Lab/Cor, Inc.

VNWSF 1.8

A Professional Service Corporation in the Northwest

12-3-02

December 3, 2002

Ecology and Environment, Inc.
2101 Fourth Avenue
Suite 1900
Seattle, WA 98121

Attn: Jeff Fowlow

Project Name: Asbestos/Vermiculite WR Grace
Project Number: TDD #10170014 Case No. 124969-S10
P. O. Number: Not Available

Lab/Cor Batch Number: 021318

Conditions Enclosed please find results for samples submitted to our laboratory on October 25, 2002. A list of samples received follows, with limitation or rejection criteria noted where applicable.

Lab/Cor Sample No.	Client Sample No.	Limitation/Rejection Criteria
021318-01	2434352	No special conditions were noted
021318-02	2434354	No special conditions were noted
021318-03	2434355	No special conditions were noted
021318-04	2434356	No special conditions were noted
021318-05	2434362	No special conditions were noted
021318-06	2434364	No special conditions were noted
021318-07	2434365	No special conditions were noted
021318-08	2434369	No special conditions were noted
021318-09	2434370	No special conditions were noted
021318-10	2434373	No special conditions were noted
021318-11	2434374	No special conditions were noted
021318-12	2434375	No special conditions were noted
021318-13	2434377	No special conditions were noted
021318-14	2434378	No special conditions were noted
021318-15	2434350	No special conditions were noted

Method Preparation and analysis of the above samples was conducted in accordance with the NIOSH method 7402 for the identification of asbestos. The samples were collapsed with acetone, carbon coated at high vacuum with a thin layer of carbon, placed on 200 mesh copper grids and allowed to dissolve in acetone until cleared of filter debris.

TEM analysis was performed using a Philips 410 transmission electron microscope equipped with an EDAX PV9800 X-ray analyzer. The air samples were scanned at a magnification of approximately 990X using an accelerating voltage of 100 KV. The magnification was increased to about 10,000X for structure sizing.

Counting Rules

Minimum Aspect Ratio	Minimum Length	Minimum Width	Minimum Required Analytical Sensitivity	Stopping Rules
3:1	5 µm	0.25 µm	NA	100 Fibers

Disclaimer This test report relates only to the items tested in this report. Interpretation of these results is the sole responsibility of the client.

USEPA SF
1222769

7619 6th Avenue NW, Seattle, WA 98117 (206) 781-0155 (206) 789-8424 (FAX)

If further clarification of these results is needed, please do not hesitate to call me. Thank you for allowing the staff at Lab/Cor, Inc. the opportunity to provide you with analytical services.

Sincerely,

John Harris
Laboratory Director

7619 6th Avenue NW, Seattle, WA 98117 (206) 781-0155 (206) 789-8424 (FAX)

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: December 3, 2002

Client Information	
Project Name:	Asbestos/Vermiculite WR Grace
Project No.:	TDD #10170014 Case No. 124969-S10
P. O. No.:	Not Available
Sample Type:	Air

Tracking Information			
Login:	Oct 25, 2002	*By:*	DJ
Prep:	Oct 28, 2002	*By:*	PA
Verified:	Oct 28, 2002	*By:*	PA
Reviewed:	Nov 4, 2002	*By:*	DW
Final Review:	Dec 3, 2002	*By:*	JH

Analysis Information	
Analysis Type:	NIOSH
Reference No.:	7402
Min. Aspect Ratio:	3:1
Min. Length:	5 µm
Min. Width:	0.25 µm

FINAL TABLE

Transmission Electron Microscopy – NIOSH – Air Sample Analysis

Lab/Cor Sample No.	Client Sample No.	Description	Fiber Type	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count	Opt. Vis. Asb. Fibs. (%)	Analytical Sens. (struc/cc)	Volume (liters)	Number of Grid Openings	Filter Area (mm²)	Area Analyzed (mm²)	Analyst	Analysis Date
021318-01	02434352	Personal Background (Januch)	ASBESTOS	<0.006	0 - 0.021	0	0	0.006	168.8	40	385	0.4026	DW	11/4/02
Test			NON-ASBESTOS	0.017	0.004 - 0.050	3								
			OTHER FIBERS											
			Winchite	<0.006	0 - 0.021	0								
			Richterite	<0.006	0 - 0.021	0								
			TOTAL	0.017	0.004 - 0.050	3								
021318-02	02434354	Location C - Dave, Pump #6	ASBESTOS	<0.006	0 - 0.023	0	0	0.006	151.0	40	385	0.4026	DW	11/4/02
Test			NON-ASBESTOS	0.063	0.030 - 0.116	10								
			OTHER FIBERS											
			Winchite	<0.006	0 - 0.023	0								
			Richterite	<0.006	0 - 0.023	0								
			TOTAL	0.063	0.030 - 0.116	10								
021318-03	02434355	Location C - Dave, Pump #3	ASBESTOS	<0.006	0 - 0.022	0	0	0.006	163.6	40	385	0.4026	DW	11/4/02
Test			NON-ASBESTOS	0.023	0.006 - 0.060	4								
			OTHER FIBERS											
			Winchite	<0.006	0 - 0.022	0								
			Richterite	<0.006	0 - 0.022	0								
			TOTAL	0.023	0.006 - 0.060	4								

% Optically Visible Asbestos Fibers = (#Asbestos / #Total Fibers). This number indicates the representative fraction of asbestos to total fibers as defined by NIOSH 7400 standards and can be used as a factor to determine asbestos concentrations from PCM counts in similar sampling areas.

NA – Not Applicable. For samples in which no fiber types are found, percentage values do not apply.

NOTE: These counting rules are intended to coincide with NIOSH 7400 counting rules and do not measure smaller asbestos fiber populations below 5.0 µm lengths as would other TEM airborne analysis methods (AHERA, EPA - Yamate).

