INDIAN AND NORTHERN AFFAIRS CANADA
ABANDONED CLINTON CREEK
ASBESTOS MINE
1998 SITE RECONNAISSANCE

APRIL, 1999

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April 6, 1999

Indian and Northern Affairs Canada
345, 300 Main Street
Whitehorse, Yukon
Y1A 2B5

Attention: Brett Hartshorne

Dear Sir:

Reference: Abandoned Clinton Creek Asbestos Mine – 1998 Site Reconnaissance

Enclosed is our report summarizing site reconnaissance trips completed by UMA Engineering at the abandoned Clinton Creek Asbestos Mine in August and September, 1998. Site photographs are included in a separate binder referenced as Appendix A.

Based on our reconnaissance and a review of historical information, we are of the opinion that conditions are continuing to deteriorate at the waste rock dumps and tailings piles. Of particular concern is the potential for either Hudgeon Lake or the pond upstream of the Wolverine Creek tailings piles to drain suddenly, causing destructive flooding and debris flows downstream of these areas. The potential also exists for a sudden release of water upstream of the Porcupine Creek waste rock blockage, however, the watershed boundary is relatively small and the consequences of a failure are less significant by comparison.

Thank you for the opportunity to work on this most interesting assignment at this site. We would be pleased to discuss appropriate follow-up activities based on the observations and assessments developed from the 1998 site inspections. Please contact Mr. Ken Skaftfeld or Mr. Tom Wingrove if you have any questions or require additional information.

Respectfully Submitted,

UMA ENGINEERING LTD.

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Vice President & Manager
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KS/dh

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Director
Earth & Environmental Division

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Summary

Based on our 1998 reconnaissance of the abandoned Clinton Creek Asbestos Mine, we are of the opinion that conditions are continuing to deteriorate at the waste rock dumps and tailings piles. Of particular concern is the potential for either Hudgeon Lake or the pond upstream of the Wolverine Creek tailings piles to drain suddenly, causing destructive flooding and debris flows downstream of existing or potential channel blockages. The potential also exists for a sudden release of water upstream of the Porcupine Creek waste rock blockage, however, the upstream watershed boundary is relatively small and the consequences of a failure are less significant by comparison.

Significant erosion, undercutting, and downcutting of the Clinton Creek channel continues. The risk of a major breach increases with time as the channel deepens downstream of the lake outlet. Although the section of channel immediately downstream of the lake outlet has remained relatively intact, channel incising is likely to gradually advance upstream increasing the potential for a complete or partial breach at the lake outlet. The destructive nature of large creek flows is evident well downstream of the waste rock dump where flow debris can be seen over a large area. A breach of the plug at the lake outlet could result in flooding and debris flows more destructive than have been seen historically. Erosion and localized failures of the access road are also occurring, a process which will eventually result in the road becoming impassable.

The Clinton Creek Waste Rock Dump has historically advanced towards the valley and into Hudgeon Lake, as evidenced by ground surface movement monitoring during mine operation. Since the dump is considered at best to be marginally stable, continued movements (spreading) of the waste rock are likely as the channel is down-cut. An understanding of the performance of the rock dump since mine closure, in particular the amount of surficial movements, is essential to fully assess the impact of creek channel erosion, the risk of a catastrophic breach and the feasibility of remedial measures.

Significant instabilities of the southern section of the Porcupine Creek Waste Rock Dump are evident, although ground movement monitoring has never been undertaken to measure the magnitude of movements. Impounded water upstream of the waste rock dump continues

to flow either below or through the waste rock or along the east valley slope in subterranean channels. Both flow channels are at risk of blockage due to subsidence of either the waste rock or the overburden soils. Should this occur, it is possible that water levels upstream of the waste rock dump would increase and eventually overtop the toe of the waste rock along the east valley slope.

The north and south tailings lobes continue to advance toward the east valley slope. Tension cracks and slumping at and behind the crest indicate that the instabilities are retrogressive in nature i.e. as the toe advances and is eroded, the mid and upper sections of the tailings are destabilized resulting in increased rates of movement. Erosion and subsequent transport of tailings from the south and north lobe continues along Wolverine Creek. Given the remaining volume and height of tailings on the west valley slope, the potential for a significant channel blockage is real. Based on the events of 1974, this would likely result in a sudden breach and downstream flooding and debris (tailings) flows. An understanding of the current magnitude and movement rates would be valuable in assessing the present situation, the risk of a sudden breach and the feasibility of remedial measures.

Although the consequences of a sudden breach of the Clinton Creek and Wolverine Creek blockages would be most severe immediately downstream of the mine site, the potential exists for property damage as far downstream as the Forty Mile River. Of particular concern is the potential for loss of life from a sudden outburst flood and debris flow. The mine site is accessible to the public and was well travelled during our site reconnaissance. Camping downstream of the washed out bridge is not uncommon and placer mining was underway along Wolverine and Clinton Creeks in September, 1998 (claim stakes have recently been placed along the creeks).

1.0 INTRODUCTION

UMA Engineering Ltd. (UMA) is pleased to submit this summary report of our 1998 site reconnaissance of the abandoned Clinton Creek Asbestos Mine. The purpose of the two site visits was to: locate, map and inventory all pertinent site conditions relative to the extent of existing slope movements of the waste rock dumps and tailings piles; and assess any visual indicators of potential continued movement. We have also summarized site development activities and previous site inspections conducted since 1974, in particular photographic and observational records of the site over a 24-year period.

An initial one day fly-in visit was made to the site in August, 1998 by Ken Skaftfeld, P.Eng. of UMA, Brett Hartshorne of DIAND and Matt Dodd of Royal Roads University (RRU). A more detailed three-day reconnaissance trip was carried out in September, 1998 by Ken Skaftfeld, P.Eng. and Jeff Tutkaluk, P.Eng. of UMA in conjunction with an environmental sampling program by RRU. Based on these site reconnaissance trips, we have prepared this report which includes updated mine site drawings, a narrated videotape, and a detailed photographic record of areas of concern.

Similar to previous reports, separate discussions are presented for the Clinton Creek Waste Rock Dump, the Porcupine Creek Waste Rock Dump, the Tailings Piles (north and south lobes), and the Clinton Creek and Wolverine Creek channels including selected historical photographs. Selected photographs are included in the body of this report. A complete UMA photo record is separately bound as Appendix A. Reference numbers for photographs from previous inspections are as they appear in historical reports and as a result, are in no particular order.

The general mine layout is shown on Drawing 01 which is based on an air photo taken in August, 1988. Field notes from our 1998 site reconnaissance, previous reports, aerial photographs, and other relevant information have been used to generate drawings of the Clinton Creek Waste Rock Dump and creek channel (Drawing 02), the Porcupine Creek Waste Rock Dump and creek channel (Drawing 03) and the Wolverine Creek Tailings Pile and creek channel (Drawing 04). Photo numbers and locations are included on Drawings 02, 03 and 04. Copies of field notes are included in Appendix B.

2.0 CLINTON CREEK WASTE ROCK DUMP

The waste rock from Porcupine Pit was initially placed along the south valley slope west of the mine as shown on Photo CC-01, probably taken around 1970 (Geo-Engineering, December, 1986). It is apparent that the waste rock was unstable at this early stage as evidenced by visible slumping of the east section of waste rock. This early photograph, looking upstream, also illustrates Clinton Creek along its original alignment in the center of the valley (now Hudgeon Lake).

Photo CC-01: Clinton Creek Waste Rock Dump (Circa 1970)

Between 1970 and 1975, a considerable volume of waste rock was dumped across the valley as shown on Photo CC-03 taken in May, 1975. The resulting valley blockage impounded water from the Clinton Creek watershed creating Hudgeon Lake.

Photo CC-03: West end of Waste Rock Dump (May, 1975)

Significant lateral spreading of the rock fill, in particular at the west end of the dump towards Hudgeon Lake, occurred as a consequence of the continued placement of waste rock. Photo 1, taken in about May 1976 (Golder Associates, April 1977), shows tension cracks along the crest of waste rock adjacent to Hudgeon Lake. By 1985, the west end of the waste rock dump had slumped considerably towards, and into, Hudgeon Lake (Photo 2, Klohn Leonoff, September, 1986).

Photo 1: Tension Cracks at West End of Waste Rock Dump (1976)

Photo 2: View South at Waste Rock Dump (1985)

Based on observational records, active movement of the waste rock dump has continued since mine closure in 1978, although the magnitude of this movement has not been quantified since that time. Prior to mine closure, surveys of movement monitoring targets were conducted to assess the rate and magnitude (vertical and horizontal) of waste rock movement. With the exception of several targets along the south bank of the creek channel, most of the monitoring points are intact. Targets located during our reconnaissance are indicated on Drawing 02. Visible movements of the waste rock pile were reported in Geo-Engineering's July, 1998 report (Photo 17). Examination of the area near the center of Photo 17 (sparsely covered with young poplar trees) in September revealed that many of the tension cracks associated with slump blocks had been infilled, possibly suggesting reduced slope movement at this end of the dump (UMA Photo 9-3). More recent multiple tension cracks which further confirm on-going lateral movements of the waste rock were observed farther east along the access road during our September, 1998 site reconnaissance (UMA Photo 2-18, Appendix A).

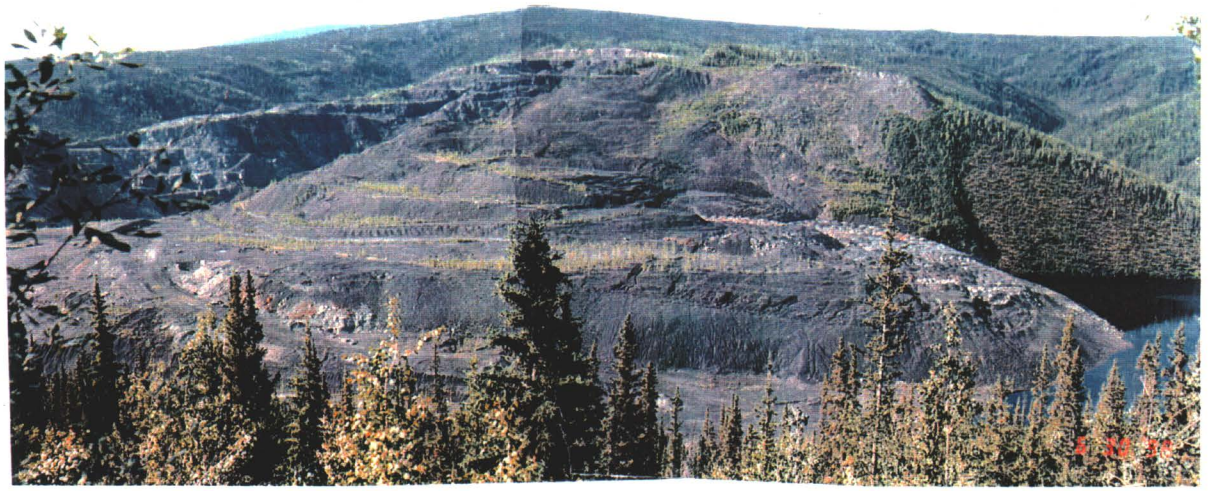


Photo 17: Tension Cracks in Waste Rock Along Sparsely Treed Area (1998)

3.0 CLINTON CREEK CHANNEL

No photographic or written records are available from when the mine first opened until the waste rock dump forced the alignment of Clinton Creek against the north valley slope and ultimately impounded Hudgeon Lake. Photo CC-02 is the earliest available photograph of Hudgeon Lake, looking east at the waste rock dump, lake outlet, and the creek channel. Initially (1974), the creek channel flowed between the waste rock dump and the mill access road located on the north valley slope (Photo CC-03). However, as the water level in Hudgeon Lake increased, the unprotected channel eroded (down-cut) and migrated laterally to the north, eventually washing out the road (Photo CC-09).

Photo CC-02: Access Road and Hudgeon Lake Outlet at Clinton Creek (1974)

Photo CC-03: Access Road Along North Side of Clinton Creek (about 1974)

Photo CC-09: Erosion of Access Road on North Side of Creek (1975)

A new access road with a wide shoulder was subsequently constructed through the rock fill along the south side of the creek channel. However, the waste rock was undercut and began slumping soon after it was constructed as shown on Photo 5, (Golder Associates, April 1977). Slumping on the north side of the channel also began to undercut the natural valley slope can also be seen in Photo 5.

Photo 5: Erosion and Slumping of New Access Road on South Side of Creek (1976)

During the summer of 1979, an attempt was made to reduce channel erosion and undercutting by constructing rock weirs and armouring the banks of the channel immediately downstream of the lake outlet. Over the next few years, however, the creek flow bypassed the rock weirs on the north side causing significant erosion (Photo 3 Hardy Associates Ltd, July 1982). By 1983, channel flow had completely bypassed the weirs substantially increasing valley slope erosion as seen in Photo 3 (Klohn Leonoff, August 1983).

Photo 3: Creek Bypassing Weirs (1982)

Photo 3: Valley Erosion (1983)

Significant channel erosion and down-cutting is also evident downstream of the weir (Photo 4 Klohn Leonoff, August 1983).

Photo 4: Channel Erosion Downstream of Weirs (1983)

Remedial work was again undertaken in the fall of 1983 to reduce channel erosion. Flow was diverted along the south side of the rock weirs while the north side of the channel and the culvert outlets were armoured with rip rap as seen in Photos 7 and 10, respectively (Klohn Leonoff, November 1983). Woven geotextile was placed beneath the rip rap on the north side of the channel (Photo 6 Klohn Leonoff, November 1983).

Photo 7: Armouring of North Side of Channel (1983)

Photo 10: Channel Lining at Culvert Outlets (1983)

Photo 6: Channel Repairs (1983)

In June 1984, the channel was beginning to by-pass the last downstream rock weir (Photo 2 - Klohn Leonoff, August 1984). Photos 3 and 4, taken in June, 1985 illustrate the minor modifications made to the north side of the channel.

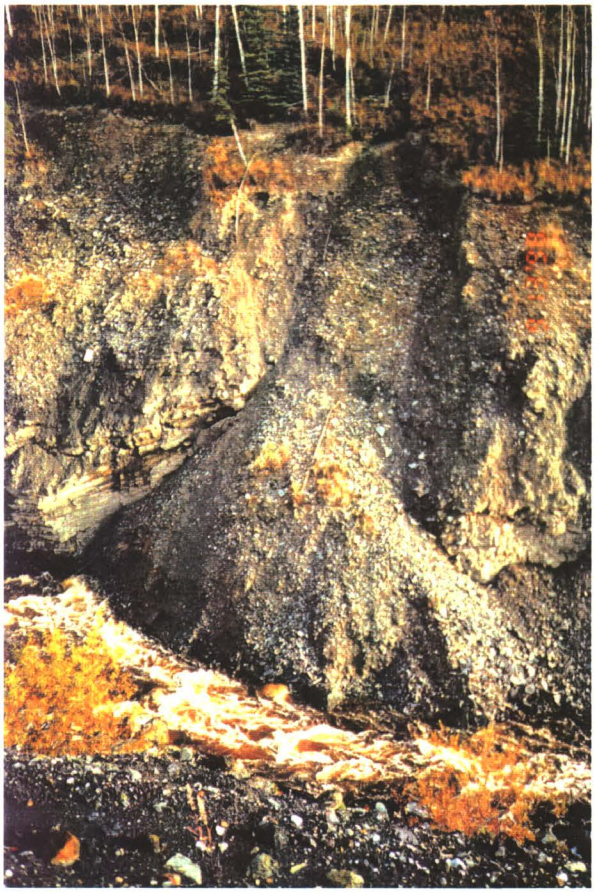
Photo 2: Channel Bypassing Rock Weirs (1984)

Photos 3 and 4: Channel repairs (1985)

Spring run-off in 1997 destroyed the rock weirs. Since that time, significant channel erosion and incising has occurred downstream of the washed out culverts, apparently down-cutting the channel by up to about 2m (UMA Photo 7-24). Down-cutting of the channel is also apparent farther downstream when Photo 4 (Page 9) is compared with UMA Photo 7-17. At present, numerous slumps and localized slope failures are occurring on either side of the channel as material is eroded (UMA Photos 7-6 and 7-18 and 7-25 in Appendix A). Once material has failed or slumped into the channel, flow is often forced to meander around the debris initiating erosion of the opposite bank.

UMA Photo 7-24: Channel Down-Cutting (1998)

UMA Photo 7-17: Channel Erosion (1998)



UMA Photo 7-6: Sloughed Till in Channel From Localized Bank Failure (1998)

This process has begun to impact the integrity of the access road along the waste rock dump as evidenced by tension cracks along the north shoulder of the access road (UMA Photo 7-14). Slumping has resulted in considerable narrowing of one section of the access road (UMA Photos 2-8 and 7-5 in Appendix A) and it is likely that the access road will become impassible in the near future as this process continues (Drawing 02).

UMA Photo 7-14: Tension Crack Along Access Road (1998)

UMA Photo 2-8: Failure Along Access Road Shoulder (1998)

Another contributing factor to erosion and slumping of the south bank is the presence of exposed bedrock along parts of the channel bottom and north valley toe. A substantial length of channel (approximately the downstream half) has been cut into the weathered Argillite bedrock as shown on Drawing 02. The bedrock generally consists of a weathered weaker bedrock unit overlying a stronger more competent bedrock unit with horizontal to slightly dipping bedding planes. The bedrock is less erodable than the waste rock that comprises the south bank and, as a result, the south bank appears to undergo preferential erosion and undercutting. In the upper reaches of the creek (downstream of the lake outlet), the channel is cut into highly erodable waste rock and till material on the north bank. Although portions of the channel contain large diameter boulders, the creek channel, in many cases, is beginning to meander around these more protected sections. Downcutting is evident just downstream of the lake outlet where the new creek bed is suspected to be at least 2 metres below its elevation following repair work in 1984 (Section A-A, Drawing 02).

The road crossing at the lake outlet is now washed out and only 2 of the original 4 CMP culverts remain (Drawing 02). Flow occurs through the culverts and between the second culvert and the north bank. The inlet for the first culvert is not visible and is blocked with debris, limiting flow. Water depths in the open channel are in the order of 0.5 metres (September, 1998) with velocities estimated to be 0.75 metres per second. The CMP section visible in the channel some distance downstream is believed to be either the end section of the second culvert or one of the missing culverts. The channel profile is estimated to drop about 3 metres between the outlet and Points A, B, and C, as shown on Drawing 02.

Two springs were observed exiting from the waste rock just downstream of the lake outlet. The first spring exits from what is believed to be the old creek bed, between the island and south bank (Drawing 02 and UMA Photo 8-16). The second spring exits about 2 metres above the creek water level on the south bank (UMA Photo 8-19 and Drawing 02). The water from both springs was clear with no evidence of fines. Brown slime was growing over the rocks at the downstream spring and the water had a noticeable hydrogen sulphide odour. A water sample was collected from the spring by RRU.

UMA Photo 8-16: Spring in Creek channel Remnant (1998)

UMA Photo 8-19: Spring on South Bank

Downstream of the washed out bridge at the east end of the waste rock dump, a single creek channel now meanders through a considerable area of flow debris consisting of gravel to 200mm diameter rock (UMA Photos 13-17 and 13-18, Drawing 02). There appears to be considerably more flow debris downstream of the bridge now (UMA Photo 2-7) as compared with Photo 7 taken in 1986 (Geo-Engineering, November 1986). Several channel remnants and evidence of significantly wider historic channel flow are visible. High water marks in trees in the area are about 600mm above the ground surface, or about 1.5 to 2 metres above the existing creek water elevation. At locations as far as 200 metres downstream of the bridge, trees and brush have trapped flow debris (UMA Photo 11-22 note leaning trees). Beaver dams several hundred metres downstream of the bridge have flooded a large area near the junction of Wolverine and Clinton Creek.

