

(65) 1.1.2

# STATE OF ALASKA

## ALASKA NATURAL GAS DEVELOPMENT AUTHORITY

FRANK H. MURKOWSKI, GOVERNOR

411 WEST 4TH AVENUE  
ANCHORAGE, ALASKA 99501  
TELEPHONE: (907) 257-1347  
FACSIMILE: (907) 646-5005

*Rec'd 11/3/2005*

November 2, 2005

Janetta Pritchard  
Natural Resource Specialist IV  
Gas Pipeline Office / Joint Pipeline Office  
Department of Natural Resources  
411 W. 4<sup>th</sup> Avenue  
Anchorage, AK 99501

**VIA HAND DELIVERY**

**SUBJECT: ANGDA Proposed Alignment Changes to Existing Alignment  
Glennallen to Palmer Natural Gas Spur Line  
Application for Pipeline Right-of-Way submitted April 4, 2005**

The Alaska Natural Gas Development Authority (ANGDA) is in process of preparing for final alignment of the pipeline. Because of recent public comment and contractor field findings, re-routes have been proposed.

- The public comments identified, for example, structure avoidance by slight movement of the alignment to a section line easement. This is primarily on the southern end of the proposed pipeline alignment. The alignment changes are minor and would not show on the alignment sheets. However, a list of these changes and the corresponding alignment sheet number will be submitted to show the pipeline will be located within the section line easement, within the MEA transmission line easement or within the DOT/PF easement.
- Contractor field reconnaissance found hazardous soil conditions, a better alignment to avoid rock formations and alternate locations for stream crossings. These changes are shown on the revised alignment sheets attached herein.

All of these issues are usually resolved by, i.e., coordination with various agencies, archaeological clearance, field stream data gathering, field soil drill sampling or a combination during the final engineering design phase.



We would like the original alignment and the proposed alignment changes to be included in the Commissioners Analysis and Decision. In this manner: [1] the public is aware of potential changes and [2] ANGDA has the flexibility to (a) maximize project and public safety and (b) potentially move to an alternate location should. i.e., geotechnical analysis, fish stream data gathering or section line proximity supports a better solution.

The proposed alignment changes are listed below in order from Glennallen to Palmer. At this writing the approximate mileposts and alignment sheets are:

	<b>LOCATION</b>	<b>MILEPOST</b>	<b>Δ</b>	<b>A/S</b>
1	Mendeltna Creek - Potential	36	0	006
2	Squaw Creek Realignments	63 - 74	-0.6	011 - 012
3	Caribou Creek - Potential	75 - 78	0	013
4	Chitna Pass Re-Route	89	+2	015
5	Boulder Creek Realignment	100 - 105	0	017
6	Chickaloon By-Pass	105 - 117	-0.3	018 - 019
7	Kings River Realignment	118	0	019
8	Kings River Draw re-Route	122.2	+0.1	020
9	Eska Creek - Potential	128	+0.1	021
10	Slipper Creek Strip Mine	128 - 130	0	021
11	Moose Creek Re-Route	134	+1.5	022
12	Section Line Refinement	137 - 138	0	022
13	Trunk Road - DOT/PF	139 - 146	-0.2	023
14	Hay Flat Access - Potential	146 - 148	-0.4	024
15	Terminus Location - Potential	148	+0.2	024

Approximate: Δ = +2.4 miles

- Attachments:**
- 1) Summary of Recommendations
  - 2) Chitna Pass Proposed Realignment
  - 3) Chickaloon River Crossing Proposed Realignment
  - 4) Moose Creek Crossing Proposed Realignment
  - 5) Helicopter Reconnaissance Report & Photos
  - 6) Alignment Maps showing revised alignment locations.

Respectfully submitted,



Harold Heinze  
 Chief Executive Officer  
 Alaska Natural Gas Development Authority  
 ANGDA

**PROPOSED REALIGNMENTS  
GLENNALLEN TO PALMER GASLINE**

**Summary of  
Recommendations**

**Alaska Natural Gas Development Authority  
November 1, 2005**

TABLE 8

SUMMARY OF SALIENT RECOMMENDATIONS

Page	Section Name	Recommendation
49	Milepost 13.3 to 15.2	This area should be accessed only during winter conditions when the ground is sufficiently frozen to support equipment. Any realignment in this area should take the presence of these mud volcanos into consideration.
49	Milepost 16 to 16.8	Consideration should be given to possible realignment of the spur line to the old gravel pit access road lying north of the highway. Drainage should be directed to minimize the concentration of water flow along this road. Detailed subsurface exploration should be performed to determine site-specific conditions.
51	Milepost 40 to 57	The alignment may need to be moved slightly north of this disturbed area.
51	Milepost 42.3 to 50	Should the alignment need to move, we recommend that it be moved south of the existing highway, and not uphill to the north.
51	Milepost 48.7 to 51.1	Both bedrock stability and highway embankment deformation should be investigated.
51	Milepost 64.3 to 64.7	The alignment should be moved north; away from these scarps and geotechnical investigations should be performed to determine whether there is any potential for further such failures elsewhere in the area.
51	Milepost 65 to 73	It may be advantageous to move the alignment uphill to avoid some of these frozen ground degradation problems. Further study and exploration should be performed to determine the extent of this hazard and the feasibility of any proposed solutions.
51	Milepost 69.1 to 69.8	The alignment should not be moved northward (uphill) at this location. Further investigations should be performed to determine whether these landslides may affect the present alignment.
52	Milepost 82.2 to 84.3	Further evaluation of these slides should be performed.
52	Milepost 84 to 93	These reported landslides should be analyzed as part of any future slope stability study.
52	Milepost 86 to 88	These two slides should be further evaluated.
52	Milepost 91.2 to 91.9	We recommend that the alignment be moved out of this area. See Section 5.2.1.

(continued)

**TABLE 8 (continued)**

**SUMMARY OF SALIENT RECOMMENDATIONS**

<b>Page</b>	<b>Section Name</b>	<b>Recommendation</b>
52	Milepost 92.4 to 92.8	Further evaluation of this slide should be performed, or the alignment should be moved to the south side of the creek.
52	Milepost 94.6 to 94.8	The likelihood of movement of the glacier should be evaluated.
53	Milepost 95.3 to 98.5	Further evaluation of these fans should be performed. Relocating the alignment across the creek, where there are fewer colluvial fans, may be appropriate.
53	Milepost 107 to 109	The alignment in this location should be moved south at least 1,000 feet.
53	Milepost 110.5	It is recommended that the alignment be shifted to avoid steep bedrock bluffs. See Section 5.2.2.
53	Milepost 117.6 to 118.6	The stability of this ridge should be evaluated.
53	Milepost 134.3	It may be advisable to move the crossing either downstream or upstream to a location with a wider floodplain, or more gentle slopes. See Section 5.2.3.
55	5.2.1 Chitna Pass Realignment	We recommend that the proposed northern realignment, as shown in Figure 15, be given further consideration.
55	5.2.2 Chickaloon River Crossing Realignment	We recommend shifting the alignment either up or downriver to a more advantageous crossing location.
58	5.2.3 Moose Creek Crossing Realignment	We recommend that consideration be given to moving the crossing either upstream as shown on Figure 18 or downstream to a location between the Glenn Highway and the Matanuska River.
61	5.4.1 Potential Material Sites	On the ground reconnaissance was not performed, but would be necessary to determine whether these sites contain sufficient quantities of suitable material to warrant further exploration.
67	5.4.1 Potential Material Sites	Future materials investigations should include a field reconnaissance study that takes into consideration estimated quantities and quality of material required, lands and ownership issues, and environmental concerns. A reconnaissance plan showing how the sites would be accessed should be prepared for review by ROW personnel.

(continued)

**TABLE 8 (continued)**

**SUMMARY OF SALIENT RECOMMENDATIONS**

<b>Page</b>	<b>Section Name</b>	<b>Recommendation</b>
67	5.4.1 Potential Material Sites	<p>Based on the results of the field reconnaissance, an exploration plan should be prepared, showing the exploration area, proposed access for equipment, test hole locations, testing requirements, and outlining any clearing required for the field work.</p> <p>Upon completion of the field work, a report containing site maps, test hole logs, laboratory testing results, access and mining guidelines, and estimated quantities should be prepared.</p>
67	5.4.2 Proposed Disposal Sites	<p>On the ground reconnaissance was not performed and would be necessary to determine whether these sites are satisfactory.</p>
67	5.5.1 Detailed On-the-Ground Geotechnical Survey	<p>A detailed on-the-ground geotechnical survey should be performed which would consist of walking the alignment and making observations of geotechnical conditions.</p>
69	5.5.2 Slope Stability Study	<p>A detailed slope stability study should be performed prior to selection of the preferred alignment. This study should determine which existing landslides are active and which can be crossed by the pipeline with minimal risk. The study should also evaluate those areas that do not have discernable existing failures and conclude what, if any, risk there is of failure in the future.</p>
69	5.5.3 Avalanche Studies	<p>Potential damage to shallow buried pipe may also be a possibility and should be considered. At a minimum, an avalanche study should be performed in the area between MP 64 and 104 to determine the probability of avalanches and potential avalanche paths. If between MP 104 and 116 the pipeline is realigned further north and closer to the mountains, then avalanche studies should be extended into these areas.</p>
69	5.5.4 Exploration for Route Soils Characterization	<p>Shallow test holes including test pitting and drilling should be performed to characterize the soils along the centerline.</p>
70	5.5.5 Geophysics	<p>Geophysical studies should be implemented as they are an excellent method to extend subsurface data between widely spaced test holes.</p>

