Brooks copy

FINAL REPORT

APPENDICES

ALASKA RAILROAD CORPORATION INTEGRATED VEGETATION MANAGEMENT RESEARCH PROJECT

by
Timothy Tilsworth
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INE 89.15

March 1991

INSTITUTE OF NORTHERN ENGINEERING

UNIVERSITY OF ALASKA FAIRBANKS

Fairbanks, Alaska 99775-176

APPENDIX A

Herbicide Application Concentrations

HERBICIDE MIXTURES

The following components were mixed through slow stirring (not shaking) for about 10 minutes prior to application and in the order listed:

1.	Water @ 70°F+	= 10,573 ml
2.	Velpar (262.4 grams)	= 210 ml
3.	NalControl	= 5.3 ml
4.	Garlon 3A	= 109.5 ml
5.	X-77	= 27.4 ml
6.	Hi-Lite	= 23 ml
	Total	= 10,948.2 ml

CHARACTERISTICS

Garlon 3A: Liquid with 44.4% A.I.

Application rate = 0.5 gal./acre

s.g. = 1.135 liquid @ 20°C

Velpar: Powder with 90% A.I.

Application rate = 10 lb./acre

s.g. = 1.25 beige powder @ 25°C

NalControl:

Application rate = 4.266 fld oz/acre
= 7.3 ml/area

Hi-Lite:

Application rate = 0.75+ oz/3 gal
= 21.4 ml/area

X-77:

Application rate = 0.25% of Volume
= 27.4 ml/area

APPENDIX B

Background Analyses

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

28 August 1990

Mr. Darren Mulkey
University of Alaska-Fairbanks
Environmental Quality Engineering
539 Duckering
Duckering Bldg., Room 361
Fairbanks, AK 99775-0660

RE: U of A-Fairbanks Project: Alaska Railroad. Herb. samples received 7-20-90: ARI JOB #6697

Dear Mr. Mulkey:

Please find the enclosed results for the above referenced project.

If you have any questions or need any further information, please feel free to call any time.

Sincerely,
ANALYTICAL RESOURCES, INC.

Peter M. Kepler
Project Coordinator

PMK/bv

Enclosures

cc: file#6697

ANALYTICAL
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Analytical
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333 Ninth Ave North
Seattle WA 98109-5111
206/621-6490

ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: CLS-22-89

Lab Sample ID: 3085 A
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized:
Report prepared 06/12/89 - MAC.C C.G.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1.2
Dry Wt Extracted: 32.27 gm

CAS Number		ug/Kg
314-40-9	Bromacil	180
51235-04-2	Hexazinon (Velpar)	10.0 U

Surrogate Recovery	
1,3-Dimethyl-2-nitrobenzene	46%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

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ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 3085 A
Matrix: Sediment

Sample No.: CLS-22-89

Client: Univ. Alaska
at Fairbanks
QC Report No: 3085
VTSR: 06/05/89

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 29.51 g
Conc/Dil Factor: 1:5

Data Release Authorized:
Report prepared on MAC:C C.G. 06/26/89

CAS Number		ug/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	10 U
	Triclopyr	0.3 U

Herbicide Surrogate Recovery	
2,3-Dichlorophenoxyacetic acid	38%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: 5-23-89(Comp.)

Lab Sample ID: 3085 B
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized:
Report prepared 06/12/89 - MAC.C C.G.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1.2
Dry Wt Extracted: 28.43 gm

CAS Number		ug/Kg
314-40-9	Bromacil	20.0 U
51235-04-2	Hexazinon (Velpar)	10.0 U

Surrogate Recovery	
1,3-Dimethyl-2-nitrobenzene	47%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

NA Indicates compound not analyzed.

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Seattle WA 98109-5[illegible]
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 3085 B
Matrix: Sediment

Sample No. 5-23-89 Comp.

Client: Univ. Alaska
at Fairbanks

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 26.46 g
Conc/Dil Factor: 1.5

QC Report No: 3085
VTSR: 06/05/89

Data Release Authorized:
Report prepared on MAC:C C.G. 06/26/89

CAS Number		ug/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	0.6 U
	Triclopyr	0.3 U

* Herbicide Surrogate Recovery	
2,3-Dichlorophenoxyacetic acid	48%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: BI(1)5-24-89

Lab Sample ID: 3085 C
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized:
Report prepared 06/12/89 - MAC:C C.G.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1.2
Dry Wt Extracted: 29.04 gm

CAS Number		ug/Kg
314-40-9	Bromacil	20.0 U
51235-04-2	Hexazinon (Velpar)	20.0 U

Surrogate Recovery	
1,3-Dimethyl-2-nitrobenzene	43%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

NA Indicates compound not analyzed.

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ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 3085 C
Matrix: Sediment

Sample No. 5-24-89 BI(1)

Client: Univ. Alaska
at Fairbanks

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 30.97 g
Conc/Dil Factor: 1.5

QC Report No: 3085
VTSR: 06/05/89

Data Release Authorized:
Report prepared on MAC:C C.G. 06/26/89

CAS Number		ug/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	0.8 U
	Triclopyr	0.3 U

* Herbicide Surrogate Recovery	
2,3-Dichlorophenoxyacetic acid	36 %

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

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Analytical Chemists & Consultants

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: BI(2)5-24-89

Lab Sample ID: 3085 D
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized:
Report prepared 06/12/89 - MAC:C C.G.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1.2
Dry Wt Extracted: 36.25 gm

CAS Number		ug/Kg
314-40-9	Bromacil	160
51235-04-2	Hexazinon (Velpar)	70.0 U

Surrogate Recovery	
1,3-Dimethyl-2-nitrobenzene	54%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

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ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 3085 D
Matrix: Sediment

Sample No. 5-24-89 B1(2)

Client: Univ. Alaska at Fairbanks
QC Report No: 3085
VTSR: 06/05/89

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 28.51 g
Conc/Dil Factor: 1.5

Data Release Authorized: [signature]
Report prepared on MAC:C C.G. 06/26/89

CAS Number		µg/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	5.0 U
	Triclopyr	0.4 U

* Herbicide Surrogate Recovery

2,3-Dichlorophenoxyacetic acid	46%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: BI(3)5-24-89

Lab Sample ID: 3085 E
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized:
Report prepared 06/12/89 - MAC.C C.G.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1 2
Dry Wt Extracted: 32.56 gm

CAS Number		ug/Kg
314-40-9	Bromacil	37
51235-04-2	Hexazinon (Velpar)	100 U

Surrogate Recovery	
1,3-Dimethyl-2-nitrobenzene	41%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

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ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 3085 E
Matrix: Sediment

Sample No. 5-24-89 BI(3)

Client: Univ. Alaska
at Fairbanks

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 31.52 g
Conc/Dil Factor: 1:5

QC Report No: 3085
VTSR: 06/05/89

Data Release Authorized:
Report prepared on MAC:C C.G. 06/26/89

CAS Number		ug/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	1.5 U
	Triclopyr	0.3 U

* Herbicide Surrogate Recovery

2,3-Dichlorophenoxyacetic acid	48 %

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: F15-24-89

Lab Sample ID: 3085 F
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized: _____
Report prepared 06/12/89 - MAC:C C.G.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1:2
Dry Wt Extracted: 39.83 gm

CAS Number		ug/Kg
314-40-9	Bromacil	120
51235-04-2	Hexazinon (Velpar)	10.0 U

Surrogate Recovery	
1,3-Dimethyl-2-nitrobenzene	43%

Data Qualifiers

U - Indicates compound was analyzed for but not detected at the given detection limit.

NA - Indicates compound not analyzed.

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ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 3085 F
Matrix: Sediment

Sample No. F15-24-89

Client: Univ. Alaska
at Fairbanks

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 34.64 g
Conc/Dil Factor: 1:5

QC Report No: 3085
VTSR: 06/05/89

Data Release Authorized:
Report prepared on MAC:C C.G. 06/26/89

CAS Number		µg/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	8.0 U
	Triclopyr	0.4 U

* Herbicide Surrogate Recovery	
2,3-Dichlorophenoxyacetic acid	55%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: SES-31-89

Lab Sample ID: 3085 G
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized:
Report prepared 06/12/89 - MAC:C C.Q.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1:2
Dry Wt Extracted: 34.23 gm

CAS Number		ug/Kg
314-40-9	Bromacil	2.3
51235-04-2	Hexazinon (Velpar)	10.0 U

Surrogate Recovery

1,3-Dimethyl-2-nitrobenzene	43%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

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ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 3085 G
Matrix: Sediment

Sample No. SES-31-89

Client: Univ. Alaska
at Fairbanks

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 35.60 g
Conc/Dil Factor: 1:5

QC Report No: 3085
VTSR: 06/05/89

Data Release Authorized:
Report prepared on MAC:C C.G. 06/26/89

CAS Number		ug/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	2.0 U
	Triclopyr	0.3 U

* Herbicide Surrogate Recovery	
2,3-Dichlorophenoxyacetic acid	58%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: FT6-01-89

Lab Sample ID: 3085 H
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized:
Report prepared 06/12/89 - MAC:C C.G.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1:2
Dry Wt Extracted: 36.12 gm

CAS Number		µg/Kg
314-40-9	Bromacil	20.0 U
51235-04-2	Hexazinon (Velpar)	10.0 U

Surrogate Recovery	
1,3-Dimethyl-2-nitrobenzene	37%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

NA Indicates compound not analyzed.

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ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 3085 H
Matrix: Sediment

Sample No. FT6-01-89

Client: Univ. Alaska at Fairbanks
QC Report No: 3085
VTSR: 06/05/89

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 32.82 g
Conc/Dil Factor: 1:5

Data Release Authorized: [signature]
Report prepared on MAC:C C.G. 06/26/89

CAS Number		µg/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	0.9 U
	Triclopyr	0.4 U

* Herbicide Surrogate Recovery	
2,3-Dichlorophenoxyacetic acid	56%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

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CREOSOTE ANALYSIS
BY GC/FID
DATA REPORT SHEET

QC Report: 3085- University of Alaska Fairbanks
VTSR: 06/05/89
MATRIX: Soil
PROJECT: Alaska Railroad

ARI SAMPLE #	CLIENT SAMPLE #	Creosote (ppm)
3085 MB	Method Blank	20 U
3085 A	CL5-22-89	20 U
3085 B	5-23-89 (Comp)	20 U
3085 C	BI(1)5-24-89	20 U
3085 D	BI(2)5-24-89	20 U
3085 E	BI(3)5-24-89	20 U
3085 F	FI5-24-89	20 U
3085 G	SE5-31-89	20 U
3085 H	FT6-01-89	20 U

DATA QUALIFIERS

U Indicates compound was analyzed for but not detected at the given detection limit.

Data Release Authorized
Report prepared 06/15/89 - MAC:C C.G.

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333 Ninth Ave North
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25 July 1989

Dr. Tim Tilsworth
University of Alaska-Fairbanks
306 Tanana Drive
Duckering Bldg., Room 361
Fairbanks, AK 99775-0660

RE: U of A-Fairbanks Project: Alaska Railroad

Dear Dr. Tilsworth:

Please find the enclosed results for the above referenced project.

If you have any questions or need any further information, please feel free to call any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Peter M. Kepler
GC Laboratory Manager

PMK/bv

Enclosures

cc: file#3295

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Organics Analysis Data Sheet
Organophosphorus Pesticide by Method 8140

Matrix: Soil

QC Report: 3295 - Univ. of Alaska at Fairbanks
Project No: Alaska Railroad
Data Received: 07/14/89

Data Release Authorized
Report Prepared 07/24/89 - MAC:C C.G.

Reported in ppb(ug/kg)

Client:	Method Blank	79 A	8 B	8C	8D
ARI #:	0719MB	3295 A	3295 B	3296 C	3296 D
Date Extracted:	07/18/89	07/18/89	07/18/89	07/18/89	07/18/89
Date Analyzed:	07/24/89	07/24/89	07/24/89	07/24/89	07/24/89
Dry Weight:	15.0 g	17.86 g	16.35 g	17.76 g	15.61 g
Dilution:	1:2	1:2	1:2	1:20	1:20
Velpar	40 U	40 U	1300	8400	7000
*Surrogate Recovery**	49%	22%	26%	40%	47%

DATA QUALIFIERS

* Surrogate is 1,3-Dimethyl-2-nitrobenzene

J Indicates an estimated value when the result is less than the calculated detection limit.

U Indicates compound was analyzed for but not detected at the given detection limit.

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Organics Analysis Data Sheet
Herbicides by Method 8150

Matrix: Soil

QC Report: 3295 - Univ. of Alaska at Fairbanks
Project No: Alaska Railroad
Date Received: 07/14/89

Data Release Authorized
Report Prepared 07/24/89 - MAC:C C.G.

Reported in ppb(µg/kg)

Clients:	Method Blank	79 A	8 B	8 C	8 D
ARI #:	0718MB	3295 A	3295 B	3295 C	3295 D
Date Extracted:	07/18/89	07/18/89	07/18/89	07/18/89	07/18/89
Date Analyzed:	07/20/89	07/20/89	07/20/89	07/20/89	07/20/89
Dry Weight:	25.0 g	25.07 g	23.40 g	23.50 g	25.47 g
Dilution:	1 5	1 5	1:250	1:250	1:250
Garlon 3A(Triclopyr)	1 0 U	0.9 J	1100	1500	950
*Surrogate Recovery**	63%	77%	91%	81%	84%

DATA QUALIFIERS

* Surrogate is 2,3 - Dichlorophenoxyacetic Acid

J Indicates an estimated value when the result is less than the calculated detection limit.

U Indicates compound was analyzed for but not detected at the given detection limit.

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[illegible]
[illegible]
[illegible]

[illegible] Ave North
Seattle Wa 98109-5187
(206) 621-6490

12 January 1990

Mr. Darren Mulkey
University of Alaska-Fairbanks
Environmental Quality Engineering
539 Duckering
Duckering Bldg., Room 361
Fairbanks, AK 99775-0660

RE: U of A-Fairbanks Project: Alaska Railroad, samples received 12-26-89.

Dear Mr. Mulkey:

Please find the enclosed results of the analysis for Hexazinone for the above referenced project.

As you know, the analysis for Triclopyr was not performed due to insufficient sample. Also, your sample #5 was broken during shipment.