UMA Photo 13-17 and 13-18: Clinton Creek at washed out bridge

Photo 7: Clinton Creek Bridge Crossing (1986)

UMA Photo 11-22: Flow Debris in Treed Area

4.0 PORCUPINE PIT

Instabilities of the open pit (Porcupine Pit) sides-slopes have been on-going since closure of the open pit mine. Recent tension cracks were observed during our site reconnaissance, in particular at the crest along the entrance to the mine as shown on UMA Photos 9-10 to 9-12 and along the west edge of the crest where a significant slump block has developed (Drawing 03). Continued sloughing of the over-steepened pit walls is clearly evident and is expected to continue for an indefinite time period (UMA Photo 11-1). Debris could occasionally be heard falling into the water while completing our reconnaissance in the area.

UMA Photo 11-1: View Northeast at Porcupine Pit (1998)

5.0 PORCUPINE CREEK WASTE ROCK DUMP

Waste rock was placed across the Porcupine Creek valley slope as shown on Drawing 04 and in Photo 12, one of the earliest aerial photographs of the area taken in 1976 or 1977 (Hardy, 1977). The most northerly section of the dump was placed at least partially up the east valley wall. This area has remained relatively stable. Sections near the centre of the dump which were placed farther away from the east valley toe, however, have experienced slumping creating blockages at two locations, as indicated on Drawing 03.

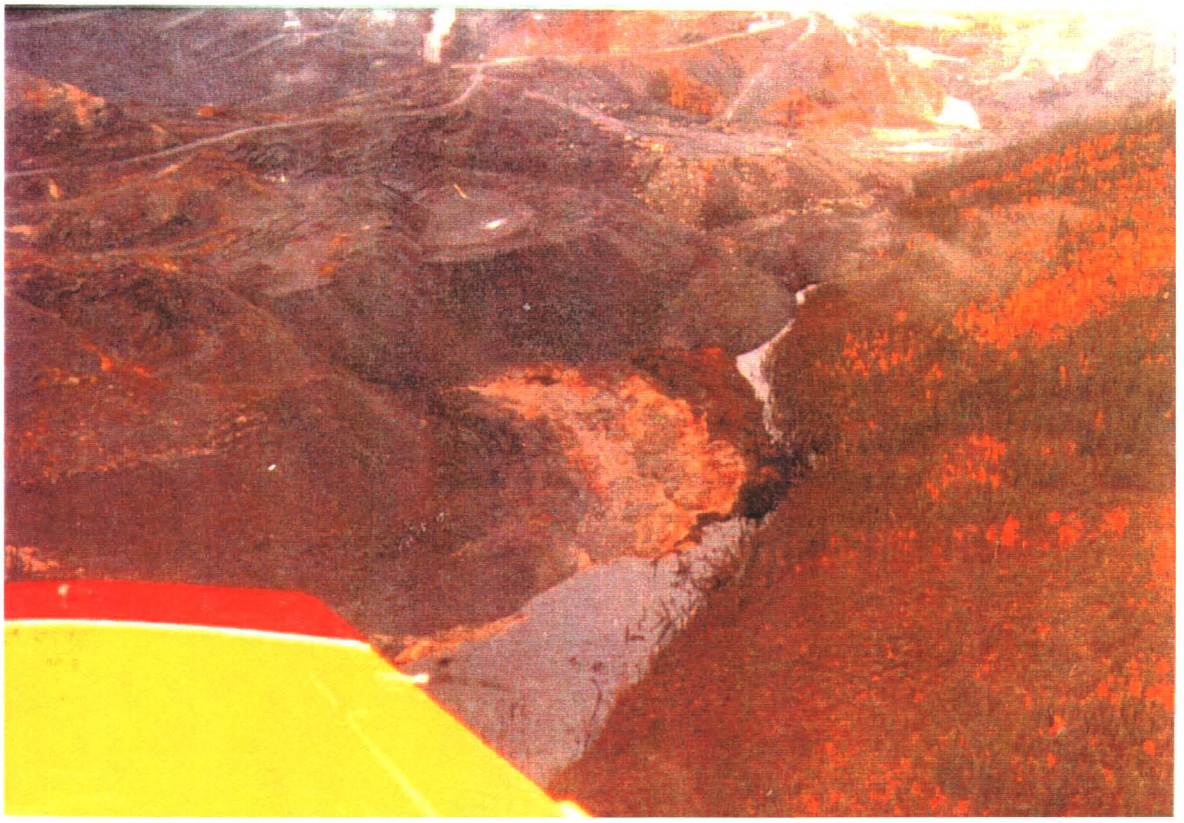


Photo 12: East Edge of Porcupine Creek Waste Rock Dump (1977)

The first blockage (blockage 1) was photographed in 1987 by Geo-Engineering (Photo 8). Subsequent inspections and photos of this blockage and our 1998 site reconnaissance indicate there has been no significant change in the geometry of this is blockage (UMA Photos 10-3 & 10-6 in Appendix A).

Photo 8: View Downstream at Blockage 1 (1987)

Blockage 2, located upstream of blockage 1, is illustrated in Photo PC-01 taken in 1975. Since 1975, subsequent inspections suggest very little additional movement is occurring (UMA Photo 10-2 in Appendix A). Both blockages probably behave as permeable dams with some water seeping through the waste rock. During high water events however, it is possible the blockages might be overtopped.

Photo PC-01: View Downstream at Blockage 2 (1975)

The southern section of the waste rock dump has undergone extensive movement at the toe and crest due to both the volume of waste rock and the method of placement. Dumping probably would have begun at or near the crest of the original valley slope but was only advanced across a portion of the valley. Instabilities of the waste rock pile have heaved the valley floor several metres as shown in Photo PC-03 (May 1975). The heaving (up-thrusting) of the valley floor is the primary reason for the impoundment of water from Porcupine Creek.

Photo PC-03: Till Up-Thrust at Toe of Failed Waste Rock (1975)

Near the crest of the waste rock dump, movement has resulted in numerous tension cracks and backscarps as shown in Photo 11 (Geo-Engineering, November 1988) and UMA Photos 10-24 to 11-0 in Appendix A. At present, considerable downslope movements are continuing in the upper slope of this section of the waste rock dump as evidenced by recent tension cracks and backscarps. It is anticipated this movement will continue until the waste rock has become geometrically stabilized, a process that could greatly increase the size of the upstream impoundment.

Photo 11: Crest of Unstable Waste Rock (1988)

Drainage of the Porcupine Creek watershed through the waste rock dump occurs in two ways. The majority of the water drains through the waste rock pile, entering at a point along the southern limit of the stable waste rock pile (Drawing 03). Water drains from the pond to the waste rock via a drainage channel incised through the slide debris from the unstable southern portion of the waste rock. Evidence of this channel was observed by Geo-Engineering during their July 1987 inspection, although at that time, the channel was dry (Photo 9). During our site reconnaissance, water was entering the waste rock pile through an opening that was estimated to be about 0.3m^2 located at the toe of the waste rock (UMA Photo 10-9 in Appendix A).

Photo 9: Dry Inlet Channel From Pond to Waste Rock Pile (1987)

The discharge point is believed to be through the toe of the northern slope of the waste rock dump, or about 550 metres to the north of the inlet (Spring A). At the time of our reconnaissance, discharge at the outlet was estimated to be in the order of 6 to 9 l/s (100 - 150 gpm) approximately 5 m above ground surface. A second outlet point, about 2m above the ground surface, discharges about 1 to 2 l/s (15-20 gpm). Localized slumping is evident where water discharges the core rock slope as seen in Photo 13 (Geo-Engineering, November 1988) and UMA Photo 11-3 (Appendix A). Water is conveyed via a drainage course that has been incised along the south edge of the road (Photo 13).

Photo 13: Outlet and Drainage Ditch on North Waste Rock Slope (1988)

Discharge is also occurring via subterranean flow along the toe of the waste rock and east valley slope (Drawing 03). Flowing water could be heard below the organic mat at two locations and was exposed at one location (UMA Photo 9-24 in Appendix A). Flows at this location were estimated to be 3 to 5 gpm. Discharge from the subterranean flow system occurs as a spring (Spring B) near the northeast corner of the waste rock dump (UMA Photo 9-23 in Appendix A). Fine grained material deposited at the discharge point indicates some transport (erosion) of material is occurring.

6.0 TAILINGS PILES

Since the failure of the asbestos tailings pile, the tailings piles have historically been referred to as the south and north lobes (UMA Photo 3-5 and Drawing 04). Each tailings lobe is discussed separately as follows:

UMA Photo 3-5: View North at South and North Tailings Lobes (1998)

6.1 South Lobe

The southerly portion of the tailings pile (south lobe) failed suddenly in early 1974. The tailings moved down the west valley slope and completely blocked the existing creek channel. The blockage was subsequently breached releasing a significant amount of water borne tailings which were deposited downstream of the blockage as shown in Photo 7 (W.B. Bowie, June 1974). Remedial works, including removal of tailings from the channel, were implemented soon after the breach occurred (Photo WC-01, July 1974).

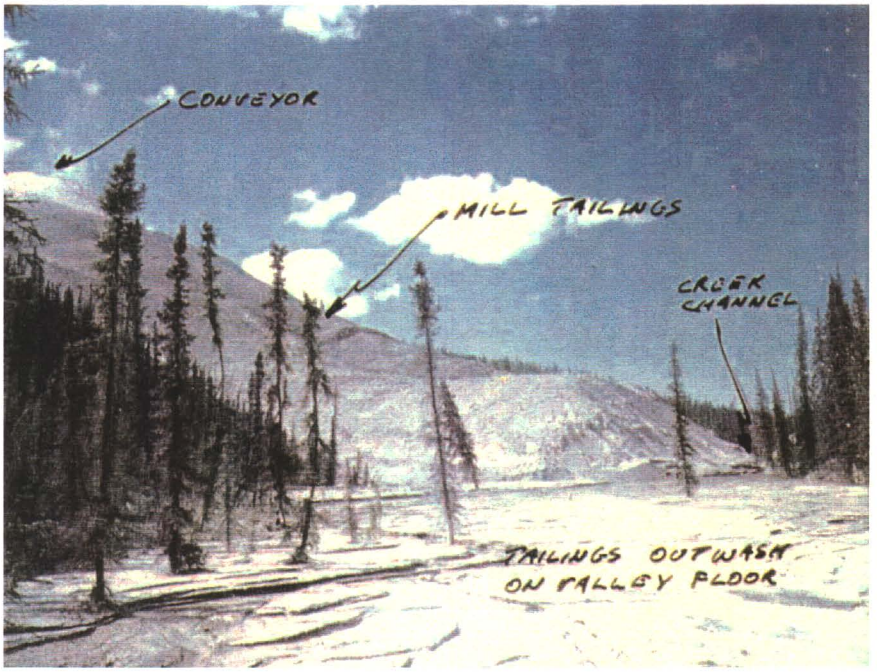


Photo 7: Tailings Deposition After Breach (1974)

Photo WC-01: Creek Channel Downstream of Breach (1974)

Following the 1974 failure, downslope movement of tailings continued resulting in occasional channel blockage as shown in Photos WC-06 (June 1976).

Photo WC-06: Channel Blockage (1976)

In 1978 a mid-slope portion of the south lobe was regraded (terraced) in an attempt to off-load this area and slow the advancement of the lobe (Drawing 04). The regraded area has since failed and evidence of the terraced slope is visible as inclined benches at the toe (Photo 18 Geo-Engineering, May 1993) and UMA Photos 3-6 and 5-11 in Appendix A.

Photo 18: Impoundment Upstream of South Lobe (1992)

As the tailings continue to move down-slope, they are eroded and transported downstream. A comparison of the position of the leading edge of the tailings in Photo 12 taken in June, 1988 by Geo-Engineering with UMA Photo 5-20 indicates the gradual advancement of tailings into the creek channel.

Photo 12: Toe of South Lobe in June (1998)

UMA Photo 5-20: Toe of South Lobe in September (1998)

It is clearly evident that the south lobe remains active as evidenced by numerous tension cracks and slump blocks between the crest and toe (UMA Photo 3-13). Although the magnitude of this movement has not been confirmed since mine closure, it is anticipated that sufficient up-slope material exists to continue the advancement of tailings for an indefinite period of time.

UMA Photo 3-13: Tension cracking of Upper Slope (1998)

6.2 North Lobe

Following the failure of the south tailings lobe, tailings were placed farther to the north. However, similar downslope movements occurred almost immediately forming the north lobe. Tailings were then placed farther to the northwest on flatter ground until mine closure.

One of first aerial photographs of the unstable north lobe was taken in 1977 (Photo 1, R.M. Hardy and Assoc.). Downslope movement of the north lobe was not as sudden as that which occurred on the south lobe. However, the tailings gradually moved down-slope and within 10 years reached the pond created by the south lobe blockage (Photo 7, Klohn Leonoff, 1984).

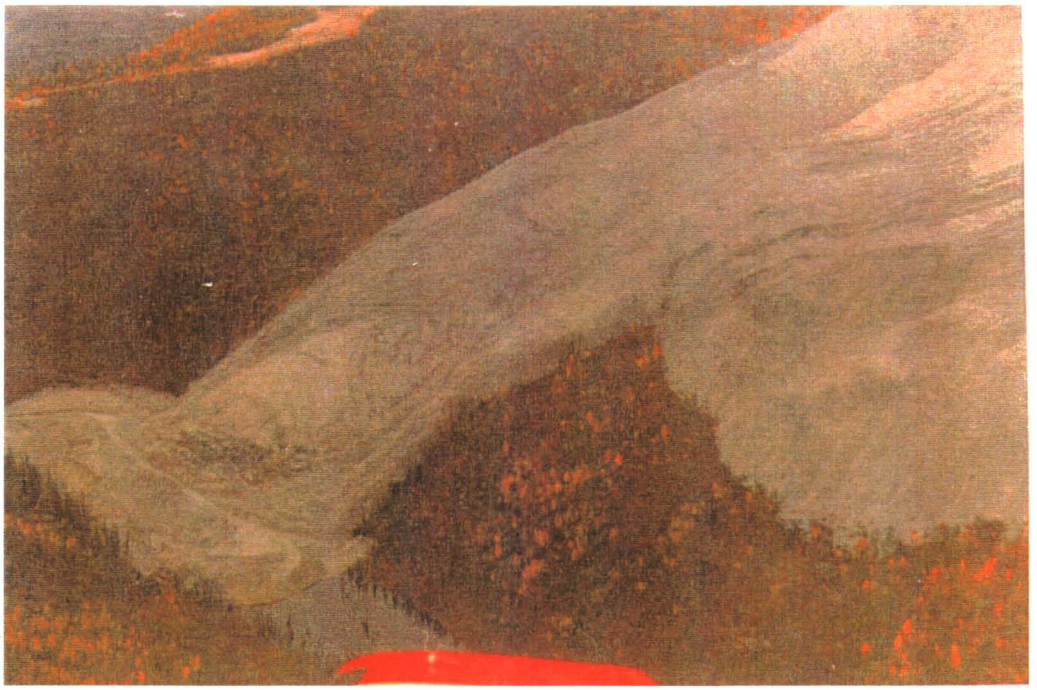


Photo 1: Aerial View of Advancing Toe of North Lobe (1977)

Photo 7: North Lobe at Edge of Pond (1984)

By July, 1986, the north lobe had nearly reached the east valley slope as shown on Photo 8 (Klohn Leonoff, September 1986). The lighter tailings areas in the upper portion of the tailings pile were relatively undisturbed in the photo. The darker areas in the mid and lower portion of the slope are indicative of heavily disturbed material as the north lobe advanced. These observations were verified with monitoring data in Hardy Associates (1978) Ltd.'s 1984 report that indicated upper-monitoring locations moved significantly less than mid and toe monitoring locations.

Photo 8: Failed North Lobe Near Valley Slope (1986)

Significant heaving (up-thrusting) of the valley floor also occurred along the north side of the lobe resulting in a narrowing of the upstream section of the channel and the formation of an upstream pond (Photo 8, Geo-Engineering, November 1986). Continued advancement of the north lobe heaval of the valley floor directly in the path of the lobe resulting in additional channel constriction as seen in Photo 19 (Geo-Engineering, November 1988) and UMA Photos 1-3, 5-9 in Appendix A.

Photo 8: Toe of North Lobe Approaching Valley Slope (1986)

Photo 19: Erosion of Toe of North Lobe and Heaved Valley Floor (1988)

Recent photographs suggest the tailings are advancing faster than they are being eroded as evidenced by mounding near the toe. This can be seen in a comparison of Photo 17 (Geo-Engineering, 1988) with Photo 22 (Geo-Engineering, 1998) and UMA Photo 5-17 (Appendix A), taken 10 years later.

Photo 17: Toe of North Lobe (1988)

Photo 22: Toe of North Lobe (1998)

Continued erosion at the toe will undoubtedly trigger retrogressive failures and continued downslope movement. Recent tension cracks were observed in the mid and upper portions of the north lobe in 1998 confirming on-going movement (UMA Photos 1-6 and 1-5, 1-12 and 4-2 in Appendix A). Tension cracks and slumping are evident at and beyond the crest of the slope supporting the observations of continued movements (UMA Photo 1-15).

UMA Photo 1-6: Back Scarps at Crest of North Lobe (1998)

UMA Photo 1-15: Tension Cracks Upslope of North Lobe Crest

7.0 WOLVERINE CREEK CHANNEL

Between 1978 and 1981, channel improvements downstream of the south lobe were undertaken including a series of rock weirs as shown on Drawing 04 and Photos 22 (Geo-Engineering, November 1986) and 12 (Geo-Engineering, November 1988). These channel improvements have remained relatively intact since construction. The secondary channel between the downstream channel improvement and the east valley slope noted in Geo-Engineering's 1986 report was visible, but dry during our September 1998 reconnaissance.

Photo 22: Armouring of Wolverine Creek Channel Downstream of the South Lobe

Photo 12: Weirs Downstream of South Lobe (1988)

At the time of UMA's site reconnaissance, four beaver dams were present between the upstream side north lobe and the downstream end of the south lobe as shown on Drawing 04. Beaver dam 1 is located at the north end of the north lobe where the valley floor has been raised. This first beaver dam has raised the water level in the upstream pond about 1 metre higher than would occur from the overburden blockage at this location. High water marks on trees in the upstream pond suggest water levels have been about 0.5 metres higher than were observed in September, 1998. Surficial slumping of the east valley slope is also occurring opposite from beaver dam 1. Test Holes 1 and 2, drilled with a hand auger within and just above the slumped area, indicate that the surficial overburden soils consist of 0.3 metres of mossy organic cover overlying 1 metre of soft, wet silty clay containing bedrock fragments (holes were terminated at 1.3 metres). No ice or frozen soil was encountered in either hole.

The second beaver dam, located between the upstream end of a small channel island and the toe of the north tailings lobe does not impound a significant amount of water. The third beaver dam is located at the upstream end of the south lobe as shown in UMA Photo 5-18

and is responsible for raising the water in the pond between the two tailings lobes by at least a metre.

UMA Photo 5-18: Beaver Dam 3 (1998)

The four beaver dams have significantly reduced channel velocities and erosion of the channel where the tailings piles meet the valley slope. Downstream of beaver dam No. 4 however, velocities increase significantly as the channel narrows and the channel slope steepens. Between the beaver dam and the rock weirs, the channel has down-cut into the underlying weathered argillite bedrock resulting in surficial slumping of the overburden soils (UMA Photos 5-23 and 5-21, 6-1 and 6-2 in Appendix A). Downstream of the south lobe, flow appears to be contained within the original modified channel with no significant erosion or down-cutting observed.

UMA Photo 5-23:
View Upstream of South Lobe Toe and East Valley Slope

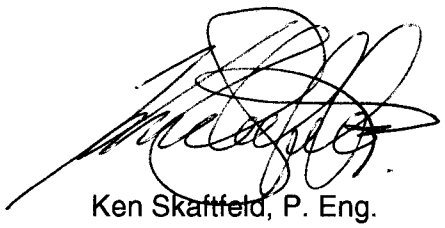
8.0 CLOSURE

Our site reconnaissance trips in 1998 have confirmed the observations made in several previous inspection reports since mine closure with respect to the overall condition of the waste rock dumps, creek channels and tailings piles. We trust this summary reconnaissance report will provide DIAND with additional information to more fully assess changes in site conditions. This report also competes an important initial step should a more comprehensive risk assessment program or remedial stabilization measures be considered.