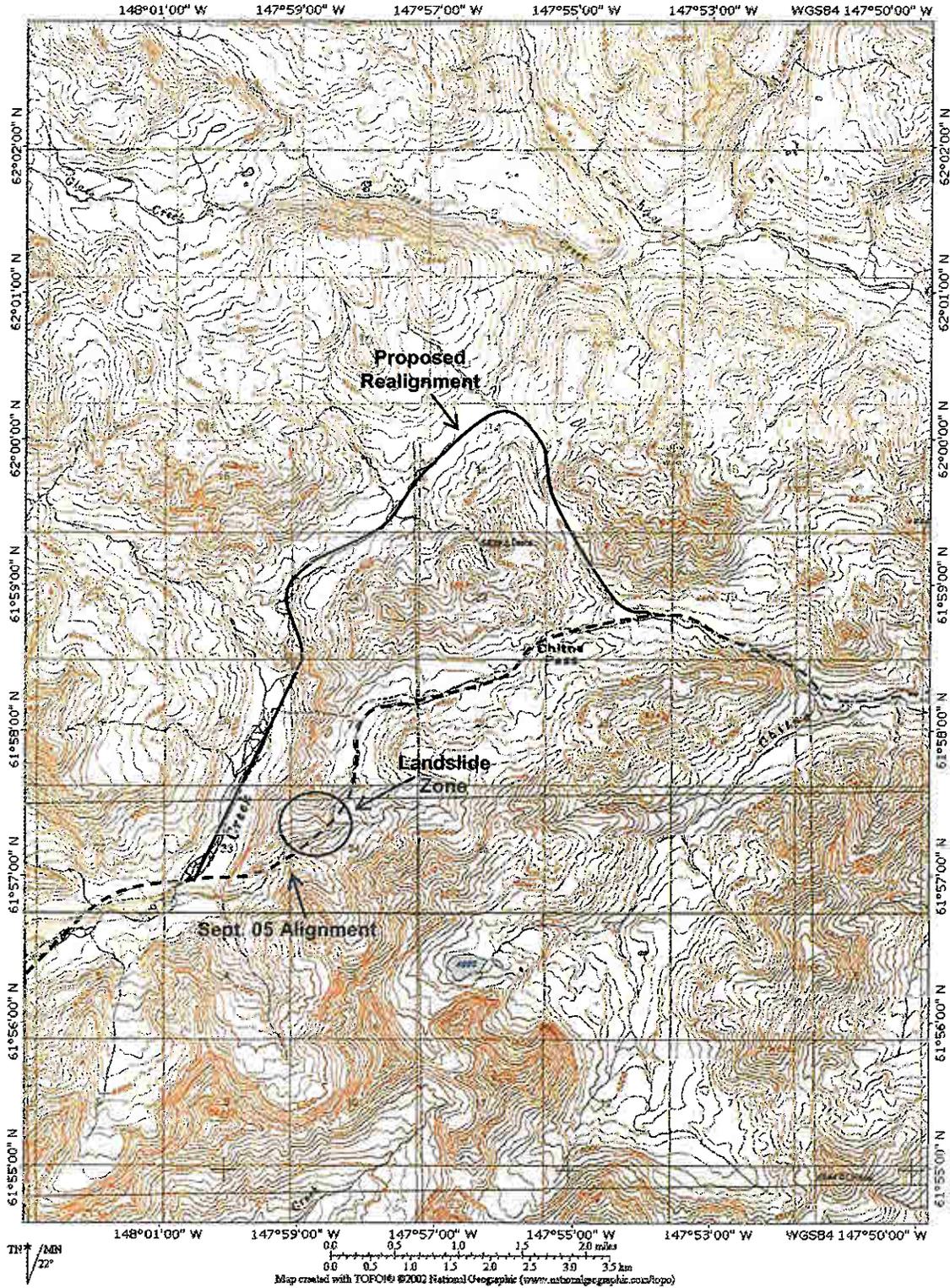
**PROPOSED REALIGNMENT  
GLENNALLEN TO PALMER GASLINE**

**CHITNA  
PASS**

**Alaska Natural Gas Development Authority  
November 1, 2005**

FIGURE 15

PROPOSED CHITNA PASS REALIGNMENT



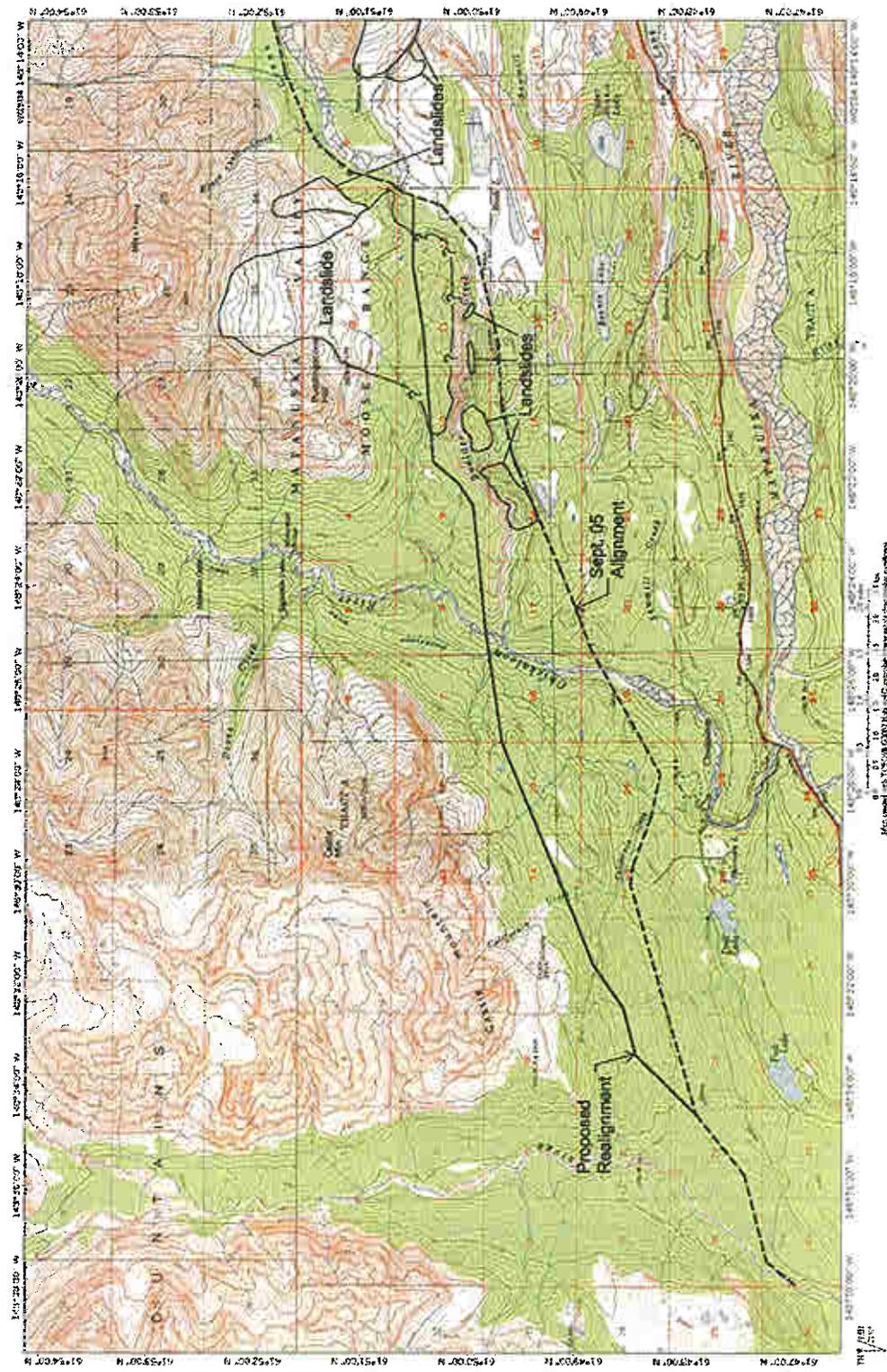
**PROPOSED REALIGNMENT  
GLENNALLEN TO PALMER GASLINE**

**CHICKALOON  
RIVER  
CROSSING**

**Alaska Natural Gas Development Authority  
November 1, 2005**

FIGURE 16

PROPOSED CHICKALOON RIVER CROSSING REALIGNMENT



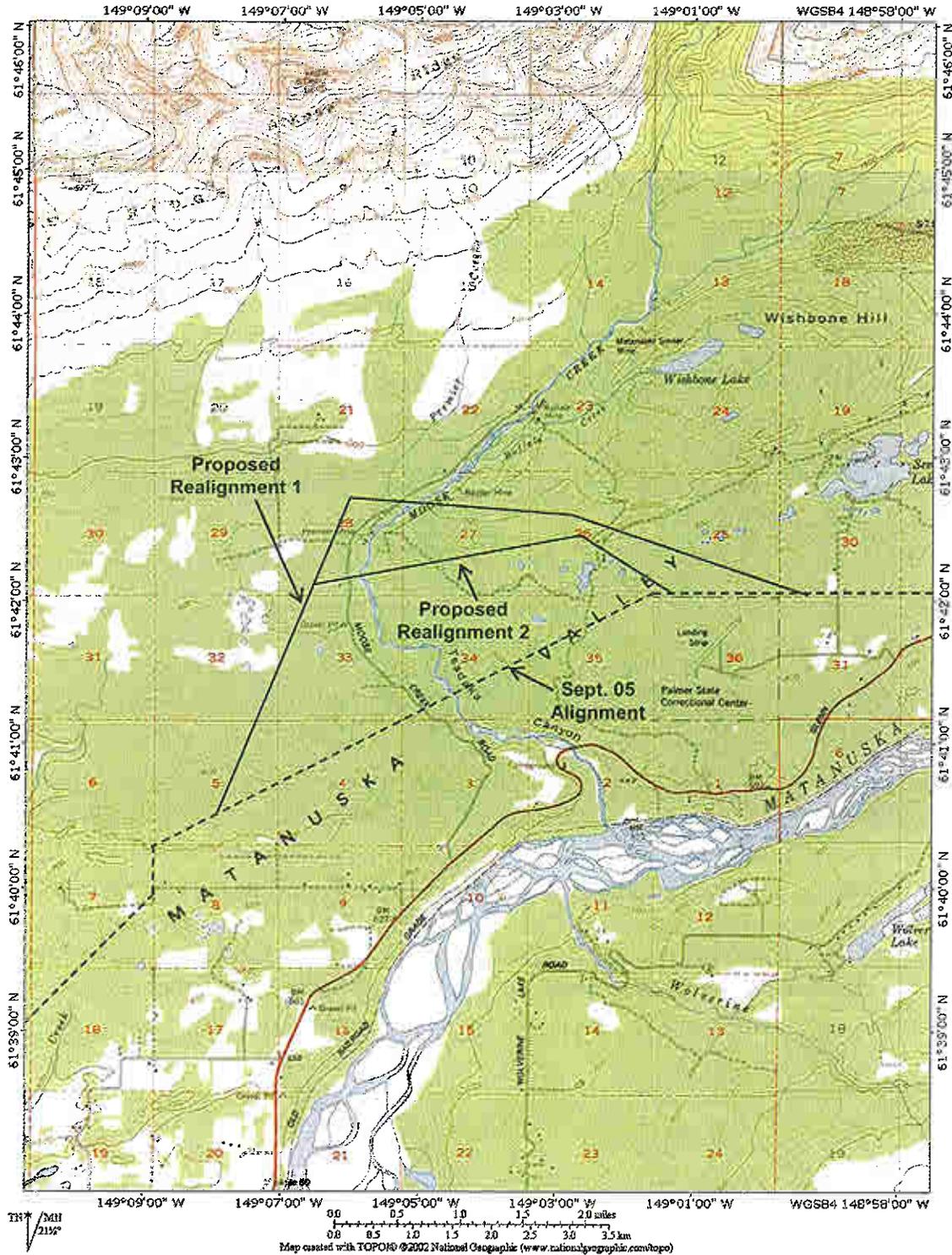
**PROPOSED REALIGNMENT  
GLENNALLEN TO PALMER GASLINE**

**MOOSE  
CREEK  
CROSSING**

**Alaska Natural Gas Development Authority  
November 1, 2005**

FIGURE 18

PROPOSED MOOSE CREEK CROSSING REALIGNMENT



HELICOPTER  
RECONNAISSANCE  
OCT 2005

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GLENNALLEN TO PALMER  
SPUR LINE

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**Alaska Natural Gas Development Authority**

October 3, 2005

<b>ANGDA MEMO</b>		MONDAY	October 3, 2005
<b>SUBJECT:</b>	<b>Helio Recon – Spur Line – Palmer to Eureka</b>		
<b>ATTENDEES:</b>	Janetta Pritchard Mike Cox Mike Bethe “OD” Odsather	JPO MBjr F&G - Habitat ANGDA - OIM	

A chopper from ERA was contracted in Anchorage to fly us to Glennallen along the spur line route. We lifted off and flew to Palmer to pick up Mike Bethe. From there we flew the route to Eureka. Low clouds between Eureka and Glennallen did not allow us to fly beyond Eureka so the pilot made the decision to return to Palmer following our previous route.

We were able to observe all proposed re-routes clearly and identified a couple of other minor reroutes (to avoid crossing wetlands, cutting a corner at the confluence of Caribou and Squaw creek and slightly changing the western end of the new Chickaloon alignment). We were able to observe ATVs operating on both Boulder and Caribou Creeks. We also saw a bear at about the 4500 foot level on the back side of the new Chitna Pass re-route.

Route observations are presented in order beginning at Eureka and heading toward Palmer.

PLMP	LOCATION	COMMENTS
64 - 75	Squaw Creek	ADD'L WINTER WORK: [1] Build permanent access road from the highway to about PLMP 76 (ABOUT 14 Miles), [2] Build Access Road and Lay the pipe at least 100 to 400 yards to the north of the existing access trail.
73.6	Proposed Re-Route	Cut the corner at the confluence of Squaw and Caribou Creeks, staying on high ground then reconnecting to the original pipeline alignment at PLMP 75.2
74 - 88	Caribou Creek	The Creek channel appears to meander quite a bit and I suspect high volumes of water move through during break-up and high rain fall periods. Bedrock showings on the sides of the creek and in the adjacent land forms. Mining activities found frequently between PLMP 74 - 86
86 - 88	Steep Climb to Chitna Pass	No room on the Left Bank. Stay on the Right bank going up stream using the broader shoulder to provide an access road and lay the pipe.
88.1 – 92.4	Proposed Re-route  Chitna Pass	Go due north through a draw to the back side and turn westerly joining in to the headwaters of Boulder Creek. Keep generally to the right (west) side of the creek taking advantage of better alignment and broader banks working your way down to the broader flatter stream bed. Hold to the right side and join up with the Original alignment at about PLMP 92.4

93 - 105	Boulder Creek	<p>The stream channel meanders considerably, probably due to high volumes of melt water during spring. There are also restrictions to the width of the stream bed because of the closeness of the mountain walls.</p> <p>[1] A number of ATV routes were apparent. Trucks can pass through without problem. ATV and vehicle travel is probably restricted or denied by the forces of nature during the spring run-off period. <i>Need to verify.</i></p> <p>[2] A permanent Access Road will need to be built generally near or over the existing Purinton Creek Trail that goes from the Highway to Simpson's Cabin (PLMP 104).</p>
104	Boulder Patch	<p>This rubble pile of really big boulders is located on the west side of Boulder creek, immediately across the creek and south west of Simpson's Cabin. It would be nice to keep to the west side of Boulder Creek at this location but it may be difficult and probably not very safe to lay a pipeline through the boulder patch. Simpson's Cabin lies in a "wetlands" like setting (I think it is part of the flood plane of Boulder Creek). The Purinton Creek Trail ends here.</p>
105 - 117	Proposed Re-Route Chickaloon	<p>It turned out that this proposed re-route is sweet. After crossing Boulder Creek at about PLMP 105 stay closer to the Right bank of the Boulder Creek Canyon thereby avoiding "wetlands" contained in a low drainage on the mountain side of the alignment.</p> <p>Follow the ridge fall line down to a location about 2 - 400 feet above the confluence of Chickaloon and Boulder Creeks. It may be possible to cross this stream using the open trench method. However, there also appears to be space enough to HDD because of the width of the stream bed at that location.</p> <p>Following the ridge fall line on the west side of the Creek up to about the 2200 foot level a "bench" is found. Staying to the left or southern side of the bench will keep you out of "wetland" pockets and take you up to a draw that can be used to lay the pipe through and lead you to a ridge like fall line down to about original PLMP 117.</p>
~118.1	King River X-ing	<p>Allow a jog in the line to cross Kings River at generally a 90 degree angle.</p>
121 - 123	King River Draw	<p>The draw route is very "do-able". Going West - At the top of the draw ~ PLMP122.2, turn immediately angling to the left (south) for about a 1/4 to 1/2 of a mile toward the bluff avoiding "wetlands", then hold the separation.</p>
124 - 127	Ridge Running	<p>Care will have to be taken to avoid houses and outbuildings in this area.</p>

128 – 130	Check Status	Land Ownership
134.6	Proposed Re-Route  Moose Creek	It turns out that Moose Creek is a major Salmon spawning and rearing site. In any event, the original crossing may not be possible. If not, then upstream about 1-1.5 miles are HDD crossing opportunities. After crossing, angle SW to connect with the original alignment as quickly as possible and avoid homeowners and out buildings. There are several subdivisions in this area that will have to be carefully avoided or aligned to have minimum impact.
148	Terminus	There is a large gravel pad (guesstimate 30 acres plus) apparently owned by Peter Kewit Co (per Mike Bethe) that may be suitable for our propane, etc. facility. It is south of the Hospital, across the Parks Hwy, less than ½ a mile away and screened by trees. An Auto Race Track appears to be in the NE Corner of the pad.