If you have any questions or need any further information, please feel free to call any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Peter M. Kepler
GC Laboratory Manager

PMK/bv

Enclosures

cc: file#4319

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Lab Sample ID: 4319MB
Matrix: Soil

Sample No: Method Blank
QC Report No: University of Alaska
Project: Alaska Railroad
VTSR: 12/26/89

Data Release Authorized:
Report prepared 01/10/90 - MAC:C C.P.G.I

Date Extracted: 01/04/90
Date Analyzed: 01/08/90
Conc/Dil Factor: 1:2
Dry Weight: 20.0 grams

CAS Number		ug/kg
51235-04-2	Hexazinon (Velpar)	10 U

Surrogate Recovery	
Bendiocarb	52%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

J — Indicates an estimated value when result is less than specified detection limit.

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ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Lab Sample ID: 4319 A
Matrix: Soil

Sample No: # 1
QC Report No: University of Alaska
Project: Alaska Railroad
VTSR: 12/26/89

Data Release Authorized:
Report prepared 01/10/90 - MAC.C C.P.C.

Date Extracted: 01/04/90
Date Analyzed: 01/09/90
Conc/Dil Factor: 1:40
Dry Weight: 20.5 grams

CAS Number		ug/kg
51235-04-2	Hexazinon (Velpar)	14000

Surrogate Recovery	
Bendiocarb	85%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

J — Indicates an estimated value when result is less than specified detection limit.

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Seattle WA 98109-5187
206/621-5490

ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Lab Sample ID: 4319 B
Matrix: Soil

Sample No: # 2
QC Report No: University of Alaska
Project: Alaska Railroad
VTSR: 12/26/89

Data Release Authorized: _____
Report prepared 01/10/90 - MAC.C C.P.G.

Date Extracted: 01/04/90
Date Analyzed: 01/09/90
Conc/Dil Factor: 1:40
Dry Weight: 21.6 grams

CAS Number		ug/kg
51235-04-2	Hexazinon (Velpar)	13000

Surrogate Recovery	
Bendiocarb	110%

Data Qualifiers

U	Indicates compound was analyzed for but not detected at the given detection limit.
NA	Indicates compound not analyzed.
J	Indicates an estimated value when result is less than specified detection limit.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave North
Seattle Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Lab Sample ID: 4319 C
Matrix: Soil

Sample No: # 3
QC Report No: University of Alaska
Project: Alaska Railroad
VTSR: 12/26/89

Data Release Authorized:
Report prepared 01/10/90 - MAC,C C.P.G.

Date Extracted: 01/04/90
Date Analyzed: 01/08/90
Conc/Dil Factor: 1:2
Dry Weight: 20.1 grams

CAS Number		ug/kg
51235-04-2	Hexazinon (Velpar)	140

Surrogate Recovery	
Bendiocarb	97%

Data Qualifiers

U	Indicates compound was analyzed for but not detected at the given detection limit.
NA	Indicates compound not analyzed.
J	Indicates an estimated value when result is less than specified detection limit.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

133 North Ave North
Seattle, WA 98109-5187
206 621-6490

ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Lab Sample ID: 4319 D
Matrix: Soil

Sample No: # 4
QC Report No: University of Alaska
Project: Alaska Railroad
VTSR: 12/26/89

Data Release Authorized:
Report prepared 01/10/90 - MAC,C C.P.G.

Date Extracted: 01/04/90
Date Analyzed: 01/09/90
Conc/Dil Factor: 1:20
Dry Weight: 30.7 grams

CAS Number		ug/kg
51235-04-2	Hexazinon (Velpar)	420

Surrogate Recovery	
Bendiocarb	97%

Data Qualifiers

U	Indicates compound was analyzed for but not detected at the given detection limit.
NA	Indicates compound not analyzed.
J	Indicates an estimated value when result is less than specified detection limit.

ANALYTICAL
RESOURCES
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Analytical
Chemists &
Consultants

333 Ninth Ave North
Seattle Wa 98109-5187
(206) 621-8490

ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Lab Sample ID: 4319 F
Matrix: Soil

Sample No: # 6
QC Report No: University of Alaska
Project: Alaska Railroad
VTSR: 12/26/89

Data Release Authorized:
Report prepared 01/10/90 - MAC:C C.P.C.

Date Extracted: 01/04/90
Date Analyzed: 01/08/90
Conc/Dil Factor: 1 :2
Dry Weight: 31.3 grams

CAS Number		ug/kg
51235-04-2	Hexazinon (Velpar)	170

Surrogate Recovery	
Bendiocarb	132%

Data Qualifiers

U	Indicates compound was analyzed for but not detected at the given detection limit.
NA	Indicates compound not analyzed.
J	Indicates an estimated value when result is less than specified detection limit.

ANALYTICAL
RESOURCES
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Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-5490
(206) 621-7523 (FAX)

Organics Analysis Data Sheet
Triclopyr & Velpar Analysis

Matrix: Soil

Data Release Authorized
Report Prepared 08/28/90 - cog

QC Report: 6697 - Univ. of Alaska - Fairbanks
Project No: Alaska Railroad
Herbicide Project
Date Received: 07/20/90

CHEMPRO #:	Method Blank	492	493	494	495	496	497
ARI #:	0815MB	6697 A	6697 B	6697 C	6697 D	6697 E	6697 F
Date Extracted:	08/15/90	08/15/90	08/15/90	08/15/90	08/15/90	08/15/90	08/15/90
Date Analyzed:	08/27/90	08/24/90	08/24/90	08/24/90	08/24/90	08/24/90	08/24/90
Dry Weight:	10.0 g	13.4 g	13.0 g	14.0 g	10.1 g	15.6 g	14.3 g
Dilution:	1 to 5	1 to 5	1 to 5	1 to 5	1 to 5	1 to 5	1 to 5
Triclopyr (Garlon) - ppb(µg/kg):	80 U	80 U	80 U	80 U	80 U	80 U	80 U
*Surrogate Recovery**	78%	94%	94%	90%	92%	87%	95%

* Surrogate used was Dichlorprop

CHEMPRO #:	Method Blank	492	493	494	495	496	497
ARI #:	0730MB	6697 A	6697 B	6697 C	6697 D	6697 E	6697 F
Date Extracted:	07/30/90	07/30/90	07/30/90	07/30/90	07/30/90	07/30/90	07/30/90
Date Analyzed:	08/15/90	08/15/90	08/15/90	08/15/90	08/15/90	08/15/90	08/15/90
Dry Weight:	25.0 g	22.6 g	25.0 g	29.6 g	21.0 g	34.7 g	30.9 g
Dilution:	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2
Velpar - ppb(µg/kg):	50 U	40	61	24	120	9.9	59
*Surrogate Recovery**	34%	71%	95%	81%	67%	83%	72%
*Internal Standard Recovery***	100%	116%	148%	102%	114%	127%	124%

* Surrogate used was Alachlor
** Internal Standard used was Metribuzin.

DATA QUALIFIERS

U Indicates compound was analyzed for but not detected at an given detection limit.

NA Indicates not analyzed.

NR Indicates not reported due to chromatographic interference and/or dilution.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave North
Seattle Wa 98109-5104
206/621-8490

ORGANICS ANALYSIS DATA SHEET - METHOD 8150

Lab Sample ID: 0616MB
Matrix: Sediment

Sample No.: Method Blk

Client: Univ. Alaska at Fairbanks
QC Report No: 3085
VTSR: 06/05/89

Date Extracted: 06/16/89
Date Analyzed: 06/22/89
Dry Weight: 30.00 g
Conc/Dil Factor: 1.5

Data Release Authorized: _____
Report prepared on MAC:C C.G. 06/26/89

CAS Number		ug/kg
94-75-7	2,4-D	1.5 U
1918-02-1	Picloram	0.3 U
	Triclopyr	0.3 U

* Herbicide Surrogate Recovery	
2,3-Dichlorophenoxyacetic acid	12 %

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

133 North Ave North
Seattle, Wa 98109-51
(206)621-6490

ORGANICS ANALYSIS DATA SHEET
Organophosphorous Pesticides
by modified Method 8140 (GC/NPD)

Sample No: Method Blank

Lab Sample ID: 0607MB
Matrix: Soils/Sediments

QC Report No: 3085-UAF
Project: Alaska Railroad
VTSR: 06/05/89

Data Release Authorized:
Report prepared 06/12/89 - MAC:C C.G.

GPC Cleanup: YES

Date Extracted: 06/07/89
Date Analyzed: 06/09/89
Conc/Dil Factor: 1.2
Dry Wt Extracted: 30.00 g

CAS Number		ug/Kg
314-40-9	Bromacil	33.0 U
51235-04-2	Hexazinon (Velpar)	33.0 U

Surrogate Recovery	
1,3-Dimethyl-2-nitrobenzene	47%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

APPENDIX C

Analytical Extraction Methods

Velpar (Hexazinone) Method
Garlon (Triclopyr) Method

VELPAR (HEXAZINONE) METHOD

This method will extract the parent compound as well as metabolites A, B, D, and E.

EXTRACTION PROCEDURE:

1. Weigh out 10 gm of thoroughly mixed soil and transfer to a 250 ml centrifuge tube. Weigh 10 grams of the same soil into an aluminum weigh dish for moisture determination.

2. Add 30 ml of acetone/H_2O solution to the centrifuge tube.

3. Mix the soil and acetone/H_2O solution by shaking the capped tube vigorously and place in the centrifuge for 5 minutes.

4. Filter the aqueous portion through a Whatman #4 filter into an 125 ml Erlenmeyer flask.

5. Repeat steps 2-5 one more time.

6. Transfer the solution from the 125 ml Erlenmeyer flask into a 1 liter Roto-Vapor distillation flask.

7. Rinse the 125 ml Erlenmeyer flask with 10 ml. acetone/H_2O solution and combine it with the aqueous solution in the Roto-Vapor distillation flask.

8. Heat the distillation flask on the Roto-Vapor apparatus at 60 degree C, and under a vacuum, to remove the acetone.

9. Transfer the aqueous solution from the distillation flask into a 125 ml separatory funnel.

10. Rinse the distillation flask with 10 ml deionized H_2O and combine with the aqueous solution in the separatory funnel.

11. Add 20 ml hexane to the separatory funnel and shake for 2 minutes. (Release pressure periodically)

12. Decant aqueous phase (bottom phase) into another 125 ml separatory funnel.

13. Repeat steps 12 and 13 two more times for a total of three hexane extractions of the aqueous phase. (Release pressure periodically)

14. Decant the aqueous phase (bottom phase) into a 125 ml separatory funnel.

THE SAMPLE CAN BE SPLIT AT THIS POINT TO ANALYZE ALL OF THE METABOLITES (Both variations...see step #15). THE ALIQUAT SHOULD BE FIGURED INTO THE DILUTION FACTOR CALCULATION.

15a. For the parent compound and metabolites A and B, add 30 ml chloroform.

15b. For metabolites D and E, add 30 ml ethyl acetate.

16. Shake separatory funnel for 2 minutes. (Release pressure periodically)

17. Decant chloroform (bottom phase) or ethyl acetate extract into a 125 ml Erlenmeyer flask.

18. Repeat steps 16-18 two more times.

19. Add about 10 gm Na_2SO_4 to the organic solution to remove any water in solution and filter the organic phase through a Whatman #4 filter into a vacuum rotary evaporator distillation flask. Rinse filter paper with about 10 ml chloroform into the distillation flask.

20. Evaporate to dryness in a 60 degree water bath under a vacuum.

21. Redissolve the residue with 20 ml acetonitrile and transfer to a 125 ml separatory funnel. Rinse the vacuum rotary evaporator distillation flask with about 10 ml of acetonitrile and combine with the organic phase in the separatory funnel.

22. Add 20 ml hexane to the separatory funnel and shake for 1 minute. (Release pressure periodically)

23. Transfer the acetonitrile (bottom phase) into a 50 ml beaker and add 2-3 boiling stones. Evaporate on a hot plate to a volume of about 2 ml. Discard the hexane extract.

24. Quantitatively transfer acetonitrile solution into a conical thick walled screw cap vial. Purge with N_2 gas and evaporate to dryness. Be certain all water is evaporated.

SAMPLES CAN BE STORED AT THIS POINT, IN A COOL DARK PLACE UNTIL ESTERIFICATION AND ANALYSIS CAN BE COMPLETED ON THE SAME DAY.

ESTERIFICATION PROCEDURE:

25. Add 1 ml chloroform and 1 ml trifluoroacetic anhydride to the vial, cap it and shake to redissolve residue.

26. Place in a 60 degree C block heater for 30 minutes.

27. After 30 min., cool the sample and evaporate with N_2 gas to dryness.

28. Add exactly 1.00 ml ethyl acetate (be careful during pipetting), recap the vial and shake to redissolve residue and transfer to a G.C. vial. Crimp a lid on the vial and place in storage refrigerator.

READY FOR G.C.

GARLON (TRICLOPYR) METHOD

EXTRACTION

1. Weigh 5 grams of thoroughly mixed soil sample into a 250 ml ground glass Erlenmeyer flask.

2. Add 15 ml deionized H_2O, 50 ml ether, 2 ml 37% KOH solution and two clean boiling chips.

3. Place a flask weight on the Erlenmeyer flask.

4. Heat in a 60-65 degree Celsius water bath for 30-45 minutes. (The ether will evaporate in about 15 minutes)

5. Filter solution through a Whatman #4 filter into a 150 ml centrifuge tube.

6. Rinse flask with 5-10 ml deionized H_2O, swirl and filter again into the 150 ml centrifuge tube.

7. Add 20 ml diethyl ether to the centrifuge tube, swirl the tube gently before putting the cap on. Shake tube gently and vent it by opening the cap partially. Once all air has been released through the gentle shaking, close the bottle tight and shake for 1 min. (IMPORTANT! Release pressure through the cap periodically). Place the bottle in the centrifuge for 5 min.

8. Use a Pasteur pipet to remove the ether (upper) phase Discard this ether. Add 2 ml cold (4 degree C) H_2SO_4(1+3) to the aqueous phase in the centrifuge bottle, shake and test for pH (2 or less). Add 20 ml diethyl ether to the centrifuge bottle.

