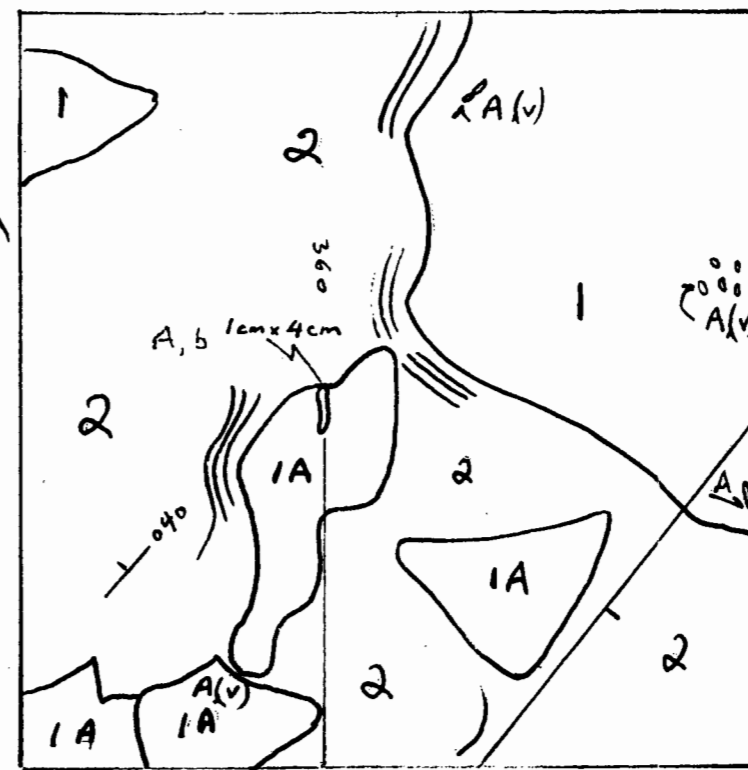
**DISCOVERY ZONE DETAILED MAPPING**  
**ONE METRE SQUARE**  
**LOCATIONS**  
 (Zone 1 - See Map 4)  
**KLINKER 2 MINERAL CLAIM**

**OKANAGAN OPAL INC.**

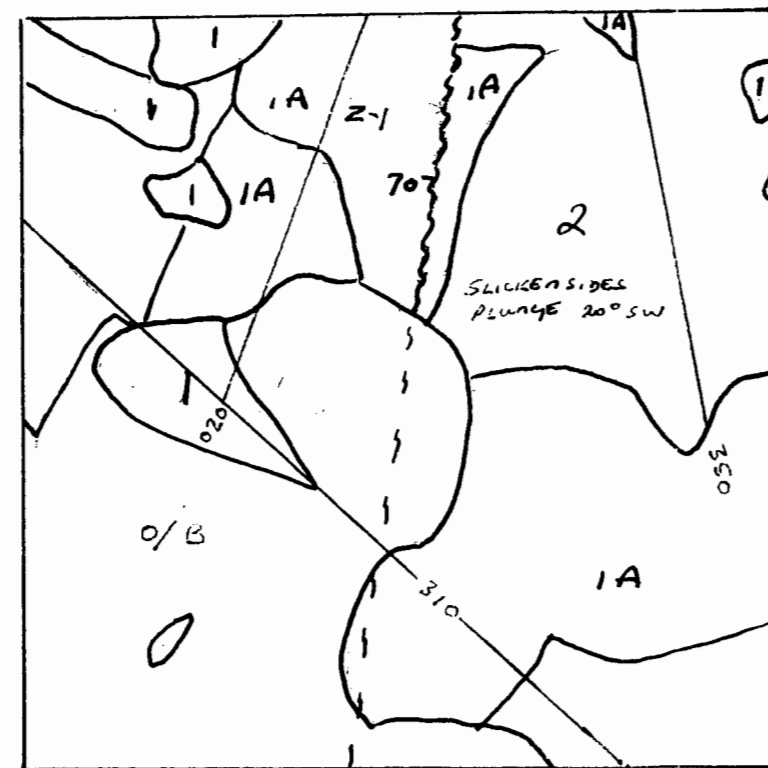
DATE: Apr. 1996      SCALE 1:100      MAP No. 6



0+05N 0+20E



0+05N 0+25E



0+00N 0+20E



0+00N 0+25E

**LEGEND**

- 1 Basalt
- 1A Basalt - bleached
- 2 Lapilli matrix
- o/B Overburden
- Fractures
- Bedding trace
- Clast boundaries

0+05N 0+20E Description  
 85% clasts, 5% lapilli 10% O/B  
 95% bleached,  
 1% opal G4 vesicles 2% Agate vesicles  
 1% opal G4 vesicles

0+00N 0+20E Description  
 10% clasts, 6% lapilli 30% O/B  
 90% bleached, 100% vesicular  
 no opal, no agate, trace zeolites in vesicles.

0+05N 0+25E Description  
 40% clasts, 60% lapilli tuff  
 25% bleached, 100% vesicular  
 1% agate vesicles

0+00N 0+25E Description  
 65% clasts, 35% lapilli tuff  
 5% bleached, 100% vesicular  
 0.5% opal G4 around clasts  
 1% agate, 75% venlets- 25% vesicles

**KLINKER PROPERTY  
 DISCOVERY ZONE**

ONE METRE GRID MAPS

(Scale : 10cm. = 1m.)

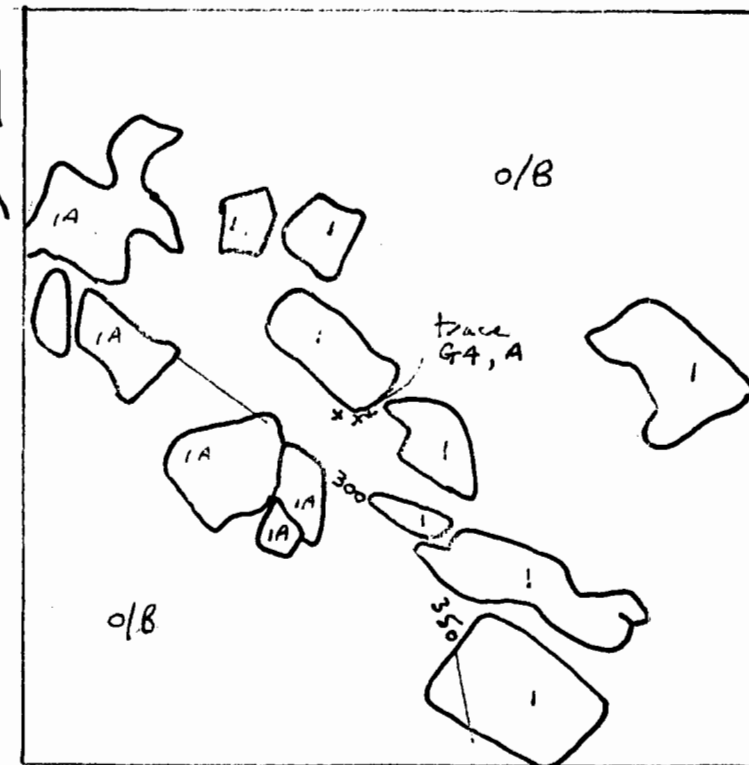
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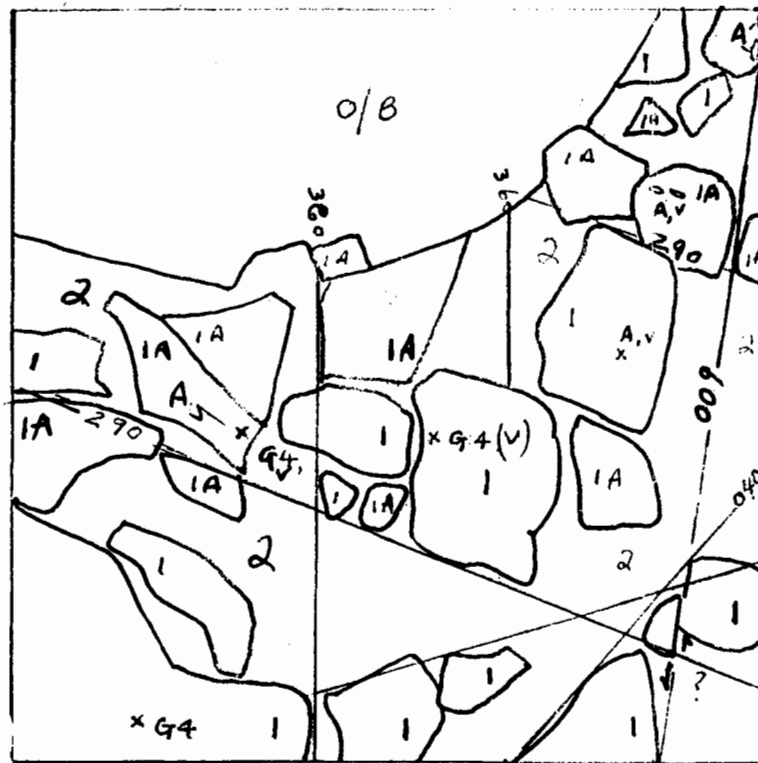
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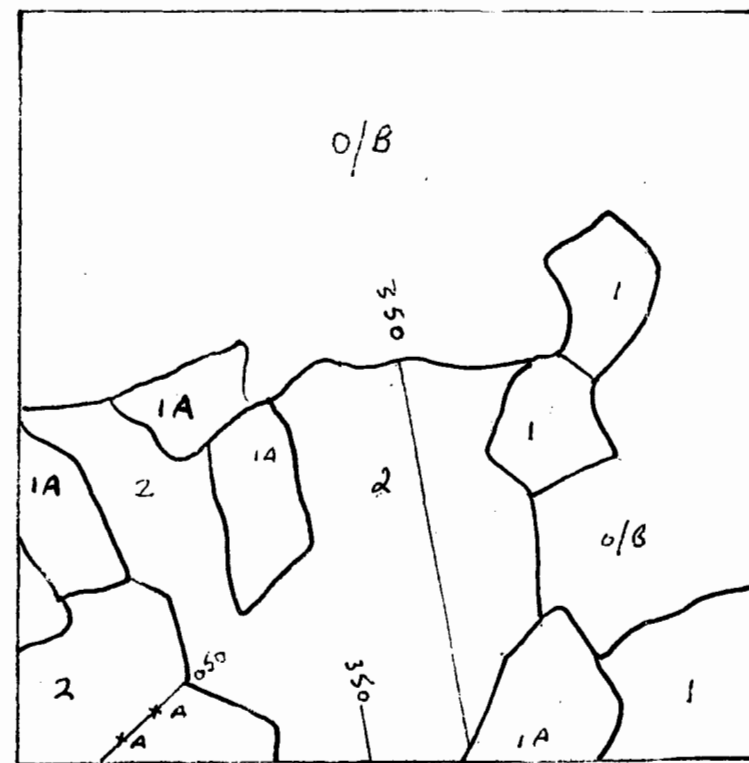
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0+15N 0+25E



0+10N 0+20E



0+10N 0+25E

**LEGEND**

- 1 Basalt
- 1A Basalt - bleached
- 2 Lapilli matrix
- 04 Fractures
- A Bedding trace
- 00 Clast boundaries
- 0/B Overburden

0+15N 0+20E Description  
 90% clasts, 5% lapilli, 5% O/B  
 20% bleached, 100 vesicular  
 trace opal G4 & G6 veinlets  
 0.5% agate vesicles

0+10N 0+20E Description  
 35% clasts, 35% lapilli, 30% O/B  
 5% bleached, 85% vesicular  
 0.5% opal G4 vesicles, 0.5% agate vesicles  
 & trace agate as veinlets