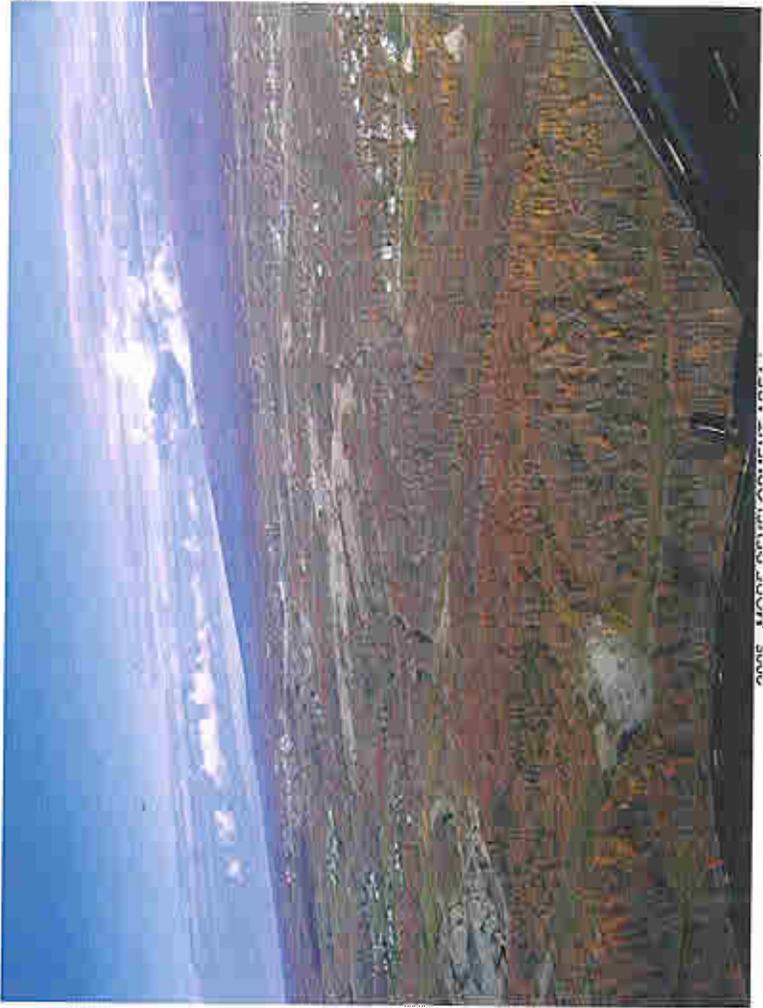
PLMP

LOCATION

COMMENTS



2005 - LOOKING SW TOWARD HOSPITAL AND MINING SITE.jpg



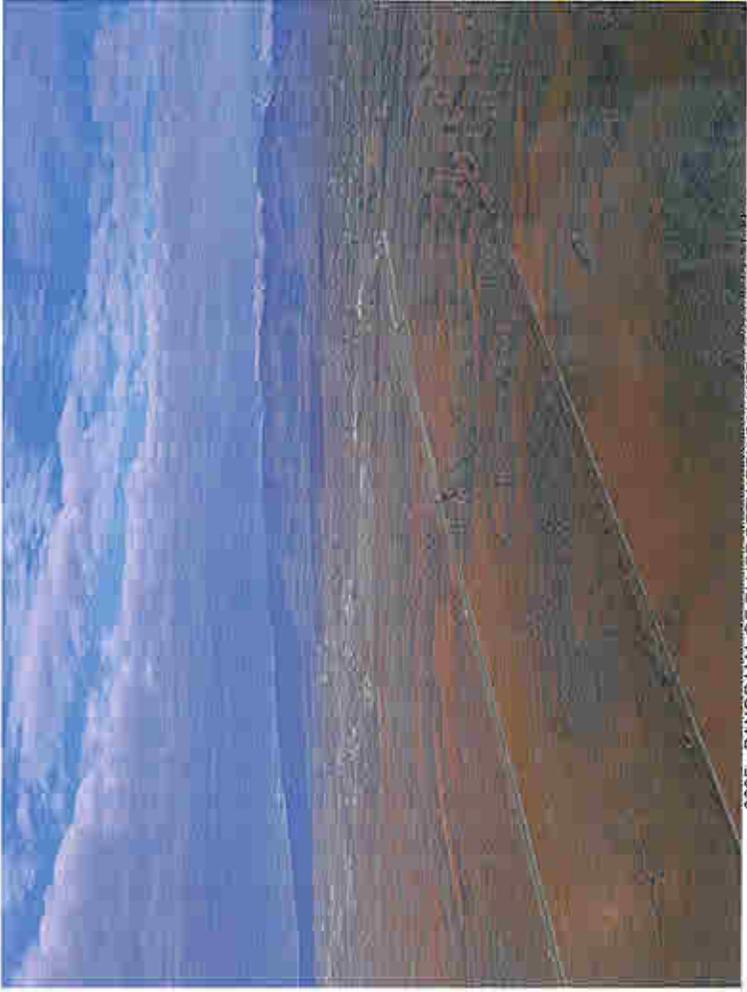
2005 - LOOKING SW TOWARD HOSPITAL AND MINING SITE.jpg



2005 - LOOKING SSW ACROSS PART OF THE PK MATERIAL SITE.jpg



2005 - LOOKING SW TOWARD HOSPITAL AND PK SITE.jpg



2005 - PANORAMA OF BLUFF BETWEEN PALMER AND WASILLA.jpg



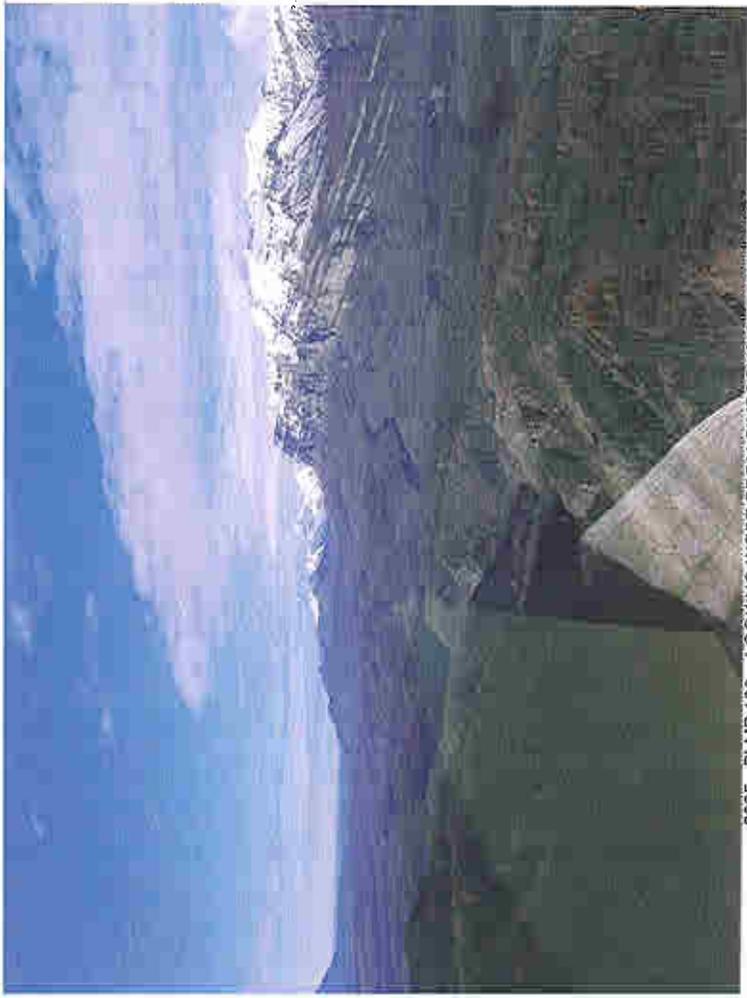
2005 - PLMP 100 .. LOOKING TOWARD SIMPSONS CABIN.jpg



2005 - PLMP 101 .. BOULDER CREEK WIDENS - PURINTON CK ON LT.jpg



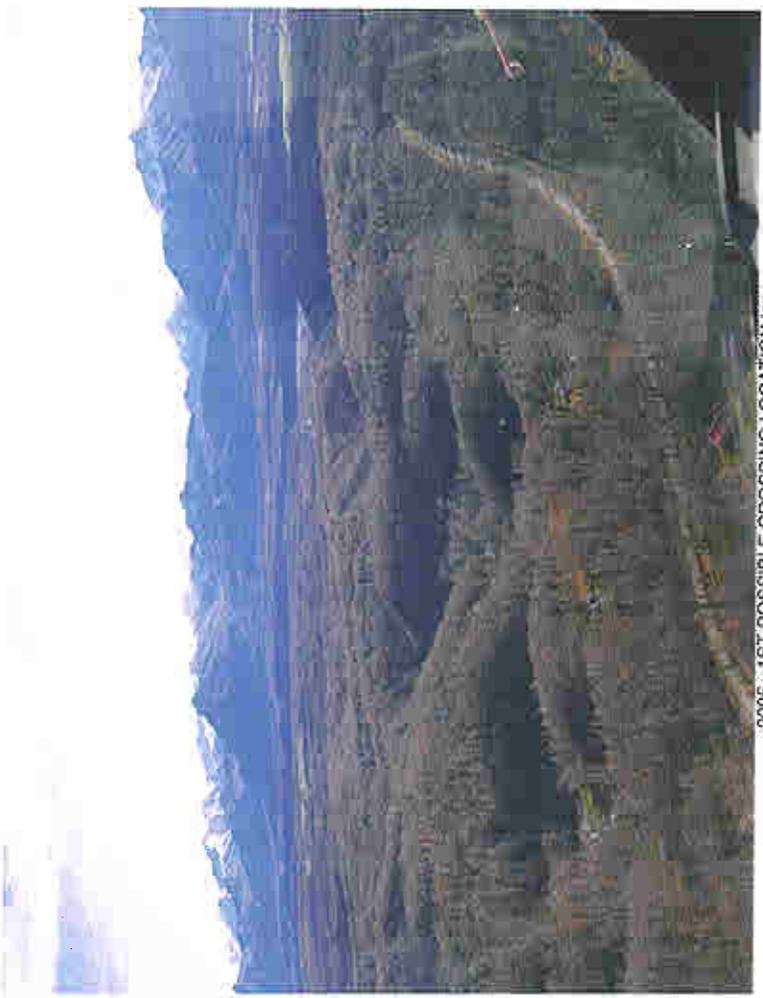
2005 - PLMP 102 .. APPROACHING SIMPSONS CABIN.jpg



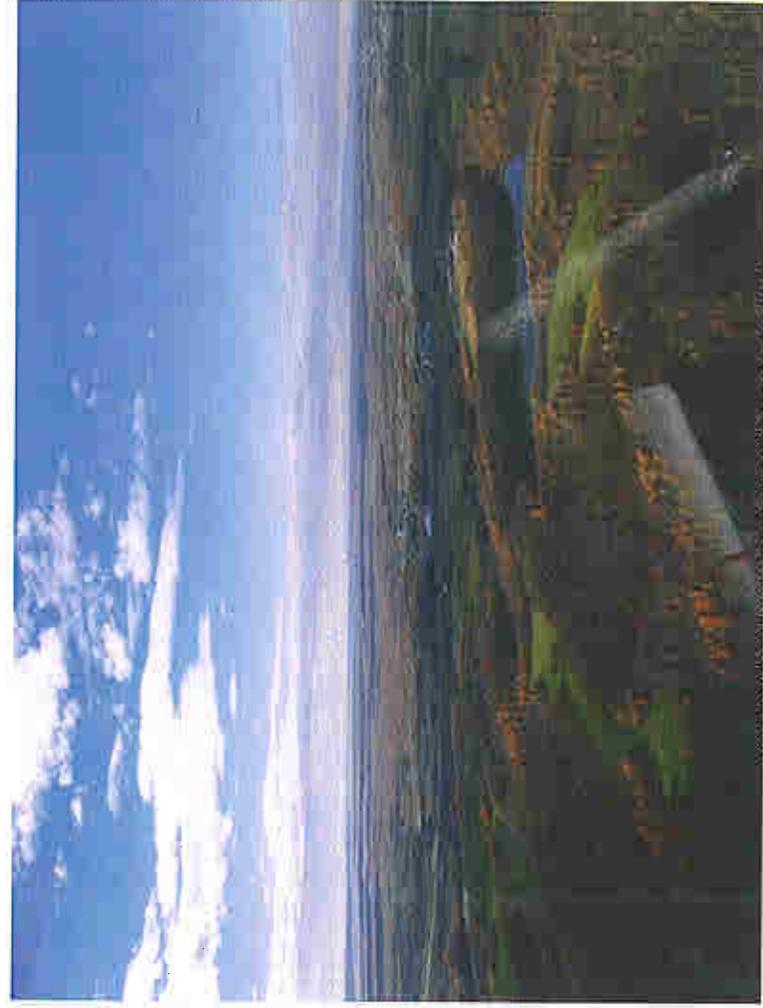
2005 PLMP 106 .. LOOKING WEST FROM SIMPSONS CABIN AREA.jpg



2005 - PLMP 68 SQUAW CREEK ACCESS - ON NORTH SIDE OF CREEK.jpg



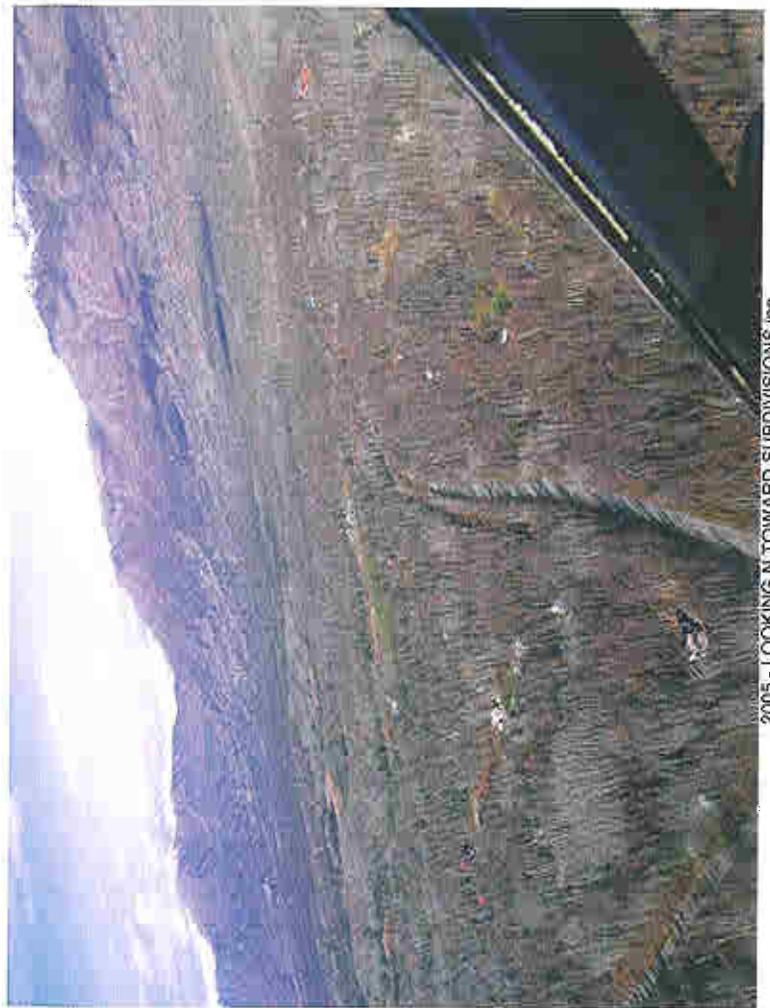
2005 - 1ST POSSIBLE CROSSING LOCATION.jpg