9. Shake the acidified aqueous phase and ether solution for 1 min. (IMPORTANT! Shake gently at first and release pressure periodically.) Place the tube in the centrifuge for 5 min. Then pipet the ether (upper) phase into a clean 125 ml Erlenmeyer flask. It is OK if there is some ether left in the bottle at this stage, but avoid pipetting the aqueous phase.

10. Add 10 ml of diethyl ether to the aqueous phase in the centrifuge bottle, and repeat step 9. Add the ether phase obtained after the centrifuging to the same Erlenmeyer flask in step 9. Repeat the extraction one more time with another 10 ml of ether. A total of 40 ml of ether solution should be obtained. (It is recommended that another 10 ml of ether should be added

to the bottle to rinse it, shaking and centrifugation are not necessary at this stage.)

11. Add about 1-2 gm acidified anhydrous Na_2SO_4 to the 125 ml Erlenmeyer flask containing the organic solution, shake and place in a dark hood for 1-2 hours.

12. Filter solution through a Whatman #4 filter into an Erlenmeyer flask, and rinse flask with 10-20 ml diethyl ether. Pour rinse ether into the filter to combine with filtered ether.

13. Add 2-3 clean boiling chips to ether in flask. Place a flask weight on the flask and heat the Erlenmeyer flask in a 60-65 degree C water bath until a final volume of 20 ml or less is obtained (about 20 min.).

14. Cool and pour into a 40 ml test tube, then rinse flask with about 1-2 ml diethyl ether and pour into a 40 ml test tube.

15. Heat in a 60-65 degree C water bath until a final volume of about 1.0-2.0 ml is obtained.

16. Quantitatively transfer the contents to a conical, thick walled 2 ml vial.

ESTERIFICATION

1. Evaporate extract with N_2 gas to dryness at room temperature.

2. Add 0.25 ml BF_3*Methanol, seal the vial with the cap and heat in an 80 degree C block heater for 1 hour.

3. Transfer solution to a separatory funnel by rinsing the vial with 20 ml 10% NaCl solution.

4. Add 30 ml hexane and shake for 1 minute. Transfer the aqueous solution to an erlenmyer flask. Transfer the hexane to a separate erlenmyer flask.

5. Place the aqueous solution back into the separatory funnel.

6. Repeat step #4. Discard NaCl solution. (bottom phase)

7. Add about 5-10 gm anhydrous Na_2SO_4 to the hexane in the erlenmyer flask.

8. Quantitatively filter the hexane through Whatman #4 filter into a 100 ml beaker and add 2-3 boiling stones.

9. Heat on a hot plate until a volume of less than 1 ml is obtained.

10. Transfer solution to a 1 ml condensing tube and adjust to exactly 1 ml with hexane (use the hexane to rinse the 100 ml beaker).

11. Transfer sample to a G.C. vial and crimp lid on it.

12. Place vial in storage refrigerator.

SAMPLE IS READY FOR G.C.

APPENDIX D

Alaska DOT&PF Soil Analyses

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: JAF HERBICIDE PROJECT
PROJECT #: 0553681
SAMPLE OF: TEST PLOTS

LAB #: 89-6003
FIELD #: [illegible]-5-22-89
OUT COMP 0-20

SAMPLED FROM: OUT COMP 0-20
SL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #
DATE SAMPLED: MAY 22, 1989
DATE TESTED: JUNE 15, 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"			
1"	100		
3/4"	98		
1/2"	98		
3/8"	82		
#4	67		
#8	59		
#10	58		
#16			
#20	50		
#30			
#40	40		
#50	33		
#80			
#50	28		
#100	24		
#200	19		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS	4.4		
.02mm			
.005mm			
SAND EQUIV			
#-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	@	
CAV POINT	@	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, CME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: JAF HERBICIDE PROJECT
PROJECT #: [illegible]
SAMPLE OF: TEST PLOTS

LAB #: 89-6004
FIELD #: 31-3 5-24-89
R OUT COMP 0-20'

SAMPLED FROM: R OUT COMP 0-20'
SC REF:
TRADE REF:
SOURCE: AK RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
1"			
3"			
1/2"	100		
	98		
3/8"	94		
#2"	83		
1	78		
#4	63		
#8	58		
#10	54		
#16			
#20	44		
#30			
40	34		
#50	28		
#60			
#80	22		
#100	21		
#200	18		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS	4.5		
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	@	
CAV POINT	@	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
% MOIST					

REMARKS

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS:
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6005
FIELD #: 89-3 5-24-89
L N COMP 0-4'

SAMPLED FROM: L N COMP 0-4
CL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC.
3"			
2"			
1 1/2"	100		
1"	98		
3/4"	91		
1/2"	82		
3/8"	76		
4	66		
#8	58		
#10	53		
#16			
#20	42		
#30			
#40	32		
#50	26		
#60			
#80	22		
#100	21		
#200	17		

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
AV SP GR		
AV POINT	3	
AV POINT	0	
VOID NO	2	3 4 5
DRY UNIT WT		
% MOISTURE		
FREE MOIST		

REMARKS

SIGNED CLASSIFIED: SM

TEST	AS REC'D	FIELD SPLIT	SPEC.
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	22		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT:
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK SME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: JAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6008
FIELD #: B-1 5-24-89
B-1 COMP 0-4

SAMPLED FROM: B-1 COMP 0-4
QL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION:
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	98		
3/4"	92		
1/2"	79		
3/8"	74		
#4	62		
#8	53		
#10	51		
#16			
#20	42		
#30			
#40	33		
#50	27		
#60			
#80	22		
#100	20		
#200	17		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY:		
OPT MOIST:		
CAV SP GR:		
CAV POINT:	@	
CAV POINT:	@	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS:

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS:
YES: ___ NO: ___ NA: ✓

SIGNATURE: Paul W Mistchek

PAUL W MISTCHEK, HME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6007
FIELD #: CH 5-23-89
L N COMP SECT BDF

SAMPLED FROM: L N COMP SECT BDF
GL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 23, 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION:
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	89		
3/4"	83		
1/2"	77		
3/8"	74		
#4	66		
#8	58		
#10	57		
#16			
#20	44		
#30			
#40	32		
#50	26		
#60			
#80	21		
#100	18		
#200	13		

TEST	AS REC'D	FIELD SPLIT	SPEC.
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS	1		
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	2	
CAV POINT	3	
MOLD NO.	1	2 3 4 5
DRY UNIT WT		
% MOISTURE		
FREE MOIST		

REMARKS:

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS
YES: ___ NO: ___ N/A: ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6008
FIELD #: 91-3 5-24-89
R IN COMP 0-4

SAMPLED FROM: R IN COMP 0-4
CL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24,1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION:
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC.
3"			
2"	100		
1 1/2"	98		
1"	93		
3/4"	91		
1/2"	82		
3/8"	76		
#4	63		
#8	49		
#10	46		
#16			
#20	32		
#30			
#40	20		
#50	15		
#80			
#90	10		
#100	3		
#200	0		

TEST	AS REC'D	FIELD SPLIT	SPEC.
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	③	
CAV POINT	④	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
CORR MOIST					

REMARKS:

UNIFIED CLASSIFICATION: SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE ___ UNACCEPTABLE ___

CONFORMS TO SPECIFICATIONS

YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: [illegible] CREEK SIDE PROJECT
PROJECT #: [illegible]3881
SAMPLE OF: TEST PLOTS

LAB #: 89-8008
FIELD #: [illegible] 6-01-89
[illegible] COMP 0-4'

SAMPLED FROM: L N COMP 0-4
CL REF
GRADE REF
SOURCE: AK RAILROAD

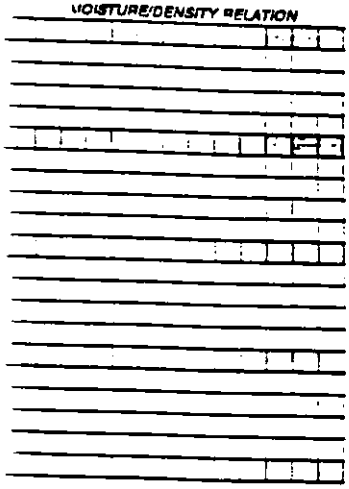
REPRESENTS
ITEM #:
DATE SAMPLED: JUNE 1,1989
DATE TESTED: JUNE 15,1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	89		
3/4"	78		
1/2"	62		
3/8"	53		
4	38		
#8	34		
#10	33		
#16			
#20	31		
#30			
#40	29		
#50	25		
#60			
#80	18		
#100	9		
#200	11		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
02mm			
005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION



% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT	SPEC
MAX DENSITY			
OPT MOIST			
CAV SP GR			
CAV POINT	3		
CAV POINT	3		

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS

UNIFIED CLASSIFICATION: GW-GM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, QAE

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: [illegible] HERBICIDE PROJECT
PROJECT #: 55538B1
SAMPLE OF: TEST PLOTS

LAB #: 89-6010
FIELD #: CL 5-22-89
SAMPLED FROM: S N COMP 0-4

CL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: MAY 22,1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE:
INFORMATION:
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPEC SPLIT
3"		
2"		
1 1/2"		
1"	100	
3/4"	98	
1/2"	87	
3/8"	79	
4	68	
#8	58	
#10	57	
#16		
#30	49	
#50		
#40	35	
#50	23	
#60		
#80	14	
#100	11	
#200	7	

TEST	AS REC'D	FIELD SPEC SPLIT
OVERSIZE		
DELETERIOUS		
FRACTURE		
LL	NV	
PI	NP	
SP GR		
FINE AGG		
COARSE AGG		
% MOISTURE		
% ORGANICS		
.02mm		
.005mm		
SAND EQUIV		
T-12		
CALIF BEARING		
SPECIAL TEST		

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY:		
OPT MOIST:		
CAV SP GR:		
CAV POINT:	3	
CAV POINT:	9	
MOLD NO	1 2 3 4 5	
DRY UNIT WT:		
% MOISTURE:		
FREE MOIST:		

REMARKS:

UNIFIED CLASSIFICATION SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: UAF HERBICIDE PROJECT
PROJECT #: 63553681
SAMPLE OF: TEST PLOTS

LAB #: 89-6011
FIELD #: CH 5-23-89
R OUT COMP SECT BOF

SAMPLED FROM: R OUT COMP SECT BOF
CL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #
DATE SAMPLED: MAY 23 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY: 0000

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"			
1"	100		
3/4"	97		
1/2"	92		
3/8"	87		
#4	77		
#8	68		
#10	65		
#16			
#20	53		
#30			
#40	39		
#50	32		
#60			
#80	26		
#100	24		
#200	18		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS	8.0		
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT	SPEC
MAX DENSITY			
OPT MOIST			
CAV SP GR			
CAV POINT	@		
CAV POINT	@		

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FINE MOIST					

REMARKS

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS:
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: UAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-8012
FIELD #: 31-1 5-24-89
L OUT COMP 0-20'

SAMPLED FROM: L OUT COMP 0-20'
CL REF:
GRADE REF:
SOURCE: AK. RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION:
QUALITY: XXXX

SIEVE SIZE	AS FIELD: SPEC REC'D SPLIT
3"	
2"	
1 1/2"	100
1"	97
3/4"	90
1/2"	81
3/8"	74
#4	61
#8	50
#10	47
#16	
#20	35
#30	
#40	26
#50	21
#60	
#80	18
#100	16
#200	13

TEST	AS FIELD SPEC REC'D SPLIT
OVERSIZE	
DELETERIOUS	
FRACTURE	
LL	NV
PI	NP
SP GR	
FINE AGG	
COARSE AGG	
% MOISTURE	
% ORGANICS	5.2
.02mm	
.005mm	
SAND EQUIV	
F-12	
CALIF BEARING	
SPECIAL TEST	

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS FIELD REC'D SPLIT
MAX DENSITY	
OPT MOIST	
CAV SP GR	
CAV POINT	@
CAV POINT	@

MOLD NO.	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS:

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS:
YES ___ NO ___ NA ✓

SIGNATURE: Paul W. Misterek

PAUL W. MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: [illegible] HERBICIDE PROJECT
PROJECT #: [illegible]
SAMPLE OF: TEST PLOTS

LAB #: 89-8017
FIELD #: 5-24-89
OUT COMP 5-10'

SAMPLED FROM: OUT COMP 5-10'
CL REF
GRADE REF
SOURCE: [illegible] RAILROAD

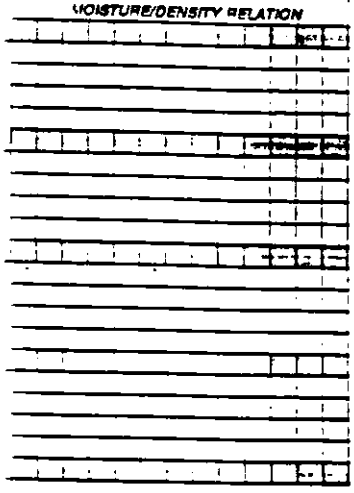
REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15,1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION: XXXX
QUALITY

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	97		
3/4"	95		
1/2"	97		
3/8"	81		
#4	72		
#8	64		
#10	52		
#16			
#20	53		
#30			
#40	43		
#50	35		
#60			
#80	27		
#100	24		
#200	19		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION



% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT		
CAV POINT		

MOLD NO	2	3	4	5
DRY UNIT WT				
% MOISTURE				
FREE MOIST				

REMARKS

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS:
YES: ___ NO: ___ NA: ✓

SIGNATURE [signature]
PAUL W. MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: [illegible] HERBICIDE PROJECT
PROJECT #: [illegible]
SAMPLE OF: TEST PLOTS

LAB #: [illegible]-6018
FIELD #: [illegible] 5-31-89
[illegible] N COMP SECT BDF

SAMPLED FROM: [illegible] N COMP SECT BDF
CL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: MAY 31 1989
DATE TESTED: JUNE 15,1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY

XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"	100		
1 1/2"	98		
1"	90		
3/4"	84		
1/2"	71		
3/8"	64		
4	48		
#8	31		
#10	28		
#16			
#30	16		
#30			
#40	9		
#50	6		
#60			
#80	4		
#100	4		
#200	3		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY:		
OPT MOIST:		
CAV SP GR:		
CAV POINT:		
CAV POINT:		

VOID NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS:

UNIFIED CLASSIFICATION: GW

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE ___ UNACCEPTABLE ___

CONFORMS TO SPECIFICATIONS:

YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: UAF HERBICIDE PROJECT
PROJECT #: 10553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6019
FIELD #: 5-24-89
R IN COMP 4-7

SAMPLED FROM: R IN COMP 4-7
CL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION: XXXX
QUALITY:

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
1"			
3"			
1 1/2"			
1"	100		
3/4"	98		
1/2"	90		
3/8"	86		
#4	72		
#8	62		
#10	60		
#16			
#30	49		
30			
#40	39		
#50	32		
#60			
#80	25		
#100	23		
#200	17		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETEPIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
1-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	@	
CAV POINT	@	
MOLD NO	1	2 3 4 5
DRY UNIT WT		
% MOISTURE		
OPT MOIST		

REMARKS

UNIFIED CLASSIFICATION SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS:
YES ___ NO ___ NA ✓

SIGNATURE Paul W Misterek

PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAB HERBICIDE PROJECT
PROJECT: [illegible]581
SAMPLE OF: TEST PLOTS

LAB #: 89-6020
FIELD #: SE 5-31-89
R IN COMP SECT 8DF

SAMPLED FROM: R IN COMP SECT 8DF
PIT REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 31 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION: XXXX
QUALITY:

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	92		
3/4"	88		
1/2"	76		
3/8"	69		
#4	53		
#8	40		
#10	37		
#16			
#20	23		
#30			
#40	[illegible]		
#50	[illegible]		
#60			
#80	7		
#100	6		
#200	5		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
DRY SP GR		
DRY POINT	[illegible]	
DRY POINT	[illegible]	
MOLD NO		
DRY UNIT WT		
% MOISTURE		
FREE MOIST		

REMARKS:

UNIFIED CLASSIFICATION: SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE [signature]
PAUL W. [illegible]STEREK, PME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: [illegible] HERBICIDE PROJECT
PROJECT #: 1553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6021
FIELD #: 5-24-89
COMP 0-4'

SAMPLED FROM: COMP 0-4
CL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY

XXXX

SIEVE SIZE	AS FIELD REC'D	SPEC SPLIT*
3"		
2"		
1 1/2"		
1"	100	
3/4"	97	
1/2"	90	
3	85	
#4	76	
#8	68	
#10	66	
#16		
#30	58	
#30		
#40	45	
#50	37	
#60		
#80	29	
#100	26	
#200	18	

TEST	AS FIELD REC'D	SPEC SPLIT
OVERSIZE		
DELETERIOUS		
FRACTURE		
LL	NV	
PI	NP	
SP GR		
FINE AGG		
COARSE AGG		
% MOISTURE		
% ORGANICS		
.02mm		
.005mm		
SAND EQUIV		
T-12		
CALIF BEARING		
SPECIAL TEST		

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS FIELD REC'D	SPEC SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV PO.NT	@	
CAV POINT	@	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
% MOIST					

REMARKS

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME	LAF HERBICIDE PROJECT			LAB #	13-6022
PROJECT #	11553881			FIELD #	1 -2 5-24-89
SAMPLE OF	TEST PLOTS				L N COMP 0-4
SAMPLED FROM	L N COMP 0-4	REPRESENTS		ACCEPTANCE	
CL REF		ITEM #		INDEPENDENT ASSURANCE	
GRADE REF		DATE SAMPLED	MAY 24 1989	INFORMATION	XXXX
SOURCE	AK RAILROAD	DATE TESTED	JUNE 15 1989	QUALITY	

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	94		
3/4"	89		
1/2"	90		
3/8"	75		
4	62		
#8	51		
#10	48		
#16			
#20	35		
#30			
#40	25		
#50	22		
#60			
#80	18		
#100	17		
#200	13		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
ZAV SP GR		
ZAV POINT	2	
ZAV POINT	3	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE ___ UNACCEPTABLE ___

CONFORMS TO SPECIFICATIONS

YES ___ NO ___ NA ✓

SIGNATURE [signature]

PAUL W. MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME UAF HERBICIDE PROJECT
PROJECT # 0553881
SAMPLE OF TEST PLOTS

LAB # 89-6023
FIELD # SE 5-31-89

SAMPLED FROM L OUT COMP SECT BOF
CL REF
GRADE REF
SOURCE AK RAILROAD

REPRESENTS L OUT COMP SECT BOF
ITEM #
DATE SAMPLED MAY 31 1989
DATE TESTED JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	97		
3/4"	96		
1/2"	92		
3/8"	89		
#4	80		
#8	66		
#10	62		
#16			
#20	42		
#30			
#40	23		
#50	14		
#60			
#80	9		
#100	8		
#200	5		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-11			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	③	
CAV POINT	④	
MOLD NO	1	2 3 4 5
DRY UNIT WT		
% MOISTURE		
SPEC MOIST		
REMARKS		

UNIFIED CLASSIFICATION SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ VA ✓

SIGNATURE Paul W Misterek
PAUL W MISTEREK EVE

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAF HERBICIDE PROJECT
PROJECT: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6024
FIELD #: BI-1 5-24-89
B OUT COMP 0-20'

SAMPLED FROM: B OUT COMP 0-20'
SUBREF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION: XXXX
QUALITY:

SIEVE SIZE	% AS REC'D	% FIELD SPLIT	SPEC
3"			
2"	100		
1 1/2"	98		
1"	92		
3/4"	88		
1/2"	80		
3/8"	74		
4	61		
#8	53		
#10	51		
#16			
#30	43		
#50			
#40	34		
#50	29		
#80			
#90	24		
#100	23		
#200	19		

TEST	% AS REC'D	% FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
P-#2			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	% AS REC'D	% FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	@	
CAV POINT	@	
MOLD NO	1	2 3 4 5
DRY UNIT WT		
% MOISTURE		
FREE MOIST		
% ADMIX		

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE: ___ UNACCEPTABLE: ___

CONFORMS TO SPECIFICATIONS

YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, QAE

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAP HERB CIDE PROJECT
PROJECT #: 1553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6025
FIELD #: DL 5-22-89
N COMP 0-4

SAMPLED FROM: N COMP 0-4
DL REF.
GRADE REF
SOURCE: RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: MAY 22.1989
DATE TESTED: JUNE 15.1989

ACCEPTANCE
INDEPENDENT ASSURANCE:
INFORMATION: XXXX
QUALITY:

SIEVE SIZE	AS FIELD SPEC'D	REC'D SPLIT
3"		
2"		
1 1/2"	100	
1"	94	
3/4"	91	
1/2"	80	
3/8"	73	
4	62	
#8	55	
#10	53	
#16		
#20	45	
#30		
#40	31	
#50	20	
#60		
#90	11	
#100	9	
#200	6	

TEST	AS FIELD SPEC'D	REC'D SPLIT
OVERSIZE		
DELETERIOUS		
FRACTURE		
LL:	NV	
PI:	NP	
SP GR		
FINE AGG		
COARSE AGG		
% MOISTURE		
% ORGANICS		
.02mm		
.005mm		
SAND EQUIV		
T-12		
CALIF BEARING		
SPECIAL TEST		

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS FIELD REC'D SPLIT
MAX DENSITY	
OPT MOIST	
CAV SP G=	
CAV POINT	@
CAV POINT	@

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS

UNIFIED CLASSIFICATION: SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT.
ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS
YES: ___ NO: ___ NA: ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAF HERBICIDE PROJECT
PROJECT #: 2553681
SAMPLE OF: TEST PLOTS

LAB #: 89-4026
FIELD #: 3-2 5-24-89
S OUT COMP 0-20'

SAMPLED FROM: R OUT COMP 0-20'
CL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION:
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	97		
3/4"	94		
1/2"	84		
3/8"	77		
4	63		
#8	51		
#10	48		
#16			
#20	36		
#30			
#40	24		
#50	17		
#60			
#80	12		
#100	10		
#200	8		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY:		
OPT MOIST:		
DAV SP GR:		
DAV POINT:		3
DAV POINT:		3

VOID NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

MARKS:

UNIFIED CLASSIFICATION: SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA: ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6027
FIELD #: BIN-2 5-24-89
BIN COMP 0-4

SAMPLED FROM: BIN COMP 0-4
CL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION:
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	98		
3/4"	94		
1/2"	84		
3/8"	80		
4	65		
#8	51		
#10	49		
#16			
#20	38		
#30			
40	28		
#50	23		
#60			
#80	18		
#100	16		
#200	14		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
72mm			
305mm			
SAND EQUIV			
n-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	@	
CAV POINT	@	
MOLD NO.	1	2 3 4 5
DRY UNIT WT		
% MOISTURE		
FREE MOIST.		

REMARKS

UNIFIED CLASSIFICATION SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS:
YES: ___ NO: ___ NA: ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: DAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6026
FIELD #: 31-3 5-24-89
L OUT COMP 0-20'

SAMPLED FROM: L OUT COMP 0-20'
TL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24,1989
DATE TESTED: JUNE 15,1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION: XXXX
QUALITY:

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	95		
3/4"	87		
1/2"	78		
3/8"	72		
#4	60		
#8	50		
#10	47		
#16			
#20	37		
#30			
#40	27		
#50	23		
#60			
#80	19		
#100	17		
#200	14		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS	3.0		
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST.		
CAV SP GR		
CAV POINT	@	
CAV POINT	@	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

BLOWS:

MODIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT:
ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS:
YES: ___ NO: ___ N/A: ✓

SIGNATURE: Paul W Misterek
PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: [illegible] HERBICIDE PROJECT
PROJECT #: [illegible]
SAMPLE OF: TEST PLOTS

LAB #: 89-6029
FIELD #: FT 6-1-89
OUT COMP 0-20'

SAMPLED FROM: OUT COMP 0-20'
CL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: JUNE 1 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY: XXXX

SIEVE SIZE	AS FIELD REC'D	SPEC SPLIT
3"		
2"	100	
1 1/2"	96	
1"	92	
3/4"	82	
1/2"	66	
3"	58	
#4	43	
#8	36	
#10	35	
#16		
#20	32	
#30		
#40	30	
#50	28	
#60		
#80	27	
#100	25	
#200	19	

TEST	AS FIELD REC'D	SPEC SPLIT
OVERSIZE		
DELETERIOUS		
FRACTURE		
LL	NV	
PI	NP	
SP GR		
FINE AGG		
COARSE AGG		
% MOISTURE		
% ORGANICS	4.2	
.02mm		
.005mm		
SAND EQUIV		
T-12		
CALIF BEARING		
SPECIAL TEST		

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS FIELD REC'D	SPEC SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT		
CAV POINT		

MOLD NO	2	3	4	5
DRY UNIT WT				
% MOISTURE				
OPT MOIST				

REMARKS

UNIFIED CLASSIFICATION: GM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W. MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: [illegible] HERBICIDE PROJECT
PROJECT #: [illegible]
SAMPLE OF: TEST PLOTS

LAB #: 89-6030
FIELD #: DL 5-22-89
R OUT COMP 0-20'

SAMPLED FROM: R OUT COMP 0-20
DL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: MAY 22,1989
DATE TESTED: JUNE 15,1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION: XXXX
QUALITY

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	98		
3/4"	92		
1/2"	80		
3/8"	74		
4	63		
#8	58		
#10	55		
#16			
#20	47		
#30			
#40	35		
#50	23		
#60			
#80	14		
#100	12		
#200	8		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS	5.2		
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST.		
AV SP GR		
AV POINT	@	
AV POINT	@	

MOLD NO.	2	3	4	5
DRY UNIT WT				
% MOISTURE				
FREE MOIST				

REMARKS:

UNIFIED CLASSIFICATION: SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE ___ UNACCEPTABLE ___

CONFORMS TO SPECIFICATIONS

YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W. MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: CAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6031
FIELD #: CH 5-23-89
R IN COMP SECT BOX

SAMPLED FROM: R IN COMP SECT BOX
TL REF:
GRADE REF:
SOURCE: AK. RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 23 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE
INFORMATION: XXX
QUALITY:

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	96		
3/4"	94		
1/2"	87		
1/4"	83		
#4	78		
#8	73		
#10	71		
#16			
#20	63		
#30			
#40	55		
#50	49		
#60			
#80	42		
#100	39		
#200	30		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS	3.4		
.02mm			
.005mm			
SAND EQUIV			
#4-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	@	
CAV POINT	@	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS:

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS:
YES ___ NO ___ NA ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: UAF HERBICIDE PROJECT
PROJECT #: 32553861
SAMPLE OF: TEST PLOTS

LAB #: 89-60
FIELD #: F 5-2
R OU

SAMPLED FROM: R OUT COMP 5-10
CL REF:
GRADE REF:
SOURCE: AK RAILROAD

REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15,1989

ACCEPTANCE:
INDEPENDENT ASSUR
INFORMATION:
QUALITY:

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC SPLIT
3"			
2"			
1 1/2"	100		
1"	92		
3/4"	88		
1/2"	83		
3/8"	78		
# 4	67		
#8	58		
#10	57		
#16			
#20	48		
#30			
#40	40		
#50	34		
#60			
#80	27		
#100	25		
#200	20		

TEST	AS REC'D	FIELD SPLIT	SPEC SPLIT
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS	4.9		
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSIT

% MOISTUF

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY:		
OPT MOIST:		
ZAV SP GR		
ZAV POINT:	9	
ZAV POINT:	9	

MOLD NO.	1	2	3	4	5
DRY UNIT WT					
% MOISTURE:					
FINE MOIST.					