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 *Report Date:* December 3, 2002

Client Information	
Project Name:	Asbestos/Vermiculite WR Grace
Project No.:	TDD #10170014 Case No. 124969-S10
P. O. No.:	Not Available
Sample Type:	Air

Tracking Information		
Login:	Oct 25, 2002	*By:* DJ
Prep:	Oct 28, 2002	*By:* PA
Verified:	Oct 28, 2002	*By:* PA
Reviewed:	Nov 4, 2002	*By:* DW
Final Review:	Dec 3, 2002	*By:* JH

Analysis Information	
Analysis Type:	NIOSH
Reference No.:	7402
Min. Aspect Ratio:	3:1
Min. Length:	5 µm
Min. Width:	0.25 µm

FINAL TABLE

Transmission Electron Microscopy – NIOSH – Air Sample Analysis

Lab/Cor Sample No.	Client Sample No.	Description	Fiber Type	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count	Opt. Vis. Asb. Fibs. (%)	Analytical Sens. (struc/cc)	Volume (liters)	Number of Grid Openings	Filter Area (mm²)	Area Analyzed (mm²)	Analyst	Analysis Date
021318-04	02434356	Location C - Marion, Pump #4	ASBESTOS	<0.007	0 - 0.027	0	0	0.007	129.0	40	385	0.4026	DW	11/4/02
			NON-ASBESTOS	0.030	0.008 - 0.076	4								
Test			OTHER FIBERS											
			Winchite	<0.007	0 - 0.027	0								
			Richterite	<0.007	0 - 0.027	0								
			TOTAL	0.030	0.008 - 0.076	4								
021318-05	02434362	Location C - Marion, Pump #1	ASBESTOS	<0.006	0 - 0.021	0	0	0.006	165.0	40	385	0.4026	DW	11/4/02
			NON-ASBESTOS	0.041	0.016 - 0.084	7								
Test			OTHER FIBERS											
			Winchite	<0.006	0 - 0.021	0								
			Richterite	<0.006	0 - 0.021	0								
			TOTAL	0.041	0.016 - 0.084	7								
021318-06	02434364	Location C - Deborah, Pump #3	ASBESTOS	<0.001	0 - 0.004	0	0	0.001	939.0	40	385	0.4026	DW	11/4/02
			NON-ASBESTOS	0.003	0.001 - 0.009	3								
Test			OTHER FIBERS											
			Winchite	<0.001	0 - 0.004	0								
			Richterite	<0.001	0 - 0.004	0								
			TOTAL	0.003	0.001 - 0.009	3								

% Optically Visible Asbestos Fibers = (#Asbestos / #Total Fibers). This number indicates the representative fraction of asbestos to total fibers as defined by NIOSH 7400 standards and can be used as a factor to determine asbestos concentrations from PCM counts in similar sampling areas.

NA – Not Applicable. For samples in which no fiber types are found, percentage values do not apply.

NOTE: These counting rules are intended to coincide with NIOSH 7400 counting rules and do not measure smaller asbestos fiber populations below 5.0 µm lengths as would other TEM airborne analysis methods (AHERA, EPA - Yamate).

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 *Report Date:* December 3, 2002

Client Information	
Project Name:	Asbestos/Vermiculite WR Grace
Project No.:	TDD #10170014 Case No. 124969-S10
P. O. No.:	Not Available
Sample Type:	Air

Tracking Information			
Login:	Oct 25, 2002	*By:*	DJ
Prep:	Oct 28, 2002	*By:*	PA
Verified:	Oct 28, 2002	*By:*	PA
Reviewed:	Nov 4, 2002	*By:*	DW
Final Review:	Dec 3, 2002	*By:*	JH

Analysis Information	
Analysis Type:	NIOSH
Reference No.:	7402
Min. Aspect Ratio:	3:1
Min. Length:	5 µm
Min. Width:	0.25 µm

FINAL TABLE
Transmission Electron Microscopy – NIOSH – Air Sample Analysis

Lab/Cor Sample No.	Client Sample No.	Description	Fiber Type	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count	Opt. Vis. Asb. Fibs. (%)	Analytical Sens. (struc/cc)	Volume (liters)	Number of Grid Openings	Filter Area (mm²)	Area Analyzed (mm²)	Analyst	Analysis Date
021318-07	02434365	Location C - Dierdre, Pump #4	ASBESTOS	<0.007	0 - 0.026	0	0	0.007	136.6	40	385	0.4026	DW	11/4/02
Test			NON-ASBESTOS	0.049	0.020 - 0.101	7								
			OTHER FIBERS											
			Winchite	<0.007	0 - 0.026	0								
			Richterite	<0.007	0 - 0.026	0								
			TOTAL	0.049	0.020 - 0.101	7								
021318-08	02434369	Location A/B - Marion, Pump #1	ASBESTOS	<0.006	0 - 0.022	0	0	0.006	159.7	40	385	0.4026	DW	11/1/02
Test			NON-ASBESTOS	0.030	0.010 - 0.070	5								
			OTHER FIBERS											
			Winchite	<0.006	0 - 0.022	0								
			Richterite	<0.006	0 - 0.022	0								
			TOTAL	0.030	0.010 - 0.070	5								
021318-09	02434370	Location A/B - David, Pump #2	ASBESTOS	0.010	0.000 - 0.054	1	33	0.010	98.5	40	385	0.4026	DW	11/4/02
Test			NON-ASBESTOS	0.010	0.000 - 0.054	1								
			OTHER FIBERS											
			Winchite	0.010	0.000 - 0.054	1								
			Richterite	<0.010	0 - 0.051	0								
			TOTAL	0.029	0.006 - 0.085	3								

% Optically Visible Asbestos Fibers = (#Asbestos / #Total Fibers). This number indicates the representative fraction of asbestos to total fibers as defined by NIOSH 7400 standards and can be used as a factor to determine asbestos concentrations from PCM counts in similar sampling areas.

NA – Not Applicable. For samples in which no fiber types are found, percentage values do not apply.

NOTE: These counting rules are intended to coincide with NIOSH 7400 counting rules and do not measure smaller asbestos fiber populations below 5.0 µm lengths as would other TEM airborne analysis methods (AHERA, EPA - Yamate).