Thank you for the opportunity to work with you on this most interesting project. Please contact either of the undersigned should you have any questions or require any additional information.

Yours Truly,

UMA ENGINEERING LTD.



Ken Skaftfeld, P. Eng.
Senior Project Engineer
(Yukon Territory License Pending)

Jeff Tutkaluk
Geotechnical Engineer

DRAWINGS

Date of Photography: Aug. 17, 1988

REV.	DESCRIPTION	DWN.	APP.	DATE

SEAL

SEAL

UMA Engineering Ltd.
Engineers and Planners
1479 Buffalo Place, Winnipeg, Manitoba, Canada R3T 1L7

APPROVED BY — DATE — MARCH, 1999

DRAWN BY: JV	DESIGNED BY:
CHECKED BY: JMT/KMS	CHECKED BY:
SCALE: APPROX. 1:36,000	JOB No. 4440-038-0

INDIAN AND NORTHERN AFFAIRS CANADA

ABANDONED CLINTON CREEK ASBESTOS MINE
SITE RECONNAISSANCE

LOCATION PLAN

DWG. No. 01 — REV. –

APR 06, 1999
Plot Scale: 1=2000
Location.dwg

Date of Photography: Aug. 17, 1988

REV.	DESCRIPTION	DWN.	APP.	DATE

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INDIAN AND NORTHERN AFFAIRS CANADA

ABANDONED CLINTON CREEK ASBESTOS MINE SITE RECONNAISSANCE

LOCATION PLAN

DWG. No. 01

REV. -

APR 06, 1999
Plot Scale: 1 = 2000
MapPlot1.dwg

APPENDIX A
SITE RECONNAISSANCE PHOTOS
COMPILED SEPARATELY IN BINDER

APPENDIX B
SITE RECONNAISSANCE FIELD NOTES

pp 1-9 AUG 10/98 SITE RECONN.

10-13 PLAN FOR SEPT. RECONN

14-20 NORTH (TAILINGS) LOBE

21-22 WOLVERINE CREEK

23 S. LOBE

24-26 WOLVERINE CR. @ TOE OF S. LOBE

27-30 WOLVERINE CR. D/S OF TAILS.

31-32 WOLV. CREEK @ ACCESS ROAD TO MINE.

33-49 CLINTON CREEK & MON #68 ON WASTE ROCK (pp 49).

50-60 CLINTON CREEK.

61-62 WASTE ROCK DUMP.

63-71 PORCUPINE CREEK.

72-78 CLINTON CREEK D/S OF WASHED OUT BRIDGE.

(1)

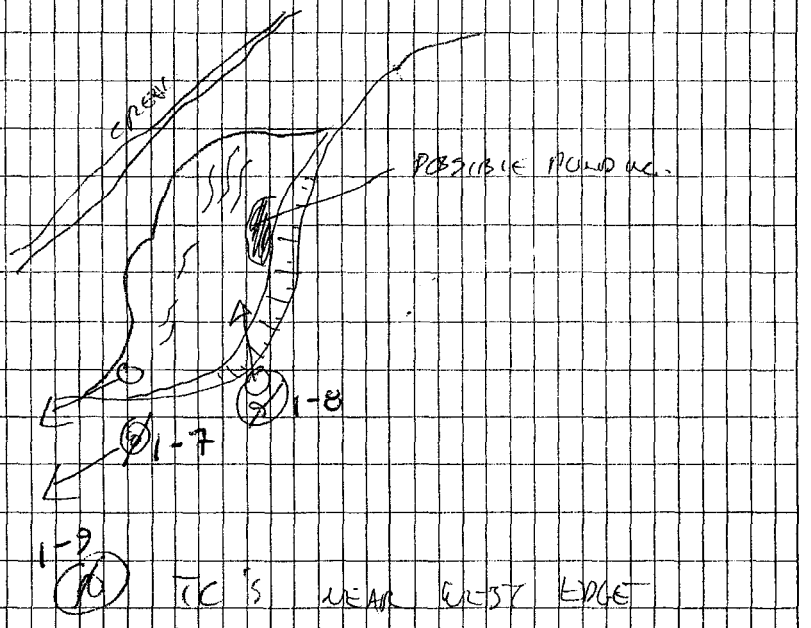
CLINTON CREEK AUG 10/98

PAGES 1-1 to 1-5

NORTH LOBE.

- SIGNIFICANT D/S MOVEMENT.

Photo (8) 1-6 - MAJOR BIG TENSION CRACK ± 8m W OF SCARP.



FIELD

(2)

(2)

CLINTON CR. - AUG 10/98

WEST SIDE OF N. LOBE APPEARS REASONABLY STABLE

$\angle \leq 45°$

(PLUSIC) 1-10 VIEW N.

NUMEROUS (MULTIPLE) TENSION CRACKS THROUGHOUT N. LOBE AS FAR BACK AS WEST LOBE. CRACKS RUN N/S $\simeq$ 4-6" WIDE.

1-11 (1/2) - VIEW N @ TC IN MIDDLE OF RAMP NEAR TOP OF N. LOBE

1-12 (1/3) - MULTIPLE T.C.'S ON WEST SIDE OF RAMP NEAR TOP OF N. LOBE

- MOVEMENT TO WEST BEGINNING TO OCCUR.

FIELD

1-13 (14) - VIEW OF MAZE WITH VIDEO ON END OF N. LOBE

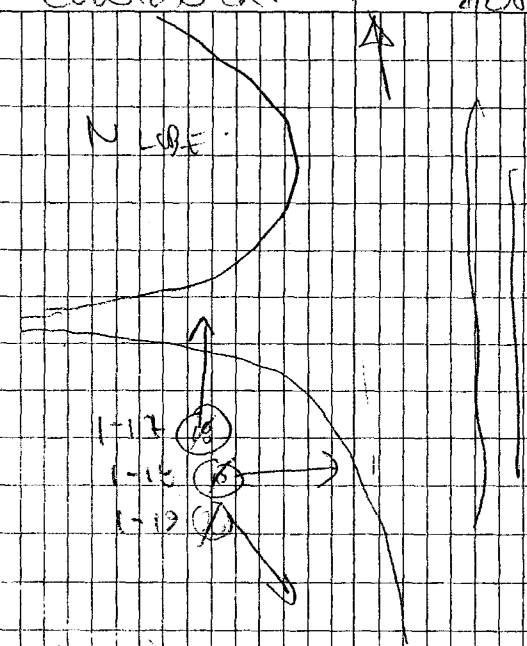
- SIGNIFICANT SLUMPING, MULTIPLE T.C.'S

1-14 (15) - BARE SCARP @ N. END OF N LOBE MVMT TO CREEK.

1-15 (16) VIEW N @ N/S LOBE ? ~~CREEK~~

LOCALIZED FAILURE ON N SLOPE OF S LOBE.
(17) 1-16

CLINTON CR. N · AUG 10/98



1-20 & 1-21
21 & 22 ½ way down S Lobe.

1-22 TOE SOUTH LOBE 1-23 SOUTH LOBE
1-24 V. NORTHERN LOBE 1-24A S. LOBE TOE
Roll 2 2-1 – 10 1-25 VIEW N @ N LOBE
fly-over to waste rock pile from Tailings.

2-1 SOUTH LOBE, 2-2 TOE OF S. LOBE, 2-3 ARMOURED HOW. CR. 2-4 JNCT OF HOW. & CLINTON CR. 2-5 V. NORTH @ CLW. DISCHARGE FROM HOW. CR., 2-6 VIEW NW @ CLINTON, 2-7 CLINTON CR, 2-8 & 2-9 CLINTON CR.

(6)

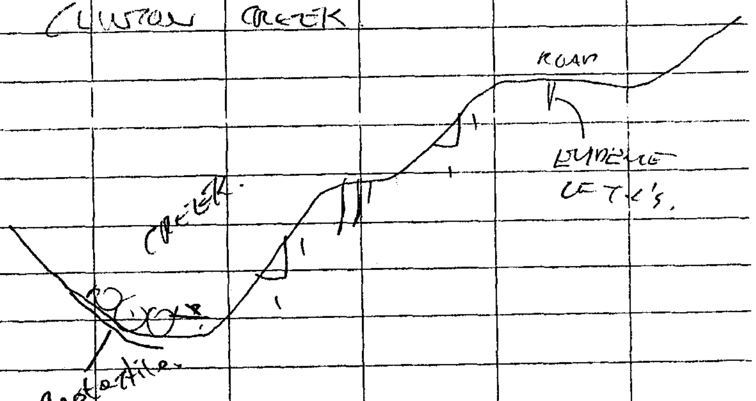
ARGILLACEOUS ? SHALE

2-10 HUDGEON LAKE OUTLET.

ROCK WEIR @ OUTLET FROM HUDGEON LAKE IN FAIRLY GOOD CONDITION ±1.5-2 m DROP OVER 1-1.5 m Ø BOULDERS.

2-11 (12) - VIEW N @ 1ST WEIR STANDING ON CULVERT.

ROAD ON S SIDE OF CLINTON CREEK



2-12 (13) - VIEW E

2-13 (14) VIEW N @ geotextile.

2-14 (15) VIEW W

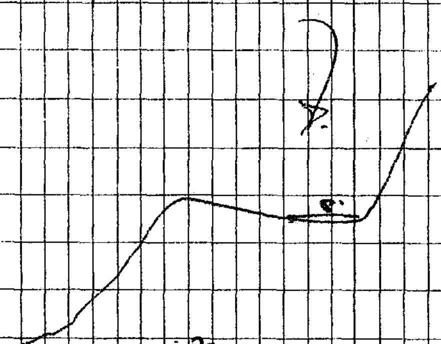
(7)

CLINTON CR. AUG 10/99

WASTE ROCK SCARPED NEARLY VERTICLE ON S SIDE OF CREEK WALKING D/S (16) 2-15 UP TO 25 m HIGH.

NUMEROUS INSTALLATIONS INTO CHANNEL AS WASTE ROCK SLUMPS. (17) 2-16

WASTE ROCK DEPOSITED WITH SOME SIGNS OF PONDING.



2-17 (18) - VIEW NE @ BRIDGE.

FIELD

(8)

2-18 - MULTIPLE T.C.'s @ WIDE ACCESS RAMP TO TOP OF WASTEPILE @ E. END OF ROCK DUMP.

NO T.C.'s @ MONUMENT 20-A.

2-19 TO 2-25 heli fly-over. →

21-23 Snow & clear dump as much visible.

Bad roll @ Hedgeman Lk. outlet

Roll #3.

(9)

CLUTTON CR | AUG 10/98

2-19	VIEW N. @ MILL
2-20	" " "
2-21	PURCELLS CR. OUTLET
2-22	TOP OF WASTE ROCK
2-23	" " "
2-24	HEDGEMAN LK. OUTLET
2-24A	" " "
2-25	" " "
2-26	
3-1	PURCELLS LK OUTLET
3-2	MILL
3-3	VIEW W OVER WASTE ROCK.
3-4	VIEW N @ TAILS ALONG HWY. CR.
3-5	" " " "
3-6	VIEW W @ TAILS
3-7	VIEW W @ N. LOBE
3-8	VIEW SW @ TAILS
3-9	VIEW S @ TAILS
3-10	VIEW S OVER TAILS
3-11	VIEW SE OVER TAILS.
3-12	VIEW NE " "
3-13	CREST OF S. LOBE
3-14	" " "

FIELD

(10)

SEPT 12/98 CLINTON CREEK.

TRAVELLED FROM WHITEHORSE TO CLINTON CREEK TOWNSITE WITH JEFF TUTKALUK. MET UP WITH MATT & BILL @ CLINTON CREEK.

- SET UP CAMP @ TOWNSITE.

3-15	ARMOURED SET. OF RAPIDS.
3-16	VIEW E ALONG CLINTON CR.
3-17	" " "
3-18	WASHED OUT BRIDGE @ MINE
3-19	" " @ TOWNSITE
3-20	CLINTON CR. TOWNSITE
3-21	40 MILE R. BRIDGE
3-22	RD FROM HWY.
3-23	40 MILE R. DISCH. INTO YUKON R.
3-24	YUKON R.
3-25	DAWSON CITY.

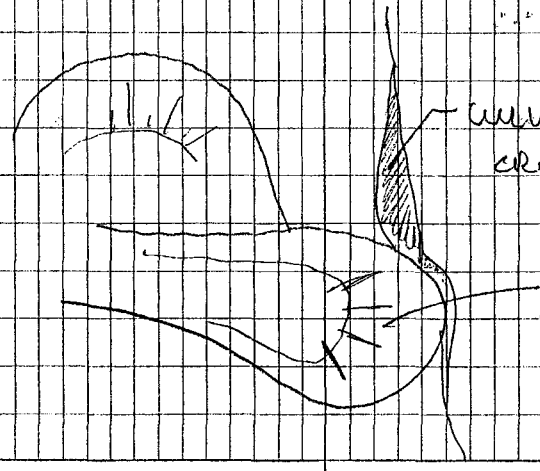
(11)

SEPT 12/98. - CLINTON CREEK.

- PLAN IS TO INSPECT TAILINGS AREA TODAY.

GENERAL NOTES:
COLDER V76083.
MAY, 1976 - 20 MONUMENTS INSTALLED ON TAILINGS DIKES.

- SOUTH LOBE FAILED (1974)
- RADIAL CRACKS IN SOUTH LOBE
- NORTH LOBE O.K.



FIELD

SEPT 12/98 CLINTON CR.

HARDY CC 10075 APRIL/84

- NORTH & SOUTH LOBES MONITORED SINCE 1970.

* • 14 MONITORING POINTS WITHIN NORTH LOBE
  • 7 MONITORING POINTS WITHIN SOUTH LOBE

- BEST PLAN WITH MONITORING POINTS IS D-1004A FROM KLOHN'S 1984 REPORT. (AT WHICH TIME TOE OF N. LOBE ALMOST REACHED CREEK).
- THERMISTOR STRINGS T5, T6, T7 INSTALLED BY GOLDER IN TAILINGS AREA.

SEPT 12/98 CLINTON CREEK.

REVIEW OF TAILINGS DRAWINGS (CHRONOLOGICAL).

KLOHN 1984 - NORTH LOBE TOE HASN'T REACHED CREEK

GEO - JUNE 1987 - TOE OF NORTH LOBE @ CREEK.

KLOHN D-4009 - TOE @ CREEK (CONFIRMS GEO 1987 SKETCH).

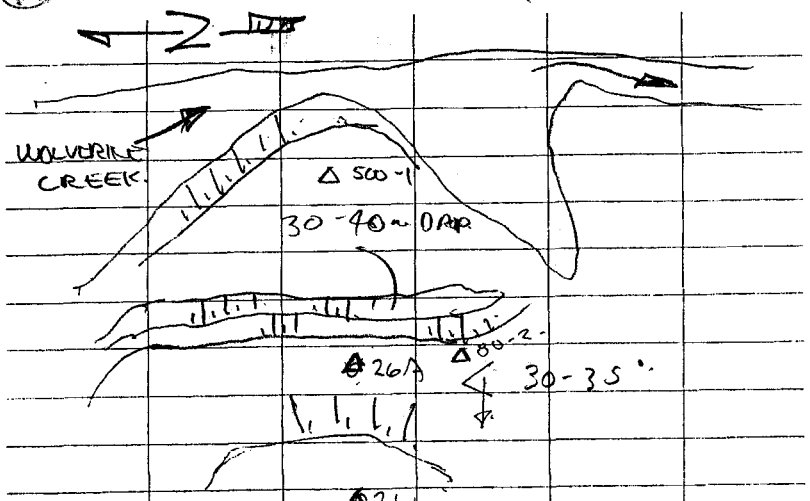
* GEO - JUNE '88] SAME SKETCHES
 '91] TOE REACHED
 '93] EAST VALLEY

W. SLOPE : BEGINNING CREEK BEGIN FLOWING VALLEY.

START INSPECTION OF TAILINGS AREA @ 9:30 - TOOK 4x4'S UP WITH MATT & BILL.
- CLOUDY 10-15 °C

FIELD

(19) SEPT 12/98 CLINTON CR.

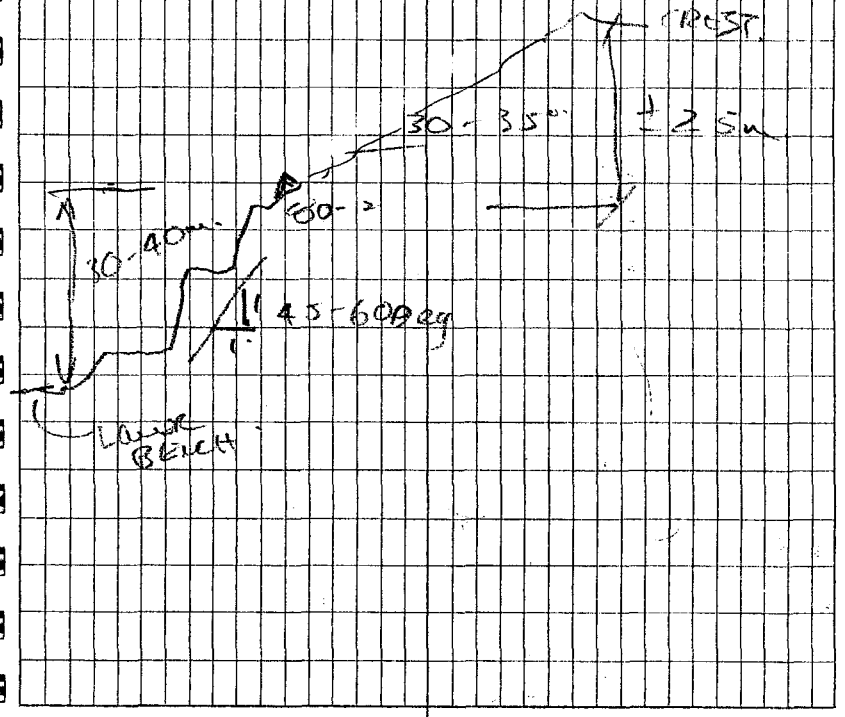


Photos. 4-2 4-3 — Taken From 20m O/C
Roll #4 4-4 4-5 From Mon 26
4-5 4-6 ↓ in N. Lobe.

4-6 4-7 From 80-2 with 26A in background.
4-7 8 S Lobe Slope
4-8 9 Wolv. Creek Armor All
4-9 10 Lake Between Lobes. Taken From 80-2
4-10 11 — N Lobe

(15) SEPT 12/98 CLINTON CR.

From Mon 80-2
Active movements at entire slope @ 80-2, looking up to crest.
- No visible T.C.'s OBT
Numerous small slumps/blockfalls upslope from 80-2
- 2 or 3 large slump blocks O/S of 80-2.



FIELD

(16)

SEPT 12/98 CLINTON CR

BENCH

4-3

RECENT T.C.'s

80-1

T.C.'s

PHOTO TAKEN FROM NEXT ▲80-1

4-11
4-12 VIEW U/S @ 80-1

4-13 4-12 VIEW OF BOTTOM

MCLOSE

@ THERMISTOR T7.

N

4-15

4-14

T7.

4-13

NO VISIBLE SLOPE MOVEMENTS @ T7.

(17)

SEPT 12/98 CLINTON CR.

CREST

45-50°

PLATEAU SURFACE

T7.