REMARKS:

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEP
ACCEPTABLE ___ UNACCEPTABLE
CONFORMS TO SPECIFICATIONS
YES: ___ NO: ___ NA: ✓

SIGNATURE: Paul W. Misterek

PAUL W. MISTEREK, R

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: [illegible] HERBICIDE PROJECT
PROJECT #: [illegible]3553681
SAMPLE OF: TEST PLOTS

LAB #: 89-6013
FIELD #: SE 5-31-89
P OUT COMP SECT SDF

SAMPLED FROM: P OUT COMP SECT SDF
SL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: MAY 31 '989
DATE TESTED: JUNE 15,1989

ACCEPTANCE.
INDEPENDENT ASSURANCE.
INFORMATION
QUALITY XXXX

SIEVE SIZE	% AS FIELD SPEC'D	% AS FIELD SPLIT
3"		
2"	100	
1 1/2"	98	
1"	93	
3/4"	89	
1/2"	83	
3/8"	79	
4	67	
#8	50	
#10	46	
#16		
#20	29	
#30		
#40	15	
#50	11	
#80		
#100	9	
#200	5	

TEST	AS FIELD SPEC'D	AS FIELD SPLIT
OVERSIZE		
DELETERIOUS		
FRACTURE		
LL	NV	
PI	NP	
SP GR		
FINE AGG		
COARSE AGG		
% MOISTURE		
% ORGANICS		
.02mm		
.005mm		
SAND EQUIV		
T-12		
CALIF BEARING		
SPECIAL TEST		

PLOT OF MOISTURE-DENSITY RELATION

% MOISTURE

TEST RESULT	AS FIELD SPEC'D	AS FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	3	
CAV POINT	9	

MOLD NO	2	3	4	5
DRY UNIT WT				
% MOISTURE				
OPT MOIST				

REMARKS

UNIFIED CLASSIFICATION: SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE Paul W Misterek
PAUL W MISTEREK RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAF HERBICIDE PROJECT
PROJECT #: 0553081
SAMPLE OF: TEST PLOTS

LAB #: 9-6014
FIELD #: CH 5-23-89
: OUT COMP SECT BDF

SAMPLED FROM: L OUT COMP SECT BDF
CL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #:
DATE SAMPLED: MAY 23 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY XXXX

SIEVE SIZE	AS REC'D	FIELD SPEC SPLIT
3"		
2"		
1 1/2"	100	
1"	94	
3/4"	89	
1/2"	91	
3/8"	75	
4	64	
8	53	
#10	51	
#16		
#20	36	
#30		
#40	22	
#50	15	
#60		
#80	11	
#100	10	
#200	7	

TEST	AS REC'D	FIELD SPEC SPLIT
OVERSIZE		
DELETERIOUS		
FRACTURE		
LL	NV	
PI	NP	
SP GR		
FINE AGG		
COARSE AGG		
% MOISTURE		
% ORGANICS	3.3	
.02mm		
.005mm		
SAND EQUIV		
T-12		
CALIF BEARING		
SPECIAL TEST		

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY:		
OPT MOIST		
CAV SP GR		
CAV POINT	2	
CAV POINT	3	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS

UNIFIED CLASSIFICATION SW-SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE: Paul W. Misterek

PAUL W. MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME UAF HERBICIDE PROJECT
PROJECT # 3553881
SAMPLE OF TEST PLOTS

LAB # 89-8015
FIELD # FT 6-01-89
L CUT COMP 0-20'

SAMPLED FROM L CUT COMP 0-20'
CL REF
GRADE REF
SOURCE AK RAILROAD

REPRESENTS
ITEM #
DATE SAMPLED JUNE 1 1989
DATE TESTED JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION XXXX
QUALITY

SIEVE SIZE	AS REC'D	FIELD SPEC SPLIT
3"		
2"	100	
1 1/2"	98	
1"	82	
3/4"	72	
1/2"	54	
3/8"	46	
4	30	
8	23	
10	21	
16		
20	17	
30		
40	14	
50	13	
60		
80	11	
100	9	
200	8	

TEST	AS REC'D	FIELD SPEC SPLIT
OVERSIZE		
DELETERIOUS		
FRACTURE		
LL	NV	
PI	NP	
SP GR		
FINE AGG		
COARSE AGG		
% MOISTURE		
% ORGANICS		
72mm		
305mm		
SAND EQUIV		
T-12		
CALIF BEARING		
SPECIAL TEST		

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST.		
AV SP GR		
ZAV POINT		
ZAV POINT		

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					
% CRKS					

UNIFIED CLASSIFICATION GW-GM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE Paul W Misterek
PAUL W. MISTEREK RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: LAF HERBICIDE PROJECT
PROJECT #: 0553881
SAMPLE OF: TEST PLOTS

LAB #: 89-6016
FIELD #: 31-1 5-24-89
N COMP 0-4

SAMPLED FROM: N COMP 0-4
CL REF:
GRADE REF:
SOURCE: AK RAILROAD

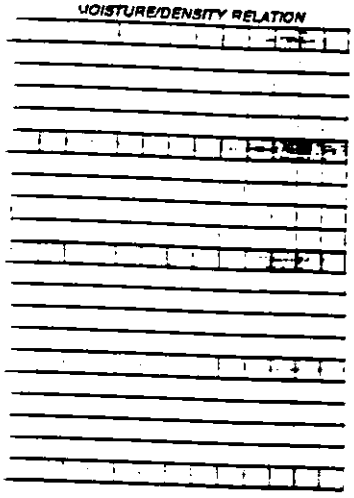
REPRESENTS:
ITEM #:
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE:
INDEPENDENT ASSURANCE:
INFORMATION:
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"	100		
1 1/2"	94		
1"	91		
3/4"	78		
1/2"	64		
3/8"	57		
#4	48		
#8	37		
#10	35		
#16			
#20	27		
#30			
#40	19		
#50	16		
#80			
#80	13		
#100	12		
#200	10		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION



% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
DAV SP G B		
DAV POINT	@	
DAV POINT	@	

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS

UNIFIED CLASSIFICATION: GW-GM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE: ___ UNACCEPTABLE: ___

CONFORMS TO SPECIFICATIONS:

YES: ___ NO: ___ NA: ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, RME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME [illegible] PROJECT
PROJECT # [illegible]
SAMPLE OF TEST PLOTS

LAB # 89-6002
FIELD # [illegible] 5-31-89
SAMPLED FROM N COMP 0-4

CL REF
GRADE REF
SOURCE RR RAILROAD

REPRESENTS
ITEM #
DATE SAMPLED JUNE [illegible] 1989
DATE TESTED JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	93		
3/4"	82		
1/2"	61		
3/8"	51		
#4	33		
#8	27		
#10	27		
#16			
#20	25		
#30			
#40	13		
#50	8		
#60			
#80	11		
#100	10		
#200	6		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE/DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT
MAX DENSITY		
OPT MOIST		
CAV SP GR		
CAV POINT	@	
CAV POINT	@	

MOLD NO	2	3	4	5
DRY UNIT WT				
% MOISTURE				
FREE MOIST				

REMARKS

UNIFIED CLASSIFICATION GW-GM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT

ACCEPTABLE ___ UNACCEPTABLE ___
CONFORMS TO SPECIFICATIONS
YES ___ NO ___ NA ✓

SIGNATURE Paul W Misterek

PAUL W MISTEREK P.E.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL MATERIALS LAB REPORT

PROJECT NAME: AF HERBICIDE PROJECT
PROJECT #: [illegible]
SAMPLE OF: TEST PLOTS

LAB #: 89-6001
FIELD #: B-2 5-24-89
OUT COMP 0-20'

SAMPLED FROM: L OUT COMP 0-20'
CL REF
GRADE REF
SOURCE: AK RAILROAD

REPRESENTS
ITEM #
DATE SAMPLED: MAY 24 1989
DATE TESTED: JUNE 15 1989

ACCEPTANCE
INDEPENDENT ASSURANCE
INFORMATION
QUALITY: XXXX

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
3"			
2"			
1 1/2"	100		
1"	98		
3/4"	93		
1/2"	86		
3/8"	81		
4	72		
#8	66		
#10	64		
#16			
#20	57		
#30			
#40	50		
#50	45		
#60			
#80	40		
#100	38		
#200	32		

TEST	AS REC'D	FIELD SPLIT	SPEC
OVERSIZE			
DELETERIOUS			
FRACTURE			
LL	NV		
PI	NP		
SP GR			
FINE AGG			
COARSE AGG			
% MOISTURE			
% ORGANICS			
.02mm			
.005mm			
SAND EQUIV			
T-12			
CALIF BEARING			
SPECIAL TEST			

PLOT OF MOISTURE:DENSITY RELATION

% MOISTURE

TEST RESULT	AS REC'D	FIELD SPLIT	SPEC
MAX DENSITY			
OPT MOIST			
CAV SP GR			
CAV POINT	@		
CAV POINT	@		

MOLD NO	1	2	3	4	5
DRY UNIT WT					
% MOISTURE					
FREE MOIST					

REMARKS

UNIFIED CLASSIFICATION: SM

COMPARISON OF ASSURANCE/ACCEPTANCE SPLIT
ACCEPTABLE: ___ UNACCEPTABLE: ___
CONFORMS TO SPECIFICATIONS
YES: ___ NO: ___ NA: ✓

SIGNATURE: Paul W Misterek

PAUL W MISTEREK, EME

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL LAB REPORT
PRECONSTRUCTION

PROJECT NAME: CHENA HOT SPRINGS ROAD WIDENING
LEDGER #: 30442022

LAB #: 89-1086
DATE SAMPLED: 5-18-89

TEST HOLE #: 89-62
SOURCE: Centennial
SAMPLED BY: G.Brazo

DEPTH: 1.5-4
STATION: CHS 89+00
OFFSET: RLS

3"	
2"	100
1"	99
3/4"	97
1/2"	91
3/8"	86
#4	73
#10	61
#40	47
#50	45
#100	38
#200	30
.02mm	
.005mm	

LL	27
PL	NP
PI	NP
L.A. ABRASION LOSS:	
DEGRADATION FACTOR:	
MAX DENSITY:	
OPTIMUM MOISTURE:	

	DEPTH	
% ORGANICS:		
% MOISTURE:		

	COARSE	FINE
SP GR (APP):		
SULFATE SOUNDNESS:		

AASHTO CLASSIFICATION: A-2-4
USCS CLASSIFICATION: SM
SOIL DESCRIPTION: SiSaGr

SIGNATURE: T. C. Harwood
TED C. HARWOOD
REGIONAL LAB SUPERVISOR

APPENDIX E

Railroad Survey Forms

Initial letter and survey form sent to railroads
Second letter (follow up) and survey form

Environmental Quality Engineering

UNIVERSITY OF ALASKA FAIRBANKS
School of Engineering
306 Tanana Drive • Fairbanks, Alaska 99775-0660

Railroad
street
city , state zip

March 15, 1989

Dear Correspondent , title :

The University of Alaska Fairbanks has contracted with the Alaska Railroad Corporation to study degradation and migration of herbicides along the railbelt. A field testing program is in progress to examine two particular herbicides: Velpar (hexazinone) which is manufactured by Dupont Chemical and Garlon 3A (triclopyr) which is manufactured by DOW.

One aspect of this project involves determining alternative methods of vegetation control used on railroad right-of-way throughout the United States and Canada. We are interested in any Integrated Vegetation Management (IVM) techniques that you are employing for the purpose of track maintenance in the ballast and subgrade area. The focus of this research is to obtain cost and effectiveness information for comparing vegetation control methods.

Our IVM study may examine a number of methods including thermal, use of a ballast regulator, reballasting, use of a Jordan spreader, mechanical cutting (including hand clearing), salt, herbicides, combinations of the above, and perhaps others. Ultimately, we anticipate that the Alaska Railroad Corporation will use several of the alternatives and attempt to minimize the use of herbicides.

Please complete the attached questionnaire which will help us evaluate the effectiveness of different techniques to control vegetation. A summary brochure which describes the herbicide portion of this project is enclosed. Later, we will forward you a brochure on the IVM portion of the study.

Your cooperation and assistance will be greatly appreciated and should you desire additional information please call my research assistant, Ms. Jill Munson, at (907) 474-6129.

Sincerely,

Timothy Tilsworth, Phd. P.E.
Professor of Environmental Quality
Engineering and Civil Engineering

Railroad Vegetation Management Survey

1. Name, Title, Address, and Telephone Number of person responding to this survey. Date of response.

2. Briefly describe your railroad's methodology for vegetation control in the ballast/subgrade area and in the wider right-of-way. Include a short history of how you chose these methods. Please specify the separate methods used for the ballast/subgrade area and wider right-of-way. Are there any construction techniques or maintenance procedures that are used for vegetation management in the ballast/subgrade area? In the right-of-way?

A. Are herbicides used? If so, which ones, how are they applied, and at what application rates and times? Are they applied only to the track and ballast area or to the entire right-of-way? What is the cost to apply the herbicides per mile in the track area? Per mile in the right-of-way? Is the herbicide applied by an in house crew, an outside contractor, or a combination of both? If you regularly use an outside contractor would you please give us the name and address.

4. Have you conducted research on vegetation management? If so would you please provide any documentation that you have.

5. Do you have cost information documenting the cost effectiveness of your methods? If so would you please provide us a copy of the data and describe how it was collected (Eg. field observation, outside consultant, etc.).

6. If you are aware of studies or materials of interest to us would you please direct us to such.

7. Would you be willing to have someone from our study visit your operation to observe your IVM program? What time of year would be best to see the operations and to discuss your approach?

Please return this form to:

Ms. Jill Munson
361 Duckering Building
Civil Engineering Department
University of Alaska Fairbanks
Fairbanks, Alaska 99775

3. Are mechanical cutting methods used (including hand clearing) in the subgrade/ballast area? In the right-of-way? What is the cost for this method (specify ballast/subgrade or right-of-way) per mile? What type of equipment is used in the ballast/subgrade area and in the right-of-way?

4. Are thermal/burning methods used in the ballast/subgrade area? In the right-of-way? How effective is this method and what type of equipment is used in this method (specify ballast/subgrade or right-of-way)? What is the cost of thermal/burning methods per mile in the ballast/subgrade area? In the right-of-way?

5. What other methods do you use? Please include the type of equipment used and costs for both ballast/subgrade and right-of-way maintenance.

6. Do you have reports describing or evaluating your vegetation management process? If so could you provide us a copy?

Environmental Quality Engineering

University of Alaska Fairbanks
School of Engineering
306 Tanana Drive
Fairbanks, Alaska 99775-0660

July 10, 1989

«Railroad»
«street»
«city», «state» «zip»

Dear «Correspondent»:

In May the University of Alaska Fairbanks mailed you a survey form requesting information on your railroad's vegetation management techniques. We have received about 40 responses to our survey and we are encouraged by them. However, your response was not among them.

We realize that the form was perhaps too complex and required too much time to complete. Your participation and information is very important to us! We have enclosed a shortened version of our survey and our primary interest is indicated in the attached questions.

We want to thank you for your assistance with this request. This is an important study, not only to us but to you as well, and we hope to share the results when it is completed.