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Report Number: 021318 *Report Date:* December 3, 2002

Client Information	
Project Name:	Asbestos/Vermiculite WR Grace
Project No.:	TDD #10170014 Case No. 124969-S10
P. O. No.:	Not Available
Sample Type:	Air

Tracking Information		
Login:	Oct 25, 2002	*By:* DJ
Prep:	Oct 28, 2002	*By:* PA
Verified:	Oct 28, 2002	*By:* PA
Reviewed:	Nov 4, 2002	*By:* DW
Final Review:	Dec 3, 2002	*By:* JH

Analysis Information	
Analysis Type:	NIOSH
Reference No.:	7402
Min. Aspect Ratio:	3:1
Min. Length:	5 µm
Min. Width:	0.25 µm

FINAL TABLE
Transmission Electron Microscopy – NIOSH – Air Sample Analysis

Lab/Cor Sample No.	Client Sample No.	Description	Fiber Type	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count	Opt. Vis. Asb. Fibs. (%)	Analytical Sens. (struc/cc)	Volume (liters)	Number of Grid Openings	Filter Area (mm²)	Area Analyzed (mm²)	Analyst	Analysis Date
021318-10	02434373	Location A/B - Marion, Pump #5	ASBESTOS	<0.008	0 - 0.030	0	0	0.008	116.2	40	385	0.4026	DW	11/4/02
			NON-ASBESTOS	0.033	0.009 - 0.084	4								
Test			OTHER FIBERS											
			Winchite	<0.008	0 - 0.030	0								
			Richterite	<0.008	0 - 0.030	0								
			TOTAL	0.033	0.009 - 0.084	4								
021318-11	02434374	Location A/B - Marion, Pump #1	ASBESTOS	<0.006	0 - 0.022	0	0	0.006	159.5	40	385	0.4026	DW	11/4/02
			NON-ASBESTOS	0.024	0.007 - 0.061	4								
Test			OTHER FIBERS											
			Winchite	<0.006	0 - 0.022	0								
			Richterite	<0.006	0 - 0.022	0								
			TOTAL	0.024	0.007 - 0.061	4								
021318-12	02434375	Location A/B - David, Pump #2	ASBESTOS	0.011	0.001 - 0.039	2	18	0.005	175.8	40	385	0.4026	DW	11/4/02
			NON-ASBESTOS	0.027	0.009 - 0.063	5								
Test			OTHER FIBERS											
			Winchite	0.022	0.006 - 0.056	4								
			Richterite	<0.005	0 - 0.021	0								
			TOTAL	0.065	0.030 - 0.107	11								

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NA – Not Applicable. For samples in which no fiber types are found, percentage values do not apply.

NOTE: These counting rules are intended to coincide with NIOSH 7400 counting rules and do not measure smaller asbestos fiber populations below 5.0 µm lengths as would other TEM airborne analysis methods (AHERA, EPA - Yamate).

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Report Number: 021318

Report Date: December 3, 2002

Client Information	
Project Name:	Asbestos/Vermiculite WR Grace
Project No.:	TDD #10170014 Case No. 124969-S10
P. O. No.:	Not Available
Sample Type:	Air

Tracking Information		
Login:	Oct 25, 2002	*By:* DJ
Prep:	Oct 28, 2002	*By:* PA
Verified:	Oct 28, 2002	*By:* PA
Reviewed:	Nov 4, 2002	*By:* DW
Final Review:	Dec 3, 2002	*By:* JH

Analysis Information	
Analysis Type:	NIOSH
Reference No.:	7402
Min. Aspect Ratio:	3:1
Min. Length:	5 µm
Min. Width:	0.25 µm

FINAL TABLE

Transmission Electron Microscopy – NIOSH – Air Sample Analysis

Lab/Cor Sample No.	Client Sample No.	Description	Fiber Type	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count	Opt. Vis. Asb. Fibs. (%)	Analytical Sens. (struc/cc)	Volume (liters)	Number of Grid Openings	Filter Area (mm²)	Area Analyzed (mm²)	Analyst	Analysis Date
021318-13	02434377	Location A/B - Jed, Pump #4	ASBESTOS	<0.014	0 - 0.051	0	0	0.014	68.9	40	385	0.4026	DW	11/4/02
Test			NON-ASBESTOS	0.042	0.009 - 0.122	3								
			OTHER FIBERS											
			Winchite	0.014	0.000 - 0.077	1								
			Richterite	<0.014	0 - 0.051	0								
			TOTAL	0.056	0.015 - 0.142	4								
021318-14	02434378	QA/QC Field Blank	ASBESTOS	NA	NA	0	0	NA	0.0	40	385	0.4026	DW	11/4/02
Blank			NON-ASBESTOS	NA	NA	3								
			OTHER FIBERS											
			Winchite	NA	NA	0								
			Richterite	NA	NA	0								
			TOTAL	NA	NA	3								
021318-15	02434350	QA/QC Field Blank	ASBESTOS	NA	NA	0	0	NA	0.0	40	385	0.4026	DW	11/4/02
Blank			NON-ASBESTOS	NA	NA	5								
			OTHER FIBERS											
			Winchite	NA	NA	0								
			Richterite	NA	NA	0								
			TOTAL	NA	NA	5								

% Optically Visible Asbestos Fibers = (#Asbestos / #Total Fibers). This number indicates the representative fraction of asbestos to total fibers as defined by NIOSH 7400 standards and can be used as a factor to determine asbestos concentrations from PCM counts in similar sampling areas.