2005 - EXPERIMENTAL FARM HOSPITAL AND PK SITE.jpg



2005 - JUST A LITTLE FURTHER.jpg



2005 - LOOKING N TOWARD SUPERVISOR.jpg



2005 - HOSPITAL LOCATION.jpg



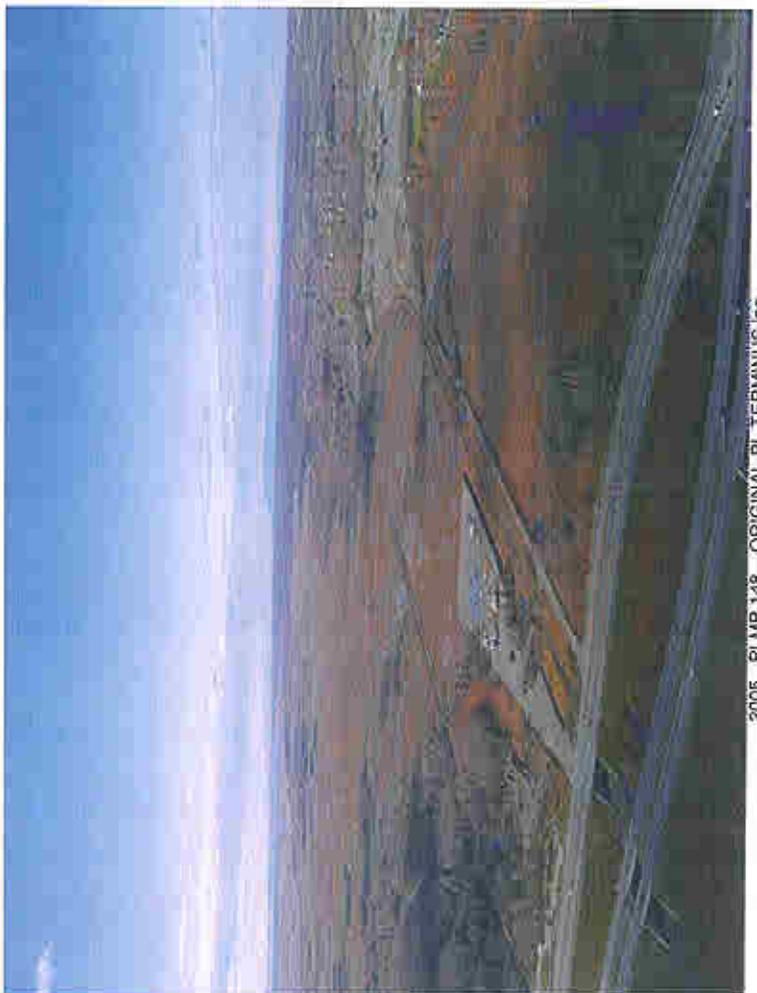
2005 - LOOKING AT UPPER MOOSE CREEK XING OPTIONS.jpg



2005 - PLMP 56 .. LOOKING WESTERLY ALONG SQUAW CREEK.jpg



2005 - PLMP 77.tn



2005 - PLMP 148 .. ORIGINAL PL TERMINUS.jpg



2005 - PLMP 67 .. SQUAW CK .. MOVE ROUTE UPHILL.jpg



2005 - PLMP 103 . BOULDER CREEK ... SIMPSONS CABIN .jpg



2005 - PLMP 104 ... LOOKING AT RTHI DIFFERS W/ OF SIMPSONS CABIN .jpg



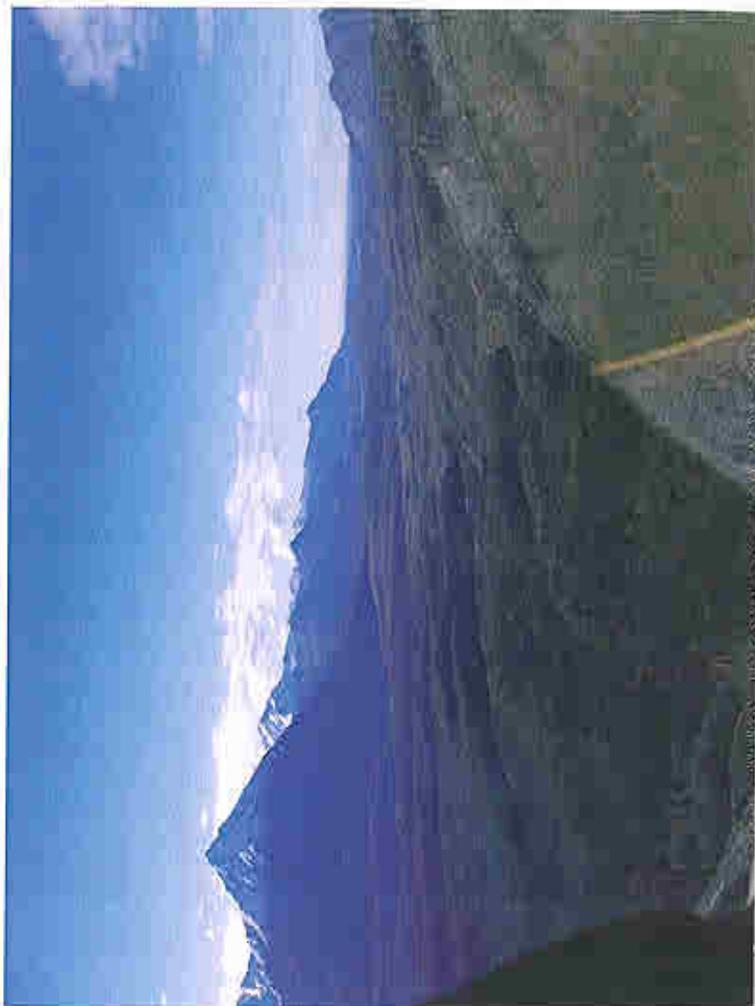
2005 - PLMP 103 . ABOUT A MILE NORTH OF SIMPSONS .jpg



2005 - PLMP 103 .. SIMPSONS CABIN .. PURINTON CREEK TR .jpg



2005 - PLMP 106+ .. LOOKING E ALONG N BANK OF BOULDER CK.jpg



2005 - PLMP 111 .. LOOKING EAST FROM CK VIEW TO CHICKALOON BOULDER.jpg



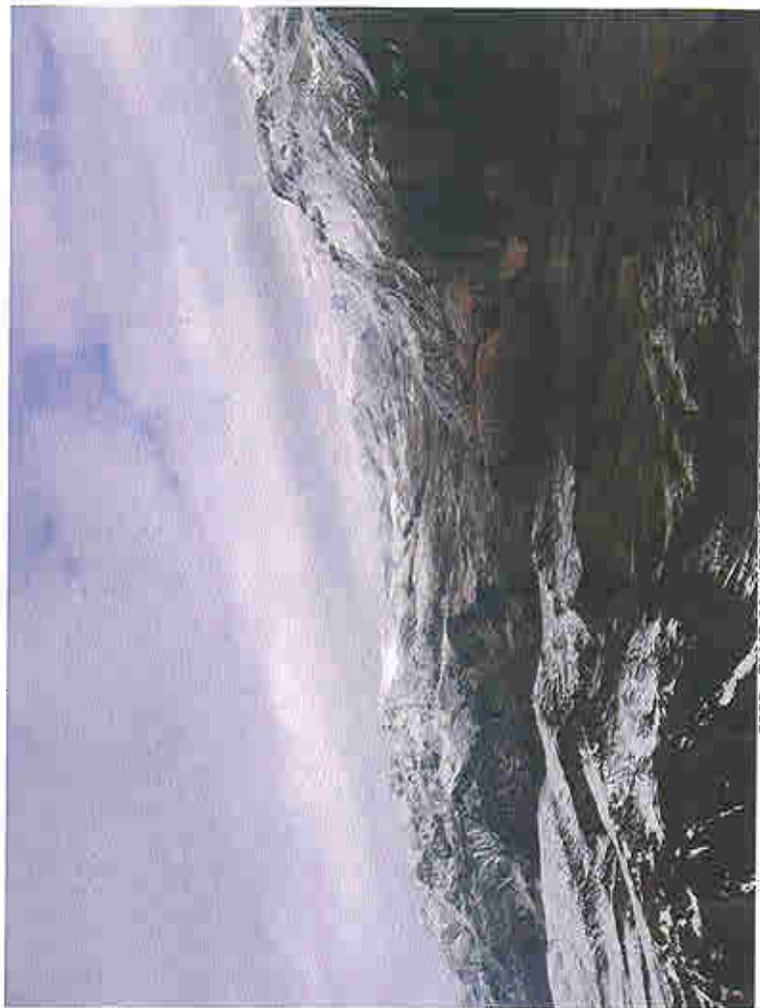
2005 - PLMP 105+ .. BEGINNING 2200 RR - BOULDER CK RT.jpg



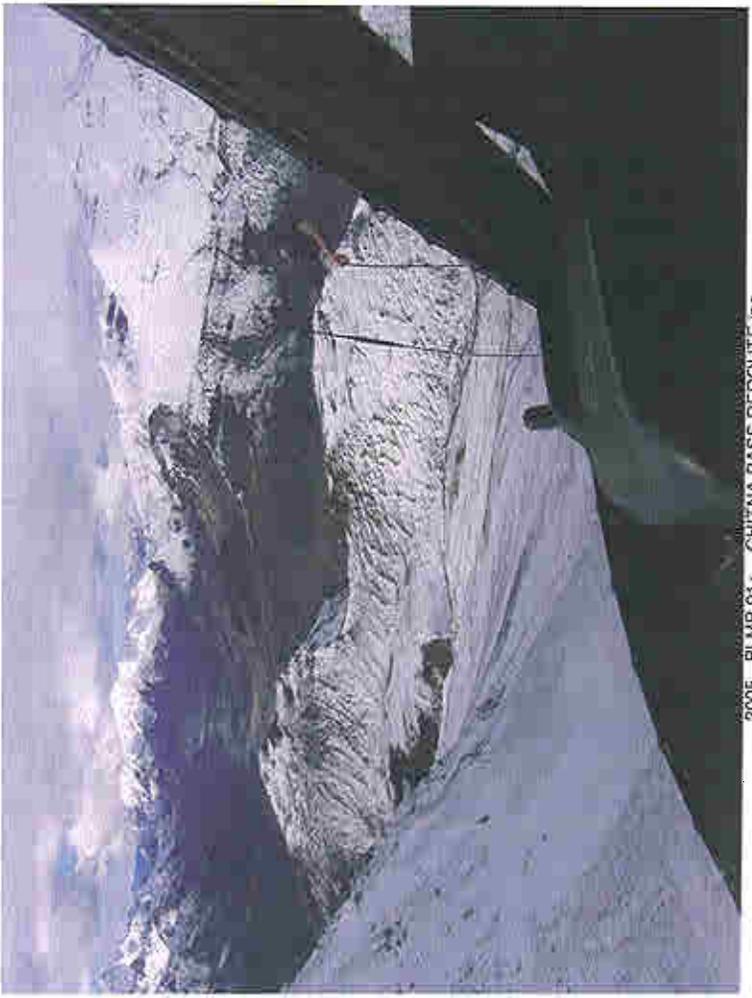
2005 - PLMP 110 .. CHICKALOON-BOULDER XING.jpg



2005 - PLMP 92 .. ALIGNMENT ON THE RIGHT SIDE OF THE RIVER.jpg



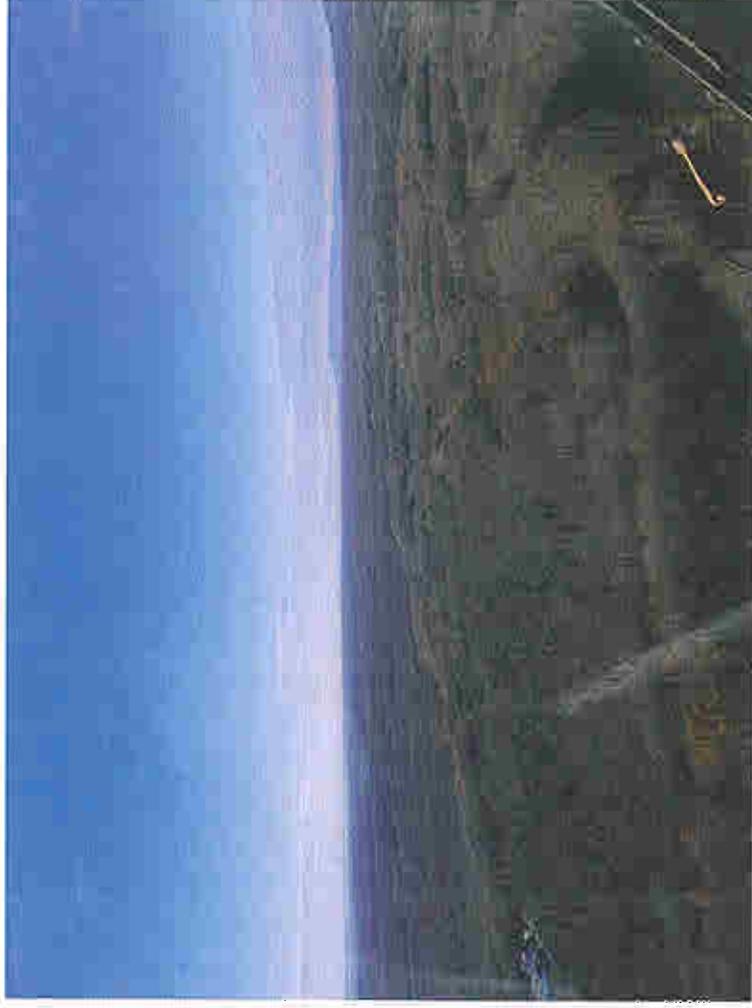
2005 - PLMP 92 .. ALIGNMENT ON THE RIGHT SIDE OF THE RIVER.jpg