Sincerely,

Timothy Tilsworth

Timothy Tilsworth, Ph.D, P.E.
Professor of Environmental
Quality Engineering and
Civil Engineering

Integrated Vegetation Management Survey

1. Please attach a business card or print your name, address, railroad, and telephone number.

2. Are you presently or have you previously used herbicides to control vegetation in the right-of-way? (yes/no)_____
Which herbicides?_____

3. Do you use any other alternative methods to control vegetation in the right-of-way? (yes/no) Please describe the type of equipment.

mechanical_____

thermal_____

ballast regulator_____

others_____

4. Would you be willing to answer future correspondence if we contacted you again?_____

Thank you again for participating in this study.
Please use the self addressed envelope or return the survey form to:

Jill Chouinard, Research Assistant
361 Duckering Building
University of Alaska
Fairbanks, Alaska 99775

APPENDIX F

Railroads Contacted

U.S. and Canadian railroads contacted for the survey
Foreign railways (excluding Canada) contacted for the survey
Respondents to railroad survey

U.S. AND CANADIAN RAILROADS CONTACTED FOR THE SURVEY

Aberdeen, Carolina & Western RY. Co.
The Akron & Barberton Belt R.R. Co.
Alabama & Florida R.R.
Algoma Central Ry.
Alleghney R.R. Co.
The Alton & Southern RY. Co.
AMTRAK
The Apache Railway Co.
Apalachicola Northern R.R. Co.
Arkansas & Louisiana Missouri Railway Co.
Arkansas and Missouri R.R. Co.
AT & L Railroad Co.
The Atchison, Topeka & Santa Fe Railway Co.
Atlanta & Saint Andrews Bay Railway Co.
Austin R.R. Co., Inc.
Bangor and Aroostook Railroad Co.
Bay Colony Railroad Corp.
BC Rail LTD.
The Belt Railway Company of Chicago
Bessemer and Lake Erie Railroad Co.
Birmingham Southern Railroad Co.
British Columbia Hydro & Power Authority
Burlington Northern (Manitoba) LTD.
Burlington Northern Railroad Company
Cadillac & Lake City Railway Company
Camas Prairie Railroad Company
Cambria and Indiana Railroad Company
Canadian National Railways
Canadian Pacific LTD.
Cartier Railway Company
Cedar Rapids & Iowa City Railway Company
Cedar Valley Railroad Company
Central California Traction Company
Central Montana Rail,Inc.
Central Vermont Railway, Inc.
Chehalis Western Railroad
Chicago & Illinois Midland Railway Company
Chicago and North Western Railway Company
Chicago and Western Indiana Railroad Company
Chicago,Central & Pacific Railroad Company
Chicago, Missouri & Western Railway Company
Chicago South Shore & South Bend Railroad
Colorado & Wyoming Railway Company
Columbus and Greenville Railway Company
Consolidated Rail Corporation
Cooper Basin Railway, Inc.
CSX Transportation, Inc.
D & I Railroad Company
Dakota, Minnesota & Eastern Railroad Corporation

Dakota Southern Railway Company
Delaware Ostego Corporation
Denver & Rio Grande Western Railroad Company
Detroit & Mackinac Railway Company
Devco Railway
Duluth, Missabe and Iron Range Railway Company
Duluth, Winnipeg & Pacific Railway
East Camden & Highland Railroad Company
Eastern Shore Railroad, Inc.
Elgin, Joliet and Eastern Railway Company
Escanaba & Lake Superior Railroad Company
The Essex Terminal Railway Company
Eureka Southern Railroad Company, Inc.
Farmrail Corporation
Florida Central Railroad Company, Inc.
Florida East Coast Railway Company
Fordyce & Princeton Railroad Company
Grainbelt Corporation
Grand Trunk Western Railroad Company
The Great Western Railway Company
Greater Winnipeg Water District Railway
Green Bay & Western Railroad Company
Green Mountain Railroad Corporation
Guilford Transportation Industries, Inc.-Rail Division
Hillsdale County Railway Company, Inc.
Houston Belt & Terminal Railroad Compan
Huron and Eastern Railway Company, Inc.
Illinois Central Railroad Company
The Indiana & Ohio Rail Corporation
Indiana Harbor Belt Railroad Company
The Indiana Railroad Company
Indianapolis Union
Iowa Interstate Railroad, LTD.
Iowa Northern Railroad Company
Kankakee,Beaverville and Southern
The Kansas City Southern Railway Company
Kansas City Terminal Railway Company
Keokuk Junction Railway
Kiamichi Railroad Company, Inc.
Knox & Kane Railroad Company
K.W.T. Railway, Inc.
Kyle Railroad Company
Lake Superior & Ishpeming Railroad Company
The Lakefront Dock & Railroad Terminal Company
Lamoille Valley Railroad Company
The Logansport & Eel River Railroad Museum, Inc.
Los Angeles Junction Railway Company
Louisiana & Arkansas Railway Company
Louisiana & Delta Rail
The Louisiana & North West Rail Company
Maryland & Delaware Rail Company

Maryland Midland Railway, Inc.
McCloud River Rail Company
Meridian & Bigbee Rail Company
Mid-Michigan Rail, Inc.
Midsouth Corporation
The Minnesota Commercial Railway Company
Minnesota Valley Transportation Company Inc.-Southwest
Missippi Delta Rail
Mississippi Export Rail Company
Missouri-Kansas-Texas Rail Company
The Monogahela Railway Company
Montana Rail Link, Inc.
Montana Western Railway Company, Inc.
Nashville and Eastern Rail Corporation
Natchez Trace Rail
Nevada Northern Railway Co. c/o Los Angeles Dept. of Water & Power
New England Southern Rail Company, Inc.
New Orleans Public Belt Rail
New York & Lake Erie Rail
Norfolk Southern Corporation
Northwestern Pacific Rail Company
Octoraro Railway, Inc.
The Ogden Union Railway and Depot Company
Ontario Midland Rail Corporation
Ontario Northland Railway
Oregon & NOrthwestern Rail Company
Oregon,California & Eastern Railway Company
Paducah & Louisville Railway, Inc.
Patapsco & Black Rivers Rail Company
Pend Oreille Valley Rail
Peoria and Pekin Union Railway
Philadelphia, Bethlehem and New England Rail Company
The Pittsburg & Shawmut Rail Company
Pocono Northeast Railway, Inc.
Ponce & Guayama Railway
Port of Tillamook Bay Rail
Port Terminal Rail Association
Providence and Worcester Rail Company
Quebec North Shore & Labrador Railway Company
Rarus Railway Company
Red River Valley & Western Rail Company
Richmond, Fredericksburg & Potomac Rail Company
The Roberval and Saguenay Railway Company
Rochester & Southern Rail, Inc.
San Diego & Imperial Valley Rail Company
Shore Fast Line, Inc.
Soo Line Rail Company
South Buffalo Railway Company
South Central Tennessee Rail Company, Inc.
Southern Pacific Transportation Company

St. Louis Southwestern Railway Company
St. Maries River Rail Company
Tennken Rail Company, Inc.
Terminal Railway Alabama State Docks
Terminal Rail Association of St. Louis
The Texas Mexican Railway Company
Tidewater Southern Railway Company
Tradewater Railway Company
Trona Railway Company
Tuscola & Saginaw Railway Company, Inc.
Union Pacific Rail
Union Rail Company
Vermont Railway, Inc.
Via Rail Canada, Inc.
Washington Central Rail Company
The White Pass and Yukon Corporation LTD.
Winchester and Western Rail Company
Winchester and Western Rail Company
Winston-Salem Southbound Railway Company
Wisconsin & Calumet Rail Company, Inc.
Wisconsin & Southern Rail Company
Wisconsin Central LTD.
Youngstown & Southern Railway Company
Finnish State Railways (VR)

FOREIGN RAILWAYS (EXCLUDING CANADA) CONTACTED FOR SURVEY

Australian National Railways Commission
1 Richmond Road
Keswick, S.A. 5035
Australia
Atten: John C.B. Adams, Ch. Civil Engineer

Brazialian Federal Railways (RFFSA)
Rede Ferroviaria Federal S.A.
Rio de Janeiro, Brazil
Atten: Geraldo Figueiredo De Castro, Asst. Ch. Safety Info.

China Railway Foreign Service Corporation
PO Box 2495 10 Fuxing Rd.
8644215
Peoples Republic of China
Atten: Ma Yun-Lin, Head of Trans. Dept.

Danish State Railways (DSB)
Danske Statsbaner
Solvgade 40
DK 1349 Copenhagen K Denmark
Atten: Peter Langager, Dir. Gen.

French National Railways
Societe National des Chemins de Fer Francais
88 Rue St. Lazare
75436 Paris Cedex 9
France
Atten: Francais Taillanter, Dir. Trans.

German State Railway (DR)
Deutsche Reichsbahn
Voss Str. 33
DDR 1086 Berlin
German Democratic Republic
Atten: Peter-Goetz Kienast, Ch. Op & Traf. Mgr.

(West) German Federal Railway (DB)
Deutsche Bundesbahn
323 Geary St.
Union Square Su. 501

San Francisco, CA 94102
Atten: Annelises Lass-Roth, Area Sales Mgr.

British Railways Board (BRB)
P.O. Box 100 Euston Square
London, NW1 2DZ
Great Britian
Atten: M.C. Purbrick, Dir. Civil Eng.

National Railways of Mexico
Pacific Region
6 Apartado Postal 15-M
Guadalajara, Jal. 44100
Mexico
Atten: Ernesto Gutierrez, Asst. Supt. M.W. & Struct.

National Railways of Mexico (FNDEM)
Av. Central No. 140 Pisco 13
D.F. Mexico
Mexico
Atten: Gonzalo Gomez dela Mata, Mgr. M.W.

RESPONDENTS TO RAILROAD SURVEY

The Akron & Barberton Belt R.R. Co.
Alabama & Florida R.R.
Algoma Central Ry.
Alleghney R.R. Co.
The Alton & Southern RY. Co.
AMTRAK
The Apache Railway Co.
Apalachicola Northern R.R. Co.
Arkansas and Missouri R.R. Co.
The Atchison, Topeka & Santa Fe Railway Co.
Atlanta & Saint Andrews Bay Railway Co.
Austin R.R. Co., Inc.
Bangor and Aroostook Railroad Co.
BC Rail LTD.
Bessemer and Lake Erie Railroad Co.
Birmingham Southern Railroad Co.
British Columbia Hydro & Power Authority
Burlington Northern Railroad Company
Cadillac & Lake City Railway Company
Camas Prairie Railroad Company
Cambria and Indiana Railroad Company
Canadian National Railways
Canadian Pacific LTD.
Cartier Railway Company
Cedar Valley Railroad Company
Central Montana Rail,Inc.
Chicago and Western Indiana Railroad Company
Chicago South Shore & South Bend Railroad
Consolidated Rail Corporation
CSX Transportation, Inc.
Dakota Southern Railway Company
Delaware Ostego Corporation
Detroit & Mackinac Railway Company
Devco Railway
Duluth, Missabe and Iron Range Railway Company
East Camden & Highland Railroad Company
Elgin, Joliet and Eastern Railway Company
Escanaba & Lake Superior Railroad Company
The Essex Terminal Railway Company
Florida East Coast Railway Company
Greater Winnipeg Water District Railway
Green Bay & Western Railroad Company
Huron and Eastern Railway Company, Inc.
Illinois Central Railroad Company
The Indiana & Ohio Rail Corporation
The Indiana Railroad Company
Indianapolis Union
Kankakee,Beaverville and Southern

Keokuk Junction Railway
K.W.T. Railway, Inc.
Kyle Railroad Company
Louisiana & Delta Rail
Maryland Midland Railway, Inc.
McCloud River Rail Company
Mid-Michigan Rail, Inc.
Midsouth Corporation
The Minnesota Commercial Railway Company
Missippi Delta Rail
Mississippi Export Rail Company
Montana Western Railway Company, Inc.
Natchez Trace Rail
Nevada Northern Railway Co. c/o Los Angeles Dept. of Water & Power
New Orleans Public Belt Rail
Norfolk Southern Corporation
Northwestern Pacific Rail Company
Ontario Midland Rail Corporation
Ontario Northland Railway
Oregon,California & Eastern Railway Company
Paducah & Louisville Railway, Inc.
Patapsco & Black Rivers Rail Company
Pend Oreille Valley Rail
Peoria and Pekin Union Railway
Philadelphia, Bethlehem and New England Rail Company
The Pittsburg & Shawmut Rail Company
Port of Tillamook Bay Rail
Providence and Worcester Rail Company
Quebec North Shore & Labrador Railway Company
Rarus Railway Company
Red River Valley & Western Rail Company
Richmond, Fredericksburg & Potomac Rail Company
Rochester & Southern Rail, Inc.
San Diego & Imperial Valley Rail Company
Shore Fast Line, Inc.
South Buffalo Railway Company
South Central Tennessee Rail Company, Inc.
Southern Pacific Transportation Company
St. Maries River Rail Company
Terminal Railway Alabama State Docks
Terminal Rail Association of St. Louis
Tradewater Railway Company
Trona Railway Company
Tuscola & Saginaw Railway Company, Inc.
Union Pacific Rail
Union Rail Company
Vermont Railway, Inc.
Via Rail Canada, Inc.
Washington Central Rail Company
Winchester and Western Rail Company

Winston-Salem Southbound Railway Company
Wisconsin & Calumet Rail Company, Inc.
Wisconsin & Southern Rail Company
Wisconsin Central LTD.
Australian National Railway
Finnish State Railways (VR)
French National Railways

APPENDIX G

Summary of Railroad Survey Responses

RAILROAD SURVEY RESPONSES

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
1	TX	Arsenal			no	brush cutter ballast regulator	no
2	FL	Garlon 3A Rounoup Daconate 6 2,4-D amine Karaex Chlorate			no	tractor w/brush hog hand-held weed trimmer	no
3	AZ	Karaex Rounoup Oust Atratol Garlon Arsenal Weed Blast Sprakil			no	mower brush cutter Jordan spreader	no
10	Canada	Tordon Krovar Glean			yes	on-track brush cutter ballast regulator	no
9	PA	Karaex-Oust Arsenal Rounoup			no	high rail brush cutter chain saw	no
8	IL	Karaex 2,4-D amine Velpar Banvel		32 ft	no	tractor with mower chain saw	no
7	PA	Atratol Arsenal			no	weed eater trimlifts chippers	no
6	AZ	Hyvar XL			no	ballast regulator bladeing	no
5	FL	Rounoup Karaex Oust Garlon 4 Diquat Hychlor	$75-100/mi		no	Kershaw brush cutter	no