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Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434352
Description: Personal Background (Januch)

Lab/Cor Sample No.: 021318-01
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coordinates	Structure No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbestos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 24	NSD**																
	2	B 14	1	Fiber	60	3.5							✓			Al, Si, K, Ca, Fe			
	3	B 4	NSD																
	4	C 4	NSD																
	5	C 14	NSD																
	6	C 24	NSD																
	7	C 34	NSD																
	8	C 44	NSD																
	9	C 43	NSD																
	10	C 33	NSD																
	11	C 23	NSD																
	12	C 13	NSD																
	13	C 3	NSD																
	14	B 3	NSD																
	15	B 13	NSD																
	16	B 23	NSD																
	17	B 22	NSD																
	18	B 12	NSD																
	19	B 2	NSD																
	20	C 2	NSD																
	21	C 12	NSD																
	22	C 22	NSD																
	23	C 32	NSD																
	24	C 42	NSD																
	25	C 41	NSD																
	26	C 31	NSD																
	27	C 21	NSD																
B	28	D 44	NSD																
	29	D 34	NSD																
	30	D 24	NSD																
	31	D 14	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434352
Description: Personal Background (Januch)

Lab/Cor Sample No.: 021318-01
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	32	D 13	NSD																
	33	D 23	NSD																
	34	D 43	NSD																
	35	D 42	1	Fiber	80	4							✓			Si, P			
	36	D 32	NSD																
	37	D 22	1	Fiber	10	0.3							✓			None	PROBABLE-ORGANIC		
	38	D 41	NSD																
	39	D 40	NSD																
	40	D 30	NSD																
	40						0	0	0	0	0	0	3						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434354
Description: Location C - Dave, Pump #6

Lab/Cor Sample No.: 021318-02
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	1	Fiber	5.5	0.5							✓			P, S, K			
	3	B 24	NSD																
	4	B 14	NSD																
	5	B 4	NSD																
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	1	Fiber	9	0.25							✓			P, S, K			
	14	C 13	1	Fiber	6	0.5							✓			P, S, K			
	15	C 3	NSD																
	16	B 3	1	Fiber	5.5	0.3							✓			P, S, K			
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33																	
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	NSD																
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	1	Fiber	6	0.5							✓			P, S, K			
	26	C 2	NSD																
	27	C 12	NSD																
B	28	A 42	NSD																
	29	A 32	NSD																
	30	A 22	NSD																
	31	A 12	1	Fiber	9	0.5							✓			Ca			

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc. | *Lab/Cor Sample No.:* 021318-02
Project Name: Asbestos/Vermiculite WR Grace | *Analyst:* DW
Sample No.: 02434354 | *Analysis Date:* Nov 4, 2002
Description: Location C - Dave, Pump #6

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
			2	Fiber	6	1							✓			Ca			
	32	A 2	NSD																
	33	D 2	1	Fiber	11	0.75							✓			P, S, K			
	34	D 12	NSD																
	35	D 22	NSD																
	36	D 32	NSD																
	37	D 42	NSD																
	38	D 41	1	Fiber	7.5	0.65							✓			P, S, K			
			2	Fiber	11	0.55							✓			P, S, K			
	39	D 31	NSD																
	40	D 21	NSD																
	40						0	0	0	0	0	0	10						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: .021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434355
Description: Location C - Dave, Pump #3

Lab/Cor Sample No.: 021318-03
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	NSD																
	4	B 14	NSD																
	5	B 4	NSD																
	6	C 4	1	Fiber	8	0.5							✓			None	PROBABLE-ORGANIC		
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	NSD																
	14	C 13	NSD																
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33	1	Fiber	16	1							✓			None	PROBABLE-ORGANIC		
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	NSD																
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	NSD																
	26	C 2	NSD																
	27	C 12	NSD																
B	28	B 44	NSD																
	29	B 34	NSD																
	30	B 24	NSD																
	31	B 14	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434355
Description: Location C - Dave, Pump #3

Lab/Cor Sample No.: 021318-03
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	32	B 4	NSD																
	33	C 4	NSD																
	34	C 14	NSD																
	35	C 24	NSD																
	36	C 34	1	Fiber	45	2							✓			P, S, K			
	37	C 44	NSD																
	38	C 43	NSD																
	39	C 33	1	Fiber	8	0.5							✓			None	PROBABLE-ORGANIC		
	40	C 23	NSD																
	40						0	0	0	0	0	0	4						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434356
Description: Location C - Marion, Pump #4

Lab/Cor Sample No.: 021318-04
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	1	Fiber	10	0.35							✓			None	PROBABLE-ORGANIC		
	3	B 24	1	Fiber	8	0.75							✓			None	PROBABLE-ORGANIC		
	4	B 14	NSD																
	5	B 4	NSD																
	6	C 4	1	Fiber	6	0.35							✓			None	PROBABLE-ORGANIC		
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	NSD																
	14	C 13	NSD																
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	NSD						//										
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	NSD																
	26	C 2	NSD																
	27	C 12	NSD																
B	28	A 1	NSD																
	29	A 11	NSD																
	30	A 21	NSD																
	31	A 31	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434356
Description: Location C - Marion, Pump #4

Lab/Cor Sample No.: 021318-04
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	32	A 41	NSD																
	33	A 42	NSD																
	34	A 32	NSD																
	35	A 22	NSD																
	36	A 12	NSD																
	37	A 2	1	Fiber	6	0.3							✓			Ca			
	38	D 2	NSD																
	39	D 12	NSD																
	40	D 22	NSD																
	40						0	0	0	0	0	0	4						

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434362
Description: Location C - Marion, Pump #1

Lab/Cor Sample No.: 021318-05
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	NSD																
	4	B 14	1	Fiber	7	0.5							✓			None	PROBABLE-ORGANIC		
	5	B 4	1	Fiber	7.5	0.35							✓			None	PROBABLE-ORGANIC		
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	NSD																
	14	C 13	NSD																
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	1	Fiber	25	0.75							✓			P, S, K	//		
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	1	Fiber	8	0.45							✓			None	PROBABLE-ORGANIC		
	26	C 2	NSD																
	27	C 12	NSD																
B	28	A 41	NSD																
	29	A 31	NSD																
	30	A 21	1	Fiber	6	0.5							✓			P, S, K			
	31	A 11	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc. | *Lab/Cor Sample No.:* 021318-05
Project Name: Asbestos/Vermiculite WR Grace | *Analyst:* DW
Sample No.: 02434362 | *Analysis Date:* Nov 4, 2002
Description: Location C - Marion, Pump #1

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	32	A 1	NSD																
	33	D 1	1	Fiber	5	1							✓			Na, Al, Si, K, Ca, Fe			
	34	D 11	NSD																
	35	D 21	NSD																
	36	D 31	NSD																
	37	D 41	NSD																
	38	D 40	1	Fiber	5.5	0.75							✓			Si			
	39	D 30	NSD																
	40	D 20	NSD																
	40						0	0	0	0	0	0	7						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434364
Description: Location C - Deborah, Pump #3