2005 - PLMP 91+ .. CHITNA PASS REROUTE.jpg



2005 - PLMP 95 .. BOULDER CREEK RESTRICTIONS.jpg



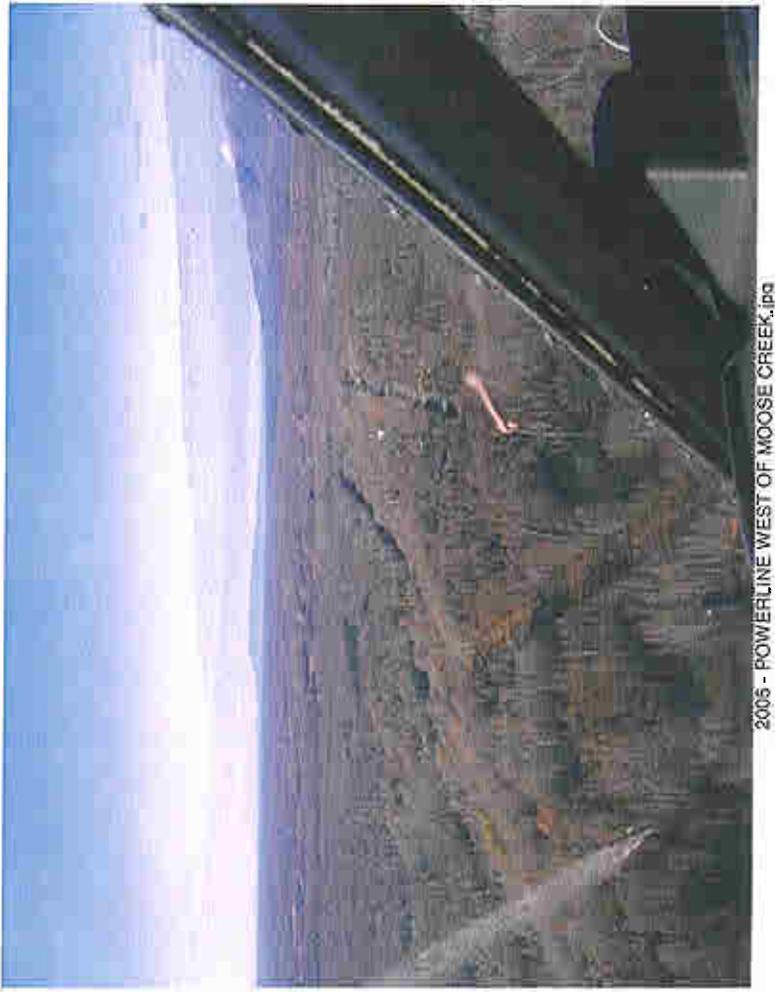
2005 - POWERLINE LEADING TO MOOSE CREEK.jpg



2005 - SUBDIVISIONS NEXT TO DAM SITE.jpg



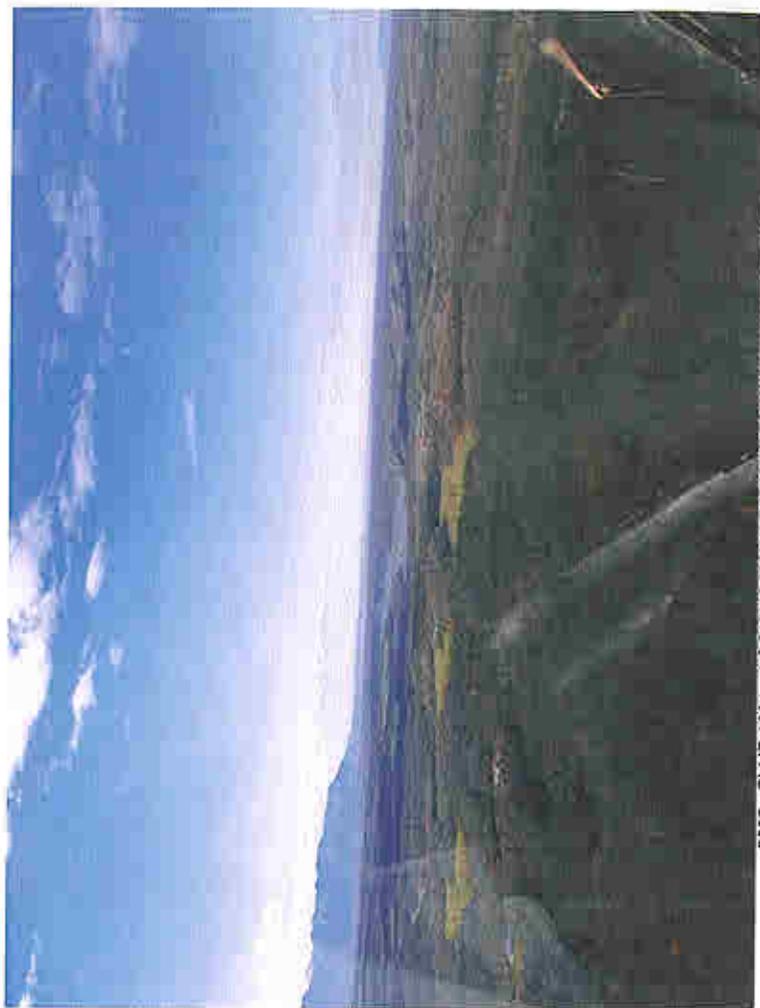
2005 - PLMP 97.5 .. RIVER ALIGNMENT CONSIDERATIONS.jpg



2005 - POWERLINE WEST OF MOOSE CREEK.jpg



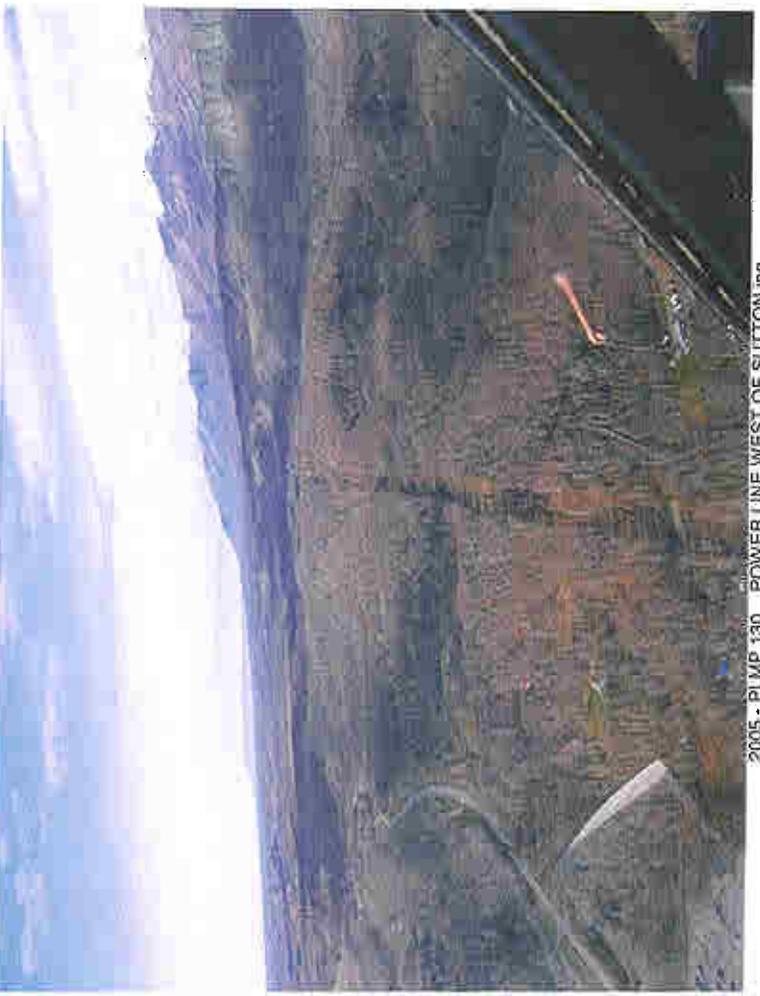
2005 - PLMP 122 .. TOP OF DRAW DROPPING IN TO KINGS RIVER.jpg



2005 - PLMP 122 .. TOP OF DRAW DROPPING IN TO KINGS RIVER.jpg



2005 - PLMP 121 .. LOWER ENTRANCE TO THE DRAW.jpg



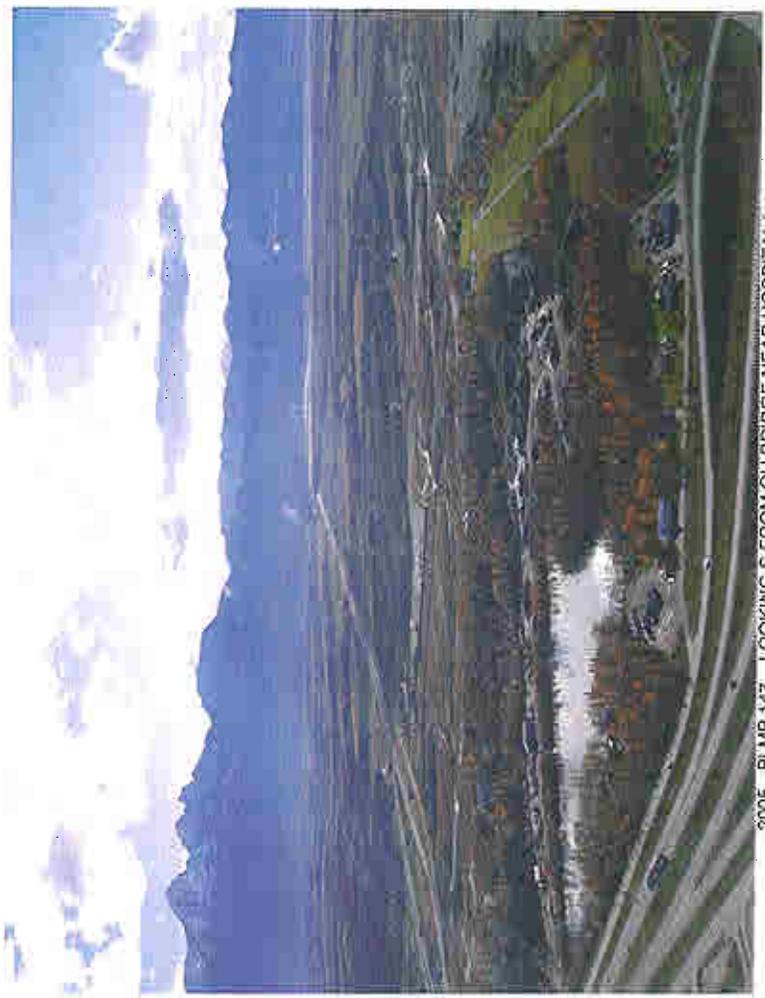
2005 - PLMP 130 .. POWER LINE WEST OF SHITTON.jpg



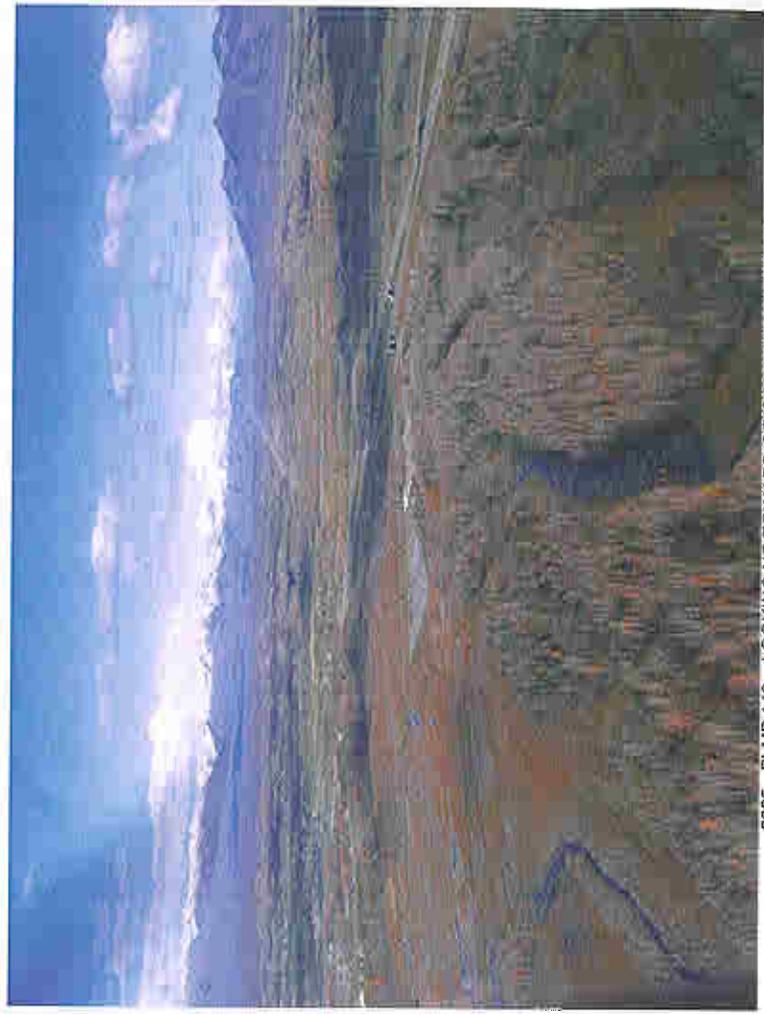
2005 - PLMP 134.3 .. MOOSE CREEK CROSSING.jpg



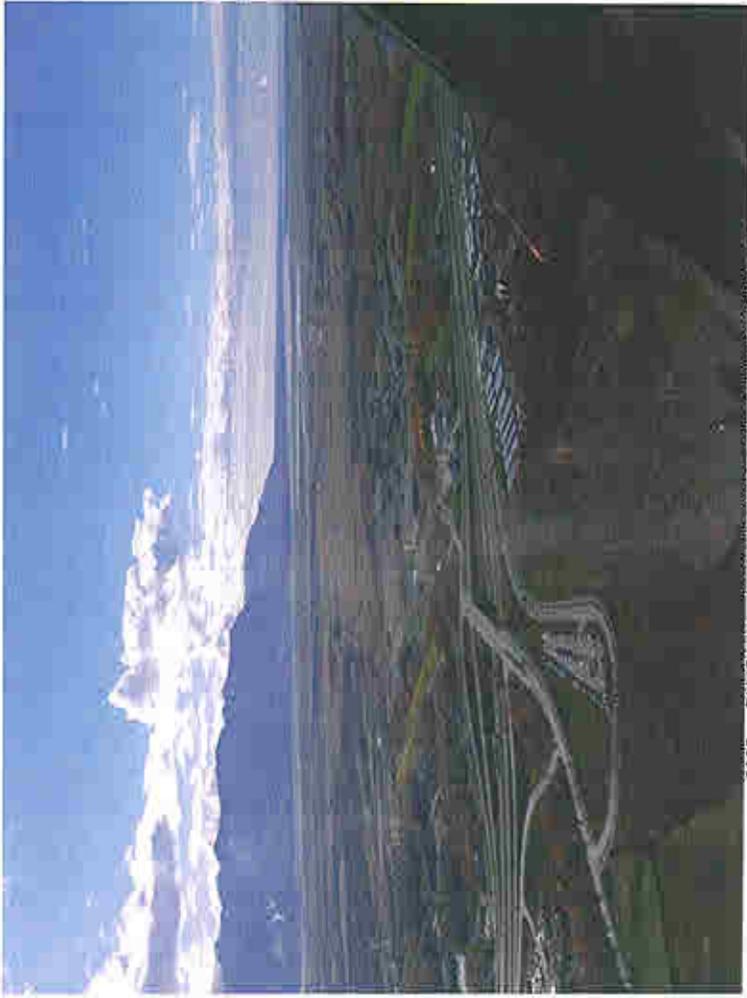
2005 - PLMP 134.5 .. CLOSER VIEW OF MOOSE CREEK CROSSING.jpg