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
4	AZ	Roundup 2,4-D Diquat Karmex Arsenal Garlon 4			no	RMC brush cutter brush hog ballast regulator	no
12	OH	Roundup Oust Arsenal			no	brush hog weed eater	
13	ME	Yes (confidential)			Yes	brush cutter ballast regulator	no
14	Canada	Spike Hyvar X Krovar I Roundup Glean Tordon 101 & 22K 2,4-D Banvel Primatol A80 Sodium TCA Fronox 80 WP	$360/ai $360/ai $354/ai	20 ft	no	weed wacker hand clearing @ 8 manDays/ai brush cutter @ $200/ai	
15	PA	Karmex Oust Weeder	$120/ai $88/ai	32 ft 26 ft	no	hand held power tools clear & grub w/excav. equipment	hand tools
16	Canada	Glyphosate Chlorsulfuron Diuron Simazine Fonasomine Spike			no	power surfacer tamper reballasting	
101	AL	Diuron 4L Arsenal Roundup			no	Mechanical and manual brush cutting	no

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
29	IN	Roundup 2,4-D Garlon Arsenal	$130/ai		no	Pettibone brush cutter @ $200/ai bulldozer	no
19	PA	Karmex Atratol 90 Arsenac Oust Spike Weedar 64A Round-up Banval Torgon, K & 101 Velpar Garlon 3A Formula 40 Rodeo			no	brush cutter ballast regulator	no
18	FL	Roundup Oust 2,4-D Escort Arsenal Karmex Garlon Sprazill RMB - 84j	$200-250/ai	24 ft	no	cutting @ ~$1000/ai manual cutting @~$1500-2500/ai ballast regulator tamper undercutter spreader ditcher	has cost information article
30	SD	Landmaster II			no	rotary mower	
31	NY	2,4-D Roundup Garlon 3A RMC B-2 D-2			no	brush cutter ballast regulator	no
32	MI	Oust Karmex Surfel			no	Kersnaw or RMC brush cutter	
33	Canada	no			no	ballast regulator speed swing machine	no
34	MN	Atratol 90 Oust 2,4-D amine Tordon 101 Banvel			yes	mechanical cutting hand cutting	no

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
17	KS	Tordon Garlon 2,4-D Atrizine Weed Master Banvil Arsenal Bush Master			no	undercutter brush cutter (shredder)	
29	CO	yes (unknown name)			no	no	no
28	ID	Oust Tordon 2,4-D	$58.85/ac $53.60/ac	22 ft 22 ft	no	ballast regulator Bantam shovel hand clearing	cost $47/mi
27	PA	yes					
26	Canada	Hyvar X & XL Karmex Krovar Velpar Glean Spike, 80W & 5G Primatol, 80 W & liquid Dycleer, 2# & liquid Krenite Tordon, 22K, 10K, & 101 Herbec 20P Calmix, Atra-Pell			yes	chain saw brush saw brush cutter	no
25	Canada	yes (unspecified)			steam	mower brushcutter	Borax competing vegetation techniques
24	Canada	Desormone Dycleer	$100,000/90 mi of track		no	hand clearing @ $1000/acre	
23	IA	Roundup			no	no	no
22	MT	Hi-Dep Banvel Tordon Roundup			no	ballast regulator	no
21	IL	yes (unknown)			no	no	no

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
38	AR	Arsenal Tordon K MSMA Diuron			no	weed eater	
37	IL	Oust Karaex Garlon 4	$7.80	36 ft	no	no	
36	MI	Rounoup			no	on track brush cutter	govern. funded youth crews w/ hand tools
35	Canada	Karaex Duiron Aprazine			no	tractor weed cutter	
40	Finland	Gordoprin	$4.50 US/ac		no	coppice cutting machines	no
39	FL	yes			no	tractor/mower track mounted brush hog	no
41	Canada	Hyvar X-L Glean	$400Can/ac	32 ft	no	ballast regulator on track crane off track excavator	@ $400Can/ac @ $400Can/ac @ $1600Can/ac
42	MI	Karaex Atrator 90 Garlon 3A Tordon 101			no	Pettibone brush cutter brush saws	
43	MI	Oust Karaex Kalo Bio-88			no	ballast regulator	no
44	IL	Arsenal Rounoup Oust 2,4-D			no	brush cutter tractor mower	no
102	IN	Arsenal Karaex 2,4-D			no	brush cutter ballast regulator off-track brush cutter	
45	OH	yes (unknown)			no	brush cutter hand clearing	no

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
46	PA	Karmex Atrazine 80 Arsenal Oust Spike Weedar 64A Roundup Banvel Tordon Tordon 101 Garlon 3A Formula 40 Rodeo Velpar			no	brush cutter ballast regulator	no
50	IL	Oust Roundup Spike ACME-Super brush killer Hyvar			no	no	no
49	IA	yes (unknown)	$8600/30 mi	32 ft	yes	rail mounted sickle mower chain saw	no
48	TN	Dacanate Karmex 2,4-D amine			no	ballast regulator brush hog	
47	KS	Oust Kravar 2,4-D amine Roundup Banvel			no	mower ballast regulator Jordan spreader	
51	LA	Arsenal			no	tractor & brush hog	
59	MD	Karmex Oust			no	brush cutter ballast regulator chain saw	no
58	CA	no			no	966 loader ballast regulator	no
57	MI	Velpar Oust 2-mD (?)			no	chain saw weed mower (brush hog) gas powered trimmer	no

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
58	MS	Roundup Oust	$70/acre	40 ft		Jordan ditcher @ $100/acre Kershaw brush cutter @ $90/acre	
		Arsenal Atrazine	$69/acre	24 ft			
		Arsenal Triclopyr	$60/acre	48 ft			
55	MN	no			no	weed mower ballast regulator	hand cut weeds hand pull weeds
54	MS	Arsenal Roundup Honcho			no	Jordan spreader	
53	MS	Roundup Oust 2,4-D		30 ft	no	no	hand clearing
52	MO	2,4-D Tordon Arsenal - WP granular LI 700			no	ballast regulator w/ broom	
60	MS	Arsenal 2,4-D Roundup Daconate Duron Karmex Krovar			no	Kershaw brush cutter Chain saw	hand tools
61	CA	no			no	hand held weed eater	no
62	LA	Krovar Karmex Oust 2,4-D amine Roundup Garlon 3A Spike 80W	$85/acre	13 to 24 ft	yes (past)		hand cut ($ 2X's, 10 X's time)
63	VA	list was not attached	$100/ac	24 ft	yes	on-track brush cutter	no
64	CA	********	data unavailable				

ID #	Location	Herbicides	Cost	Width	Manual	Mechanical	Others
67	NY	Roundup			no	brush hog chain saw weed whacker	no
66	Canada	**********	Data unavailable				
65	OR	Krovar Tranizol Brush buster Weed done			yes	no	no
68	KY	Arsenal			no	Porter brush cutter	no
69	PA	yes			no	no	no
70	MA	Karmex Atrzal 2,4-D Spike			no	brush cutter ballast regulator	no
71	IL	Karmex Oust Garlon 3A Tordon K Riverdale butyl ester 6D			no	no	no
72	PA	yes			no	no	no
73	PA	Diuron Arsenal Atratal		24 ft	no	bulldozer	no
74	OR	Roundup Cross Bow			no	brush cutter ditcher	no
75	RI	Roundup			no	brush cutter ballast regulator backhoe w/ rear mounted mowing attachment	no
76	Canada	Tordon 101			no	brush cutter	

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
80	MT	Tordon 22K R-11 2,4-D			no	no	
79	MN	Atratol 2,4-D Karnex			no	no	no
78	VA	Velpar Arsenal 2,4-D Oust Karnex			yes	bush hog	
77	NY	Karnex Oust 2,4-D Weedar 64 Formula 40		24 ft	no	hand or power equip. @ $420/ml chain saw	
81	CA	no			no	yes - unspecified	no
82	WJ	Karnex Atratol 90 Weedar 64 (2,4-D) Arsenal			no	no	no
83	PA	yes			no	no	no
84	TN	Oust Roundout (?) 2,4-D Arsenal pramital Habco hycnior			no	chain saw brush axe ballast regulator	no
85	CA	yes (contractor applied)			no	plowing grading	geotextiles sand removal
86	ID	Atratol Oust Tordon 22K Krovar 2,4-D			no	no	

ID #	Location	Herbicides	Cost	Width	Thermal	Mechanical	Others
91	AL	Arsenal Induce-F			no	brush hog	no
90	IL	yes contractor selects			no	brush cutter on speedswing tractor w/ sickle bar brush hog	no
89	KY	Arsenal			no	no	
88	CA	no			no	ballast regulator	
87	MI	yes (contractor)			no	brush axe chain saw ballast regulator	prisoners
103	PA	Karmex Oust Weeder	main - $102/ai yard - $88/ai	16 ft 13 ft	no	no	no
92	NE	Karmex 2,4-D Tordon 101 Banvel Garlon Oust Telar Roundup	$72.50 - 75/	24 ft	yes	mech. cutting @ $1750/mi+ brush hog mower grader ballast regulator	no weed burner @ $1000/mi
93	PA	Karmex Oust Weeder	@ $102/ai	12 ft	no	mechanical cutter hand held power tools excavating equipment	hand tools
		same as above	@ $88/ai	24 ft			
94	VT	Karmex Oust Rodeo Arsenal Spike 2,4-D Banvel			no	high rail brush cutter mower chain saw brush master ballast regulator	
104	Canada	no			no	hand operated mech. cutting	

ID #	Location	Herbicides	Cost	Width	Aerial	Mechanical	Others
98	MA	Arsenal Oivron	@ $150-200/a	12 ft	no	backhoe mounted brush blade	
98	MA	Yes (contractor)			no	chain saw back hoe weed eater ballast regulator	no
97	MI	Cyanimid Arsenal 2,4-D Roundup Oust			no	brush cutter ballast regulator	no
96	MI	Oust 88 2,4-D amine Tordon 101 Garlon 4		18 ft	no	Canron brush cutter @ $0.20/mi	convicts. hand labor
95	MI	Atratol Karnex 2,4-D	@ $61.4/mi				
		Tordon 101 Garlon 3	@ $172.88/mi	12 ft	no	brush cutter @ $250/mi	

APPENDIX H

Species List by Site

APPENDIX H - SPECIES LIST BY SITE

Common and scientific names of plant species and species groups observed within sampling plots of the ARRC Integrated Vegetation Management Research Project, Alaska. Scientific nomenclature follows Hulten (1968) or Viereck and Little (1972). FT = Fort Wainwright site, CL = Clear site, BI = Birchwood site, SE = Seward site; X = occurred in plots; - = did not occur in plots; . . . = no common name.

Site					
FT	CL	BI	SE	Common Name	Scientific Name
X	X	X	X	Lichens	not identified further
X	X	X	X	Mosses	not identified further
X	X	X	X	Horsetail	*Equisetum arvense*
-	-	X	-	Lady Fern	*Athyrium filix-femina*
-	-	-	X	. . .	*Poa palustris*
X	-	X	-	Tundra bluegrass	*Poa glauca*
X	X	X	X	Bluegrass	*Poa pratensis*
-	X	-	-	Lyme grass	*Elymus innovatus*
-	-	X	X	. . .	*Trisetum spicatum*
X	X	X	-	Wheatgrass	*Agropyron pauciflorum*
-	X	X	X	Bentgrass	*Agrostis scabra*
X	X	X	X	Bluejoint	*Calamagrostis canadensis*
X	-	-	-	Brome	*Bromus inermis*
X	-	X	-	Squirreltail grass	*Hordeum jubatum*
-	-	X	X	. . .	*Hordeum brochyantherum*
X	-	-	-	Vanilla grass	*Hierchloe odorata*
-	-	X	X	. . .	*Geocaulon lividum*
-	-	-	X	Sheep sorrel	*Rumex acetosella*
-	-	-	X	Black bindweed	*Polygonum convolvulus*
-	-	X	-	Chickweed	*Stellaria calycantha*
X	-	-	-	Sandwort	*Minuartia rubella*
X	-	-	-	Grove Sandwort	*Moehringia lateriflora*
-	-	X	X	Avens	*Geum macrophyllum*
-	X	-	-	. . .	*Silene Williamsii*
-	-	X	-	Yellow Cress	*Rorippa hispida*
-	-	-	X	Shepherd's Purse	*Capsela bursa-pastoris*

APPENDIX H (continued).

Site					
FT	CL	BI	SE	Common Name	Scientific Name
-	-	X	X	. . .	*Erysimum cheiranthoides*
-	X	-	-	Common Peppergrass	*Lepidium densiflora*
X	-	-	-	Nagoonberry	*Rubus arcticus*
-	-	X	-	Raspberry	*Rubus idaeus*
X	-	X	X	Cinquefoil	*Potentilla norvegica*
-	-	X	-	Cinquefoil	*Potentilla pennsylvanica*
-	-	X	-	Clover	*Trifolium pratense*
X	-	-	-	Milk Vetch	*Astragulus alpinus L.*
-	-	-	X	Beach Pea	*Lathyrus maritimus*
-	-	X	-	. . .	*Epilobium latifolium*
X	X	X	X	Fireweed	*Epilobium angustifolium*
-	-	X	-	Willow herb	*Epilobium glandulosum*
-	-	-	X	. . .	*Angelica lucida*
-	-	-	X	Cow Parsnip	*Heracleum lanatum*
-	-	X	-	Wintergren	*Pyrola secunda*
X	-	X	-	Wintergreen	*Pyrola grandiflora*
-	-	-	X	Snapdragon	*Antirrhinum orontium*
-	-	X	X	Butter-and-Eggs	*Linaria vulgaris*
-	-	X	-	Yellow Rattle	*Rhinanthus minor*
-	-	X	-	Common Plantain	*Plantago major*
-	X	-	-	Bedstraw	*Galium boreale*
X	-	-	-	Goldenrod	*Solidago multiradiata*
-	X	-	-	Goldenrod	*Solidago decumbens*
X	X	X	-	Fleabane	*Erigeron acris*
-	X	-	-	Yarrow	*Achillea sibirica*
X	X	X	X	Yarrow	*Achillea borealis*
-	-	-	X	Yarrow	*Achillea lanulosa*
-	-	-	X	Wormwood	*Artemesia tilesii*
-	X	-	-	Arnica	*Arnica alpina*
X	-	X	-	Ragwort	*Senecio pauciflorus*
-	X	-	-	Aster	*Aster sibiricus*
X	X	X	X	Dandelion	*Taraxacum cerataphorum*

APPENDIX H (continued).