Lab/Cor Sample No.: 021318-06
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	NSD																
	4	B 14	NSD																
	5	B 4	NSD																
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	1	Fiber	5.5	0.35							✓			None	PROBABLE-ORGANIC		
			2	Fiber	8	1.5							✓			Na, Mg, Si, Ca			
	12	C 33	NSD																
	13	C 3	NSD																
	14	B 3	NSD																
	15	B 13	NSD																
	16	B 23	NSD																
	17	B 33	NSD																
	18	B 43	NSD																
	19	B 42	NSD																
	20	B 32	NSD																
	21	B 22	1	Fiber	8	0.5							✓			None	PROBABLE-ORGANIC		
	22	B 12	NSD																
	23	B 2	NSD																
	24	C 2	NSD																
	25	C 32	NSD																
	26	C 42	NSD																
B	27	A 1	NSD																
	28	A 11	NSD																
	29	A 21	NSD																
	30	A 31	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434364
Description: Location C - Deborah, Pump #3

Lab/Cor Sample No.: 021318-06
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	31	A 41	NSD																
	32	A 42	NSD																
	33	A 32	NSD																
	34	A 22	NSD																
	35	A 12	NSD																
	36	A 2	NSD																
	37	D 32	NSD																
	38	D 42	NSD																
	39	D 41	NSD																
	40	D 31	NSD																
	40						0	0	0	0	0	0	3						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434365
Description: Location C - Dierdre, Pump #4

Lab/Cor Sample No.: 021318-07
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	1	Fiber	25	4							✓			Al, Si, P			
	2	B 34	1	Fiber	12	0.5							✓			None	PROBABLE-ORGANIC		
			2	Fiber	5.5	0.65							✓			None	PROBABLE-ORGANIC		
	3	B 24	NSD**																
	4	B 14	NSD																
	5	B 4	1	Fiber	10	0.5							✓			P, S, K			
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	1	Fiber	5.5	0.35							✓			None	PROBABLE-ORGANIC		
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	NSD																
	14	C 13	1	Fiber	40	4							✓			Al, Si, P			
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	NSD										✓						
	22	B 32	NSD																
	23	B 12	NSD																
	24	B 2	1	Fiber	15	0.65							✓			None	PROBABLE-ORGANIC		
	25	C 2	NSD																
	26	C 12	NSD																
	27	C 22	NSD																
B	28	B 44	NSD																
	29	B 34	NSD																
	30	B 24	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434365
Description: Location C - Dierdre, Pump #4

Lab/Cor Sample No.: 021318-07
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	31	B 14	NSD																
	32	B 4	NSD																
	33	C 4	NSD																
	34	C 14	NSD																
	35	C 24	NSD																
	36	C 34	NSD																
	37	C 44	NSD																
	38	C 43	NSD																
	39	C 33	NSD																
	40	C 23	NSD																
	40						0	0	0	0	0	0	7						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434369
Description: Location A/B - Marion, Pump #1

Lab/Cor Sample No.: 021318-08
Analyst: DW
Analysis Date: Nov 1, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coordinates	Structure No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbestos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	1	Fiber	5.5	0.4							✓			None	PROBABLE-ORGANIC		
	4	B 14	NSD																
	5	B 4	1	Fiber	11	2							✓			Mg, Al, Si, Ca, Fe			
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	1	Fiber	7.5	1							✓			Mg, Al, Si, Ca, Fe			
	14	C 13	1	Fiber	60	1							✓			None	PROBABLE-ORGANIC		
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	1	Fiber	12	2.5							✓			Mg, Si, Al			
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	NSD																
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	NSD																
	26	C 2	NSD																
	27	C 12	NSD																
B	28	A 41	NSD																
	29	A 31	NSD																
	30	A 21	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434369
Description: Location A/B - Marion, Pump #1

Lab/Cor Sample No.: 021318-08
Analyst: DW
Analysis Date: Nov 1, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	31	A 11	NSD																
	32	A 1	NSD																
	33	D 1	NSD																
	34	D 11	NSD																
	35	D 21	NSD																
	36	D 31	NSD																
	37	D 41	NSD																
	38	D 42	NSD																
	39	D 32	NSD																
	40	D 22	NSD																
	40						0	0	0	0	0	0	5						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434370
Description: Location A/B - David, Pump #2

Lab/Cor Sample No.: 021318-09
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coordinates	Structure No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbestos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	NSD																
	4	B 14	NSD																
	5	B 4	NSD																
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	1	Fiber	15	2.5			✓					2580	12673	Mg, Al, Si, Ca, Fe	[3 1 0] ZONE AXIS	JH	11/27/02
	11	C 33	NSD																
	12	C 23	NSD																
	13	C 13	NSD																
	14	C 3	NSD																
	15	B 3	NSD																
	16	B 13	NSD																
	17	B 23	NSD																
	18	B 33	NSD																
	19	B 43	NSD																
	20	B 42	NSD																
	21	B 32	1	Fiber	5	1							✓			Na, Mg, Al, Si, K, Ca, Fe			
	22	B 22	NSD																
	23	B 12	NSD																
	24	B 2	NSD																
	25	C 2	NSD																
	26	C 12	NSD																
	27	C 22	NSD																
B	28	A 41	NSD																
	29	A 31	1	Fiber	5	0.35							✓	2581	12674	Mg, Si, Ca, Fe	[3 1 0] ZONE AXIS, WINCHITE	JH	11/27/02

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434370
Description: Location A/B - David, Pump #2

Lab/Cor Sample No.: 021318-09
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	30	A 21	NSD																
	31	A 11	NSD																
	32	A 1	NSD																
	33	D 1	NSD																
	34	D 11	NSD																
	35	D 21	NSD																
	36	D 31	NSD																
	37	D 41	NSD																
	38	D 42	NSD																
	39	D 32	NSD																
	40	D 22	NSD																
	40						0	0	1	0	0	0	2						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434373
Description: Location A/B - Marion, Pump #5