6m

BERM

5m

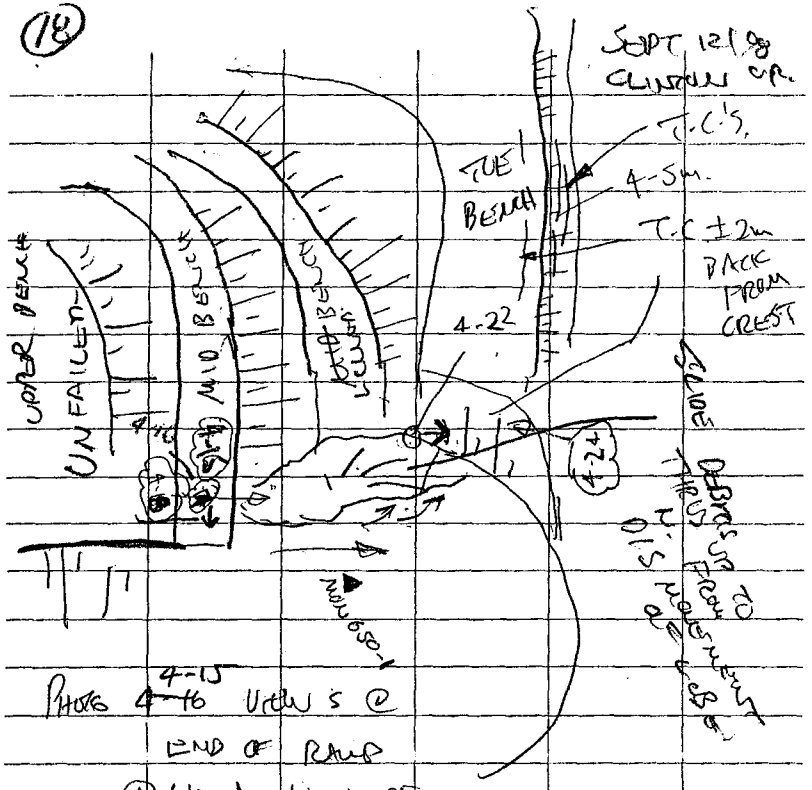
STABLE SLOPE 2°

TRAIL

* POSSIBLY THE TRAIL ALONG THE NORTH EDGE OF THE PIPE WORK PRIOR HERE DURING 1978 EXCAVATIONS WORK ON MCLOSE TOOK PLACE? - SAME AROUND NE CORNER.

FIELD

(18)



PHOTOS 4-15 ~~4-16~~ VIEWS @ END OF RAMP @ N. LIMIT OF SLIDE

~~4-16~~ ~~4-17~~ 4-~~17~~18 VIEW E @ END OF RAMP.

* ~~N~~ N LIMIT OF FAILURE @ END OF RAMP - 60m N OF MON 650-1

(19)

SEPT 12/99 CLINTON CR.

4-18 (4-19) VIEW NW FROM 650-1

4-19 (4-20) VIEW SE ACROSS FAILURE

4-20 (4-21) VIEW N @ END OF MID BENCH

4-21 4-22 VIEW EAST ACROSS N. LIMIT OF SLIDE TOE BENCH IN LEFT AND TREE TRENCHES

TILT INCLUSIONS IN SLOPE FACE @ END OF TOE BENCH @ EDGE OF SLIDE

SEE PHOTO (4-23) 4-22

4-23 4-24 VIEW WEST FROM TOE BENCH

FIELD

(20)

SEPT 12 '08 CLINTON CR.

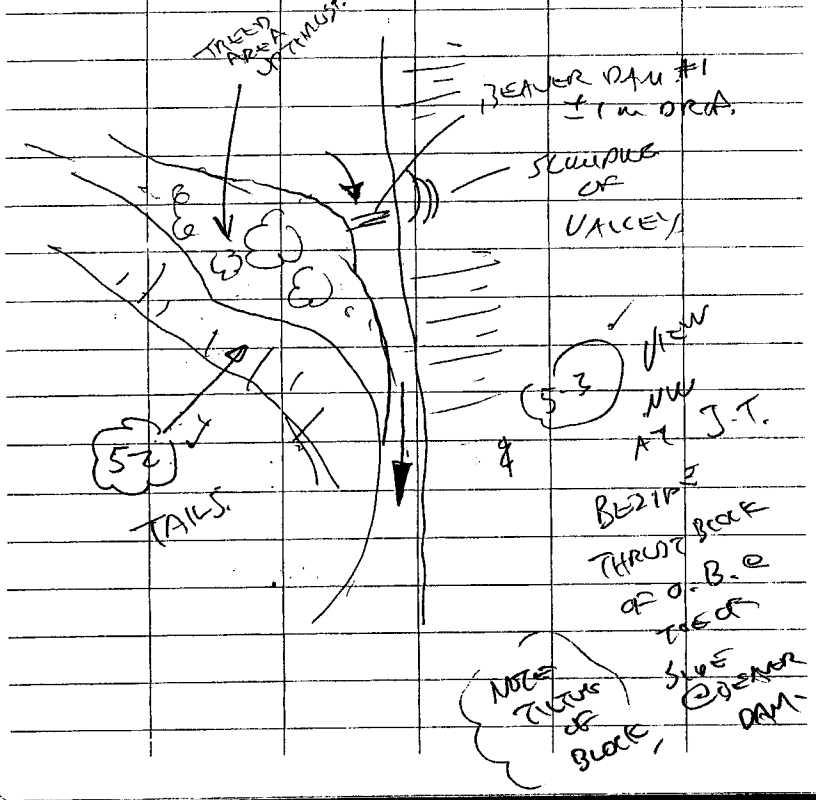
4-~~25~~ 4-24 VIEW WEST FROM N.E. CORNER OF N. LOBE

4-25

4-~~26~~ VIEW NE CREEK. FROM N.E. CORNER.

ROLL 5

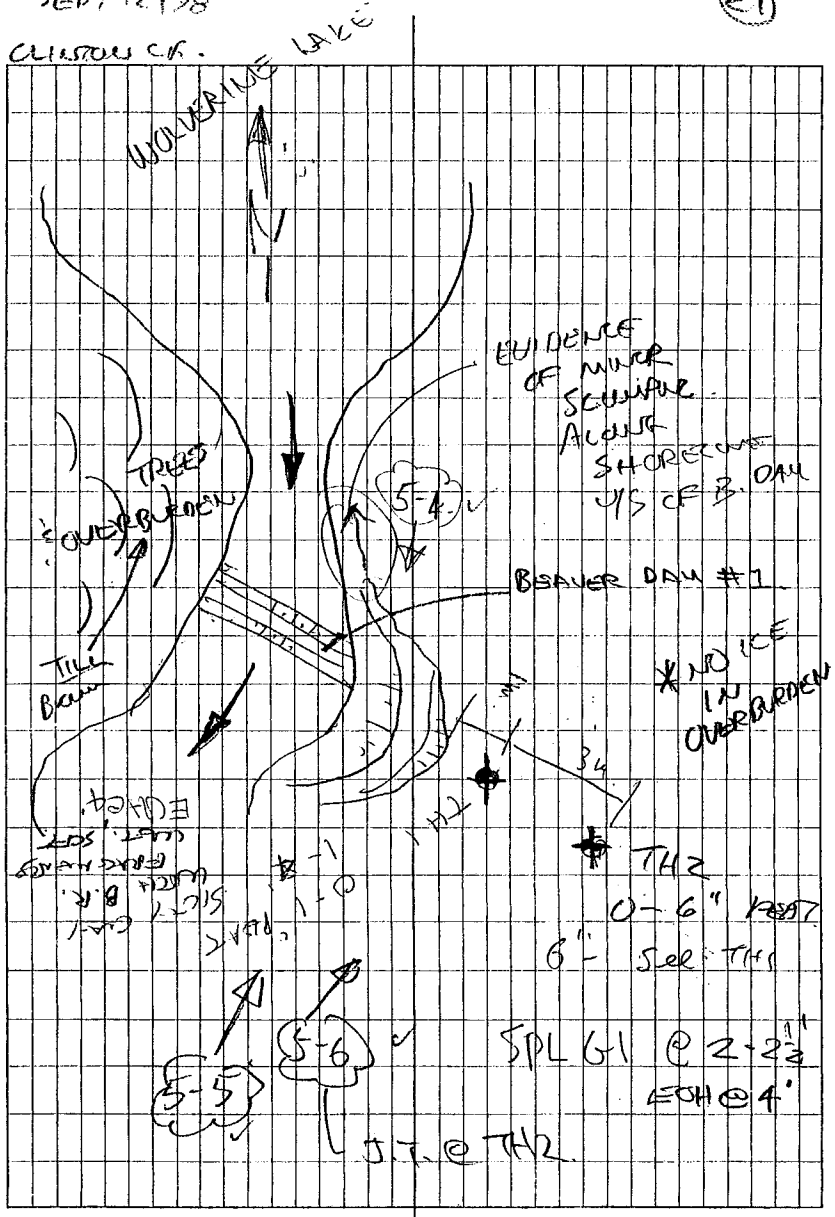
5-0; 5-1 REDUCED 4-26.



SEPT 12/08

(21)

CLINTON CR.



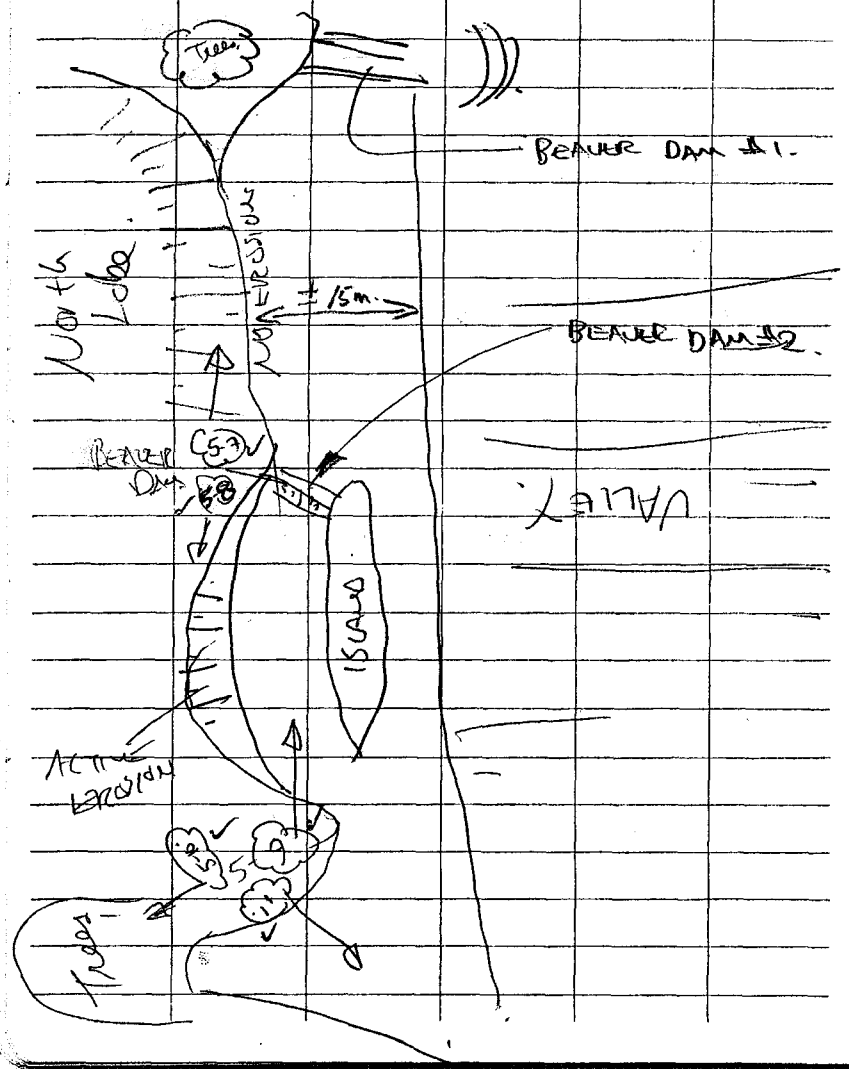
FIELD

(22)

SEPT 12/96 CLINTON CR.

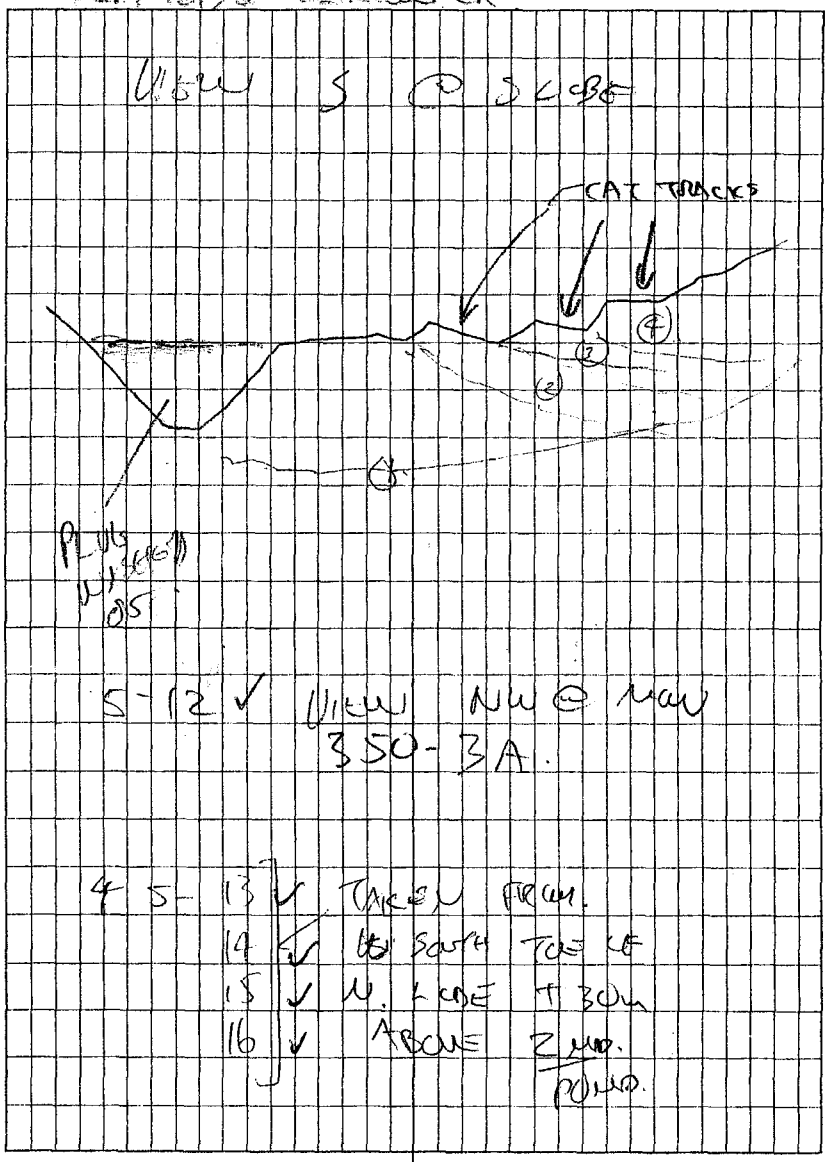
HAUL DN TREES IN NWV.

LAKE ± 1-2' ABOVE PRESENT LAKE ⊜.



(23)

SEPT 12/96 CLINTON CR



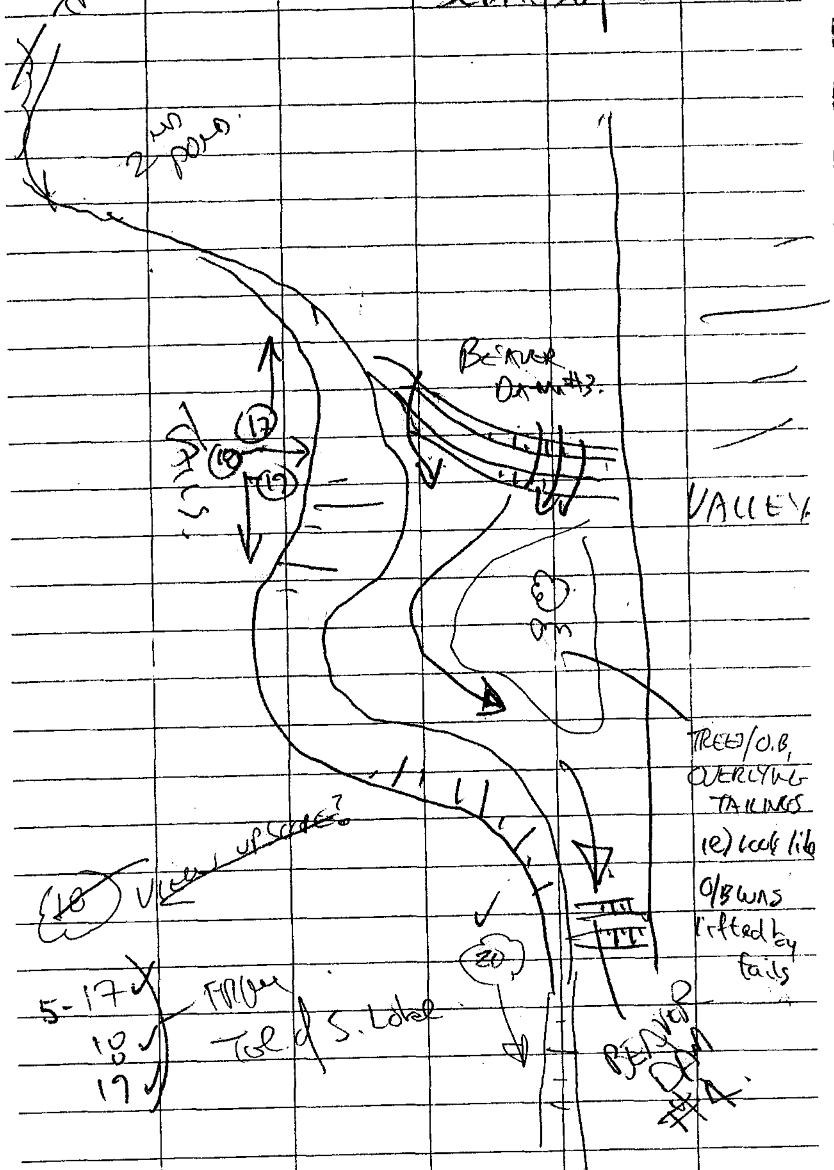
5-12 ✓ VIEW NW @ MAN 350-3A.

4 5-13 ✓ TAKEN FROM.
14 ✓ W. SOUTH TOE OF
15 ✓ N. LOBE ± 30m
16 ✓ ABOVE ZERO. POND.