0+15N 0+25E Description  
 20% clasts, 80% O/B  
 30% bleached, 100% vesicular  
 trace opal G4 veinlets,  
 trace agate vesicles

0+10N 0+25E Description  
 20% clasts, 30% lapilli tuff, 50% O/B  
 50% bleached, 50% vesicular  
 0% opal, trace agate veinlets

**KLINKER PROPERTY**

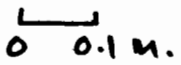
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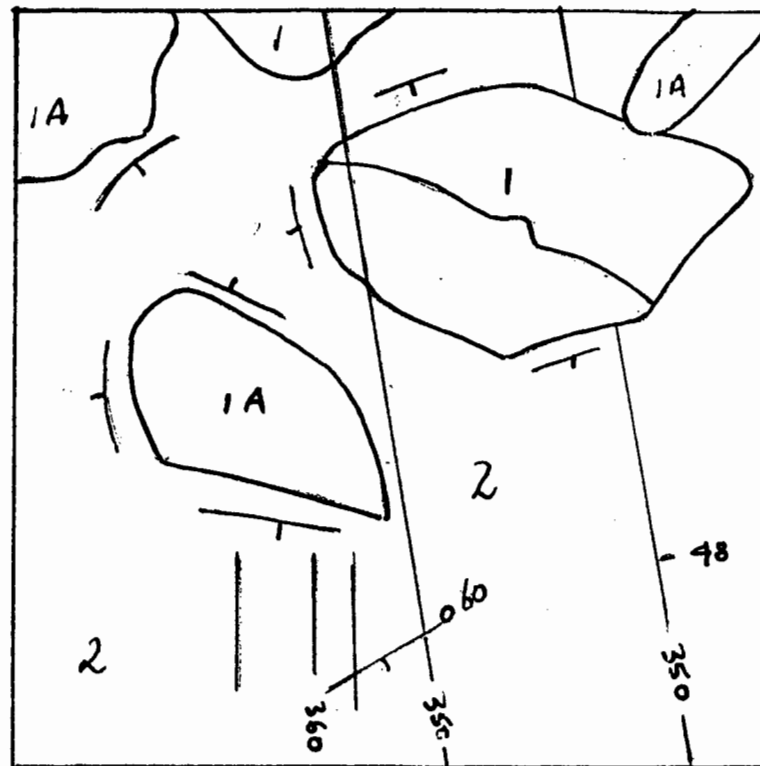
ONE METRE GRID MAPS

(Scale : 10cm. = 1m.)

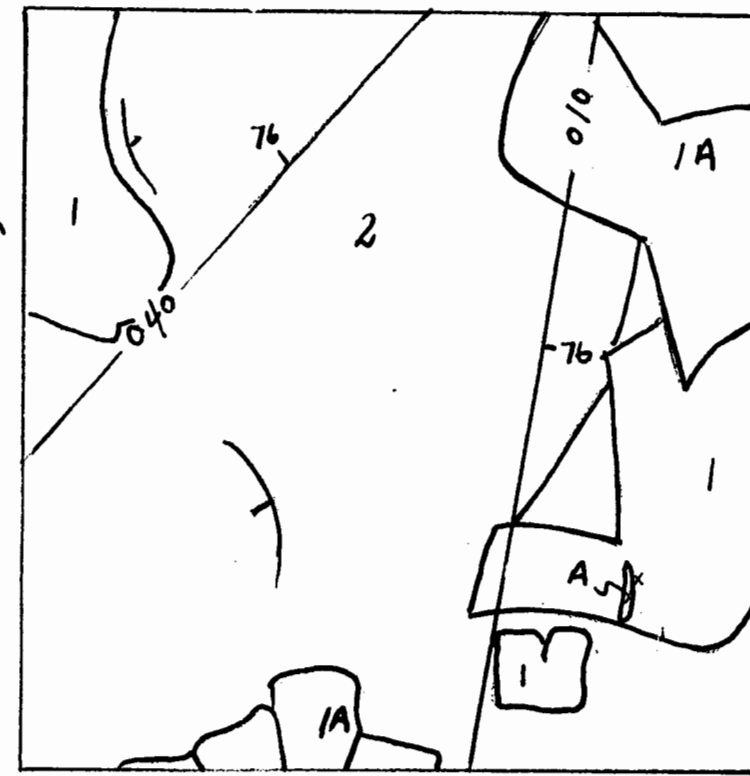
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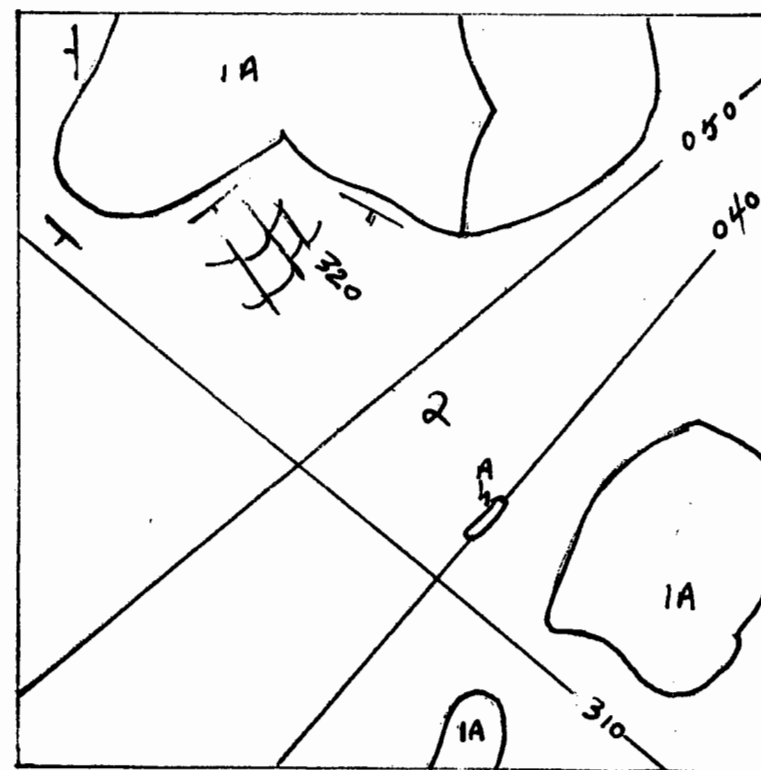
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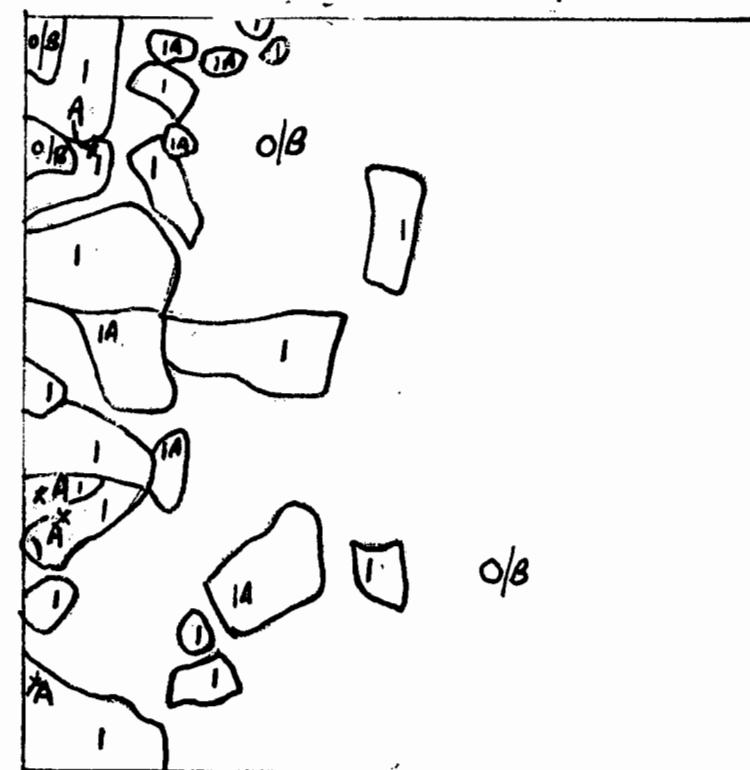
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**LEGEND**

- 1 Basalt
- 1A Basalt - bleached
- 2 Lapilli matrix
- Fractures
- Bedding trace
- Clast boundaries
- o/B Overburden



0+10N 0+10E



0+25N 0+25E

**0+15N 0+10E Description**  
 20% clasts, 80% lapilli tuff  
 50% bleached, 100% vesicular  
 0% opal, 0% agate

**0+10N 0+10E Description**  
 20% clasts, 80% lapilli tuff  
 100% bleached, 100% vesicular  
 clasts up to 90 cms  
 2% agate in vesicles, 1 veinlet

**0+15N 0+15E Description**  
 15% clasts 85% lapilli tuff  
 50% bleached, 100% vesicular  
 0% opal, 0.5% agate vesicles

**0+25N 0+25E Description**  
 30% clasts, 70% O/B  
 20% bleached, 100% vesicular  
 0% opal, 0.5% agate as fractures  
 around boulders and in clasts.

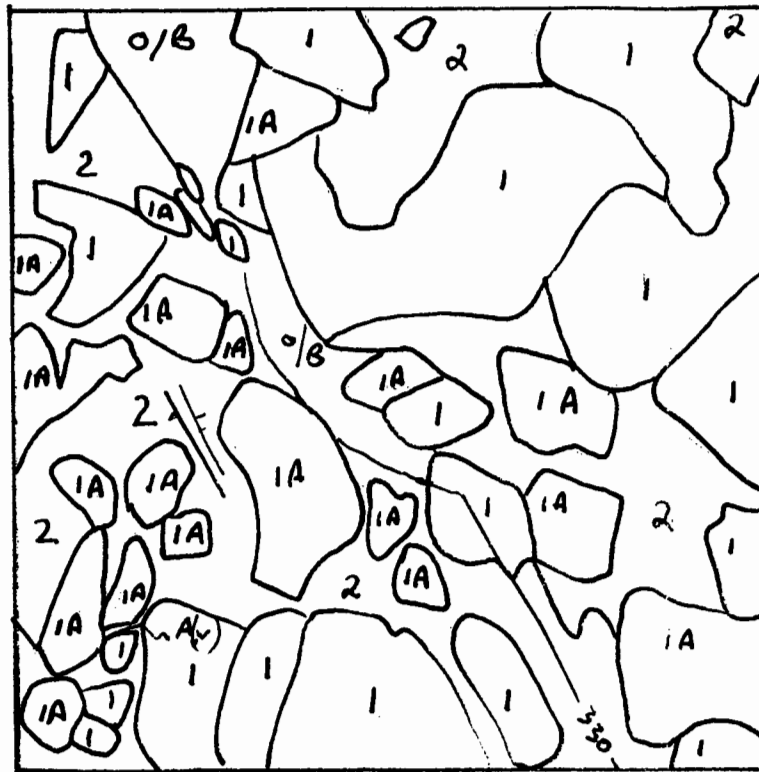
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 DISCOVERY ZONE**