Lab/Cor Sample No.: 021318-10
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	1	Fiber	6	0.45							✓			None	PROBABLE-ORGANIC		
	4	B 14	NSD																
	5	B 4	NSD																
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	NSD																
	14	C 13	NSD																
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	NSD																
	23	B 22	NSD																
	24	B 12	1	Fiber	5.5	1							✓			Mg, Al, Si, K, Ca, Fe			
	25	B 2	NSD																
	26	C 2	NSD																
	27	C 12	NSD																
	28	C 22	1	Fiber	5.5	0.75							✓			Na, Al, Si, K, Ca, Fe			
B	29	B 43	NSD																
	30	B 33	NSD																

**NSD – No Structures Detected

02131800.TEM

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434373
Description: Location A/B - Marion, Pump #5

Lab/Cor Sample No.: 021318-10
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	31	B 23	NSD																
	32	B 13	NSD																
	33	B 3	NSD																
	34	C 3	NSD																
	35	C 13	NSD																
	36	C 23	NSD																
	37	C 33	NSD																
	38	C 43	NSD																
	39	C 42	1	Fiber	20	0.5							✓			None	PROBABLE-ORGANIC		
	40	C 32	NSD																
	40						0	0	0	0	0	0	4						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434374
Description: Location A/B - Marion, Pump #1

Lab/Cor Sample No.: 021318-11
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	NSD																
	4	B 14	1	Fiber	5.5	0.35							✓			P, S, K			
	5	B 4	NSD																
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 33	1	Fiber	7.5	0.5							✓			None	PROBABLE-ORGANIC		
	12	C 43	NSD																
	13	C 23	NSD																
	14	C 13	NSD																
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	NSD																
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	NSD																
	26	C 2	NSD																
	27	C 12	NSD																
B	28	A 41	NSD																
	29	A 31	NSD																
	30	A 21	NSD																
	31	A 11	NSD																

**NSD – No Structures Detected

02131800.TEM

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434374
Description: Location A/B - Marion, Pump #1

Lab/Cor Sample No.: 021318-11
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	32	A 1	NSD																
	33	D 1	NSD																
	34	D 11	1	Fiber	7.5	0.45							✓			None	PROBABLE-ORGANIC		
	35	D 21	NSD																
	36	D 31	NSD																
	37	D 41	NSD																
	38	D 42	NSD																
	39	D 32	NSD																
	40	D 22	1	Fiber	8	1.5							✓			Mg, Si, Ca, Fe	HIGH FE		
	40						0	0	0	0	0	0	4						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434375
Description: Location A/B - David, Pump #2

Lab/Cor Sample No.: 021318-12
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 41	NSD**																
	2	B 31	1	Fiber	10	0.5			✓						12675	Mg, Si, Ca, Fe			
	3	B 21	NSD																
	4	B 11	NSD																
	5	B 1	NSD																
	6	C 1	1	Fiber	35	1							✓	2601	12676	Mg, Si, Ca, Fe	[3 0 1] ZONE AXIS, WINCHITE	JH	11/27/02
	7	C 11	NSD																
	8	C 21	NSD																
	9	C 31	NSD																
	10	C 41	1	Fiber	40	1							✓			None	PROBABLE-ORGANIC		
	11	C 42	NSD																
	12	C 32	NSD																
	13	C 22	1	Fiber	5	1.2							✓			Na, Mg, Si, K, Ca			
	14	C 12	NSD																
	15	C 2	1	Fiber	5	1							✓		12677	Na, Mg, Al, Si, K, Ca, Fe			
	16	B 2	NSD																
	17	B 12	1	Fiber	14	0.3			✓					2600	12678	Na, Mg, Si, K, Ca, Fe	[3 1 0] ZONE AXIS	JH	11/27/02
	18	B 22	NSD																
	19	B 32	NSD																
	20	B 42	1	Fiber	11	0.5							✓		12679	Na, Mg, Si, K, Ca, Fe	WINCHITE		
			2	Fiber	5.5	0.3							✓		12680	Na, Mg, Si, K, Ca, Fe	WINCHITE		
	21	B 43	NSD																
	22	B 33	1	Fiber	6.5	0.5							✓			None	PROBABLE-ORGANIC		
	23	B 23	NSD																
	24	B 13	NSD																
	25	B 3	1	Fiber	15	0.4							✓		12681	Na, Mg, Si, K, Ca, Fe	WINCHITE		
	26	C 3	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434375
Description: Location A/B - David, Pump #2

Lab/Cor Sample No.: 021318-12
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	27	C 13	NSD																
	28	C 23	NSD																
	29	C 33	NSD																
	30	C 43	NSD																
B	31	B 44	NSD																
	32	B 34	NSD																
	33	B 24	NSD																
	34	B 14	NSD																
	35	B 4	NSD																
	36	C 4	NSD																
	37	C 14	1	Fiber	10	0.35							✓			None	PROBABLE-ORGANIC		
	38	C 24	NSD																
	39	C 34	NSD																
	40	C 44	NSD																
	40						0	0	2	0	0	0	9						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434377
Description: Location A/B - Jed, Pump #4

Lab/Cor Sample No.: 021318-13
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	NSD																
	4	B 14	1	Fiber	5.5	0.5							✓			None	PROBABLE-ORGANIC		
	5	B 4	NSD																
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	NSD																
	14	C 13	NSD																
	15	C 3	1	Fiber	20	1							✓			None	PROBABLE-ORGANIC		
			2	Fiber	40	0.75							✓		12682	Na, Mg, Si, K, Ca, Fe	WINCHITE		
	16	B 3	NSD																
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	1	Fiber	5.5	0.65							✓			None	PROBABLE-ORGANIC		
	22	B 32	NSD																
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	NSD																
	26	C 2	NSD																
	27	C 12	NSD																
B	28	A 41	NSD																
	29	A 31	NSD																
	30	A 21	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434377
Description: Location A/B - Jed, Pump #4

Lab/Cor Sample No.: 021318-13
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	31	A 11	NSD																
	32	A 1	NSD																
	33	D 1	NSD																
	34	D 11	NSD																
	35	D 21	NSD																
	36	D 31	NSD																
	37	D 41	NSD																
	38	D 42	NSD																
	39	D 32	NSD																
	40	D 22	NSD																
	40						0	0	0	0	0	0	4						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434378
Description: QA/QC Field Blank