FIELD

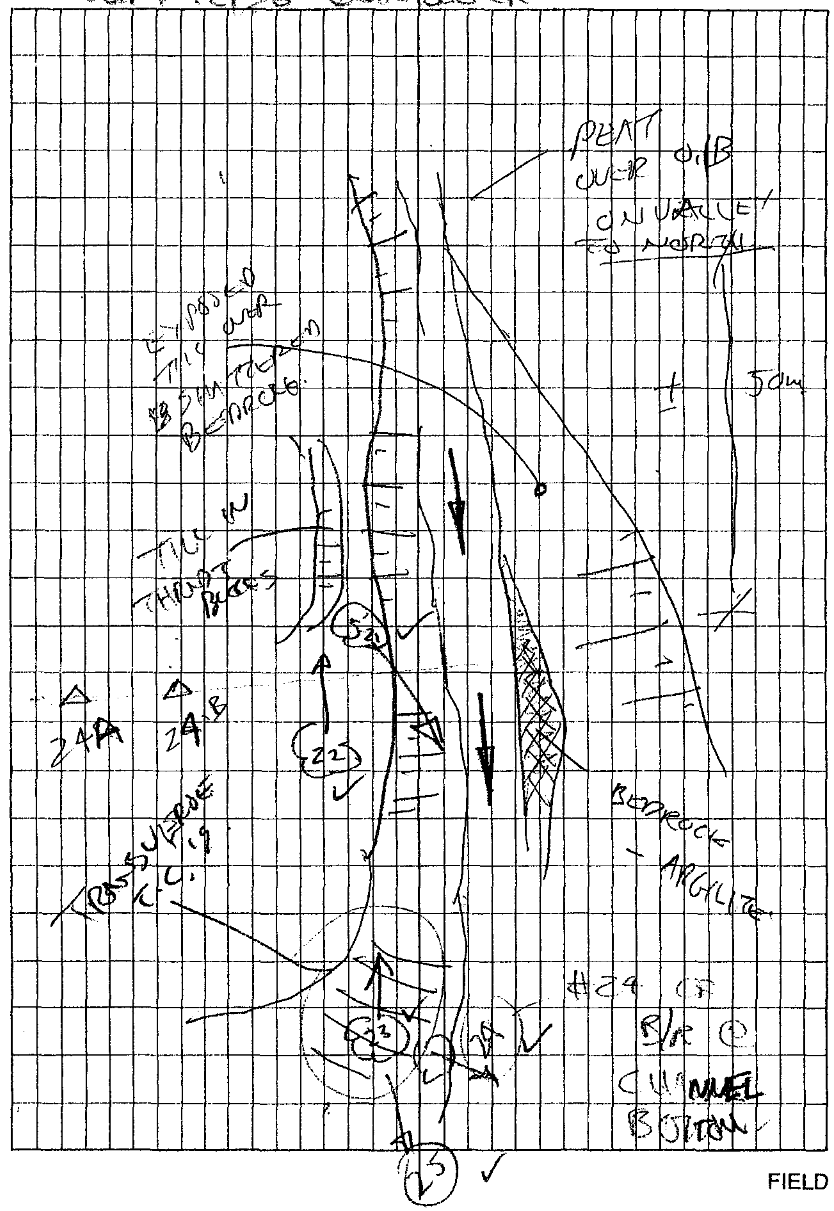
(24)

SEPT 12/98 CLINTON CR.



(25)

SEPT 12/98 CLINTON CK



FIELD

(26)

SEPT 12/98 CLINTON CK.

Rock #5 — STUCK? may look like from.

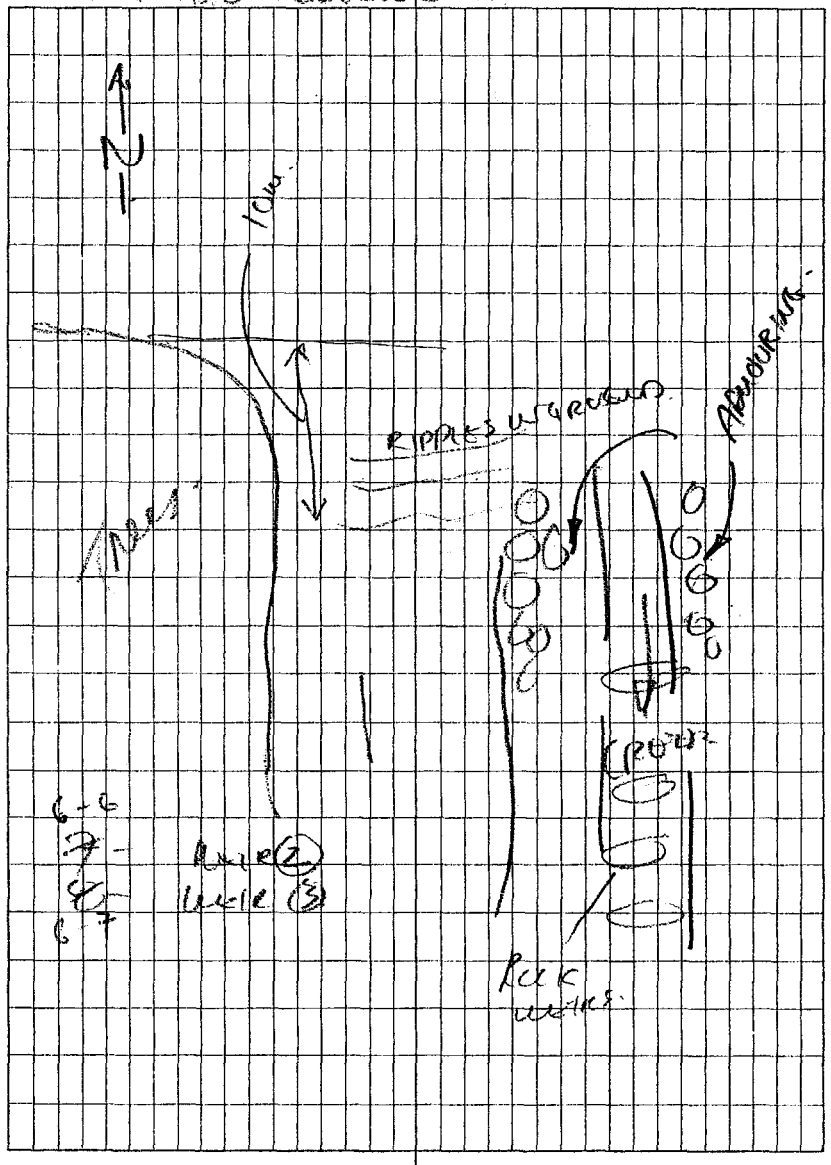
Roll 6

6-0	Reloke	5-23
6-21		5-24
6-23		5-25
6-34	VIEW U/S TRANS. T.C.'S.	
6-4	VIEW N FROM 60m S OF 80-9.	
6-5	VIEW S DOWN RD FROM 80-9	

SOUTH LIMIT OF MEASUREMENT (MUD RIPPLES ON GROUND SURFACE ENDS HERE)

(27)

SEPT 12/98 CLINTON CK



FIELD

(28)

SEPT 12/96 CLINTON CR

* SECONDARY FLOW CHANNEL NOTED IN 1993 GEO ENV SITE PLAN NOT EVIDENT (NO FLOW VISIBLE)

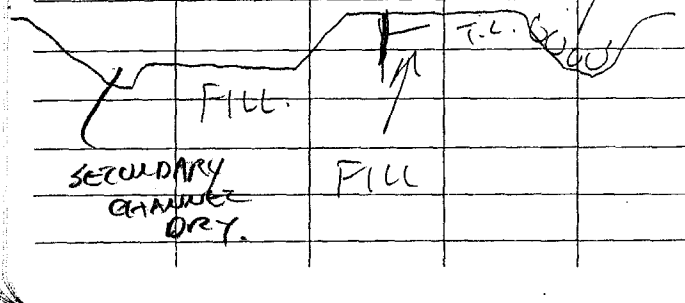
↳ RECENTLY PLACED TAILINGS??

*

6-8 (9) – U/S FROM ± 50m S OF START OF ARMOURLINE

6-9 (10) D/S " "

6-10 (11) VIEW D/S ALONG FILL IN SECONDARY FLOW CHANNEL.



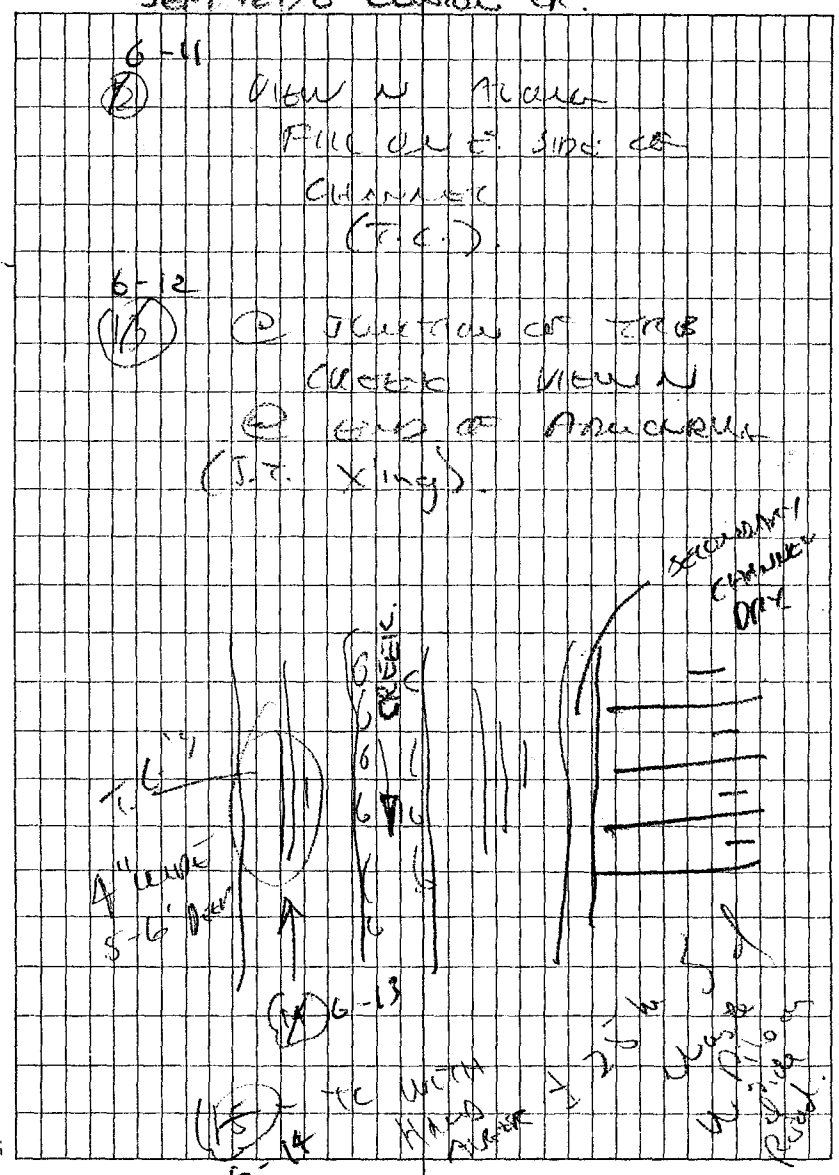
(29)

SEPT 12/96 CLINTON CR.

6-11 (12) VIEW N ALONG FILL ON E. SIDE OF CHANNEL (T.C.).

6-12 (13) JUNCTION OF TRIB CREEK VIEW N

END OF ARMOURLINE (T.T. Xing).



FIELD

(30)

6-15 SEPT 12/98 CLINTON CR

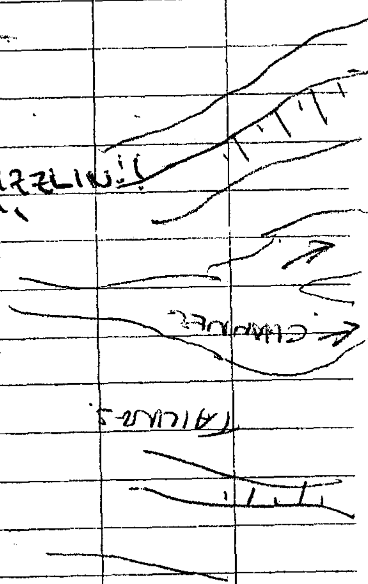
(16) VIEW N OPPOSITE
MW 24? (a 24A) FROM
S. EDGE OF S. LOBE.

6-~~18~~ 6-16 MATT ON ATV

(17) 6-17 ROAD TO FALLS
- VIEW ACROSS HUNGERFORD
@ SLIDE.

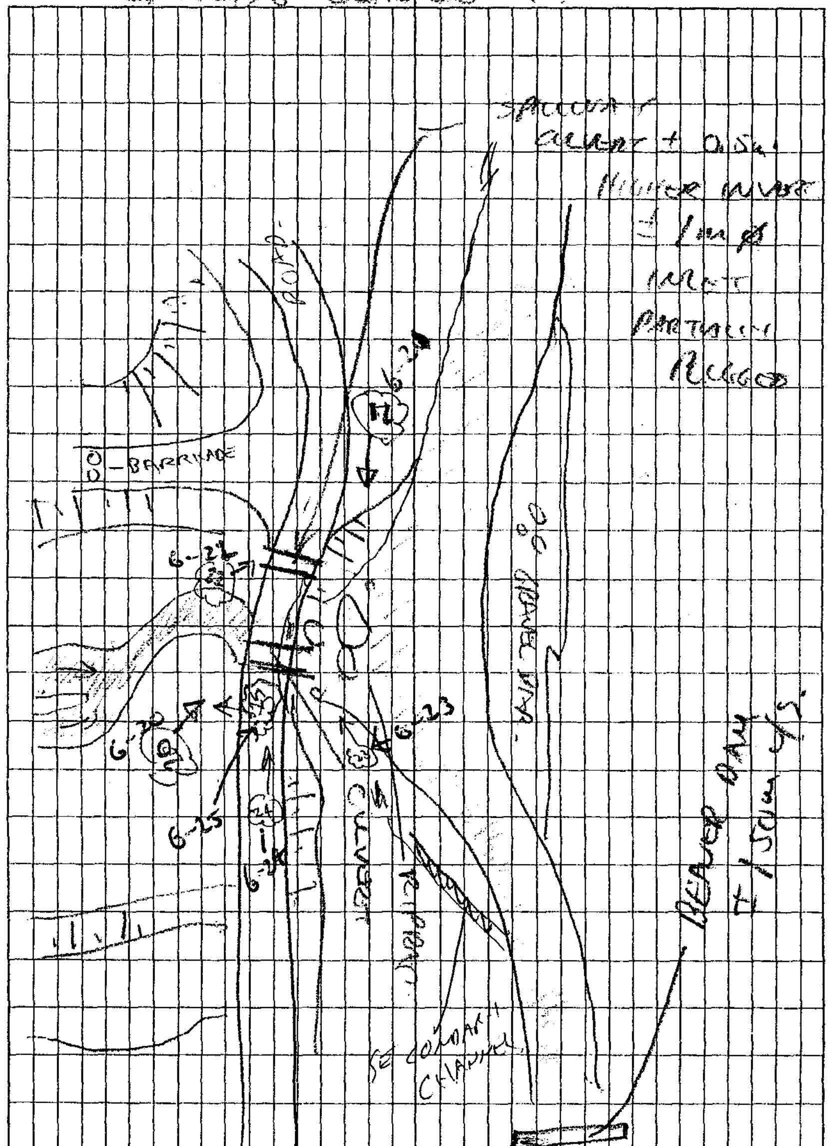
SUMMARY Sept 12/98

6-18 STEAKS A SIZZLIN'!
6-19 " "



(31)

SEPT 12/98 CLINTON CR.



FLOWED

FIELD

SEPT 13/98   +10° PTLY SUNNY
RAIN @ 7:00pm.

CLINTON CREEK ; WASTE ROCK
DUMP.

CHECK LIST.

→ SEEPAGE THROUGH WASTE ROCK
±60m D/S FROM OUTLET

→ EVIDENCE OF ACCUMULATION
(BOULDERS ABOVE CREEK).

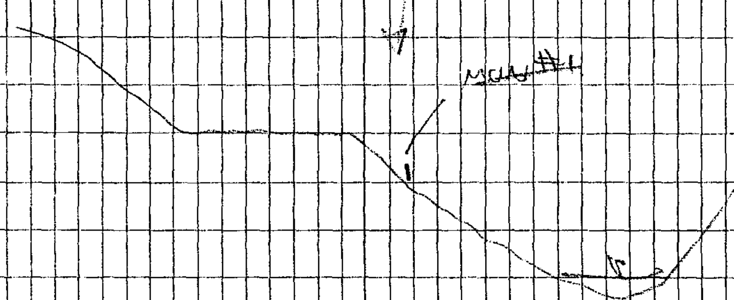
SEPT 13/98

WALKING UP FROM BRIDGE TO
~~MAKE~~ HUDSON LAKES CULVERT.

General Notes

- ~~D/S MISSED~~ NO
- MONITOR #1 - Pressure Missing
but Monuments (2) + cone visible
on waste rock slope

SECTION EE.

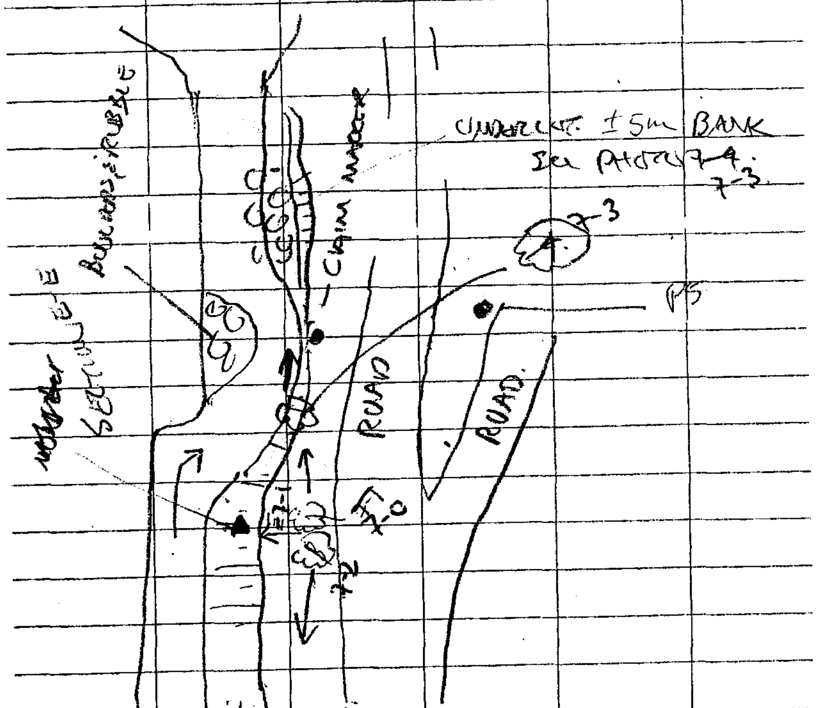


(34)

SEPT13/98 CLINTON CREEK

- BEDROCK CONTROLLED CHANNEL FROM ~~N~~ EAST EDGE OF HIGH GROUND ON N. SIDE OF CHANNEL.

- WASTE ROCK ALONG SOUTH SIDE OF CHANNEL BEING UNDERCUT AS CHANNEL WIDENS TO SOUTH.



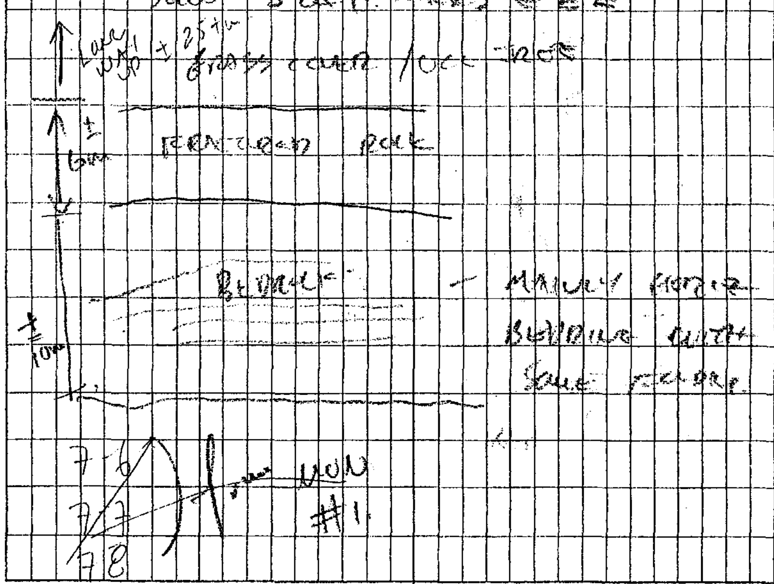
(35)

SEPT13/98 CLINTON CREEK.