2005 - PLMP 147 .. LOOKING S FROM OH BRIDGE NEAR HOSPITAL.jpg



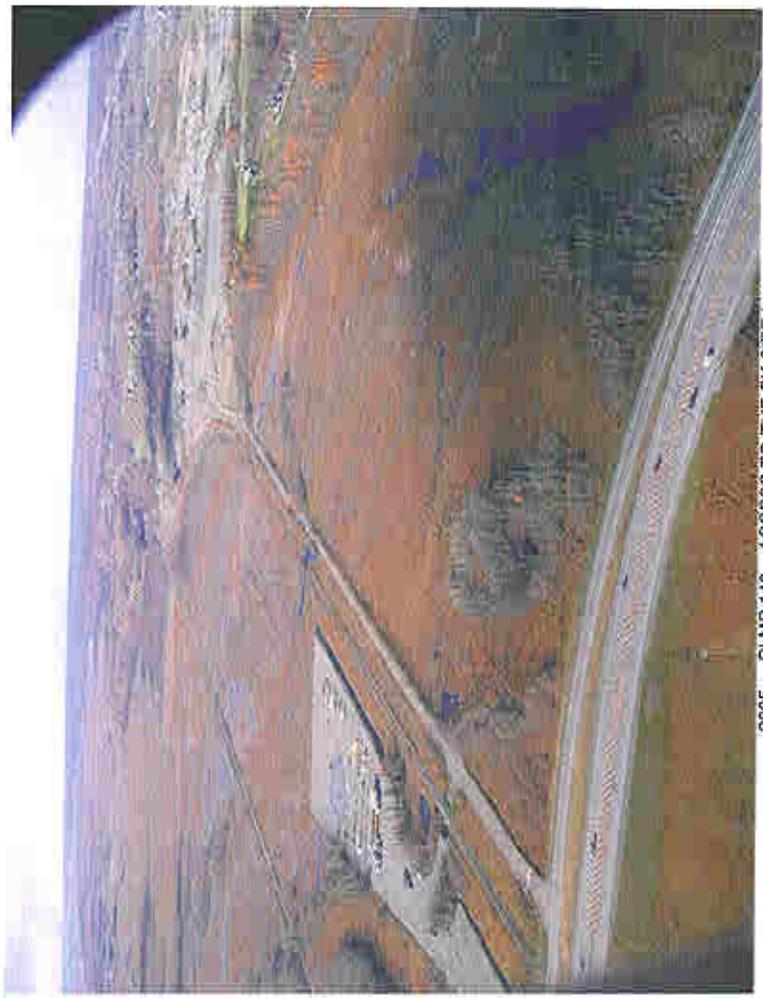
2005 - PLMP 149 .. LOOKING S FROM OH BRIDGE NEAR HOSPITAL.jpg



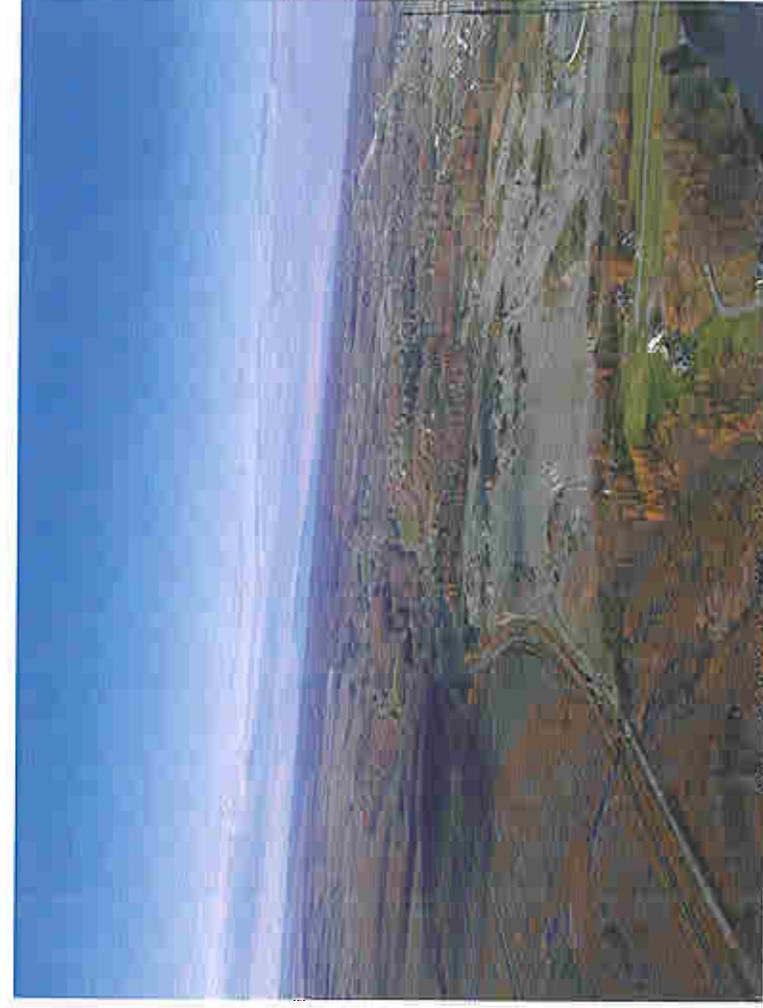
2005 - --PLMP 147 .. PK SITE SW OF THE NEW HOSPITAL..jpg



2005 - --PLMP 148 .. SW CORNER OF THE PK MATERIAL SITE..jpg



2005 - --PLMP 148 .. ACCESS TO THE PK SITE..jpg



2005 - --PLMP 148 .. LOOKING TOWARD THE SW MINING SITE..jpg



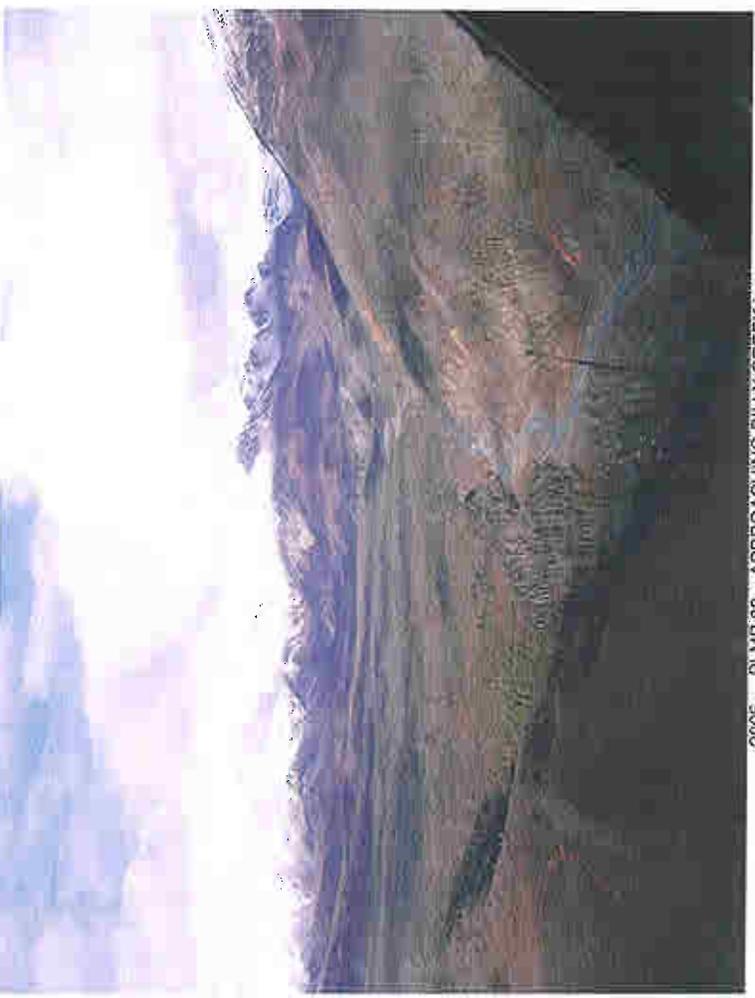
2005 - ~PLMP 148 .. TERMINUS, RAILROAD AND ENERGY POTENTIAL.jpg



2005 - ~PLMP111 .. LOOKING TOWARD CHIPSEAL CANYON.jpg



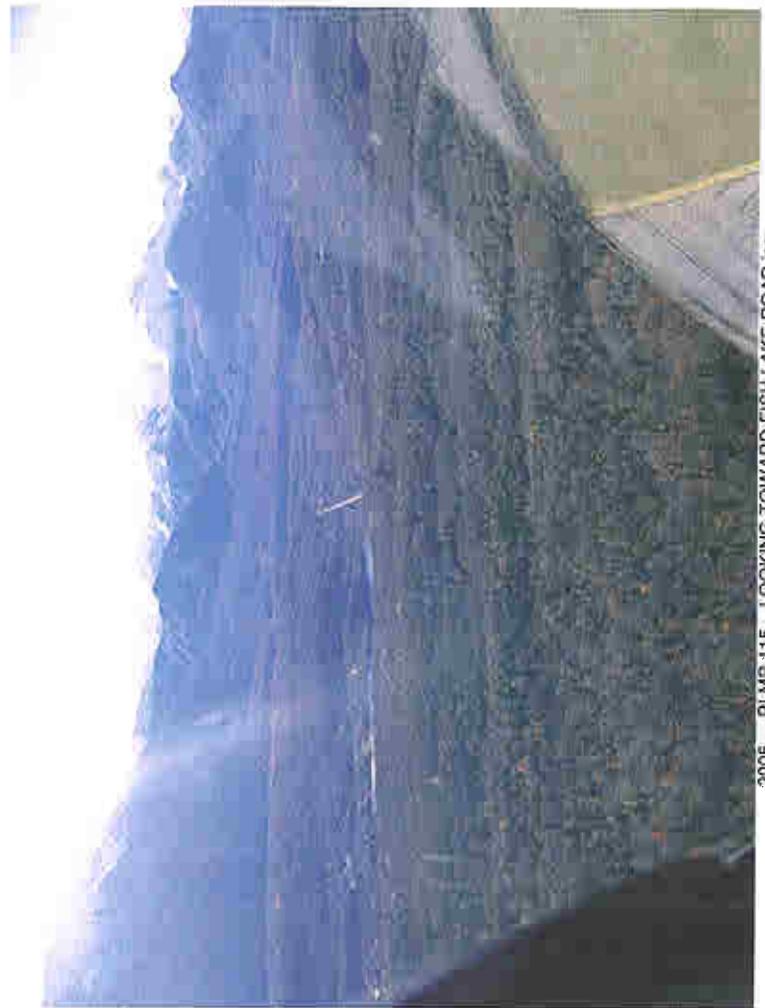
2005 - ~PLMP 148 .. POSSIBLE TERMINUS SITE RELATIONSHIPS.jpg



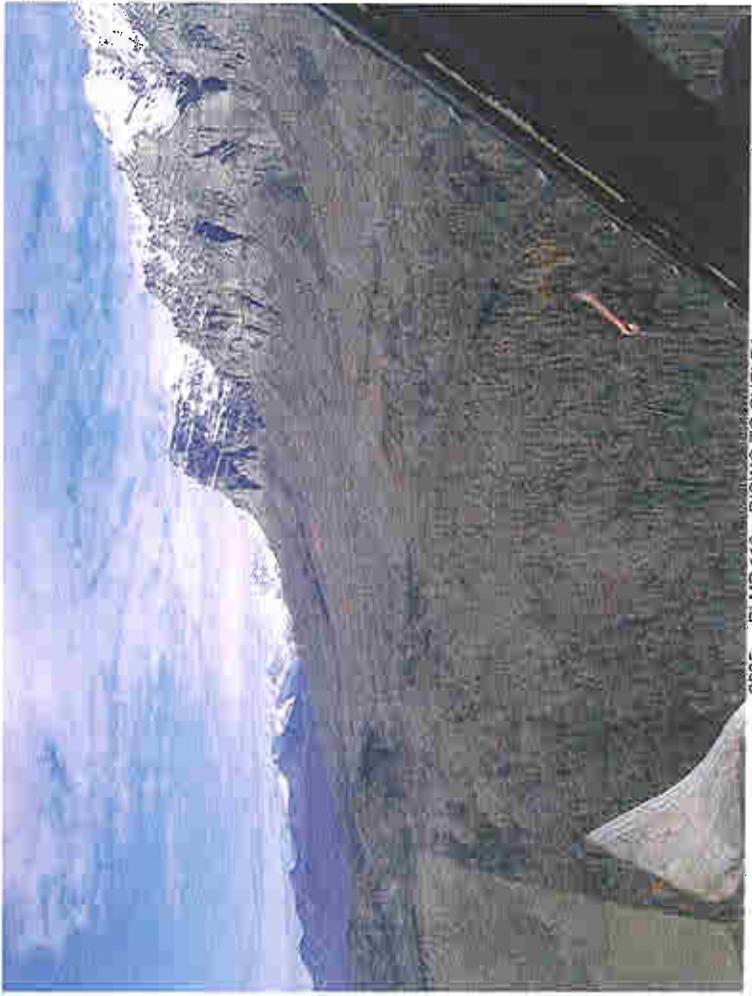
2005 - ~PLMP 83 .. APPROACHING BILLY CREEK.jpg