Site					
FT	CL	BI	SE	Common Name	Scientific Name
-	X	-	-	Prickly Rose	*Rosa acicularis*
X	X	-	-	Soapberry	*Shepherdia canadensis*
X	-	X	-	Labrador Tea	*Ledum groenlandicum*
X	-	-	-	Bearberry	*Arctostaphylos uva-ursi*
X	-	-	-	Tamarack	*Larix laricina*
-	-	-	X	Sitka Spruce	*Picea sitchensis*
X	X	X	X	White Spruce	*Picea glauca*
X	X	X	X	Balsam Poplar	*Populus balsamifera*
X	X	X	-	Quaking Aspen	*Populus tremuloides*
-	X	X	X	Bebb Willow	*Salix bebbiana*
-	-	-	X	Sitka Willow	*Salix sitchensis*
X	X	X	-	Paper Birch	*Betula papyrifera*
-	X	X	-	Mountain Alder	*Alnus crispa*
-	-	-	X	Sitka Alder	*Alnus sinuata*

APPENDIX I

Summary Statistics

for

Total Vascular Cover

A. Ft. Wainwright

Treatment	Period	Type	Mean	StdDev	Max	
Control	Baseline	Tie	1.22	1.98	5.50	
		Ballast	1.47	2.23	5.50	
		Edge	17.47	18.06	55.00	
	1st Season	Tie	1.36	2.29	5.50	
		Ballast	0.69	1.76	5.50	
		Edge	24.28	21.19	65.00	
	2nd Season	Tie	- - data missing - - -			
		Ballast	1.78	3.90	15.00	
		Edge	18.44	10.70	45.00	
Herbicide	Baseline	Tie	0.05	0.15	0.50	
		Ballast	0.66	1.59	5.50	
		Edge	20.39	16.84	55.00	
	1st Season	Tie		0.00	0.00	0.00
		Ballast	0.11	0.21	0.50	
		Edge	1.90	2.33	5.50	
	2nd Season	Tie		0.00	0.00	0.00
		Ballast	0.52	1.61	5.50	
		Edge	1.93	2.41	5.50	
Ballast Regulate	Baseline	Tie		0.06	0.16	0.50
		Ballast	2.33	2.61	5.50	
		Edge	14.94	16.42	65.00	
	1st Season	Tie		0.61	1.78	5.50
		Ballast	2.47	2.79	5.50	
		Edge	5.64	5.64	15.00	
	2nd Season	Tie	- - data missing - - -			
		Ballast	3.86	4.81	15.00	
		Edge	5.69	4.82	15.00	
Combination	Baseline	Tie		2.28	4.79	15.00
		Ballast	3.00	2.57	5.50	
		Edge	20.69	18.10	65.00	
	1st Season	Tie		0.00	0.00	0.00
		Ballast	0.67	1.77	5.50	
		Edge	16.06	16.50	55.00	

	2nd Season	Tie	- - data missing - - -			
		Ballast	1.00	2.08	5.50	
		Edge	10.89	11.16	45.00	
Reballast	Baseline	Tie		0.00	0.00	0.00
		Ballast	1.33	1.92	5.50	
		Edge	12.81	17.16	65.00	
	1st Season	Tie		0.03	0.12	0.50
		Ballast	0.03	0.12	0.50	
		Edge	16.86	17.67	75.00	
	2nd Season	Tie	- - data missing - - -			
		Ballast	0.31	1.30	5.50	
		Edge	11.86	5.71	25.00	
Hand Weed	Baseline	Tie		0.47	1.28	5.50
		Ballast	0.11	0.21	0.50	
		Edge	11.47	12.58	45.00	
	1st Season	Tie		1.00	2.08	5.50
		Ballast	0.08	0.19	0.50	
		Edge	2.08	2.49	5.50	
	2nd Season	Tie		1.61	2.49	5.50
		Ballast	0.44	1.28	5.50	
		Edge	4.36	3.57	15.00	
Hand Cut	Baseline	Tie		0.08	0.19	0.50
		Ballast	0.28	0.26	0.50	
		Edge	10.03	8.43	25.00	
	1st Season	Tie		0.03	0.12	0.50
		Ballast	1.03	2.07	5.50	
		Edge	4.33	3.61	15.00	
	2nd Season	Tie		0.67	1.77	5.50
		Ballast	2.81	3.96	15.00	
		Edge	5.72	3.87	15.00	
Multiple Cut	Baseline	Tie		0.06	0.16	0.50
		Ballast	1.08	2.05	5.50	
		Edge	6.97	6.22	15.00	
	1st Season	Tie		0.03	0.12	0.50
		Ballast	0.75	1.74	5.50	
		Edge	1.56	2.18	5.50	
	2nd Season	Tie	- - data missing - - -			
		Ballast	2.94	4.94	15.00	
		Edge	2.89	2.69	5.50	

B. Clear

Treatment	Period	Type	Mean	StdDev	Max
Control	Baseline	Tie	0.03	0.12	0.50
		Ballast	0.75	1.74	5.50
		Edge	22.36	19.52	65.00
	1st Season	Tie	0.00	0.00	0.00
		Ballast	1.03	2.07	5.50
		Edge	19.64	23.29	85.00
	2nd Season	Tie	0.00	0.00	0.00
		Ballast	1.86	2.65	5.50
		Edge	21.61	22.56	85.00
Herbicide	Baseline	Tie	0.05	0.15	0.50
		Ballast	1.61	2.44	5.50
		Edge	15.77	20.83	65.00
	1st Season	Tie	0.00	0.00	0.00
		Ballast	0.05	0.15	0.50
		Edge	0.33	1.20	5.50
	2nd Season	Tie	0.00	0.00	0.00
		Ballast	0.00	0.00	0.00
		Edge	1.16	2.11	5.50
Ballast Regulate	Baseline	Tie	0.00	0.00	0.00
		Ballast	0.67	1.77	5.50
		Edge	16.31	15.80	55.00
	1st Season	Tie	0.00	0.00	0.00
		Ballast	1.00	2.15	5.50
		Edge	2.53	3.93	15.00
	2nd Season	Tie	0.00	0.00	0.00
		Ballast	1.56	2.52	5.50
		Edge	3.47	2.62	5.50
Reballast	Baseline	Tie	0.03	0.12	0.50
		Ballast	0.31	0.25	0.50
		Edge	13.56	11.54	35.00
	1st Season	Tie	0.08	0.19	0.50
		Ballast	0.03	0.12	0.50
		Edge	13.58	11.52	35.00

	2nd Season	Tie	0.08	0.19	0.50
		Ballast	0.94	2.10	5.50
		Edge	17.17	12.27	35.00
Hand Weed	Baseline	Tie	0.00	0.00	0.00
		Ballast	0.72	1.75	5.50
		Edge	16.28	9.43	35.00
	1st Season	Tie	0.00	0.00	0.00
		Ballast	0.17	0.24	0.50
		Edge	1.86	2.33	5.50
	2nd Season	Tie	0.06	0.16	0.50
		Ballast	0.89	1.69	5.50
		Edge	6.00	5.77	25.00
Hand Cut	Baseline	Tie	0.00	0.00	0.00
		Ballast	0.06	0.16	0.50
		Edge	10.86	10.64	45.00
	1st Season	Tie	0.00	0.00	0.00
		Ballast	0.08	0.19	0.50
		Edge	3.56	2.51	5.50
	2nd Season	Tie	0.00	0.00	0.00
		Ballast	0.47	1.28	5.50
		Edge	5.72	3.87	15.00

C. Birchwood

Treatment	Period	Type	Mean	StdDev	Max
Control	Baseline	Tie	0.3	1.3	5.5
		Ballast	1.7	2.5	5.5
		Edge	33.3	17.9	85.0
	1st Season	Tie	0.4	1.3	5.5
		Ballast	3.1	4.8	15.0
		Edge	27.3	19.8	85.0
	2nd Season	Tie	0.7	1.8	5.5
		Ballast	6.2	8.5	35.0
		Edge	43.9	24.7	95.0
Herbicide	Baseline	Tie	0.5	1.7	5.5
		Ballast	5.6	5.3	15.0
		Edge	44.6	30.5	95.0

	1st Season	Tie	0.0	0.0	0.0
		Ballast	0.1	0.2	0.5
		Edge	18.7	19.5	85.0
	2nd Season	Tie	0.0	0.0	0.0
		Ballast	0.3	1.2	5.5
		Edge	27.2	26.8	75.0
Ballast Regulate	Baseline	Tie	3.0	4.9	15.0
		Ballast	3.3	8.2	35.0
		Edge	22.6	12.5	45.0
	1st Season	Tie	1.1	2.0	5.5
		Ballast	2.6	5.9	25.0
		Edge	16.5	13.4	55.0
	2nd Season	Tie	2.7	4.0	15.0
		Ballast	5.3	8.3	35.0
		Edge	24.0	14.6	45.0
Reballast	Baseline	Tie	3.5	5.7	15.0
		Ballast	15.3	21.6	85.0
		Edge	50.6	26.8	95.0
	1st Season	Tie	0.1	0.2	0.5
		Ballast	12.1	18.2	75.0
		Edge	43.4	29.3	85.0
	2nd Season	Tie	1.4	3.8	15.0
		Ballast	19.7	24.5	95.0
		Edge	67.8	25.4	95.0
Hand Weed	Baseline	Tie	0.0	0.1	0.5
		Ballast	0.7	1.8	5.5
		Edge	21.8	15.9	55.0
	1st Season	Tie	0.1	0.2	0.5
		Ballast	1.9	3.9	15.0
		Edge	14.4	12.2	45.0
	2nd Season	Tie	0.4	1.3	5.5
		Ballast	4.0	6.5	25.0
		Edge	23.5	16.0	55.0
Hand Cut	Baseline	Tie	0.6	1.8	5.5
		Ballast	2.3	2.7	5.5
		Edge	43.9	23.9	95.0
	1st Season	Tie	0.7	1.8	5.5
		Ballast	4.8	5.3	15.0
		Edge	26.8	17.5	65.0

	2nd Season	Tie	3.2	5.7	15.0
		Ballast	7.3	7.0	25.0
		Edge	55.6	25.5	95.0

D. Seward

Treatment	Period	Type	Mean	StdDev	Max
Control	Baseline	Tie	2.3	2.6	5.5
		Ballast	0.4	1.3	5.5
		Edge	35.0	15.3	55.0
	1st Season	Tie	2.8	4.0	15.0
		Ballast	0.8	1.7	5.5
		Edge	27.3	14.3	55.0
	2nd Season	Tie	4.3	4.6	15.0
		Ballast	2.1	2.5	5.5
		Edge	40.0	21.2	75.0
Herbicide	Baseline	Tie	4.1	4.3	15.0
		Ballast	2.2	2.6	5.5
		Edge	8.7	6.4	25.0
	1st Season	Tie	0.2	0.3	0.5
		Ballast	0.0	0.1	0.5
		Edge	6.7	7.2	25.0
	2nd Season	Tie	0.2	0.3	0.5
		Ballast	0.1	0.2	0.5
		Edge	10.1	9.4	35.0
Ballast Regulate	Baseline	Tie	4.1	2.3	5.5
		Ballast	3.0	4.9	15.0
		Edge	67.2	19.3	95.0
	1st Season	Tie	1.9	2.6	5.5
		Ballast	3.5	5.7	15.0
		Edge	26.2	22.1	85.0
	2nd Season	Tie	3.8	4.7	15.0
		Ballast	4.6	8.3	25.0
		Edge	76.7	21.5	95.0
Combination	Baseline	Tie	7.1	11.3	45.0
		Ballast	3.2	6.7	25.0
		Edge	38.6	20.8	75.0

	1st Season	Tie	2.8	3.9	15.0
		Ballast	0.7	1.8	5.5
		Edge	4.0	3.7	15.0
	2nd Season	Tie	5.1	8.4	35.0
		Ballast	1.8	3.7	15.0
		Edge	33.4	16.1	65.0
Reballast	Baseline	Tie	4.6	4.5	15.0
		Ballast	1.1	2.0	5.5
		Edge	47.8	16.4	75.0
	1st Season	Tie	0.7	1.8	5.5
		Ballast	1.0	2.1	5.5
		Edge	48.9	24.7	85.0
	2nd Season	Tie	0.8	1.7	5.5
		Ballast	3.2	5.9	25.0
		Edge	62.2	21.1	95.0
Hand Weed	Baseline	Tie	3.4	2.7	5.5
		Ballast	3.4	5.9	25.0
		Edge	1.2	2.0	5.5
	1st Season	Tie	2.9	2.6	5.5
		Ballast	1.3	1.9	5.5
		Edge	2.5	2.6	5.5
	2nd Season	Tie	5.1	5.2	15.0
		Ballast	2.4	2.6	5.5
		Edge	2.6	2.7	5.5
Hand Cut	Baseline	Tie	3.7	3.9	15.0
		Ballast	1.6	2.1	5.5
		Edge	0.3	0.3	0.5
	1st Season	Tie	3.8	3.8	15.0
		Ballast	3.3	2.6	5.5
		Edge	2.1	2.4	5.5
	2nd Season	Tie	4.2	4.7	15.0
		Ballast	6.5	6.1	25.0
		Edge	3.3	2.6	5.5

E. Bible Camp Road (MP 133)

Treatment	Period	Type	Mean	StdDev	Max
Rebuilt	2nd Season	Tie	0.0	0.0	0.0
		Ballast	6.2	12.1	35.0
		Edge	47.9	40.9	95.0

F. Salmon River (MP 4.8)

Treatment	Period	Type	Mean	StdDev	Max
Rebuilt	2nd Season	Tie	0.0	0.0	0.0
		Ballast	0.0	0.0	0.0
		Edge	11.4	12.9	45.0