PHOTO (~~7-3~~ 7-4) - VIEW U/S FROM ~~MON STA NO. 1~~ MON MKRS @ E-E
(Taken from S. edge of Creek.)
~~7-6~~ 7-5
~~7-7~~ 7-6

PS - DRY - OBS @ 8.2 m
TOP OF PIPE 1.3 m ABOVE GRADE

VIEW N FROM MON STA 1. MKRS @ E-E X-SECTION



FIELD

(36)

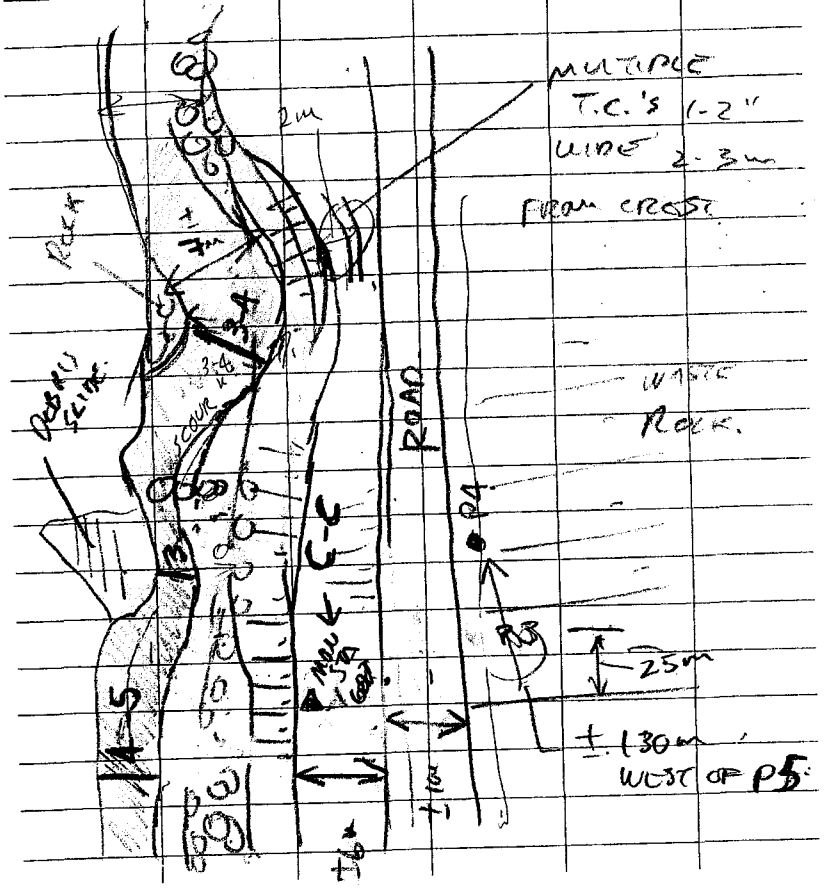
SEPT 13/98 CLINTON CREEK

MARKERS FOR X-SEC C-C.

MOW STA ~~#4.69~~.

- SOUTH BANK 8-10m HIGH.

X-SEC D-D GONE SLIDE AREA



(37)

SEPT. 13/98 CLINTON CREEK

- DEBRIS SLIDE ON N BANK ± 5m WEST OF P4
- Partially blocked channel due to undermining to South
- Several 1-2m ø Boulders upstream P3 (See photo # 7-9)

7-6 D/S FROM MOW P4.
7-7 N " "
7-8 U/S " "

7-9 - Boulders in ℄ channel

- Bank on WASTE ROCK 8-10m HIGH
- OVER STEEPENED (1:1), BUT RELATIVELY STABLE - BOULDERS ABOUT 5 TABLE OF CREST ARE THE MINIMUM UNDERCUTTING

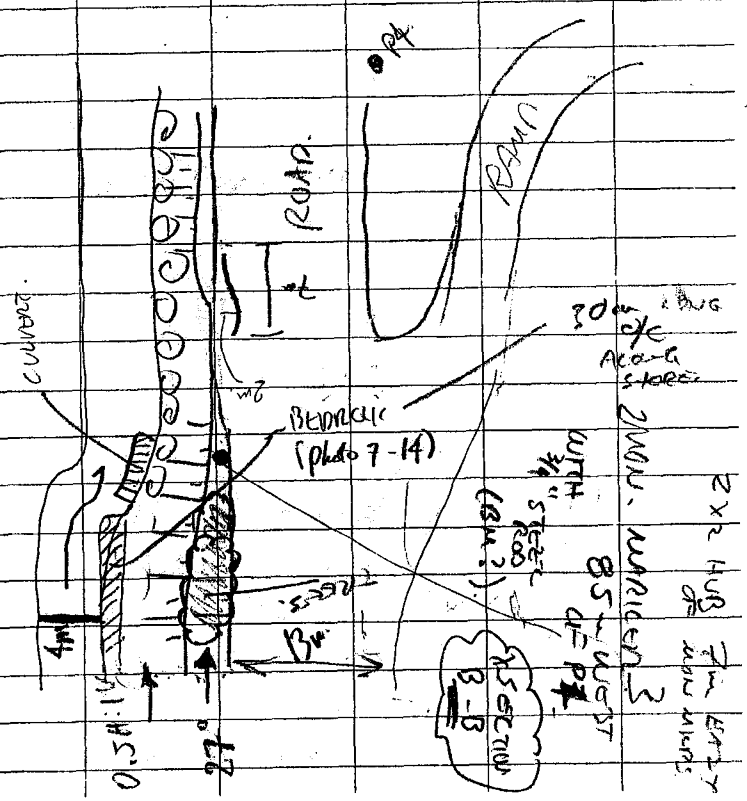
FIELD

38

SEPT 13/98 CLINTON CREEK

7-9/10 VIEW D/S @ SLIDE IN ROCK FILL ± 30m D/S FROM P4
7-10/4 " U/S @ DEBRIS SLIDE ON N. BANK " "

P4 - DRY - DEPTH @ 3.1m
TOP OF PIPE 1.3m ABOVE GR.



89

SEPT 13/98 CLINTON CREEK.

7-11/2 U/S
7-12/3 - D/S
7-13/4 NORTH

- T.C. REMNANT, 6' WIDE
± 7m LONG (INFILLED)
(OLD) PHOTO 7-15 7-14

7-15 7-16 T.T. WITH FLAGGING
ON MON MKR ? PIN.

PHOTO 7-16 7-17 7-18 VIEW U/S FROM
RAMP ± 140m W of P4

- OC W. ROCK PILE OVER STEEPENED
AND BEDR UNDERCUT
BANK ± 15' HIGH.
- BR DIPPING TO SOUTH < 45°

(R) WAS DIPPING TO WEST (R
WAS HORIZ. NOW DIPPING TO SOUTH

(90)

SEPT 13/98 CLINTON CREEK.

@ UNKNOWN MONUMENT MARKER
45 m E of P3.

~~7+18~~ ~~19~~ D/S } Δ
~~7+19~~ ~~20~~ U/S }
7-20 ~~21~~ N. }

& 1X2 STAKE
(BELIEVED TO BE X-SEC AA)

OPPOSITE FROM P3. (~~7-22~~ 7-21 VIEW D/S.)

- SIGNIFICANT UNDERCUTTING & SLUMPING OF WASTE ROCK SEVERAL m BACK FROM CREEK

- LARGE TREE COVERED LOWER BENCH ~~SLUMP BLOCK~~ U/S.
(PHOTO ~~7-23~~)
7-22

- BEDROCK CONTACT NO LONGER VISIBLE ON NORTH BANK JUST U/S FROM HERE (± 25m?)

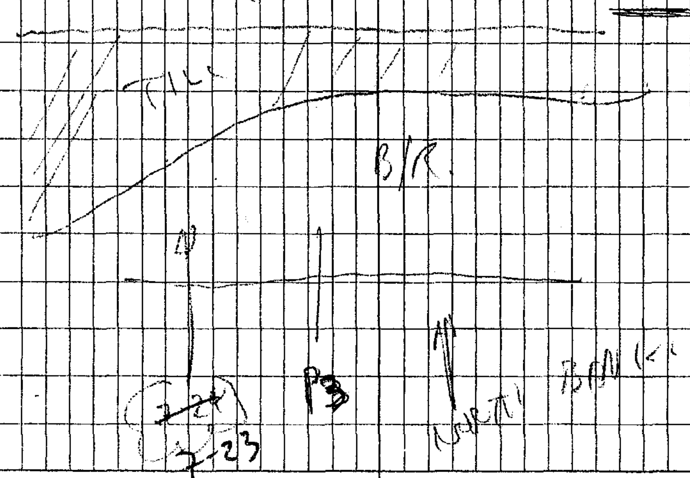
(91)

SEPT 13/98 CLINTON CREEK

P3 ⊼ @ 3.62m.
- PARTIAL SHEAR @ 3.55
- BOTTOM @ 5.17
SOC = 1.35m.

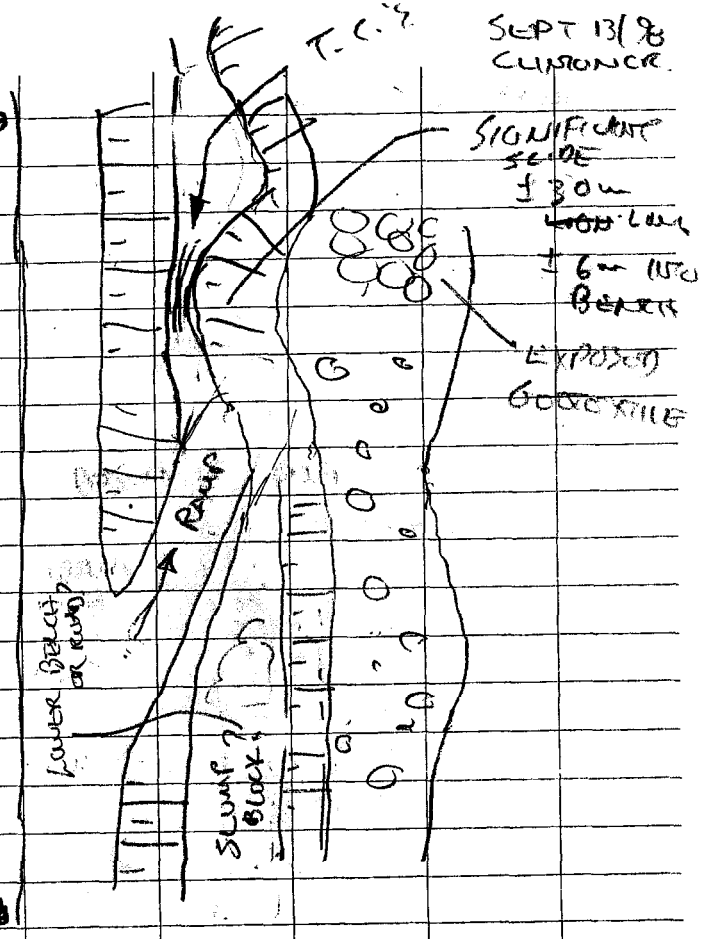
- EXPOSED TILL ON N. BANK U/S FROM P2

- MON MARKER 4 m N OF N. EDGE OF RD. OPPOSITE FROM P3. (flagged)
(BELIEVED TO BE MON 69)



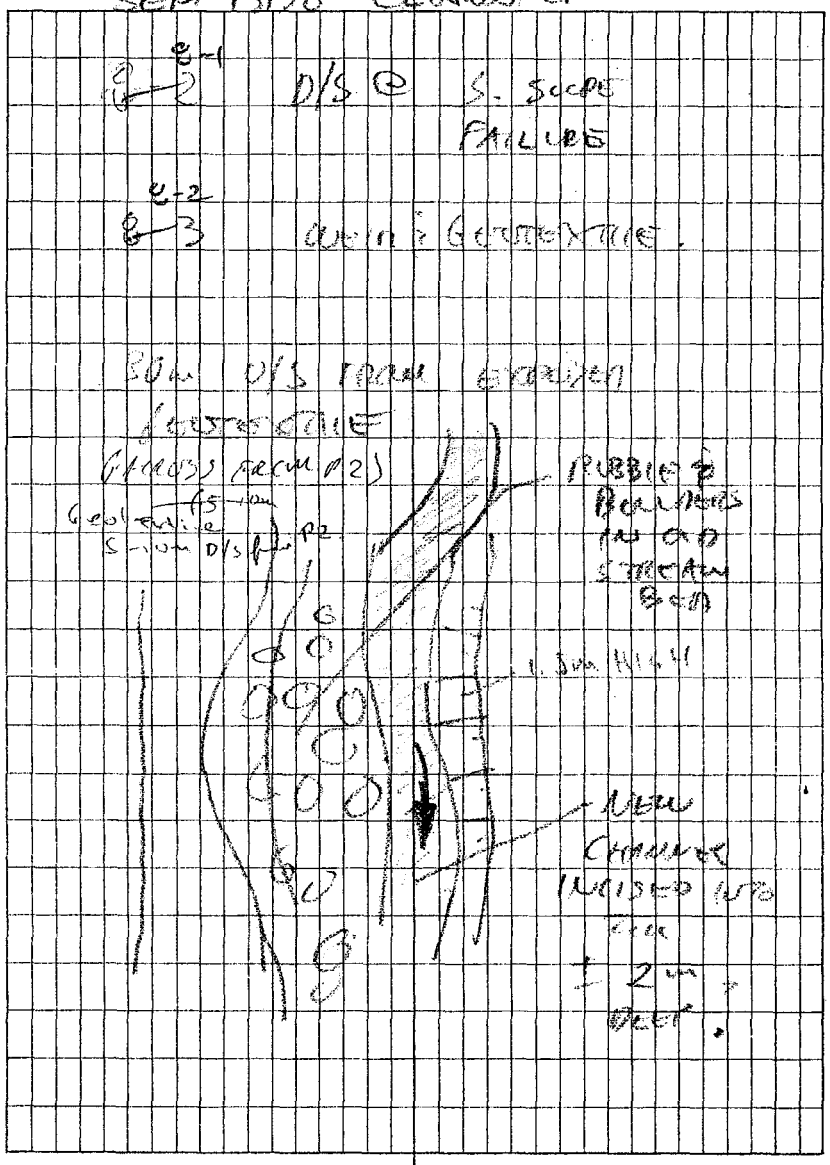
FIELD

(42)



(43)

SEPT 13/98 CLINTON CR.



FIELD

(44)

SEPT 13/90 CLINTON CR.

P @-83
* @-84
@-85
@-86

→ PREVIOUS ITEMS FROM ± 30m U/S. FROM EXPOSED GEOTEXTILE.

P2 ± 9.00
12m to Bottom of pipe
(sediment in bottom)
SV = 1.65.

P1

± @797
Bottom @ 13.5m.
SV = 1.95.

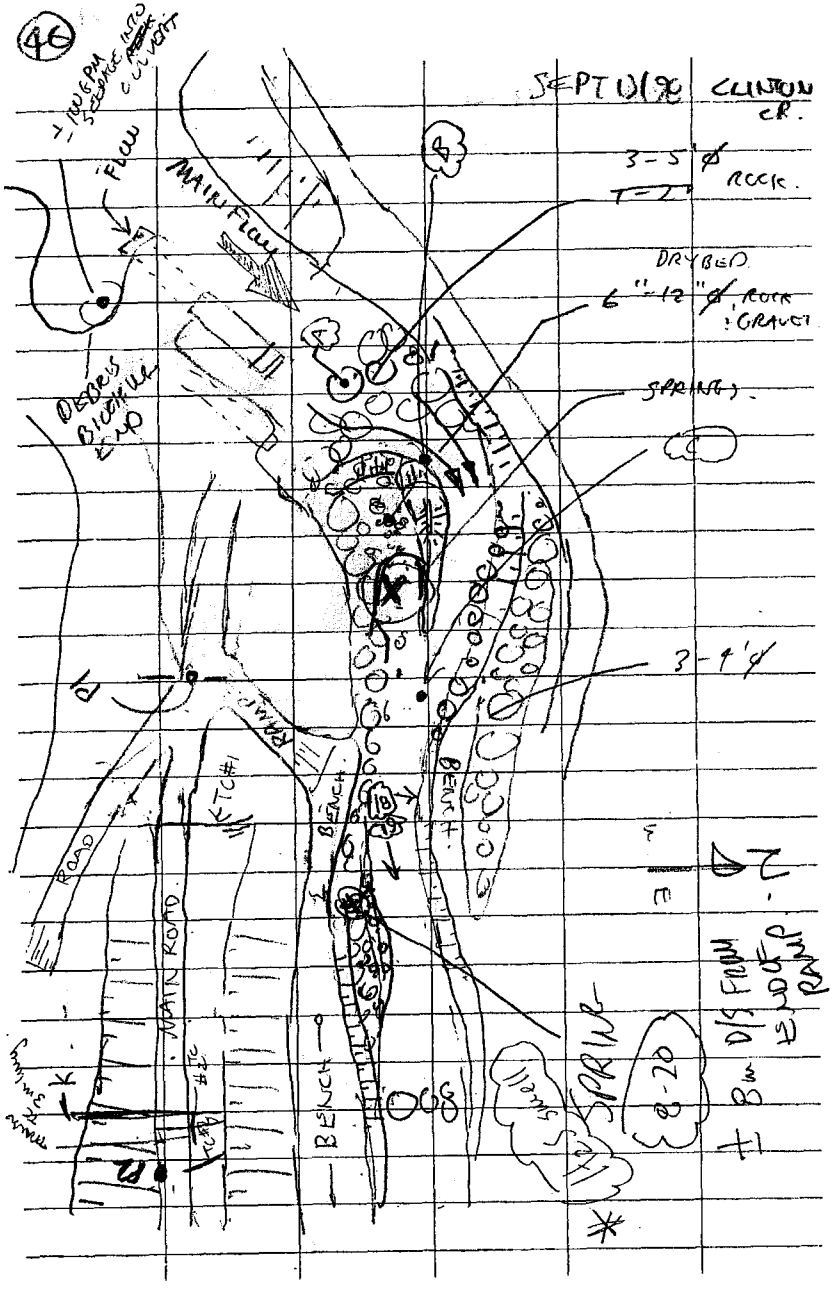
(45)

SEPT 13/90 CLINTON CR.

SEE A-A FOUND 95m D/S FROM P3.

FIELD

(96)



(97)

SEPT 13/98 CLINTON CR

FROM POINT A PICS 8-8 D/S
8-9 E SOUTH
8-10 U/S
8-11 NORTH.

OUTLET TO POINT A - 0.5m ϕ
A-B 2.0m ϕ

PHOTO 8-12 8-13 - FROM B - U/S
B - D/S.

B-C 1 1m

FROM C 8-14 13 U/S
8-15 14 NW
8-16 15 D/S

8-16 8-17 VIEW U/S @ SPRING

* SPRING 0.5m HIGHER THAN B IN MAIN CHANNEL (50 GPM - SPRING)

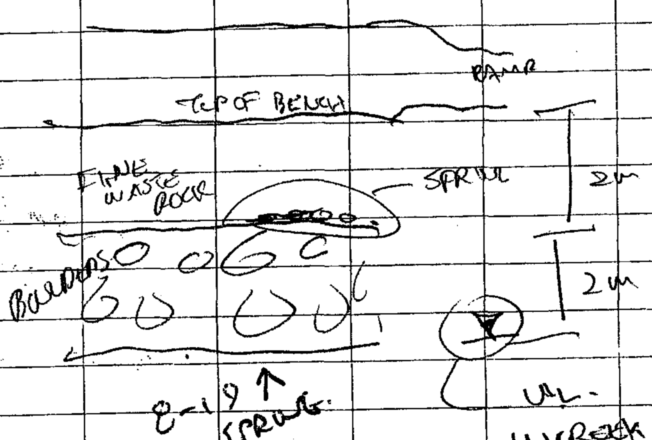
FIELD

(48)

SEPT 13/98 CLINTON CR

~~18 49~~ FROM BOTTOM
8-17, 18 OF RAMP.
(See Sketch)

SPRING ± 8m D/S FROM
END OF RAMP



EXITING SLOPE
± 2m ABOVE RIVER ▽

- NO FINES TRANSP.
- BROWN MOSS GROUND
OVER ROCKS IN AREA
OF SPRING.

(49)

SEPT 13/98 CLINTON CR.

TC #1 (See PP 46)

1'-3" WIDE ← (8-20) T.C.

- OPEN NORTH OF ROAD (NOT
RECORD) - See Geo Report.