2005 - --PLMP 113 .. SWEEPING RIGHT TOWARD MINE.jpg



2005 - --PLMP 114 .. MOVE UP TO NOTCH AND DROP INTO IT.jpg



2005 - --PLMP 113 .. RISING TO SHELF.jpg



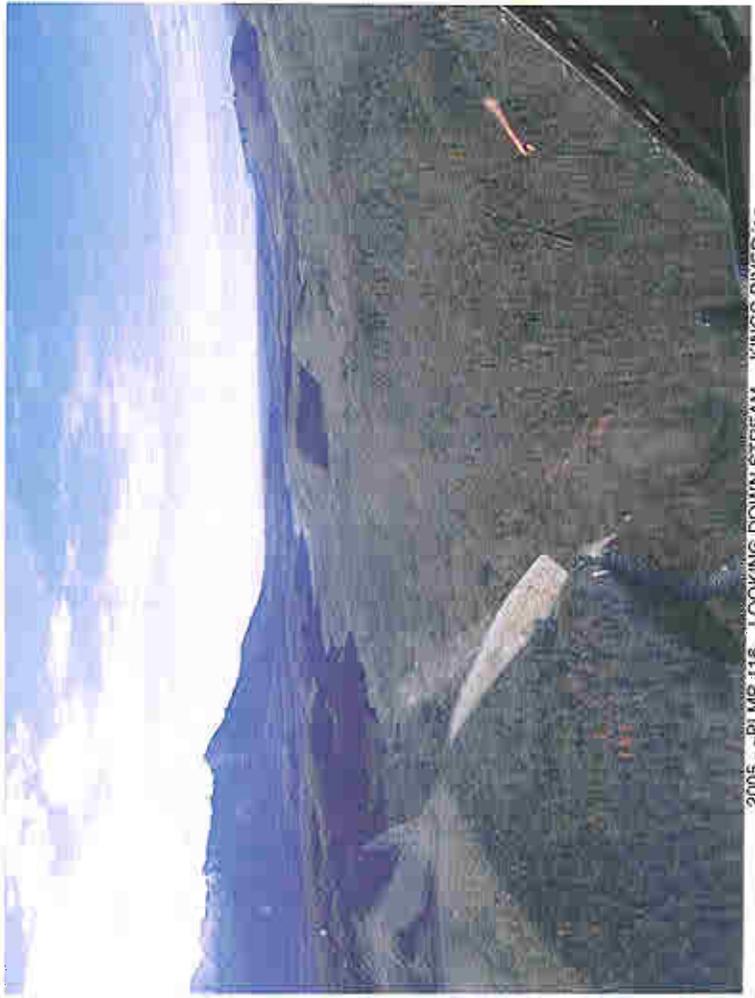
2005 - --PLMP 114 .. MOVE UP TO NOTCH AND DROP INTO IT.jpg



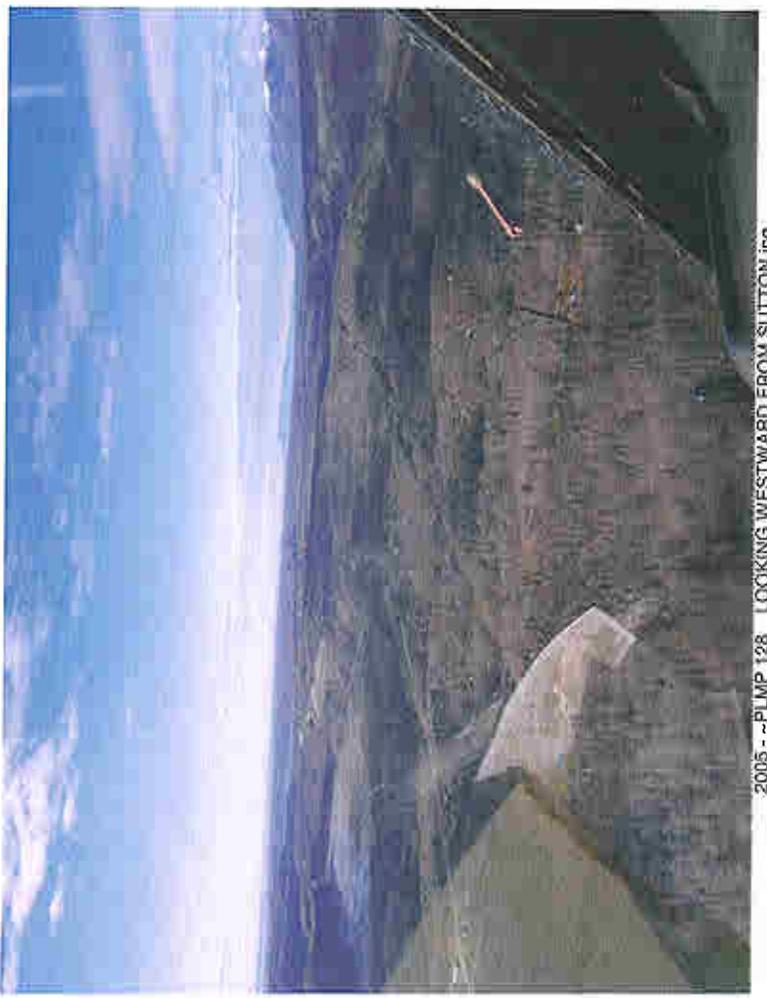
2005 - ~PLMP 122.. TOP OF THE DRAW .. TURN LEFT NOW.jpg



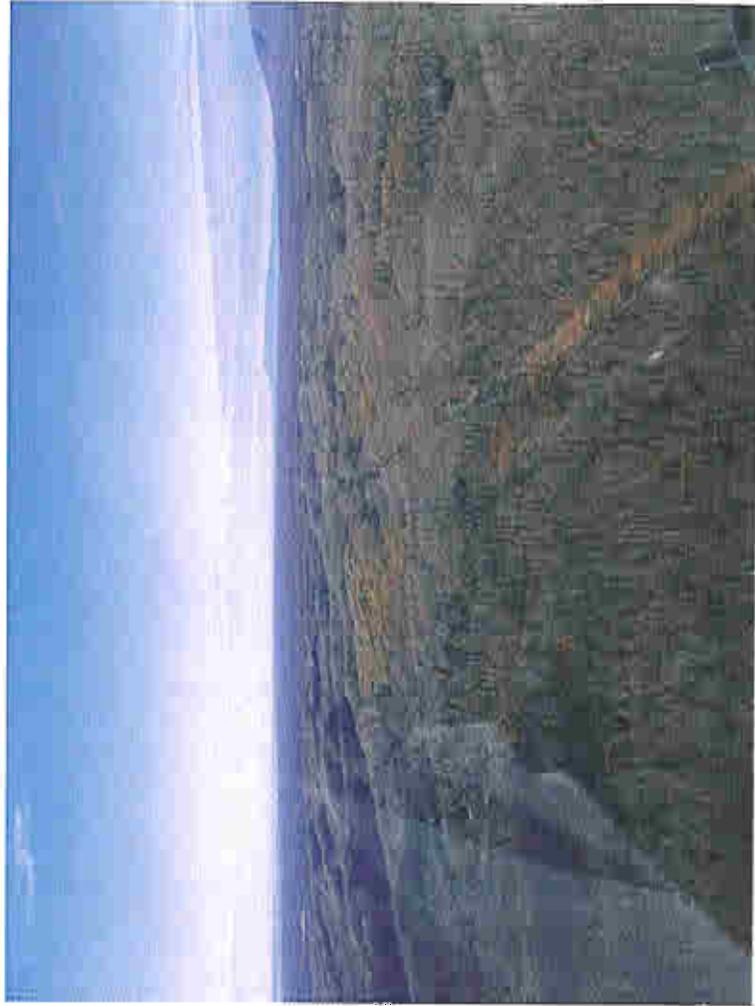
2005 - ~PLMP 121 POWERLINE NEAR CORRECTIONAL.jpg



2005 - ~PLMP 116 .. LOOKING DOWN STREAM ... KINGS RIVER.jpg



2005 - ~PLMP 128 .. LOOKING WESTWARD FROM SUTTON.jpg



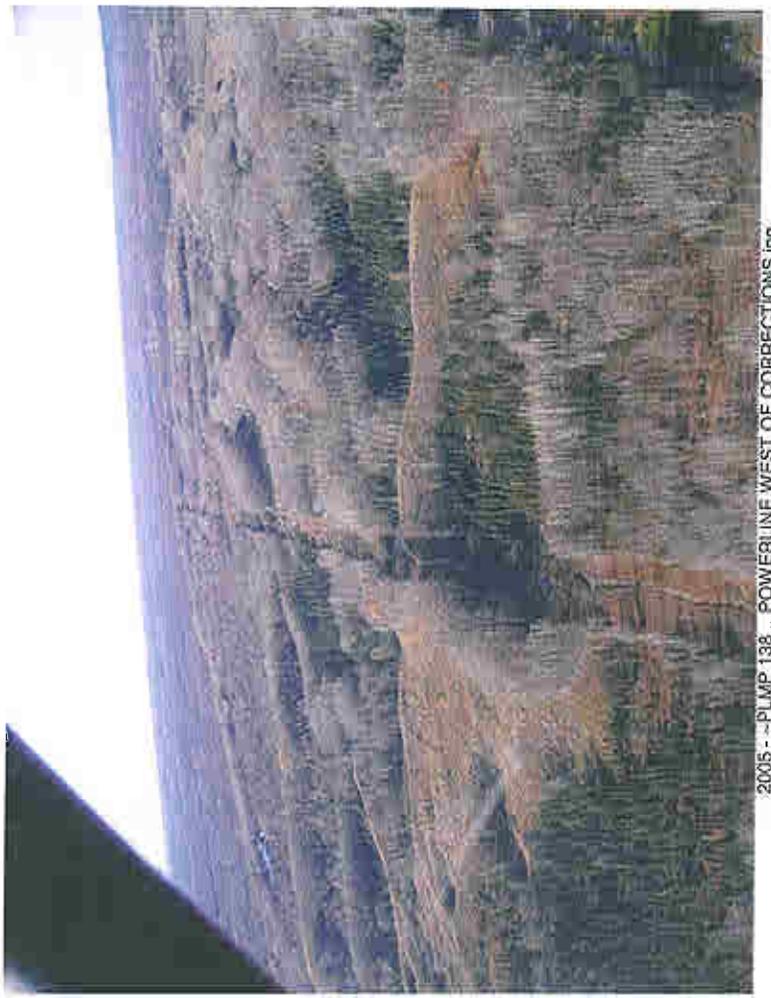
2005 - ~PLMP 134 . . WEST OF CORRECTIONAL CENTER.jpg



2005 - ~PLMP 147 . . POWERLINE SE TOWARD CORRECTIONAL CENTER.jpg



2005 - ~PLMP 133 . . POWERLINE W OF CORRECTIONAL CENTER.jpg



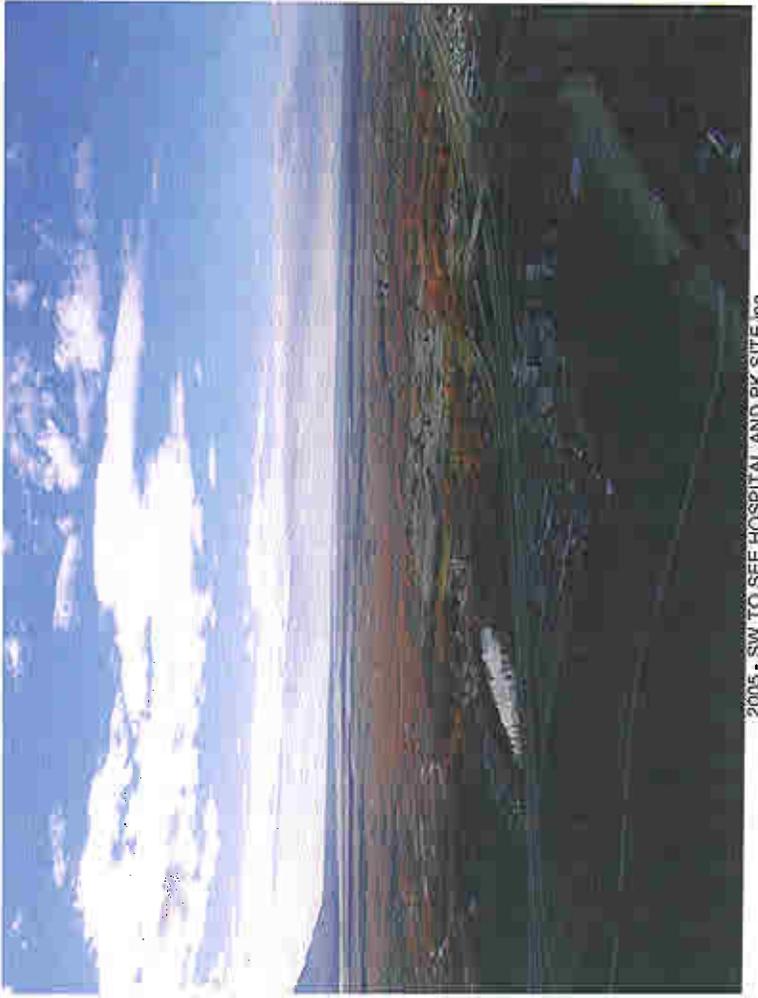
2005 - ~PLMP 138 . . POWERLINE WEST OF CORRECTIONS.jpg



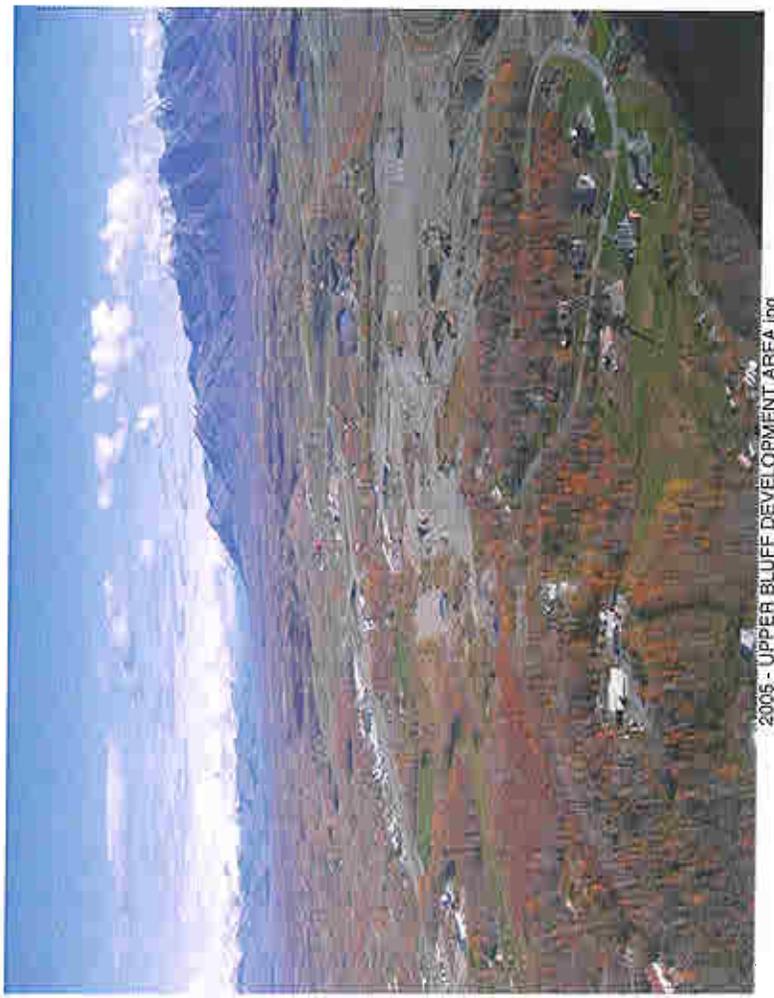
2005 - UPPER BANK POPULATION POTENTIAL.jpg