ONE METRE GRID MAPS  
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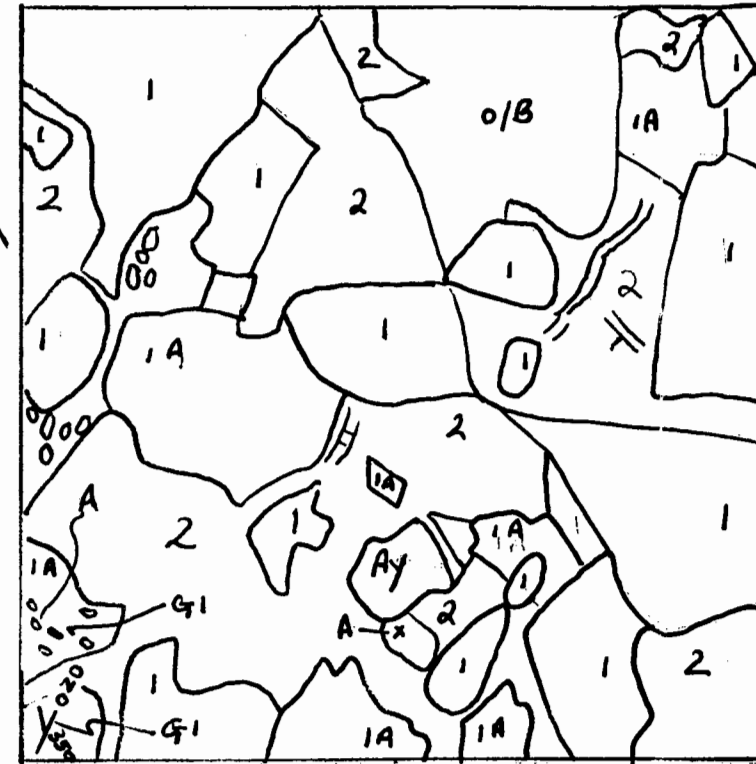
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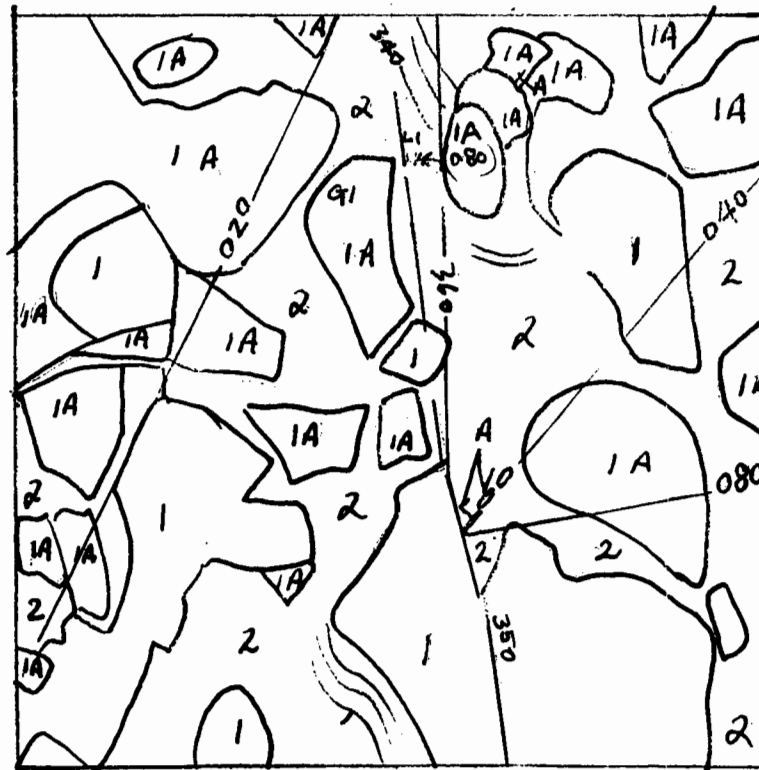
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0+25N 0+15E

**LEGEND**

- 1 Basalt
- 1A Basalt - bleached
- 2 Lapilli matrix
- o/B Overburden
- Fractures
- Bedding trace
- Clast boundaries



0+20N 0+10E



0+20N 0+15E

0+25N 0+10E Description  
 80% clasts, 20% lapilli tuff  
 40% bleached, 100% vesicular  
 0% opal, trace agate veinlet

0+20N 0+10E Description  
 60% clasts, 38% lapilli tuff, 2% O/B  
 20% bleached, 100% vesicular  
 1% opal L1 veinlet, G1 vesicles  
 blue green flash and red green flash  
 0.5% agate vesicles

0+25N 0+15E Description  
 60% clasts, 38% lapilli, 2% O/B  
 33% bleached, 100% vesicular  
 0.5% opal G1 1-2cm fracture  
 trace agate in vesicles

0+20N 0+15E Description  
 95% clasts, 4% lapilli tuff, 1% O/B  
 5% bleached, 100% vesicular  
 0% opal, trace agate through boulders  
 and around margins of clasts

**KLINKER PROPERTY  
 DISCOVERY ZONE**

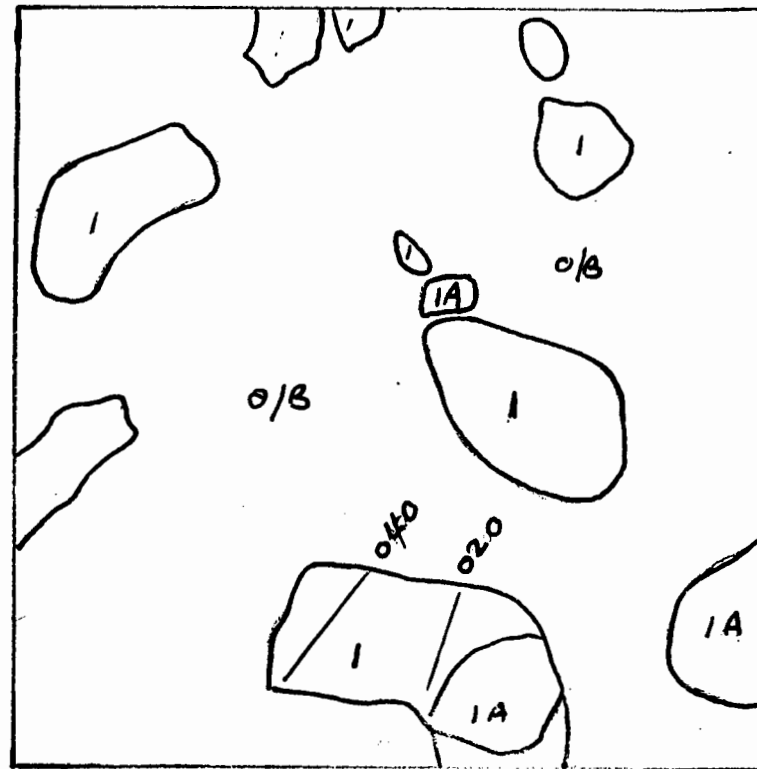
ONE METRE GRID MAPS

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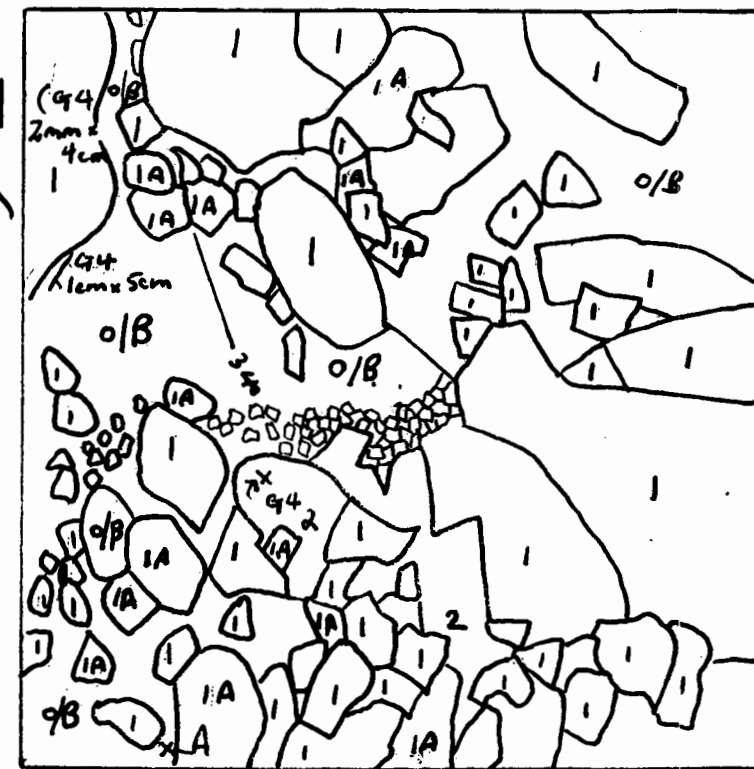
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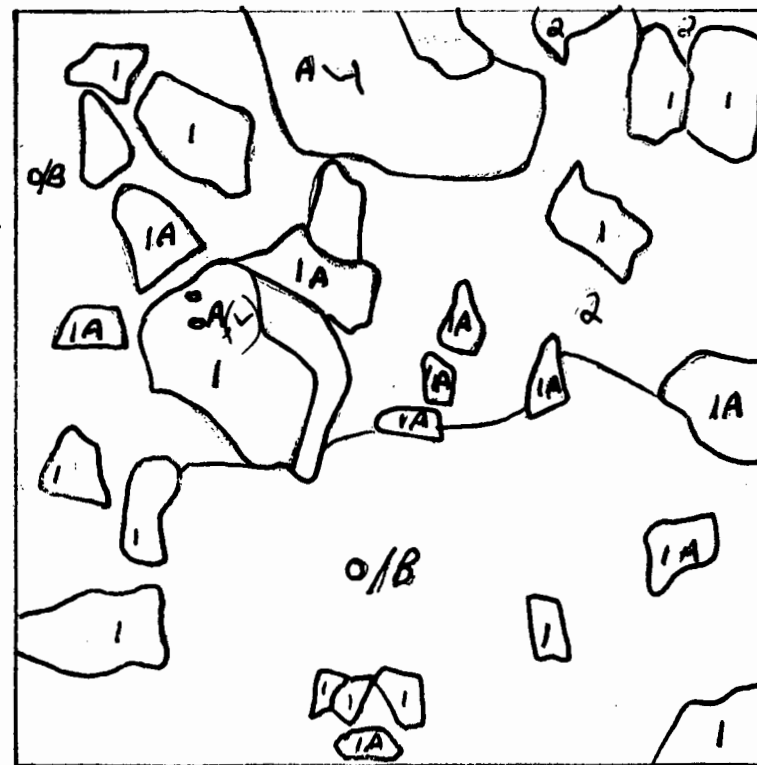
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0+35N 0+25E



0+35N 0+20E



0+30N 0+25E



0+30N 0+20E

**LEGEND**

- 1 Basalt
- 1A Basalt - bleached
- 2 Lapilli matrix
- Fractures
- Bedding trace
- Clast boundaries
- O/B Overburden

0+35N 0+25E Description  
 20% clasts, 80% O/B  
 30% bleached, 100% vesicular  
 0% opal, 0% agate

0+30N 0+25E Description  
 25% clasts, 25% lapilli tuff, 50% O/B  
 5% bleached, 100% vesicular  
 0% opal, trace agate in vesicles

0+35N 0+20E Description  
 80% clasts, 10% lapilli tuff, 10% O/B  
 20% bleached, 100% vesicular  
 0.5% opal G4 veinlet, 0% agate

0+30N 0+20E Description  
 80% clasts, 15% lapilli tuff, 5% O/B  
 10% bleached, 100% vesicular  
 trace opal G1 with blue green flash  
 in vesicles

**KLINKER PROPERTY**

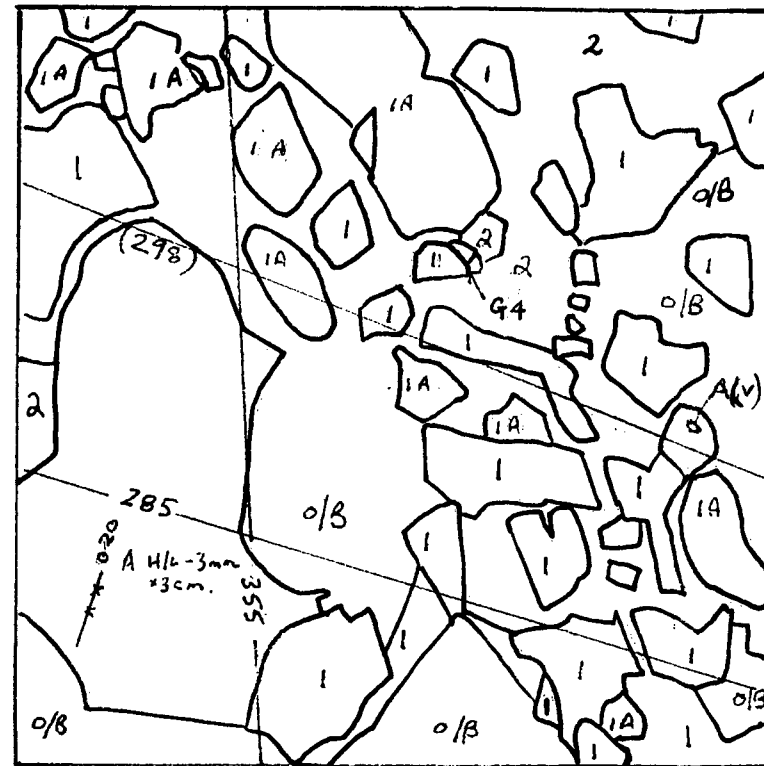
**DISCOVERY ZONE**

ONE METRE GRID MAPS  
 (Scale : 10cm. = 1m.)