~~8-19, 20, 21, 22~~

WALKING UP ROAD FROM
HUDGEON LAKE OUTLET

- FOUND MON #68 - Prism
tilted E/W. WATH CONE
ON E SLOPE

8-21 VIEW N FROM WASTE ROCK
8-22 - VIEW NE FROM

PHOTOS 20, 21, 22.
~~8-21, & 22~~

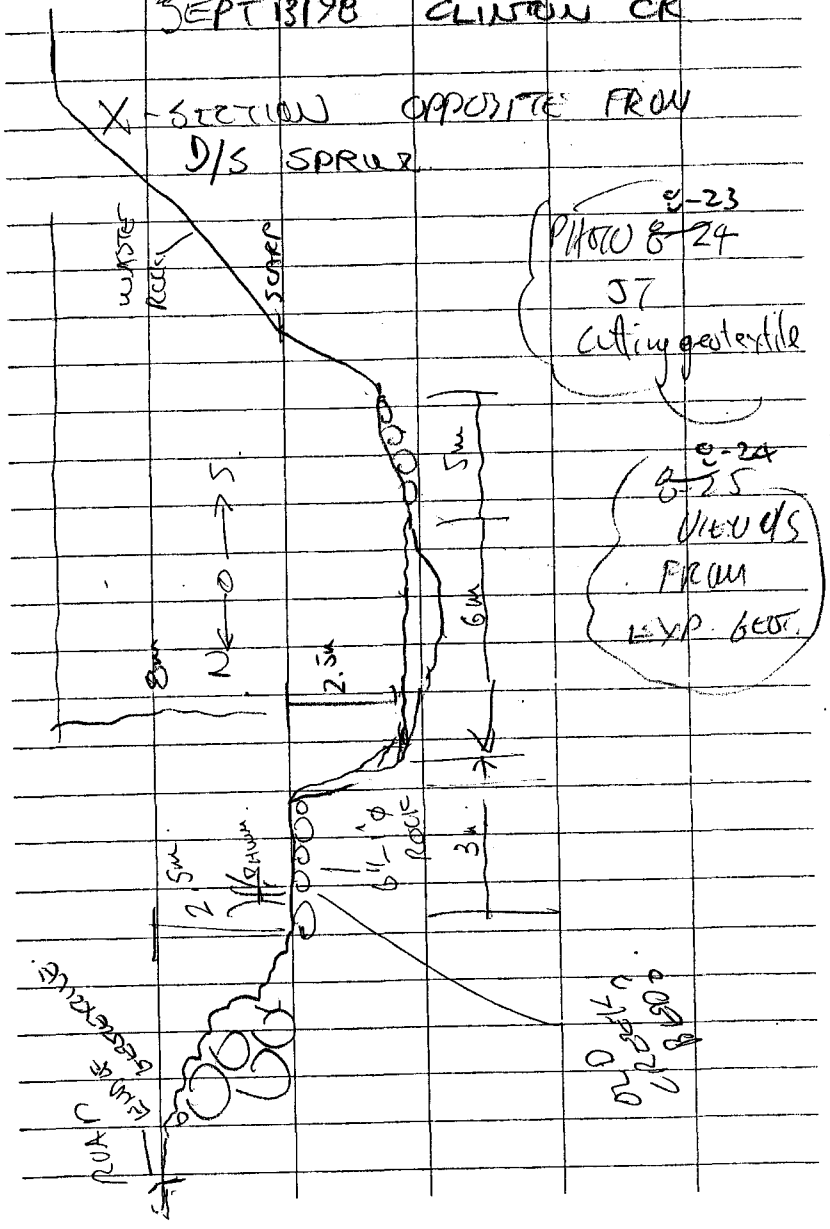
HUM IN TREES ON BENCH
OPPOSITE FROM RAMP (N SIDE)
1' ABOVE BENCH.

FIELD

(50)

SEPT 13/98 CLINTON CR

X-SECTION OPPOSITE FROM D/S SPRUCE



(51)

SEPT 13/98 CLINTON CR.

9-0 View u/s @ X-section

Creek

- River has deposited sand & gravel on bench ± 1-2' above bench against RIP RAP

9-1 - Rocks @ 25.

9-2 JEFF COLLINS HANDLOGGER HELPER MWM 6000'

FIELD

(52)

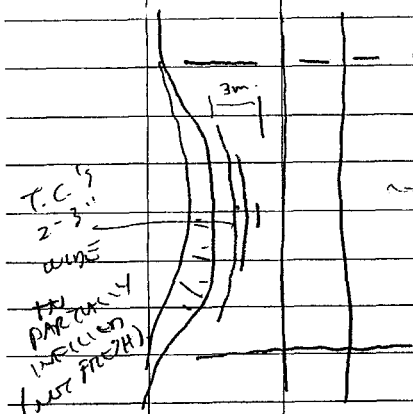
SEPT 14/98 CLINTON CREEK

CHAINAGE ALONG CLINTON CR. RD.

P5 STA 0+00

CLAIM MARKER POST NO. 1 EVA 99 ✓
150'E 150'S
AUG 26/98 B. SAUER
NEXT POST 150'W / 150'R.
→ STA 20+00 W.

X-SEC E-E STA 42+00 W.



(53)

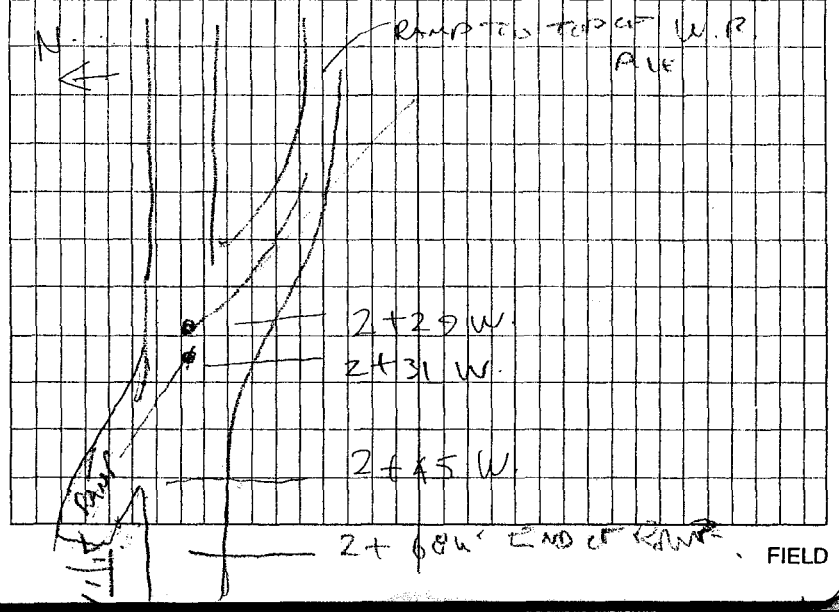
SEPT 14/98 CLINTON CREEK

P4 1+25.7m W.

X-SEC E-E 1+50 SW.

T.C. 4' wide ± 9m long
FROM 1+96 to 2+06
6m NORTH of RD.

2'X2' HOLE 2+06
X-SEC BB - 99 deg. 2+15.5



FIELD

(54)

SEPT 14/98 CLINTON CREEK

3/4" STEEL BAR ON S. SIDE OF RD (UNKNOWN) BUT FLAGGED @ 3+02 W.

CONTRACT GRADE FROM PS TO SECTION A-A (SHOULD BE ABLE TO CORRECT FOR TRUE HORIZ DISTANCE)

X-SEC A-A. 3+08W.

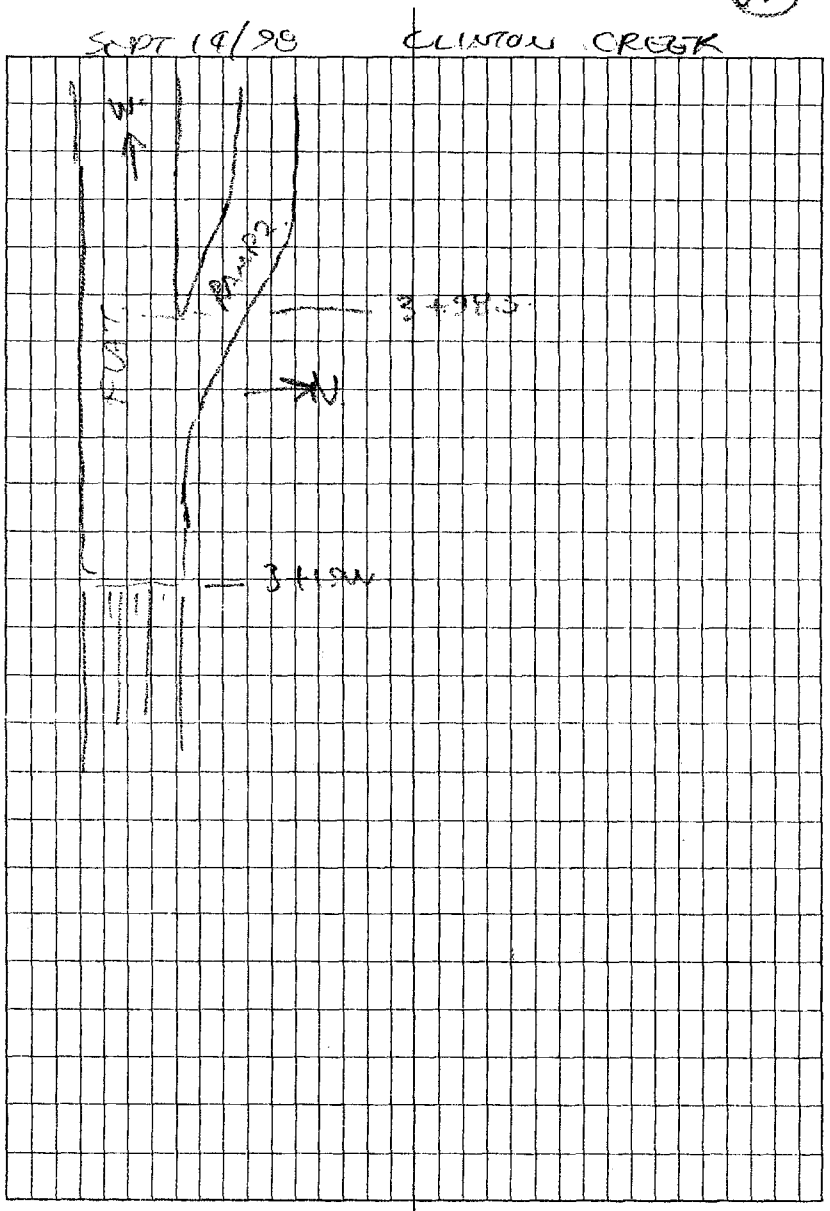
TOP OF ROAD @ 3+19W.

P3 3+52W.

MON STA 69 3+55.5

(55)

SEPT 14/98 CLINTON CREEK

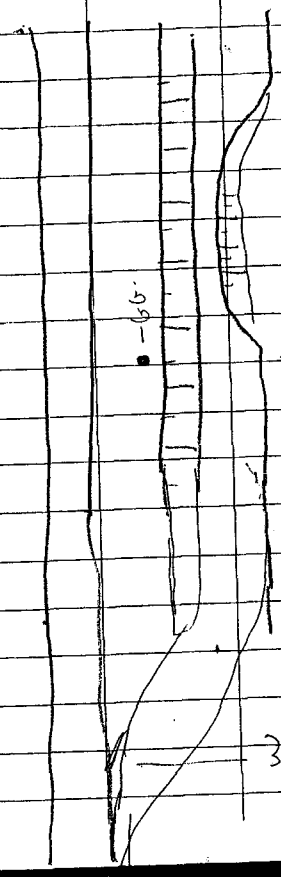


FIELD

(56)

SEPT 14/88 — CLINTON CREEK

X-SEC GG. - 3/4" PIN ± 1 ft above gr., N side of road, 7m N of ℄



(57)

SEPT 19/88 — CLINTON CREEK

TRANSV. T.C. @ 4+84.5 ACROSS RD.

P2 4+96.2

- BELOW PRE RAPIDS @ 4+94

- LOW WATER RD FOR 15m E & W OF P2 ± 0.5m

LOWER WATER.

1 X 2" STAKE SET K-K

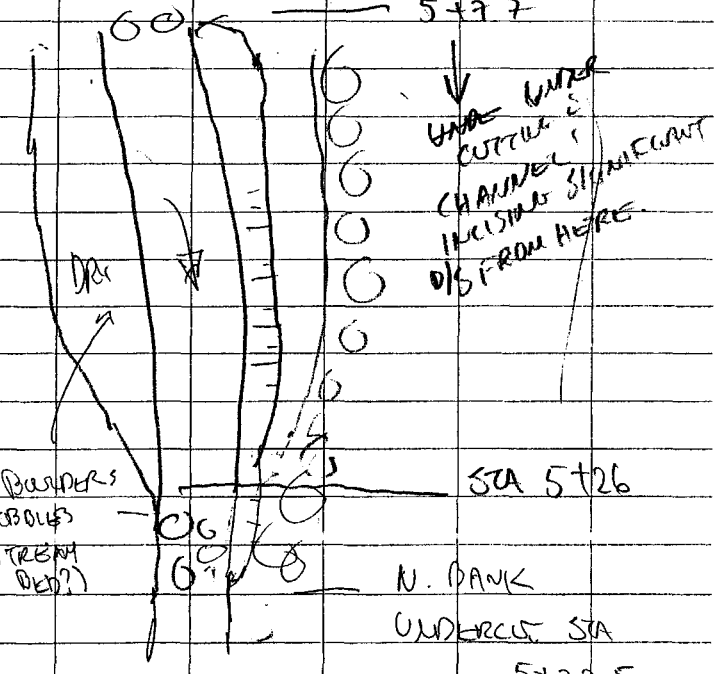
± 1/4" RE-BAR

± 5m N of ℄ STA 5+22.4

FIELD

(58)

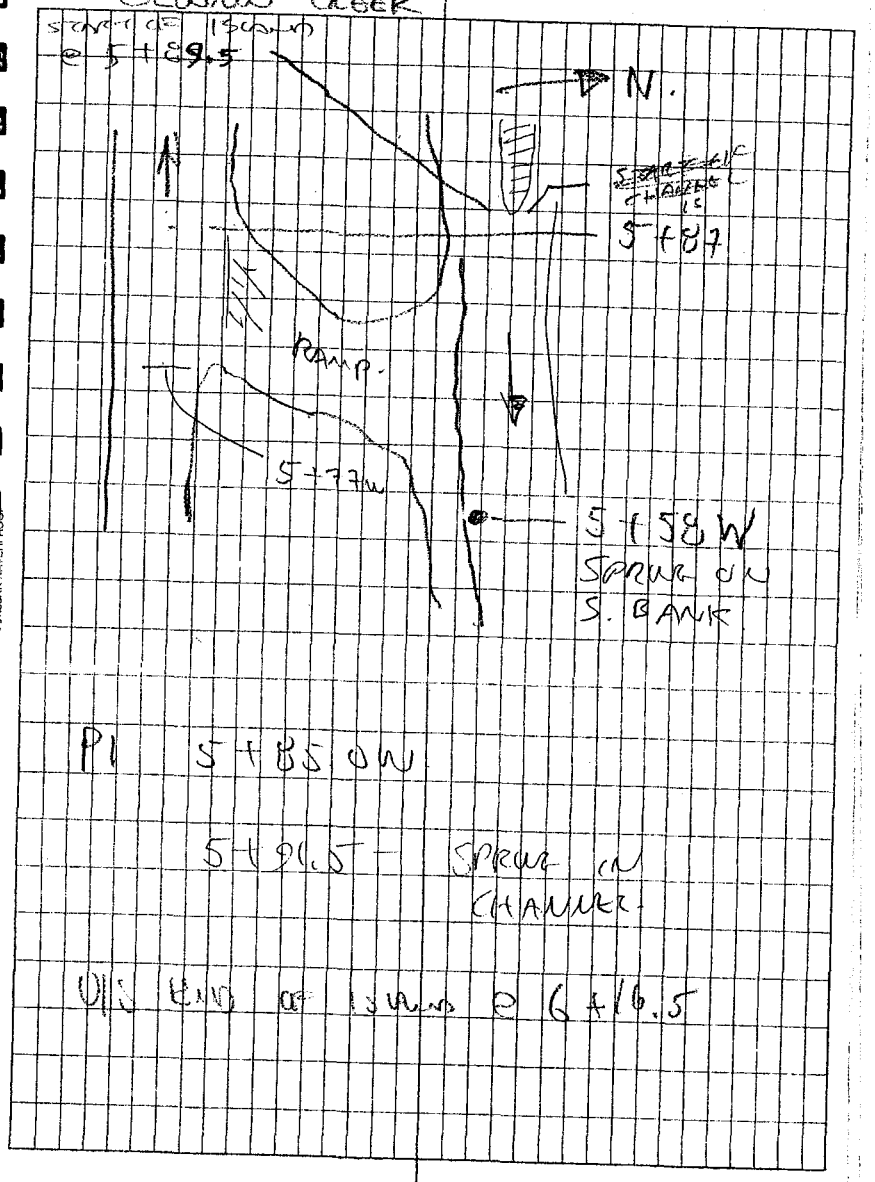
SEPT 14/96 CLINTON CREEK



4 TRANSIT T.C.'s @

(59)

SEPT 14/96 CLINTON CREEK



FIELD

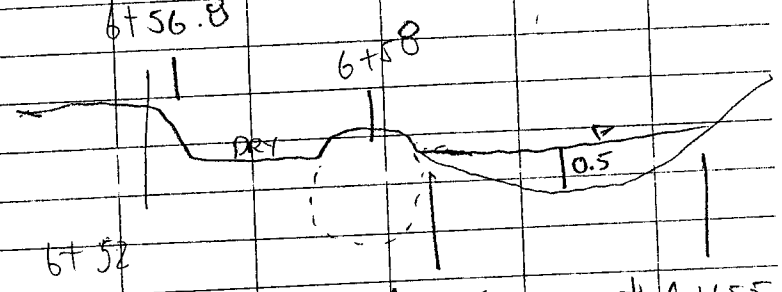
(60)

SEPT 14/98 CLINTON CREEK

1 x 2 ; 1/4" REBAR
X-SEC J-J
6+27.2

EDGE OF OUTLET

℄ CULVERT 6+59



STICK OVER 10m.

51 - 04 = 13 seconds
@ OUTLET.
27 - A1 14 sec.

(61)

SEPT 14/98 CLINTON CREEK

PICKED UP WASTE ROCK DUMP

LOCATED NOW 20-A
B1-2
21-A
22-A
B1-1 (A1019 IN BACKGROUND)

HUDGEON LK

1.1.2 Filled in (NO Signs of recent movement)

WATER

0.22A

0.21A

T.C. 1st SLUMP AROUND (See Klohn '87)

9-3
9-4 VIEW N ½ way between
9-5 22-A & 22A.
2-5 VIEW E " "

(21A IN BACKGROUND) FIELD

(62)

SEPT 14/98 CLINTON CREEK

9-5 ~~9-6~~ VIEW S FROM ± 60m W OF MON 81-1 → SLUMPING OF W SLOPE TOWARDS LAKE.

9-6 ~~7~~ — JT IN PIC
9-7 ~~8~~ — PAN
9-8 9
9-9 10 — 30m E of O/B CONTACT ±60m S of 81-1.

9-10 ~~9-11~~ T.C.'s ACROSS MAIN RD INTO OPEN PIT.

9-11 ~~9-12~~
9-12 ~~13~~ — OPEN P.T.

9-13 ~~9-14~~ FROM MINE BLDGS LOOKING @ JCT. OF WOLV. & CLINTON CR.

(63)

SEPT 14 CLINTON CR.

9-14 ~~9-15~~
9-15 ~~16~~
9-16 ~~17~~
9-17 — VIEWS OF PORCUPINE R FROM 100m W OF MILL.