Lab/Cor Sample No.: 021318-14
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	NSD																
	4	B 14	NSD																
	5	B 4	1	Fiber	15	0.65							✓			None	PROBABLE-ORGANIC		
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	NSD																
	10	C 44	1	Fiber	12	0.55							✓			None	PROBABLE-ORGANIC		
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	NSD																
	14	C 13	NSD																
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	NSD																
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	NSD																
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	NSD																
	26	C 2	NSD																
	27	C 12	NSD																
B	28	B 14	1	Fiber	9	0.65							✓			None	PROBABLE-ORGANIC		
	29	B 4	NSD																
	30	C 4	NSD																
	31	C 14	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434378
Description: QA/QC Field Blank

Lab/Cor Sample No.: 021318-14
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	32	C 24	NSD																
	33	C 34	NSD																
	34	C 44	NSD																
	35	C 43	NSD																
	36	C 33	NSD																
	37	C 23	NSD																
	38	C 13	NSD																
	39	C 3	NSD																
	40	B 3	NSD																
	40						0	0	0	0	0	0	3						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318

Report Date: Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434350
Description: QA/QC Field Blank

Lab/Cor Sample No.: 021318-15
Analyst: DW
Analysis Date: Nov 4, 2002

TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
A	1	B 44	NSD**																
	2	B 34	NSD																
	3	B 24	NSD																
	4	B 14	NSD																
	5	B 4	NSD																
	6	C 4	NSD																
	7	C 14	NSD																
	8	C 24	NSD																
	9	C 34	1	Fiber	12	0.65							✓			None	PROBABLE-ORGANIC		
	10	C 44	NSD																
	11	C 43	NSD																
	12	C 33	NSD																
	13	C 23	1	Fiber	10	0.65							✓			None	PROBABLE-ORGANIC		
	14	C 13	NSD																
	15	C 3	NSD																
	16	B 3	NSD																
	17	B 13	1	Fiber	5.5	0.65							✓			None	PROBABLE-ORGANIC		
	18	B 23	NSD																
	19	B 33	NSD																
	20	B 43	NSD																
	21	B 42	NSD																
	22	B 32	NSD																
	23	B 22	NSD																
	24	B 12	NSD																
	25	B 2	NSD																
	26	C 2	NSD																
	27	C 12	NSD																
B	28	A 41	NSD																
	29	A 31	NSD																
	30	A 21	NSD																
	31	A 11	NSD																

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 021318 | *Report Date:* Dec 3, 2002

Client: Ecology and Environment, Inc.
Project Name: Asbestos/Vermiculite WR Grace
Sample No.: 02434350
Description: QA/QC Field Blank