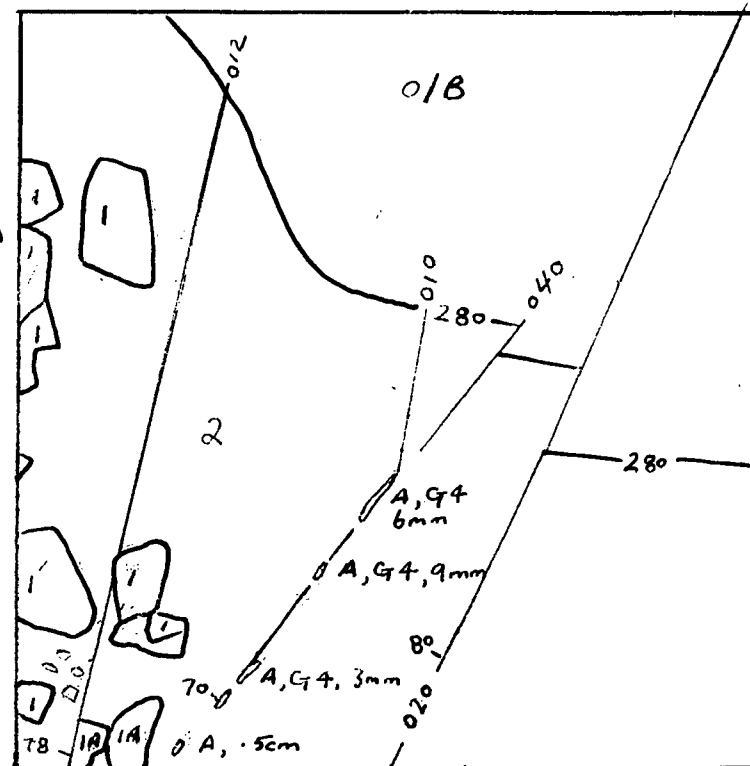
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0 0.1m.



0+25N 0+20E



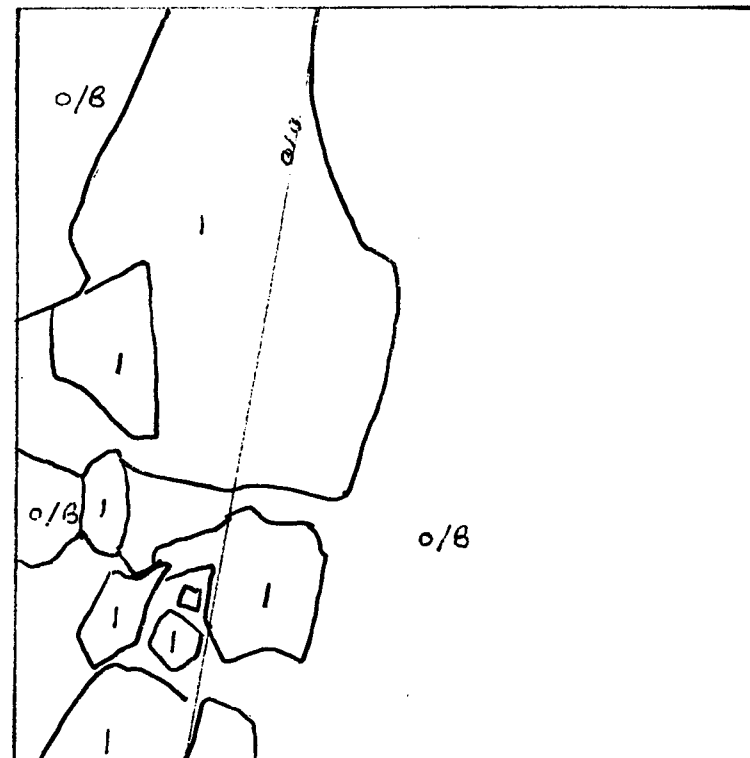
0+15N 0+00E

0+25N 0+20E Description  
 70% clasts, 10% lapilli tuff, 20% O/B  
 15% bleached, 100% vesicular  
 trace opal G4 around clasts  
 1% agate veinlets and vesicles

0+15N 0+00E Description  
 10% clasts, 65% lapilli tuff, 25% O/B  
 5% bleached, 95% vesicular  
 1 opal G4 agate veinlet  
 0% agate in vesicles

0+20N 0+00E Description  
 40% clasts 60% O/B  
 0% bleached, 100% vesicular  
 0% opal, 0% agate  
 trace zeolites along fractures

- LEGEND**
- 1 Basalt
  - 1A Basalt - bleached
  - 2 Lapilli matrix
  - /B Overburden
  - Fractures
  - ~ Bedding trace
  - Clast boundaries



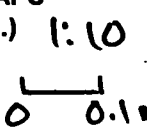
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**KLINKER PROPERTY  
 DISCOVERY ZONE**

ONE METRE GRID MAPS

(Scale : 10cm. = 1m.)

Page 6 of 6



**APPENDIX II**

**Preliminary Analyses and Petrographic Information**  
(per George Simandl, EMPR)



Province of British Columbia  
Ministry of Energy, Mines and Petroleum Resources

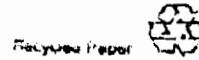
Geological  
Survey  
Branch



George Simandl,  
Ph.D., P. Geo.  
Industrial Minerals  
Geological Survey  
Branch

5th Floor  
1010 Bannard Street  
Victoria  
British Columbia  
V8V 1Y4

Phone: (604) 952-6410  
Fax: (604) 952-0361



Date Sent: \_\_\_\_\_

Fax Number: \_\_\_\_\_

604-542-7115

To: \_\_\_\_\_

Mr. Robert Yarke Hardy

Comments: \_\_\_\_\_

Here is some <sup>preliminary</sup> information  
that we extracted from samples  
that we collected last September.

Most of the analytical data  
is not back yet. I hope to  
work on this more, and write  
a paper this October.

George

page 5 & 6 only

Number of Pages Sent Including Cover Sheet: \_\_\_\_\_

6 pages

REF - Whole Rock Analysis

From : Job no. X95-153 Reported 11-24-1995  
 To : Ministry of Energy, Mines & Petroleum Resources  
 Client's I.D. no. : PCN127374

Page 1

Sample number	CaO	K2O	P2O5	SiO2	Al2O3	FeO	MgO	Fe2O3	TiO2	MnO	Cr2O3	Bt	LOI	Total
	%	%	%	%	%	%	%	%	%	%	%	ppm	%	%
1 STD 514	8.00	1.52	0.13	50.22	20.31	0.51	6.98	6.12	0.28	0.12	0.01	347	4.69	99.65
2 51152 CS950P-2	7.74	1.56	0.50	54.68	15.38	4.15	2.59	7.57	1.02	0.13	0.02	1413	2.02	99.63
3 51153 CS950P-6	8.03	1.94	0.52	53.90	14.20	4.56	2.33	6.81	0.97	0.17	0.07	1285	5.36	99.93
<del>4 SY2(1)</del>	<del>7.93</del>	<del>1.52</del>	<del>0.43</del>	<del>59.97</del>	<del>12.05</del>	<del>2.66</del>	<del>4.15</del>	<del>6.60</del>	<del>0.14</del>	<del>0.33</del>	<del>0.01</del>	<del>450</del>	<del>1.15</del>	<del>99.81</del>
5 51154 CS950P-7	7.85	2.02	0.49	52.58	17.35	5.06	2.32	6.21	0.99	0.26	0.07	1144	4.28	99.51
6 51155 CS950P-8	7.19	1.38	0.58	54.29	14.02	3.21	2.19	5.81	1.09	0.21	0.08	1317	6.60	99.43
7 51156 CS950P-9	6.41	1.59	0.38	52.22	15.57	3.52	1.53	7.26	1.01	0.10	0.02	812	11.80	99.61
8 51157 CS950P-10	6.13	1.75	0.56	54.52	15.09	2.95	2.33	7.55	1.12	0.11	0.01	1335	4.46	99.37
9 51158 CS950P-11	6.31	1.62	0.37	52.21	12.71	3.72	1.45	8.17	0.77	0.11	0.05	872	11.78	99.67
10 51159 CS950P-5	7.61	2.50	0.51	54.03	14.62	1.29	2.38	7.67	1.14	0.18	0.06	1197	4.56	99.43
<del>11 51161 STD</del>	<del>7.71</del>	<del>2.52</del>	<del>1.52</del>	<del>51.21</del>	<del>15.29</del>	<del>1.29</del>	<del>2.38</del>	<del>6.78</del>	<del>1.12</del>	<del>0.15</del>	<del>0.02</del>	<del>1309</del>	<del>5.64</del>	<del>99.41</del>
<del>12 SY2(2)</del>	<del>7.91</del>	<del>1.51</del>	<del>1.43</del>	<del>59.91</del>	<del>12.63</del>	<del>2.59</del>	<del>4.15</del>	<del>6.41</del>	<del>0.14</del>	<del>0.32</del>	<del>0.01</del>	<del>414</del>	<del>1.15</del>	<del>99.73</del>

SY2(2) and SY2(1) are standards

samples were also sent for gold, base metal and REE analyses

NO. 399 PEARL 1986

BIOLOGICAL SURVEY BRANCH (CBC) > OIKOYAL (GB4) 542 7115

02/20/96 18:57

Job : X95-153

Reported : 11-24-1955

Ministry of Energy, Mines & Petroleum Resources

Client's I.D. No. CN127374 batch 95-057

Sample No.	Ce ppm	Nb ppm	Rb ppm	Sr ppm	Ta ppm	Th ppm	U ppm	V ppm	Zr ppm
51152	68	19	131	961	15	<5	<5	193	153
51153	78	23	87	911	15	<5	<5	169	173
51154	68	31	135	826	15	<5	7	171	165
51155	105	22	91	910	15	<5	<5	188	183
51156	59	22	63	762	6	10	5	157	172
51157	31	20	125	979	6	<5	<5	159	187
51158	60	17	93	744	15	7	5	164	162
51159	71	25	140	872	15	<5	<5	172	172
51161	75	15	102	981	15	5	<5	176	190
STD SY-2	175	25	217	273	15	367	290	45	284