2005 - HIBBED MUDGE CREEK APPROPRIATE CONTAMINANTS



2005 - SW TO SEE HOSPITAL AND PK SITE.jpg



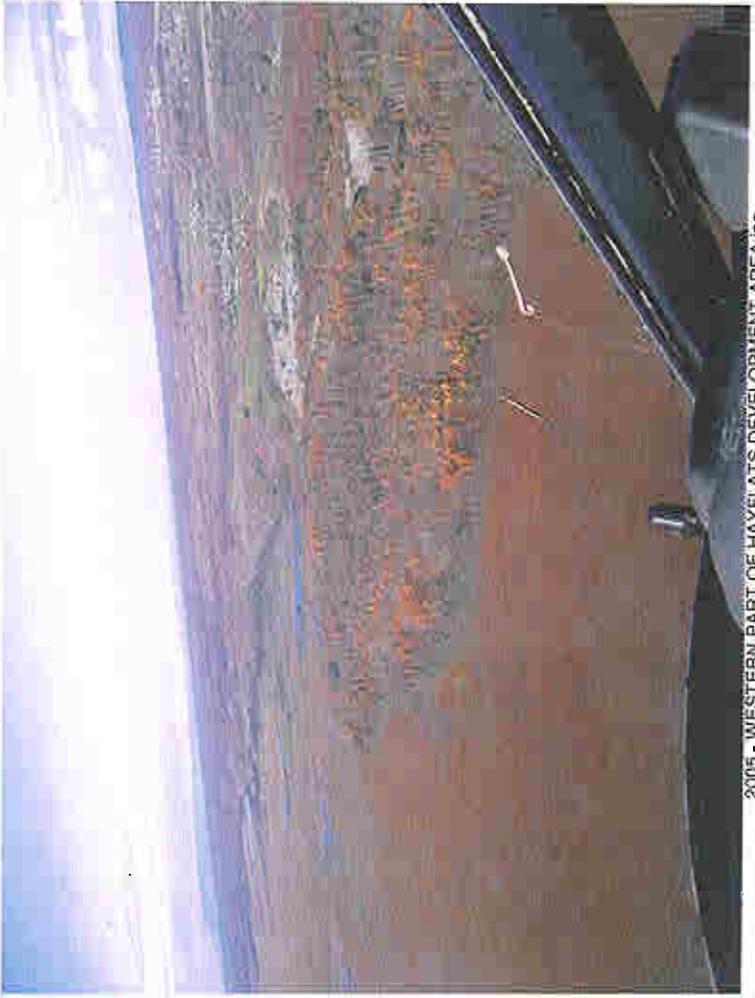
2005 - UPPER BLUFF DEVELOPMENT AREA.jpg



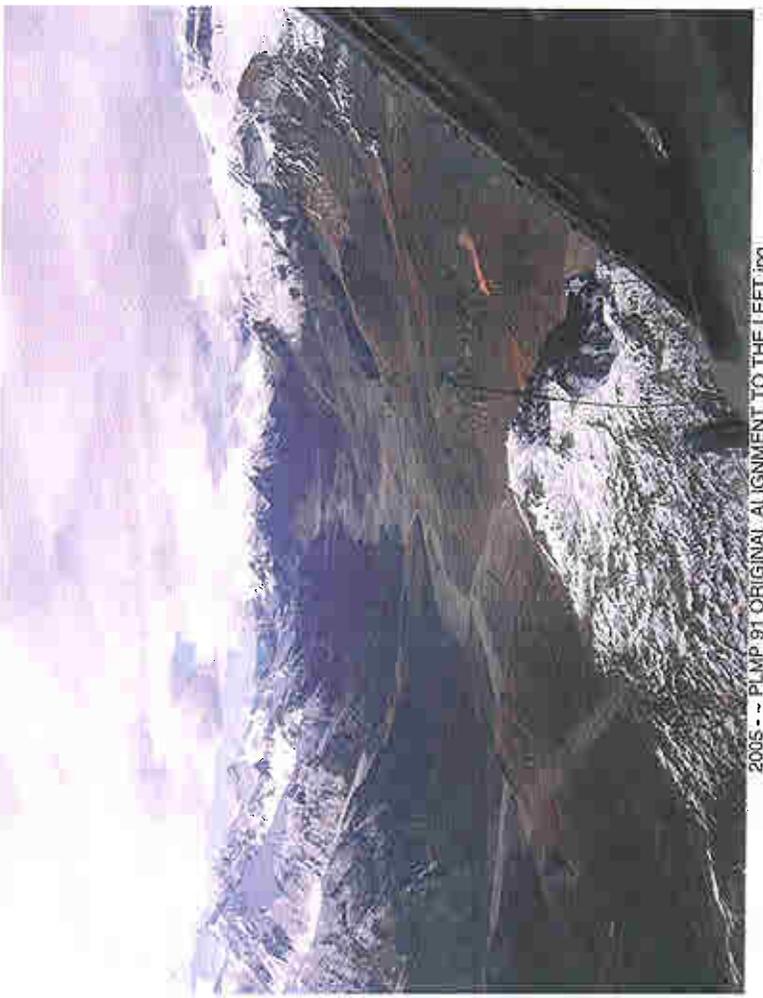
2005 - ~ PLMP 72 - LOOKING NE CREEK.jpg



2005 - ~ PLMP 88 - APPEARS TO BE AN AREA OF MAJOR DEVELOPMENT



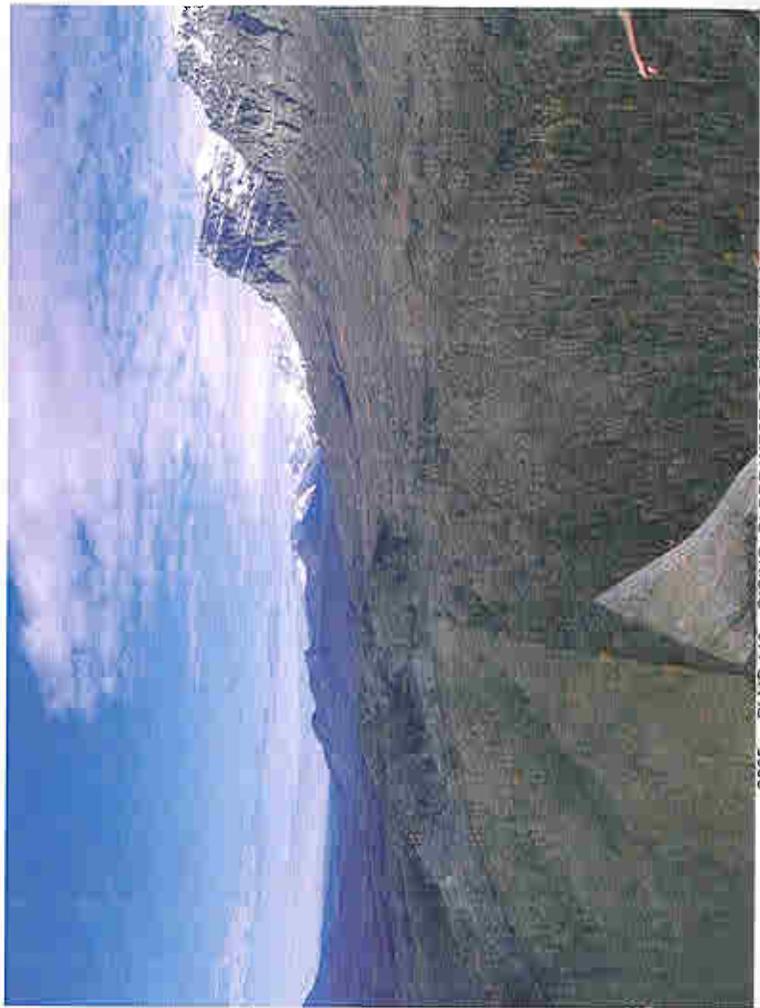
2005 - WESTERN PART OF HAYFLATS DEVELOPMENT AREA.jpg



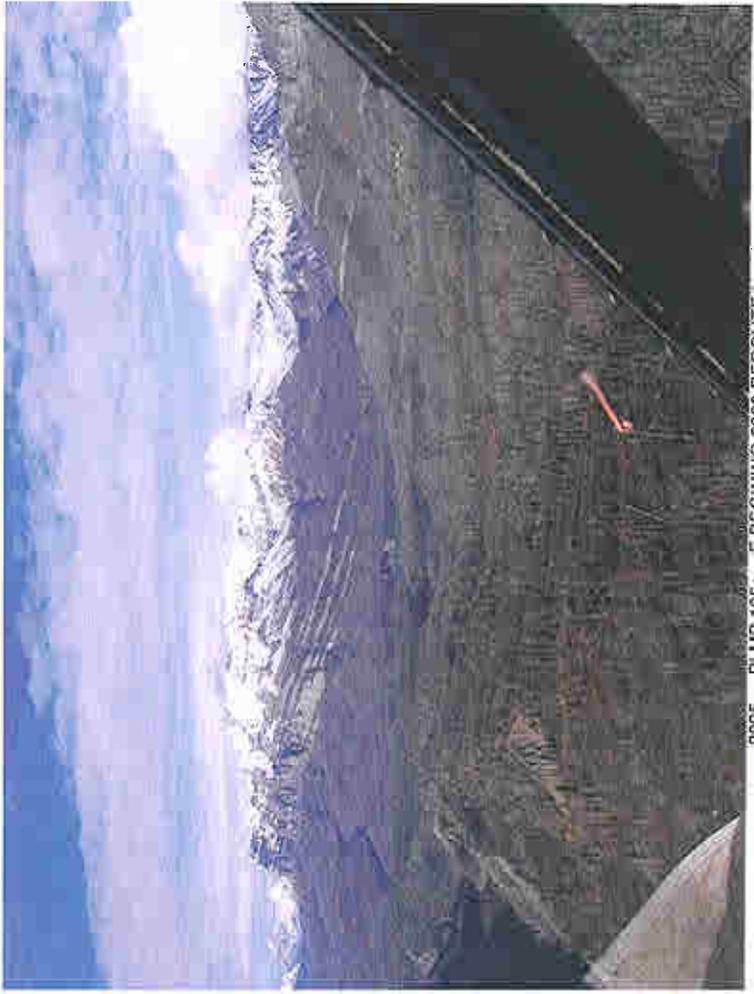
2005 - ~ PLMP 91 ORIGINAL ALIGNMENT TO THE LEFT.jpg



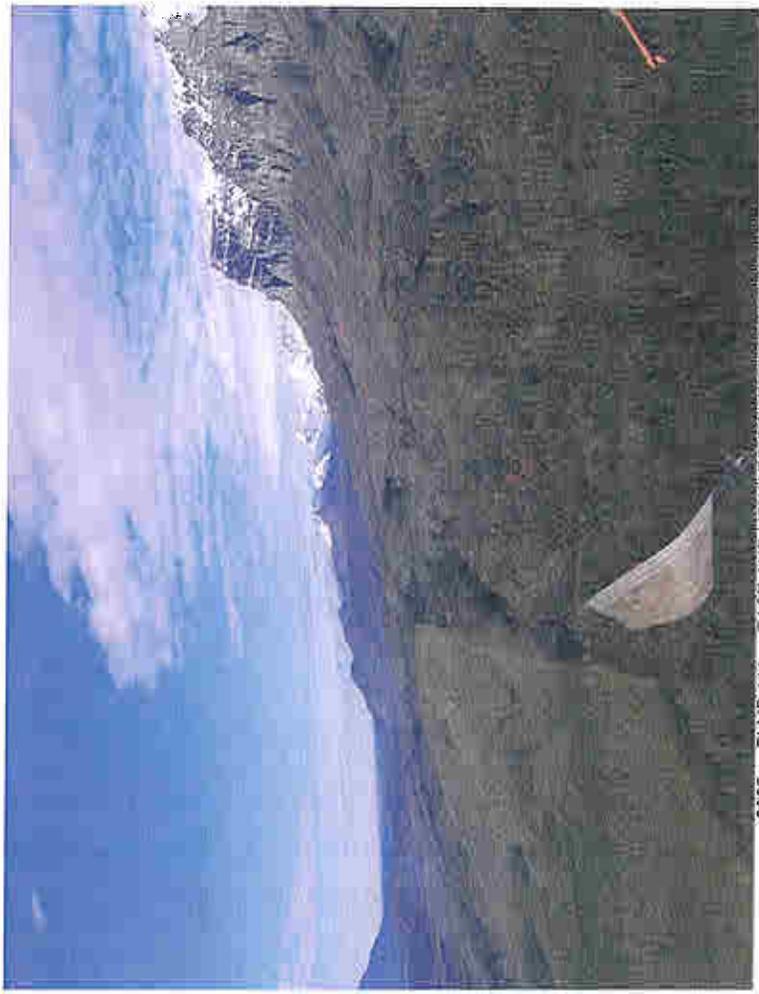
2005 - ~PLMP 108 .. LOOKING WEST ... 2200 REROUTE.jpg



2005 - \_DI MD 113 \_DIRMS ST RDE MRECT OE SIVED VMAP .jpg



2005 - ~PLMP 105+ .. E BEGINING 2200 REROUTE.jpg



2005 - ~PLMP 111 .. EAST AND UPWARD ROUTE TO THE SHELF .jpg



2005 - PLMP 89+ .. CHITNA PASS REROUTE.jpg



2005 - PLMP 90 .. CHITNA PASS REROUTE.jpg



2005 - PLMP 80 .. A COUPLE OF MILES NORTH OF SQUAW CREEK.jpg



2005 - PLMP 90 .. LOOKING DOWN BOULDER CREEK.jpg

**PROPOSED REALIGNMENTS  
GLENNALLEN TO PALMER GASLINE**

# Alignment Maps

*(REVISED ALIGNMENT NOV 1, 2005)*

1505043-011

1505043-012

1505043-013

1505043-014

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**Alaska Natural Gas Development Authority  
November 1, 2005**