VIEW OF HEAVY SPRING & POSSIBLE CHANNEL REMNANT.

WALKED DOWN ROAD FROM MILL & ENCOUNTERED HEAVY SPRING (A) (See Gen. Sketch).

SPRING EXITS NE SLOPE OF WASTE ROCK ± 5m ABOVE ROAD
SEEPAGE EST @ ± 100-150gpm.

- SMALLER SPRING TO LEFT (±3m) ± 3m ABOVE GR.

9-18 ~~9-18~~ — SPRING (A).

~~9-19~~ 9-19 ~~9-19~~ — CREEK FROM SPRING (J.T. IN PIC)

FIELD

(64)

CREEK WATER PONDS ± FROM
D/S WHERE SMALLER CREEK
(LESS FLOW?) CUTS ITS WAY
THROUGH WASTE ROCK
TOWARDS WATERFALL.

9-20 ✓ NEW CHANNEL
BEING CUT.

- * CULVERT @ ROAD
CROSSING (NOW ABANDONED).

9-21 ✓ 2ND SPRING.

HEAVY FLOW AS
NOTED ON GEO DWG.
± 200 GPM
TO WATERFALL

- Smaller creek diminishes
but discharges to North
of main spring.

(65)

SEPT 14/98 CLINTON CR.

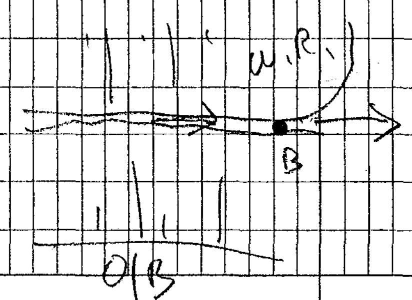
✓ 9.22 - VIEW WITH
AT JT AT JCN OF
O.D. & NEW CHANNEL
FROM SPRING A

SPRING B 15-20 GPM

- FINES SAND/SILT DEPOSITED
D/S OF SPRING.
- ~~POSSIBLE~~ * PIPING.

✓ 9.23 - SPRING B ~~CATCH~~ SWALLOWING
JEFF'S ARM.

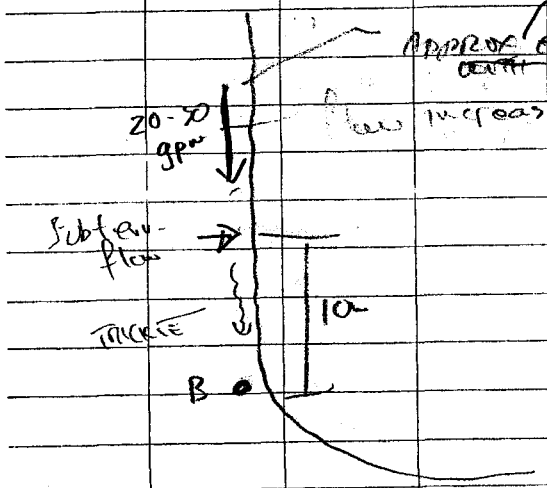
- WATER TRICKLING DOWN
CROTCH ABOVE SPRING B



(66)

HEAVY ~~UG~~ SUBTERRANEAN FLOW NOTED 10m UPSCOPE FROM SPRING B (~~NO~~ TRICKLE OF WATER VISIBLE)

- HEADWATER FLOW VISIBLE THROUGH CAVE GRILLS



(67)

SEPT 14 CLINTON CR.

HEAVY SUBTERRANEAN FLOW 45M UPSLOPE FROM SPRING B.

WATER IS RUNNING OVER SPHAGNUM MOSS/ TREES, ADJACENT TO TOE OF ROCK FILL

√9-24 SUBTERRANEAN FLOW @ 0.5-1.0 L/S FROM SPRING B + SEEPAGE ROAD @ MID. (SUMMER)

FLOW ENDS ± 7m ABOVE GROUND @ MID MAN DOOR.

√9-25 (MCL)

√10-0 Returned 9-25 @ END OF RUNNING WATER

FIELD

MOVEMENT WEST POND
2 CONFIRMED
10-1 10-2
(Photos ~~2~~ 2&3)

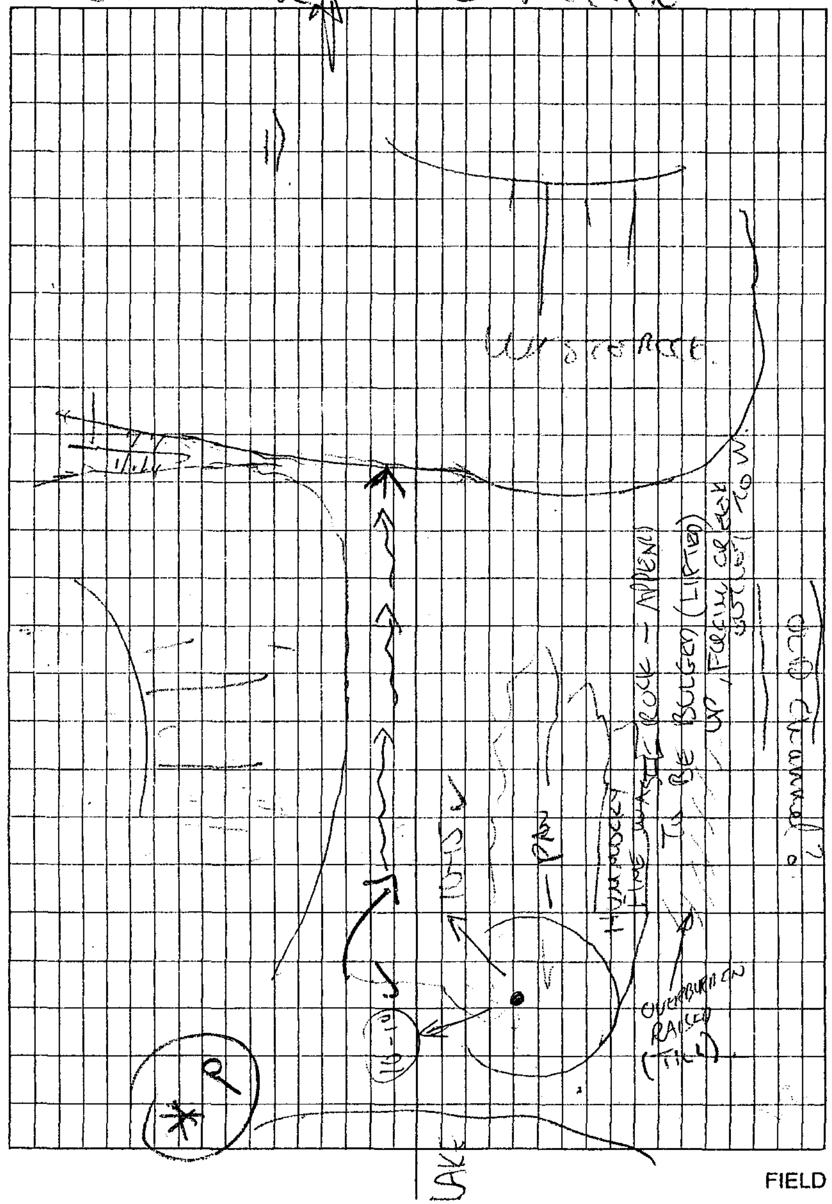
Photo ~~#~~ 10-3 higher up
looking @ Pond 2.

10-4 ~~10-5~~ Blast Area Sign.

10-5, 6, 7, 8
~~10-6~~ 6, 7, 8, South Lake
(See Geo Plan).

~~10-8~~
~~10-9~~ 10-9 WATER FLOWED INTO
WASTE ROCK

CLYTONIER? N ? | SEPT 14/08

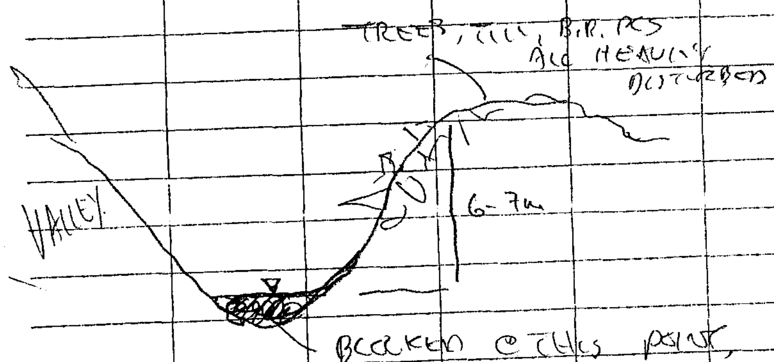


FIELD

(70)

10-16 ✓ TILL LIFTED UP
± 100m W OF CREEK
(LAKE W B.G.).

WALKING N. ALONG
TILL RIDGE
TOWARDS WASTE ROCK
- NOW ± 6m ABOVE



X-SECTION 100m D/S FROM
OD OUTLET.

(*P) ✓17, ✓18, ✓19 - Pan from lake shore.

(71)

SEPT 14/98 | CLINTON CK.

(P) 20, 21, 22 - Pan from higher up
while wait.

✓23, ✓24, ✓25 - Road from Test Bldg.

11-0 JT @ SLIDE AREA
11-1 OPEN PIT
11-2 " "

2 ?

* PAN (P) 3 - SPRING A. FROM RD FROM
4 FORE BLDG.
5

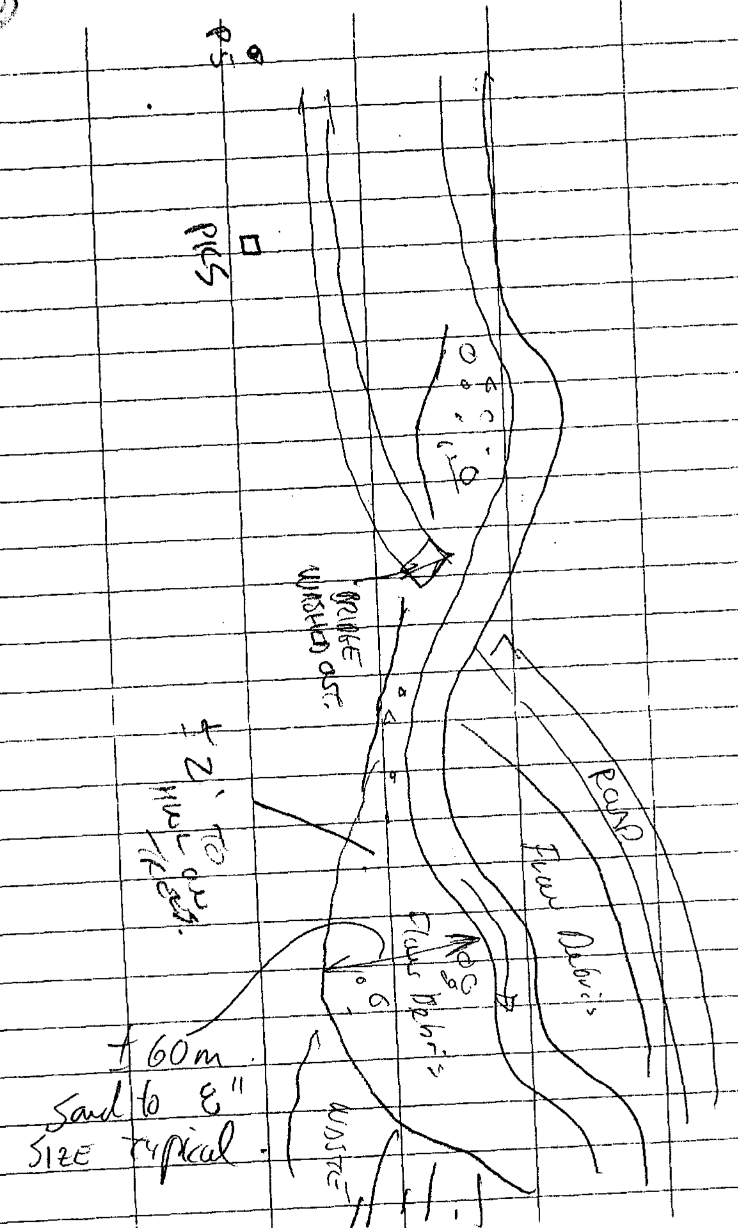
✓6 - T.C.'s along road to M. ll.

✓7, ✓8, ✓9 - Pan of Clinton Cr
FROM RAMP ± 50m D/S
OF PS.

Pics huge here
Also Dumps

FIELD

(72)



(73)

SEPT 19/98 | CLUTOU CR

✓ 11-10) — VIEW U/S @ CROSSING
✓ 11-11)

✓ 12)
✓ 13) — Same Spot
✓ (14))

11-15 — D/S.

└— Fairbank

11-16 WASHED OUT BRIDGE
11-17 VIEW D/S OF BRIDGE (ATV x'ing)

(15) — 3-4" Ø Gravel & 2 R.
± 150m D/S of BRIDGE

11-18 ON N SIDE OF CHANNEL
(± 20m)

UPTO 16" Ø ROCK @
(Channel
(11-18) 11-19 & 11-20 (D/S).

11-21 11-22
... TREES flattened
... HW flow ...
D/S.

FIELD

11-23 11-24
~~20~~ & ~~21~~) ± 225m D/S ?
D/S U/S

2+14 m OF START
Flag a ROAD

lateral extent of debris
reduced to say 30m wide.

SHAWNIGAN BACK TO BRIDGE

0900 - EXTENSIVE BEAVER DAM FLOODING - NO FLOOD DEBRIS VISIBLE.

(11-23)

23? - END OF ROLL.

- Check No.'s.

163
SEPT 14/98 ~~3~~ ↓ CLINTON CR.

30m WEST

- SOME FLOW DEBRIS VISIBLE ON N SIDE OF CREEK (~~[illegible]~~)

98 am - OBSTRUCTION - POSSIBLE BEAVER DAM UNNUMBERED

FLOW DEBRIS VISIBLE ON N BANK FROM 30 to ± 80m

MINOR DEBRIS VISIBLE 98 - 1+63

DEBRIS VISIBLE BOTH BANKS U/S OF 1+63 TO 2+14 (meander to road @ 2+14)

1+80 TO END OF CR @ 3+19 ± 4-52 TO END CREEK

FIELD

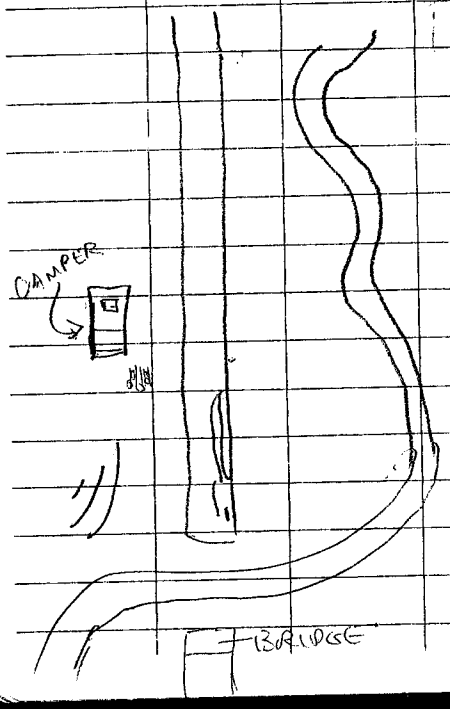
(76)

12-0
12-2
12-2 3 } from Road @ camper.

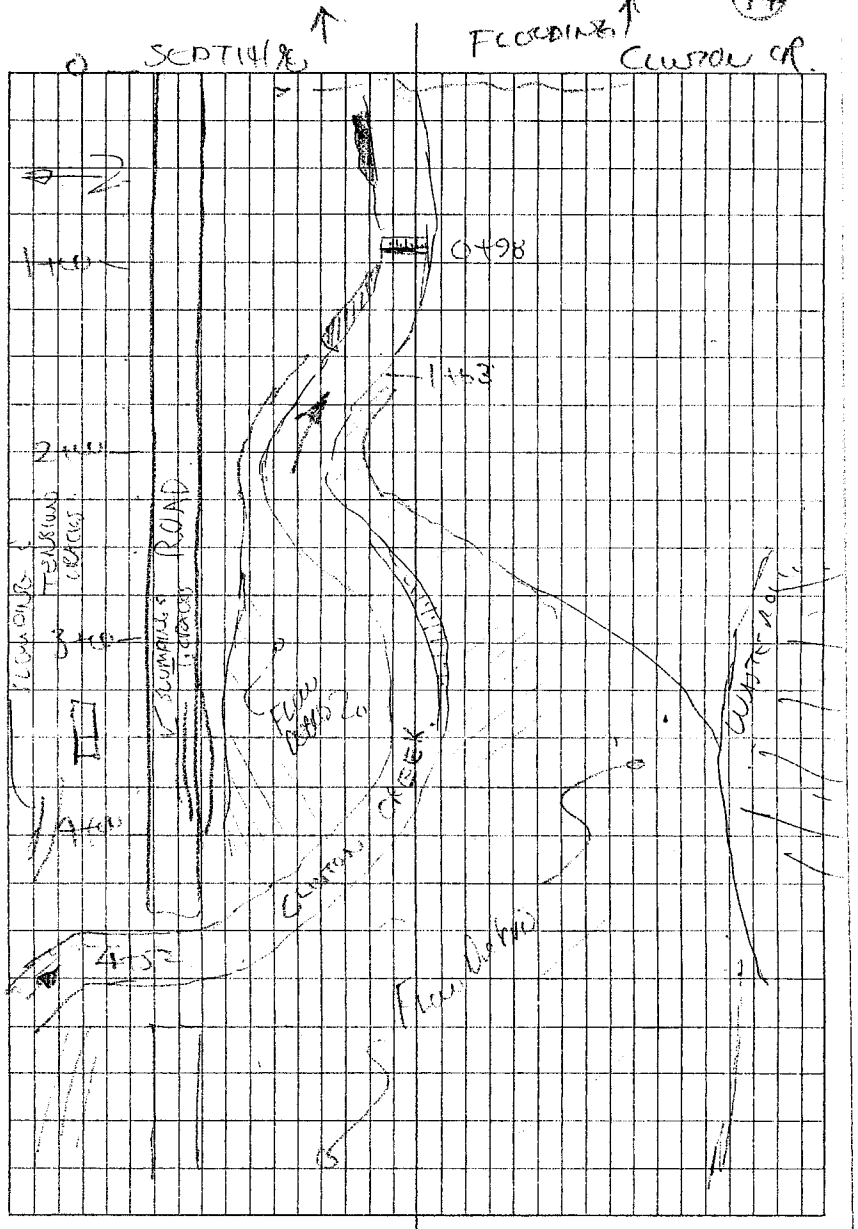
12-3 YUKON RIVER

* Debris @ Wdy Cr. Outlet.

* Nothing visible D/S from here.



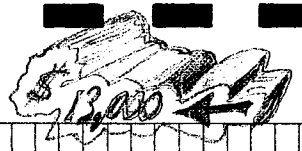
(77)



SEPT 14/76 CUSTON CR.

- OLD DRILL CUT

- COARSE GRAVEL VISIBLE ON MOST OUTSIDE BENDS STREAM - POSSIBLE THAT THIS MATERIAL IS NATURAL & NOT ASSOCIATED WITH OLDER FLOW.



Richard Schlachter
Geomatic
- Jim Simmons.

1975 and 98

13-9
13-10
13-11
13-12
13
14
15
16
17
18
19
20
21

Helicopter from AK-10 TRIP
5 Further Reports (March 12)

CUSTON CREEK FROM TOP OF WASTE ROCK FLUE U/S OF P5.

FIELD

(88)

- DEPART CLINTON CREEK CAMP SITE @ 9.15
- ARRIVED WHITEHORSE @ 1:30 AM TUESDAY.

(89)

SEPT 15TH/98.

- ARRIVED W.H. @ 1:30
- MET WITH BRETT/MARK/MATT & DAN
- DEPARTED @ 9:00.
- RETURNED CLIENT'S HOME.

FIELD

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