→ these numbers are same as previous page

FORM 200

NO. 200

GEOLOGICAL SURVEY BRANCH (S.D.) - ENERGY DIVISION 7115

02/20/56 10:57



Petrographic descriptions

95 GS-OP-16 Basalt fragment (clast)  
porous (+ clinopyroxene?) basalt  
texture vesicular,  
well-chopped plagioclase

95 GS-OP-08 Basalt clast  
similar to 95 GS-OP-16  
porphyritic, vesicular  
trachytic texture

95 GS-OP-01 similar to OP-16 but  
strongly altered

95 GS-OP-15 Porphyritic basalt  
phenocrysts: pyroxene,  
clinopyroxene? strongly altered,  
textures: locally glomerular  
Porphyritic

95 GS-OP-07 similar to 95 GS-OP-16  
• matrix trachytic  
• porphyritic glomerular  
porphyritic and vesicular  
textures

95 GS-OP-06 Basaltic flow clast  
similar to OP-16



# Mineralogy of selected samples

~~Final report of the laboratory~~

## Preliminary results

Sample no

G.S. 95/OP-5

Quartz, Tridimite, celestite, aragonite, Mantnorillanite

G.S. 95/OP 18 a

ferrosite, Albite, Mantnorillanite

G.S. 95/OP 18 b

Albite, Mantnorillanite + amorphous material

G.S. 95/OP 12

Clinoptilolite, Anorthite, Mantnorillanite + amorphous material

G.S. 95/OP 13

Sandstone, Anorthite (No) Anorthite, Mantnorillanite

G.S. 95/OP 17

Glauconite or Celadonite (needs confirmation)

G.S. 95/OP 3

Anorthite quartz + fine amorphous material

G.S. 95/OP 17

Quartz, Tridimite, Mantnorillanite, + amorphous material

Not these are strong of almost all samples

some of this have to be double checked



Province of British Columbia

Ministry of Energy, Mines and Petroleum Resources

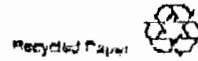
Geological Survey Branch



George Simandl,  
Ph.D., P. Geo.  
Industrial Minerals  
Geological Survey  
Branch

5th Floor  
1810 Blanshard Street  
Victoria  
British Columbia  
V8V 1X4

Phone: (604) 952-0413  
Fax: (604) 952-0381



Date Sent: April 3 / 96  
Fax Number: 604-542-5173  
To: Mr. Robert Yorke Hardy

Comments: \_\_\_\_\_

Here is some additional  
chemical data on rocks  
from your property

Note: there is a mistake  
in reporting. I double-checked  
it. Au values are in ppb  
not PPM

It would have been too good  
to be true

Number of Pages Sent Including Cover Sheet: 2

*Handwritten initials/signature*

Element																																
Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe*	Au	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Tl	B	Al	Na	K	W	Au	Hg	
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	%	ppm	ppm	ppb
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	FAS	PLA	
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	
Detection Lim.	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2	5	1
Field No.	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppb	ppb	
51814 GS95-OP-2	1	12	3	74	0.3	24	38	457	3.65	<2	<5	<2	8	578	0.7	4	<2	143	2.9	2.217	32	32	1.03	294	0.28	8	3.49	0.7	0.4	84	7	23
51821 ACME QIC	<1	<1	<1	<1	<0.3	<1	<1	<1	<1	<5	<2	<2	2	58	0.7	2	<2	112	0.99	0.098	8	28	0.74	46	0.48	<3	2.13	0.03	0.03	<3	57	40
51815 GS95-OP-6	1	18	8	78	0.3	153	59	835	3.41	5	<5	<2	8	300	0.9	2	<2	38	1.91	0.195	41	52	1.25	201	0.3	4	1.78	0.3	0.15	36	8	85
51816 GS95-OP-7	<1	12	10	68	0.3	170	42	155	4.35	22	<5	<2	6	257	0.2	2	3	72	2.08	0.178	26	80	2.37	128	0.2	5	1.38	0.34	0.16	83	2	10
51817 GS95-OP-8	<1	17	12	68	<3	115	82	138	3.31	<2	<5	<2	11	718	0.9	<2	5	151	1.98	0.218	63	72	0.73	233	0.24	<3	2.51	0.34	0.37	9	5	10
51818 GS95-OP-9	<1	12	8	72	<3	63	65	475	4.25	<2	<5	<2	9	201	0.5	<2	<2	119	1.52	0.193	34	11	1.12	102	0.32	5	2.99	0.14	0.19	8	2	5
51819 GS95-OP-10	<1	5	8	62	0.3	3	42	585	4.72	3	<5	<2	8	408	<2	<2	<2	120	1.98	0.208	37	18	1.06	250	0.21	<3	2.23	0.37	0.41	25	4	5
51820 GS95-OP-11	<1	12	8	65	0.3	81	67	840	4.65	<2	<5	<2	8	178	<2	<2	8	115	1.58	0.12	38	28	1.18	128	0.36	3	2.73	0.13	0.27	9	8	76
51821 Red Dog Site	17	1.1	3	64	<3	15	12	57	4.94	7	<5	<2	9	82	0.9	3	<2	113	0.99	0.36	6	24	0.75	40	0.2	<3	2.28	0.03	0.04	2	22	45
51822 GS95-OP-15	1	14	6	72	0.3	168	48	855	3.87	12	<5	<2	6	112	0.4	2	2	75	1.98	0.182	30	58	1.17	138	0.24	<3	1.87	0.41	0.18	57	6	15
51823 GS95-OP-16	1	2	7	101	<3	40	71	887	0.7	5	5	<2	10	294	0.9	2	3	117	1.98	0.208	38	10	0.78	170	0.48	3	2.16	0.29	0.24	25	8	5

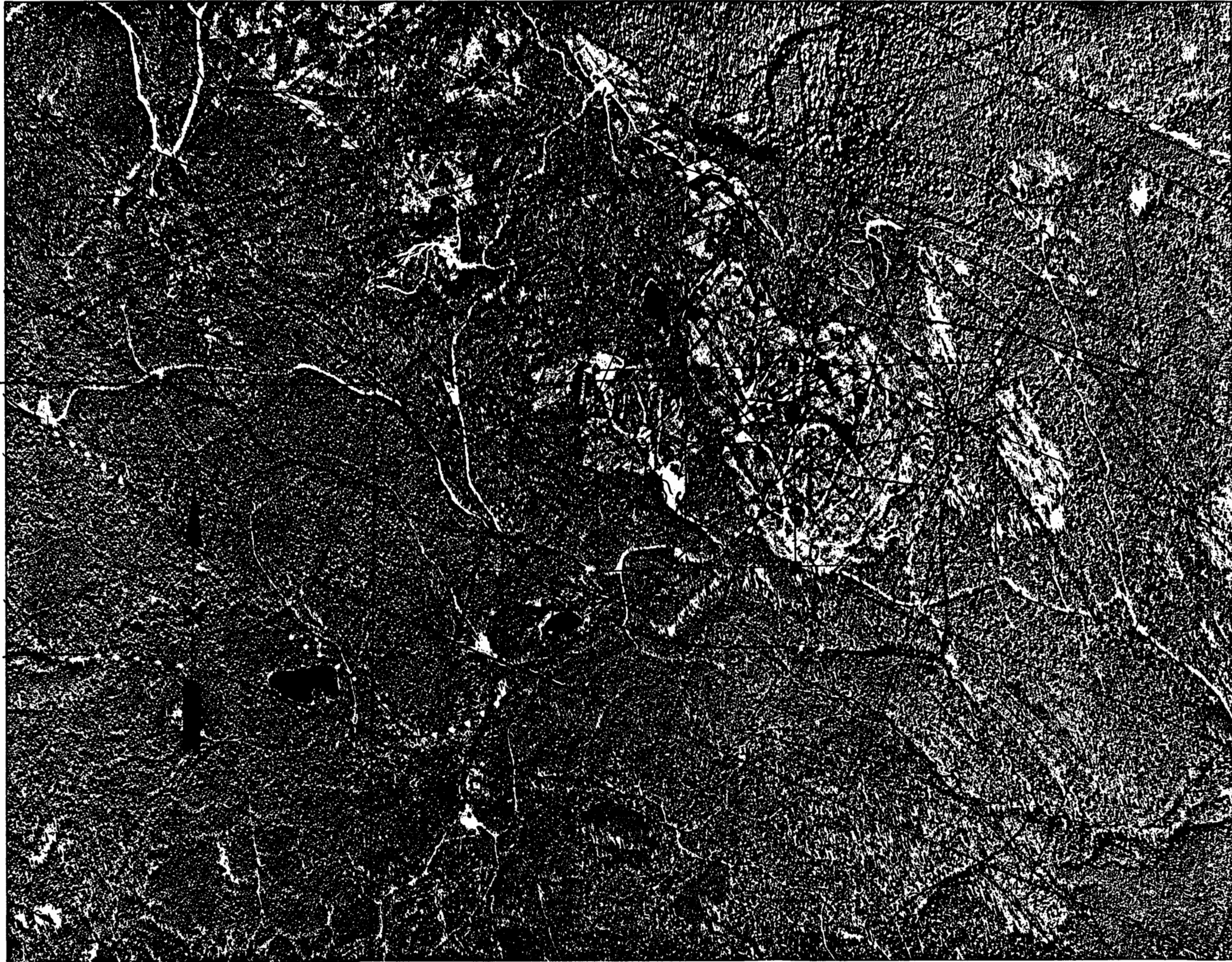
NOTES

- \* Cr \* Contamination from steel grinding
- LA = Fire assay-ICP
- LA = Flameless atomic absorption
- ICP = Aqueous regia-ICP
- GM = ACME Analytical

**APPENDIX III**

**1:10,000 Airphoto Composite Showing Opal Occurances and Interpreted Lineations.  
1:10,000 Airphoto Composite Overlay Showing Precious Opal and Lahar Occurances  
and Interpreted Base of Eocene Volcanics.**

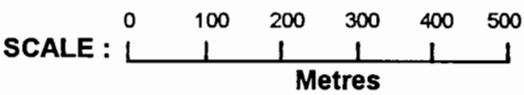




3E

**LEGEND**

- Precious opal occurrence
- Klinker claim post
- +— Claim line
- ~ ~ ~ ~ ~ Interpreted fault or fault contact
- - - - - Interpreted base of Eocene Volcanic Unit
- - - - - Interpreted flow/bed? contact within Eocene Units
- \\ \\ \\ \\ North-westerly trending lineations :  
- flow/bed? boundaries
- /// /// /// East to north-easterly trending lineations :  
- tension fractures, jointing and/or faulting



