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BLACKHAWK ENGINEERING, INC.

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Pamela Grubaugh-Littig
Permit Supervisor
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

J. Guy
C/007/0019

Re: Andalex Resources, Inc.
Clean Copies
Ditch Amendment
Centennial Project
C/007/019, Task ID #1755
Carbon County, Utah

Dear Ms. Littig:

Mike Glasson asked me to forward 5 clean copies of the above referenced amendment for the Centennial Permit.

If you have any questions, please give Mike a call.

Sincerely,

Dan W. Guy
President

cc: Mike Glasson

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JAN 20 2004

DIV. OF OIL, GAS & MINING

TABLE IV-3A (Continued)

DISTURBED DIVERSION DESIGN
(PRIMARY ROAD DRAINAGE - 10YR.-6HR. DESIGN)

<u>Structure</u>	<u>DD-2</u>	<u>DD-3</u>	<u>DD-4</u>	<u>DD-6</u>	<u>DD-7</u>
Drainage Area (acres)				*	
Disturbed	4.07	7.41	12.21	-	1.28
Undisturbed	-	25.49	12.20	-	6.12
Time of Conc. (hrs.)	0.04	0.327	0.289	0.289	0.08
Runoff Curve Number (CN)					
Disturbed	90	90	90	-	90
Undisturbed	-	70	70	-	70
Weighted CN	90	75	80	-	74
Manning's Number (n)	0.040	0.040	0.040	0.040	0.040
Ditch Slope (%)	6.25	6.25	6.25	5.95	5.56
Hydraulic Length (ft.)	200	1200	1200	-	800
Land Slope (%)	6.25	6.25	8.00	-	56.25
10 yr. -6 hr. Event (in)	1.25	1.25	1.25	1.25	1.25
Peak Flow 10/6 (cfs)	1.70	0.90	1.67	0.84	0.20
Required Area 10/6 (ft ²)	0.47	0.30	0.40	0.28	0.10
Flow Depth 10/6 (ft.)	0.69	0.24	0.68	0.53	0.31
Velocity 10/6 (fps)	3.62	2.96	3.60	2.98	2.03
10yr.-24hr. Event (in.)	1.82	1.82	1.82	1.82	1.82
Peak Flow 10/24 (cfs)	3.50	5.75	8.06	4.03	1.92

* Based on ½ flow for DD-4

Notes:

1. Ditch Slopes measured from Plate 8.
2. Peak flows by SCS-TR55 Method using "Storm 6.20" Computer program.
3. The Manning's Number is based on Table 3.1, page 159, under Small Drainage Ditches - Earth Lined, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner, and Haan, 1983.
4. See Appendix O for computer back-up.
5. All calculations are based on minimum ditch size- "V" shape with 1:1 side slopes, except DD-3 which has a 1' bottom width. Ditch configurations may vary in field.

TABLE IV -3B
DIVERSION DITCH SUMMARY

<u>DITCH NO.</u>	<u>FLOW</u> (cfs)	<u>REQ'D FLOW DEPTH</u> (ft.)	<u>REQ'D FLOW AREA</u> (ft ²)
UD-1	1.35	0.61	0.37
UD-2 (PAD)	0.99	0.61	0.37
UD-2 (UPPER)	0.99	0.41	0.17
UD-2 (LOWER)	0.99	0.39	0.15
UD-3	0.11	0.24	0.06
UD-4	0.47	0.45	0.20
UD-4 (MAX)	10.43	1.09	1.18
UD-5	0.29	0.39	0.15
UD-5 (MAX)	0.29	0.29	0.08
DD-1	0.08	0.22	0.05
DD-2	1.70	0.69	0.47
DD-3	0.90	0.24	0.30
DD-4	1.67	0.68	0.46
DD-6	0.84	0.53	0.28
DD-7	0.20	0.31	0.10
DD-8	0.07	0.21	0.04
DD-9	0.07	0.21	0.04
DD-10	0.05	0.18	0.03
DD-11	0.13	0.26	0.07

- Notes:
- 1- Flows for UD ditches and primary road ditches (D-2 through DD-7) based on 10 yr.-6hr. event (1.25).
 - 2- Flows for Ditches DD-1 and DD-8 through DD-11 based on 2yr.-6hr. event (0.80").
 - 3- All calculations based on minimum ditch size - "V" ditch with 1:1 side slopes, except DD-3, which has a 1' bottom width. Ditch configurations may vary in field.
 - 4- Ditches will be maintained to minimum depth and/or area shown in this table.

TABLE IV-3C (Continued)

DISTURBED AREA CULVERT DESIGN

<u>Structure</u>	<u>CD-4</u>	<u>CD-5</u>	<u>CD-6</u>	<u>CD-7</u>
10 yr. - 6 hr. Event (in.)	1.25	1.25	1.25	1.25
Manning's Number (n)	0.025	0.025	0.025	0.025
Culvert Slope (%)	5.56	5.56	5.56	5.56
Peak Flow	1.50	1.55	2.33	4.65
Velocity	4.26	4.29	4.75	5.65
D Req'd (ft.)	0.67	0.68	0.79	1.02
D in Place (ft.)	1.50	1.50	2.00	2.00

Note:

All culverts have adequate headwater to allow flow.

Map(s) is kept with this application located in the Public Information Center of our Salt Lake City office.