**KLINKER PROPERTY**

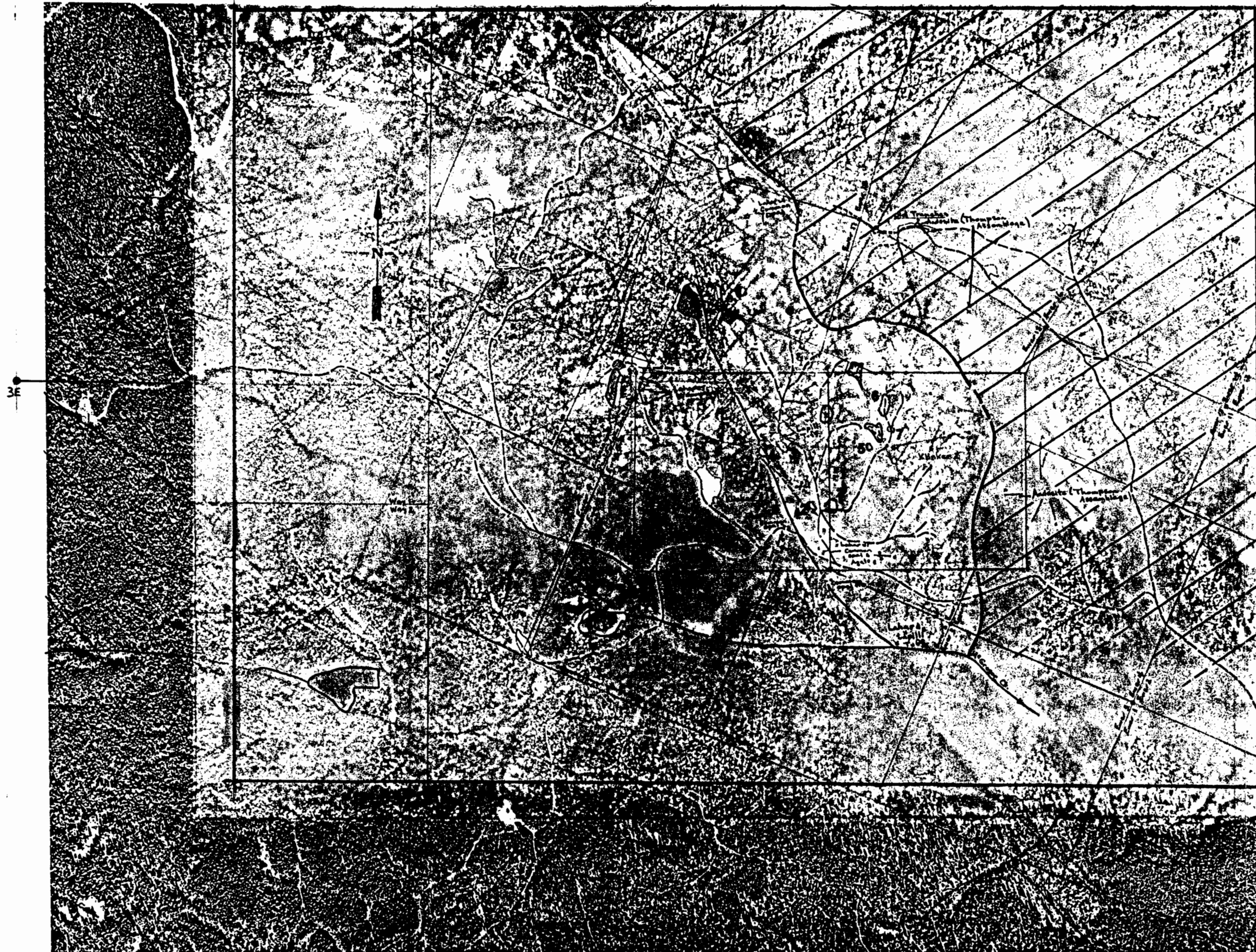
McGregor Creek Area, B. C.  
Vernon Mining Division

**OPAL OCCURRENCES,  
AIRPHOTO LINEATIONS**  
(and DETAILED CLAIM BOUNDARIES)

**OKANAGAN OPAL INC.**

DATE: Apr. 1996      SCALE: 1:10,000      MAP No. 13



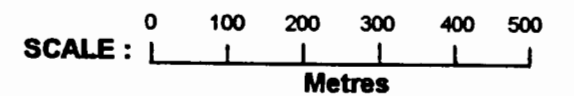


**LEGEND**

- Precious opal occurrences
- - - Interpreted base of Eocene Kamloops Group Rocks
- /// Permian Thompson Assemblage Rocks

**PRECIOUS OPAL ZONES**

- 1 DISCOVERY ZONE
- 2 BLUEBIRD ZONE
- 3 CAMEL ZONE
- 4 CAMEL EXTENSION
- 5 TRIPOD ZONE
- 6 RED ROCK ZONE
- 7 EAST WATERHOLE ZONE



**KLINKER PROPERTY**

McGregor Creek Area, B. C.  
Vernon Mining Division

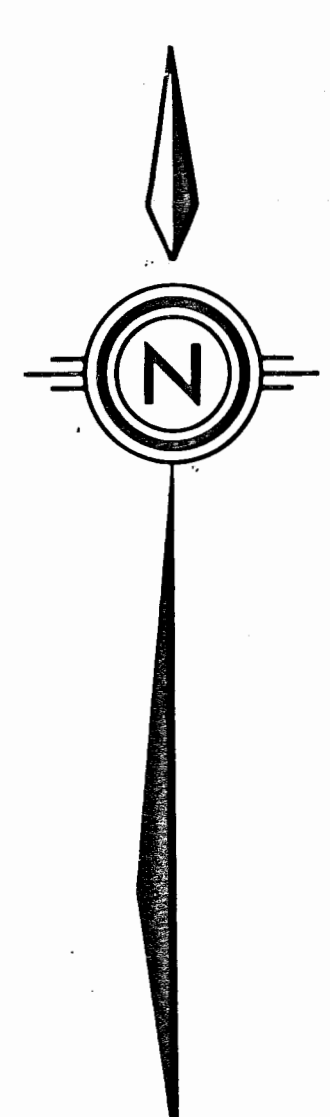
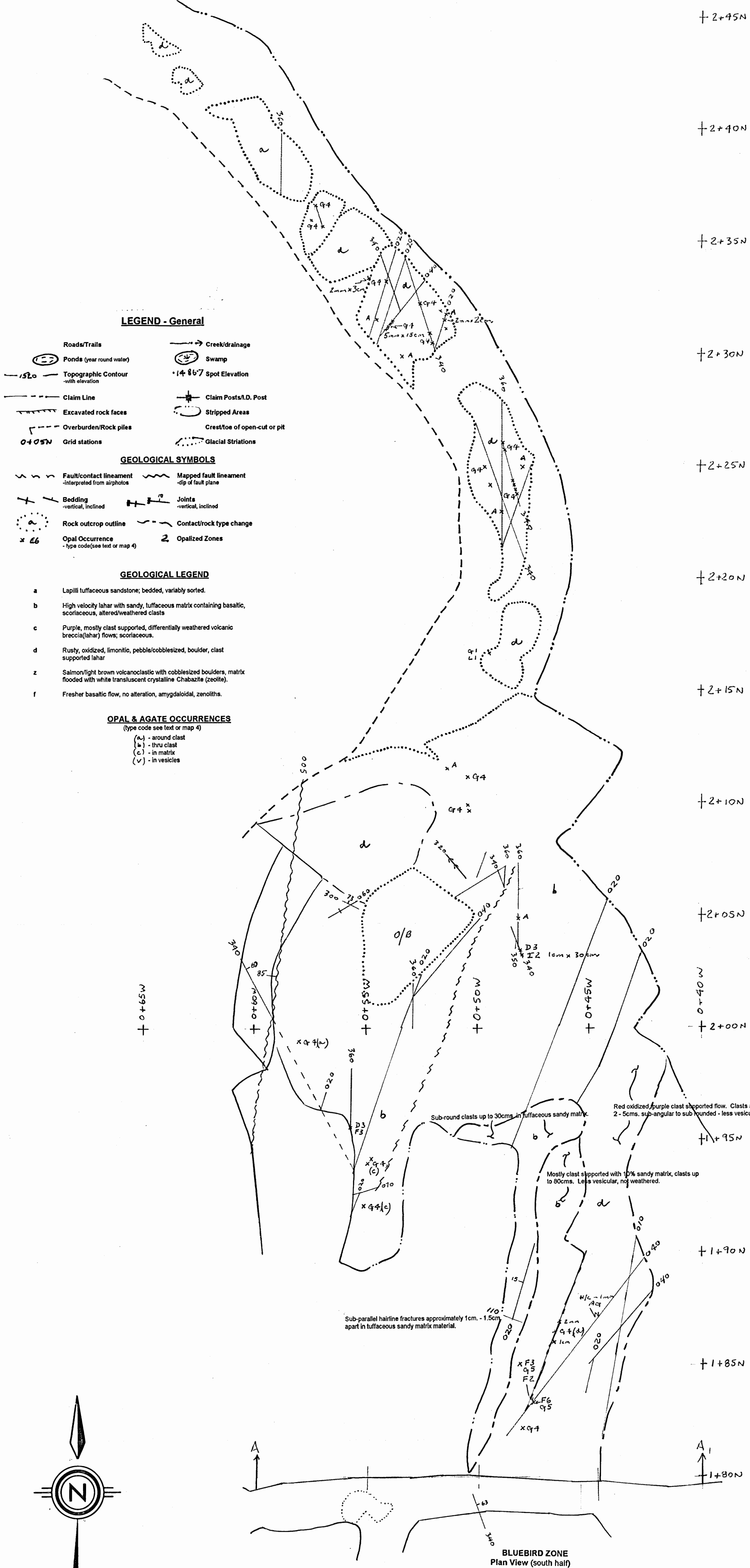
**MAP 13 OVERLAY**

Showing Precious Opal Zones,  
 Prospected Areas Indicating Lahar Flows,  
 Agate and Common Opal Occurrences  
 &  
 Interpreted Base of the Eocene Volcanics

**OKANAGAN OPAL INC.**

DATE:	SCALE	MAP No.
Apr. 1996	1:10,000	14





**GEOLOGICAL BRANCH ASSESSMENT REPORT**

**24,370**

**KLINKER PROPERTY**  
McGregor Creek Area, B. C.  
Vernon Mining Division  
**GEOLOGY OF THE BLUEBIRD ZONE**  
(Zone 2 - See Map 4)  
**KLINKER 1 MINERAL CLAIM**

**OKANAGAN OPAL INC.**  
DATE: Apr. 1996 SCALE: 1:100 MAP No. 10

**LEGEND - General**

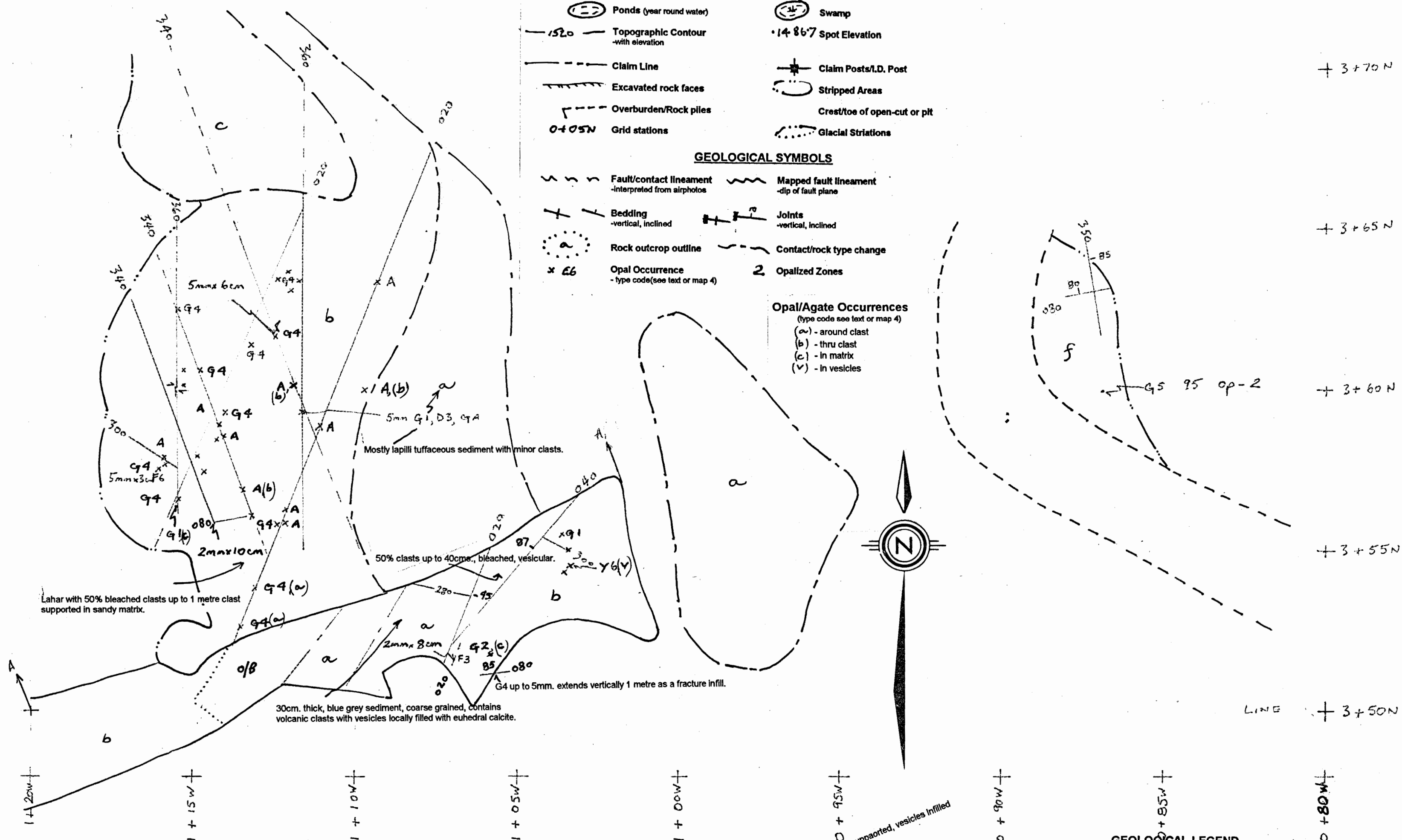
- |  |                              |
|--|------------------------------|
| Roads/Trails                           | Creek/Drainage               |
| Ponds (year round water)               | Swamp                        |
| Topographic Contour<br>-with elevation | 14 867 Spot Elevation        |
| Claim Line                             | Claim Posts/I.D. Post        |
| Excavated rock faces                   | Stripped Areas               |
| Overburden/Rock piles                  | Crest/toe of open-cut or pit |
| 0+05N Grid stations                    | Glacial Striations           |

**GEOLOGICAL SYMBOLS**

- |  |   |
|--|---|
| Fault/contact lineament<br>-interpreted from airphotos | Mapped fault lineament<br>-dip of fault plane |
| Bedding<br>-vertical, inclined                         | Joints<br>-vertical, inclined                 |
| Rock outcrop outline                                   | Contact/rock type change                      |
| Opal Occurrence<br>-type code(see text or map 4)       | 2 Opalized Zones                              |

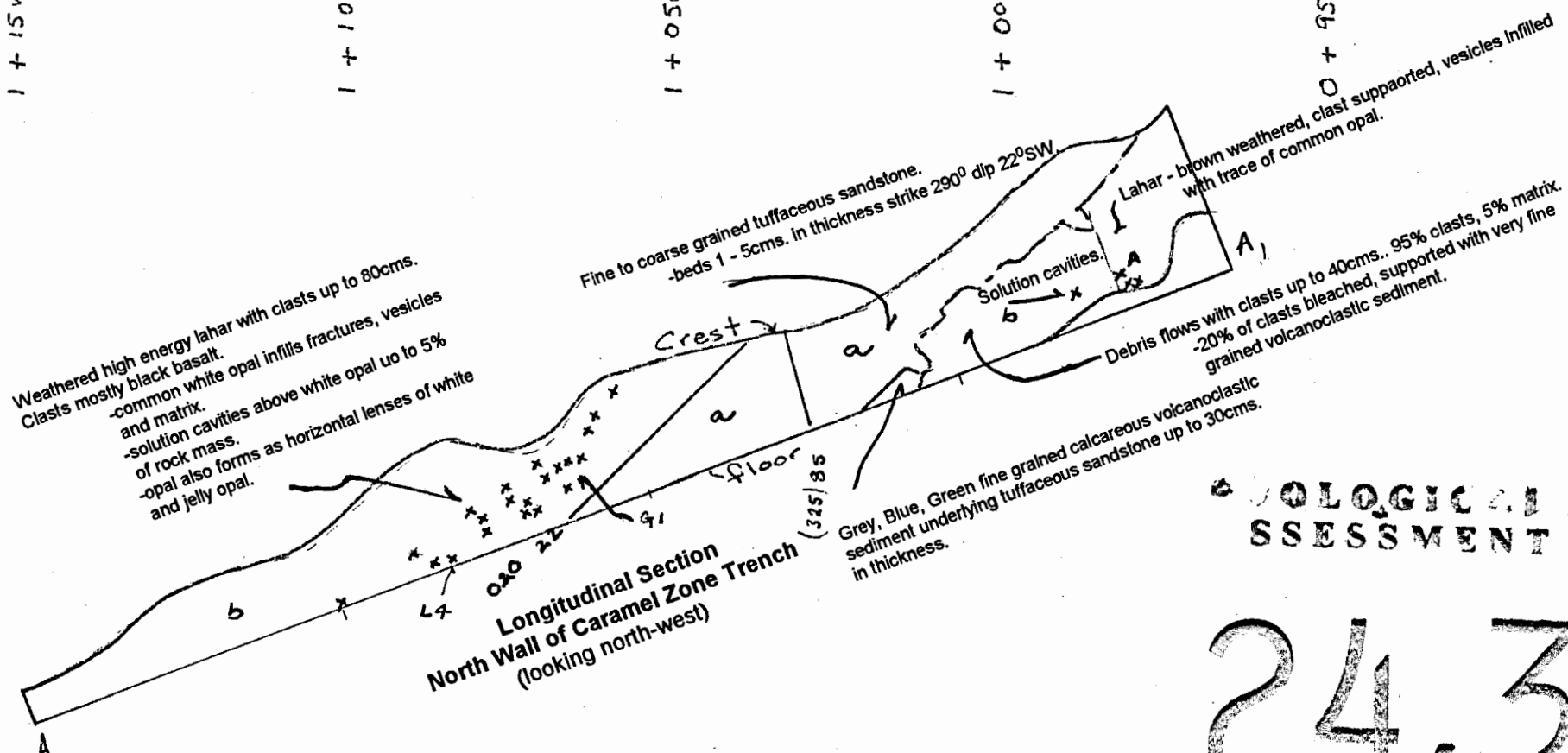
**Opal/Agate Occurrences**  
(type code see text or map 4)

- (a) - around clast
- (b) - thru clast
- (c) - in matrix
- (v) - in vesicles



**GEOLOGICAL LEGEND**

- a Lapilli tuffaceous sandstone; bedded, variably sorted.
- b High velocity lahar with sandy, tuffaceous matrix containing basaltic, scoriaceous, altered/weathered clasts
- c Purple, mostly clast supported, differentially weathered volcanic breccia(lahar) flows; scoriaceous.
- d Rusty, oxidized, limonitic, pebble/cobblesized, boulder, clast supported lahar
- z Salmon/light brown volcanoclastic with cobblesized boulders, matrix flooded with white translucent crystalline Chabazite (zeolite).
- f Fresher basaltic flow, no alteration, amygdaloidal, zeoliths.



**GEOLOGICAL BRANCH ASSESSMENT REPORT**

**24,370**

**KLINKER PROPERTY**  
McGregor Creek Area, B. C.  
Vernon Mining Division

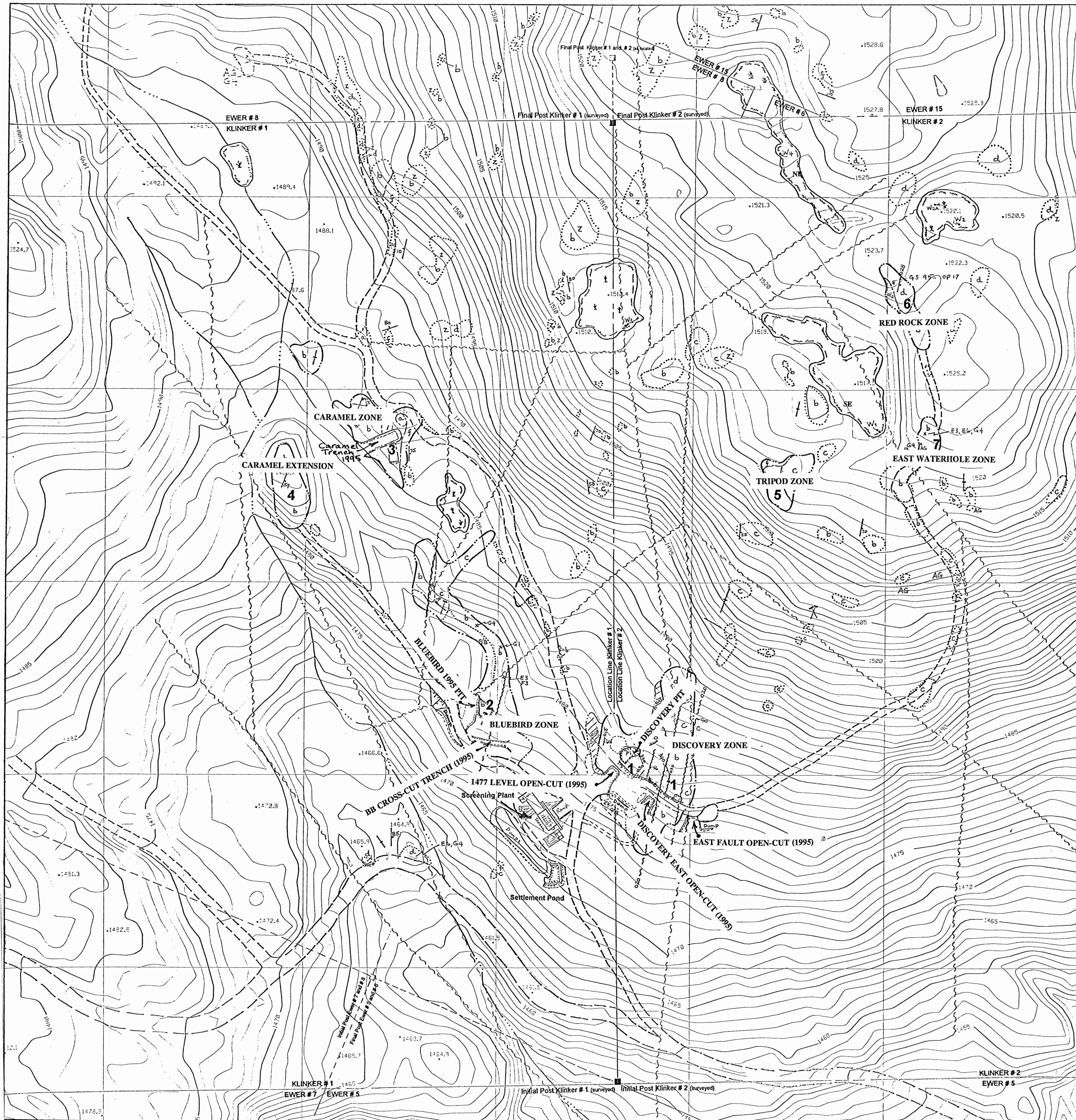
**GEOLOGY OF THE CAMEL ZONE**  
(Zone 3 - See Map 4)

**KLINKER 1 MINERAL CLAIM**

**OKANAGAN OPAL INC.**

DATE: Apr. 1996 SCALE: 1:100 MAP No. 11





**OPALIZED ZONES**

- 1 DISCOVERY ZONE OPAL TYPES:** A3, A4, A6, B3, B5, B6, D2, D3, D5, D6, E2, E3, E5, E6, F2, F3, F5, F6, G1, G2, G4, G5, H4, J1, J4, K1, K3, K4, K5, L1, L2, L4. - NOTE: also contains agate.
- 2 BLUEBIRD ZONE OPAL TYPES:** A3, A4, B3, B6, D3, D6, E3, E6, F1, F4, F6, G1, G2, G4, G5, I4, J1, J2, J4, J5, K1, L1, L2, L4. - NOTE: also contains agate.
- 3 CARAMEL ZONE OPAL TYPES:** A4, D6, E3, E6, F2, F5, F6, G1, G3, G4, G5, J2, J4, J6, L2, L4. - NOTE: also contains agate.
- 4 CARAMEL EXTENSION OPAL TYPES:** A4, E3, G3, G1, J4, L4. - NOTE: also contains agate.
- 5 TRIPOD ZONE OPAL TYPES:** D3, D6, E3, F3, F6, G4, J4, K4, K5. - NOTE: also contains agate.
- 6 RED ROCK ZONE OPAL TYPES:** B4, B5, B6, C5, C6, D6, G1, G4, G5, J4, K4, K5. - NOTE: also contains agate.
- 7 EAST WATERHOLE ZONE OPAL TYPES:** E3, E6, G4. - NOTE: also contains agate.

**OPAL DESCRIPTION TABLES**

PRECIOUS OPAL				
DESCRIPTION	BASE COLOR	CODE	OPAQUE	TRANSPARENT
BLACK	A	n/a	1	2
ORANGE	B	n/a	n/a	n/a
RED	C	n/a	n/a	n/a
AMBER	D	n/a	amber	amber
YELLOW	E	n/a	yellow	yellow
CLEAR	F	n/a	semi-clear	clear
WHITE	G	white base color	semi-white	n/a
GREEN	H	n/a	n/a	n/a
SALMON/PINK	I	n/a	n/a	n/a
CARAMEL	J	caramel	caramel	n/a
BROWN	K	brown	with play of color	faces up brown
BLUE	L	blue	with play of color	with play of color

COMMON OPAL (no play of color)				
DESCRIPTION	BASE COLOR	CODE	OPAQUE	TRANSPARENT
BLACK	A	black base color	black base color	faces up black
ORANGE	B	orange base color	orange base color	orange base color
RED	C	n/a	red base color	red base color
AMBER	D	n/a	amber	amber
YELLOW	E	n/a	yellow base color	yellow base color
CLEAR	F	n/a	semi-clear	clear
WHITE	G	white	semi-white	n/a
GREEN	H	green	n/a	n/a
SALMON/PINK	I	salmon/pink	n/a	n/a
CARAMEL	J	caramel	caramel	n/a
BROWN	K	brown	brown	n/a
BLUE	L	blue	n/a	n/a

**LEGEND - General**

- Roads
- Ponds (year round water)
- Topographic Contour w/ elevation
- Claim Line
- Excavated Rock Faces
- Water Sample Site
- Water level monitor site
- Creek/drainage
- Swamp (seasonal water)
- Spot Elevation
- Claim Posts/I.D. Post
- Stripped Areas
- Overburden Files
- EM grid baseline

**Geological Symbols**

- Fault/contact lineament: -Interpreted from alphotos
- Bedding: vertical, inclined
- Rock Outcrop outline
- Opal Occurrence: -type code
- Mapped fault lineament
- Joints: vertical, inclined
- Contact/Rock type change
- Opalized Zones

**Geological Legend**

Map Symbol	Age	Rock Type/Description
a	Eocene	Tuffaceous sandstone.
b	Eocene	High velocity lahar with tuffaceous sandy matrix; clasts, basaltic, scoriaceous, highly altered, weathered.
c	Eocene	Mostly clast supported, differentially weathered volcanic breccia (lahar?), purple, scoriaceous.
d	Eocene	Rusty, oxidized, limonitic, pebble, cobble, boulder, clast supported lahar or breccia.
z	Eocene	Salmon to light brown colored volcaniclastic with cobbles, boulders; matrix flooded with white crystalline zeolite (chabazite).
f	Eocene	Fresher basaltic flow, no alteration, amygdaloidal, xenoliths.

**24,370**

**LOGICAL BRANCH ASSESSMENT REPORT**

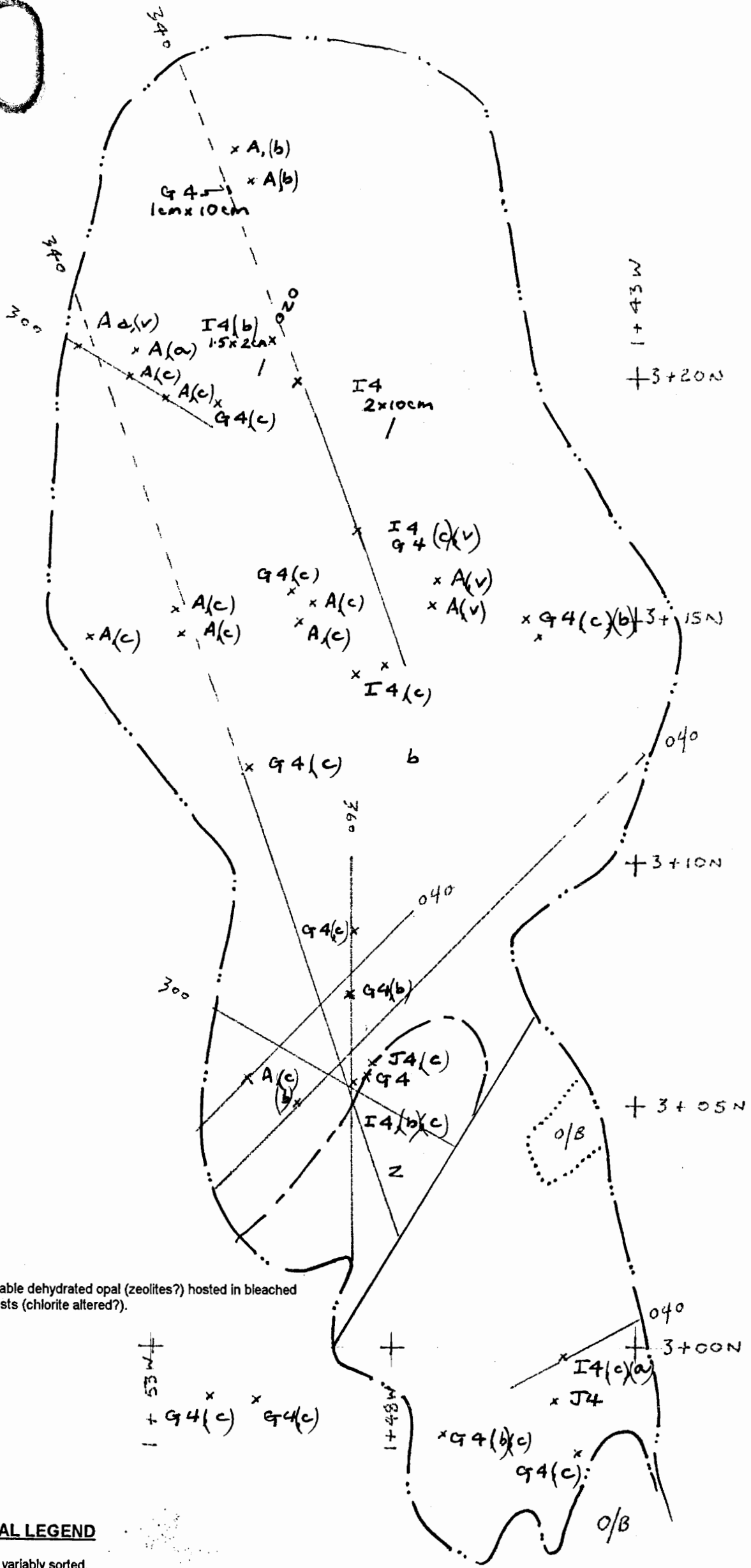
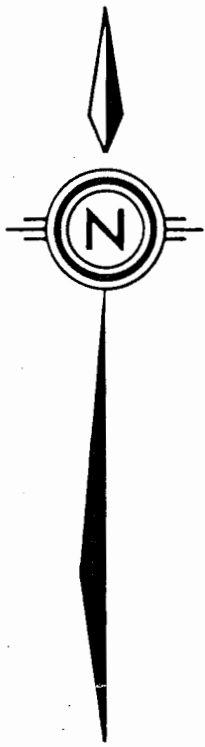
**KLINKER PROPERTY**  
 McGregor Creek Area, B. C.  
 Vernon Mining Division  
**GEOLOGICAL MAP OF KLINKER CLAIMS & OPAL BULK SAMPLING SITE PLAN**  
 KLINKER 1 AND 2 MINERAL CLAIMS

**OKANAGAN OPAL INC.**  
 DATE: Apr. 1996 SCALE: 1:1000 MAP No. 4

**NOTE:**  
 Map updated in January 1996 to show 1995 work locations.



24,370



**GEOLOGICAL LEGEND**

- a Lapilli tuffaceous sandstone; bedded, variably sorted.
- b High velocity lahar with sandy, tuffaceous matrix containing basaltic, scoriaceous, altered/weathered clasts
- c Purple, mostly clast supported, differentially weathered volcanic breccia(lahar) flows; scoriaceous.
- d Rusty, oxidized, limonitic, pebble/cobblesized, boulder, clast supported lahar
- z Salmon/light brown volcanoclastic with cobblesized boulders, matrix flooded with white translucent crystalline Chabazite (zeolite).
- f Fresher basaltic flow, no alteration, amygdaloidal, xenoliths.

**Opal/Agate Occurrences**

- (type code see text or map 4)
- (a) - around clast
  - (b) - thru clast
  - (c) - in matrix
  - (v) - in vesicles

**KLINKER PROPERTY**

McGregor Creek Area, B. C.  
Vernon Mining Division

**GEOLOGY OF THE  
CAMEL ZONE EXTENSION**

(Zone 4 - See Map 4)  
**KLINKER 1 MINERAL CLAIM**

**OKANAGAN OPAL INC.**

DATE: Apr. 1996 SCALE: 1:100 MAP No. 12

For additional Legend see map No. 11



**LEGEND - General**

	Roads/Trails		Creek/Drainage
	Ponds (year round water)		Swamp
	Topographic Contour with elevation		Spot Elevation
	Claim Line		Claim Posts/L.D. Post
	Excavated rock faces		Stripped Areas
	Overburden/Rock piles		Crest/toe of open-cut or pit
	Grid stations		Glacial Striations

**GEOLOGICAL SYMBOLS**

	Fault/contact lineament -interpreted from airphotos		Mapped fault lineament -dip of fault plane
	Bedding -vertical, inclined		Joints -vertical, inclined
	Rock outcrop outline		Contact/rock type change
	Opal Occurrence -type code(see text or map 4)		Opalized Zones

**GEOLOGICAL LEGEND**

- a Lapilli tuffaceous sandstone; bedded, variably sorted.
- b High velocity lahar with sandy, tuffaceous matrix containing basaltic, scoriaceous, altered/weathered clasts
- c Purple, mostly clast supported, differentially weathered volcanic breccia(lahar) flows, scoriaceous.
- d Rusty, oxidized, limonitic, pebble/cobblesized, boulder, clast supported lahar
- e Salmon/light brown volcanoclastic with cobblesized boulders, matrix flooded with white translucent crystalline Chabazite (zeolite).
- f Fresher basaltic flow, no alteration, amygdaloidal, zeolite.

**OPAL & AGATE OCCURRENCES**  
(type code see text or map 4)

- (a) - around clast
- (b) - thru clast
- (c) - in matrix
- (v) - in vesicles

**KLINKER PROPERTY**  
McGregor Creek Area, B. C.  
Vernon Mining Division

**GEOLOGICAL MAP OF THE DISCOVERY ZONE**  
(Zone 1 - See Map 4)  
KLINKER 2 MINERAL CLAIM

**OKANAGAN OPAL INC**  
DATE: Apr. 1996 SCALE: 1:100 MAP No. 5

**GEOLOGICAL BRANCH ASSESSMENT REPORT**

# 24,370