Lab/Cor Sample No.: 021318-15
Analyst: DW
Analysis Date: Nov 4, 2002

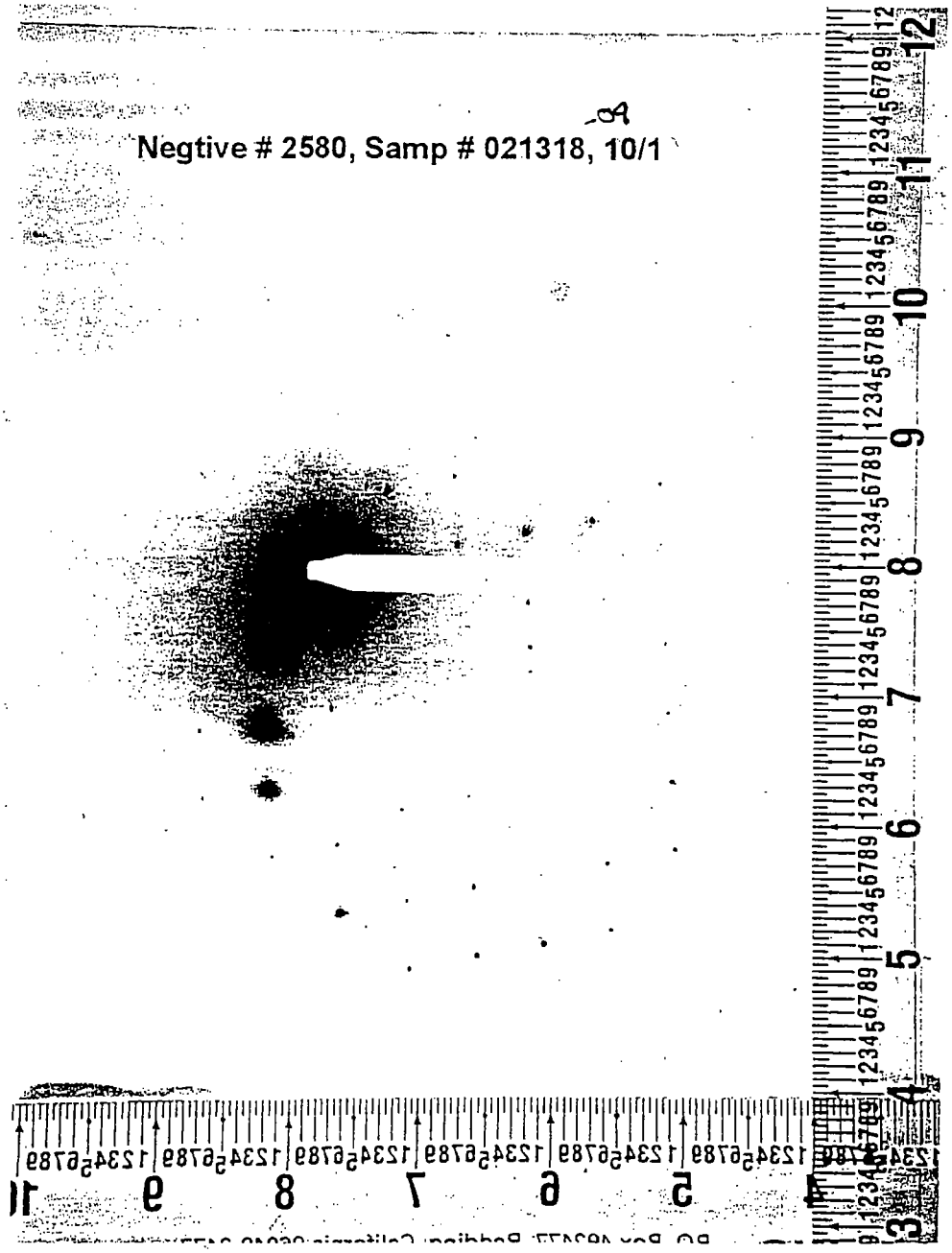
TEM ASBESTOS FIBER COUNT – RAW DATA

Grid	GO No.	Grid Coord-inates	Struc-ture No.	Structure Type	Average Length	Average Width	Asbestos						Non-Asbes-tos	Neg. No.	EDS No.	Elements	Comments	Confirmation	
							Ch	Am	Ac	An	Tr	Cr						By	Date
	32	A 1	1	Fiber	6	0.5							✓			None	PROBABLE-ORGANIC		
	33	D 1	NSD																
	34	D 11	NSD																
	35	D 21	NSD																
	36	D 31	NSD																
	37	D 41	1	Fiber	10	0.65							✓			None	PROBABLE-ORGANIC		
	38	D 42	NSD																
	39	D 32	NSD																
	40	D 22	NSD																
	40						0	0	0	0	0	0	5						

**NSD – No Structures Detected

Ch – Chrysotile Ac – Actinolite Tr – Tremolite Am – Amosite An – Anthophyllite Cr – Crocidolite

Negtive # 2580, Samp # 021318, 10/1

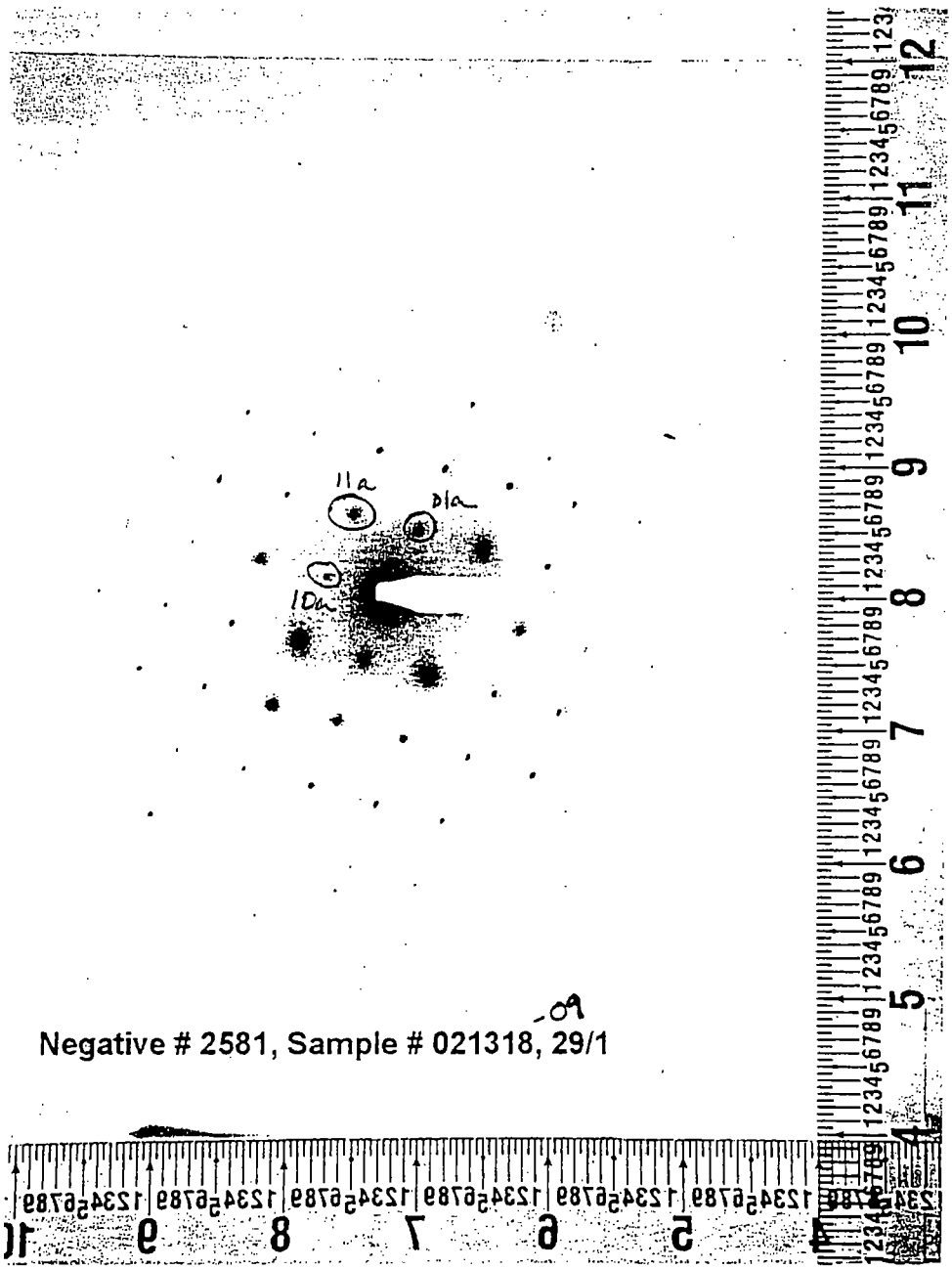


ACTINOLITE

[310]

```
;
; File : C:\Images\Nikon Cam Pics\ED patterns\TIFF Images by Negative #
\2580.tif, Phase Identification
;
;  U1        V1     [Zone axes] U^Verr Uerr  Verr
;-----------------------------------------------
Actinolite      : Lattice=Monoclinic , Base-centered (C)
  0  0  1   1 -3  0 [ -3 -1  0] 0.342 0.000 0.000
  0  0  1   1  3  0 [  3 -1  0] 0.342 0.000 0.000
;-----------------------------------------------
Winchite        : Lattice=Monoclinic , Base-centered (C)
  0  0  1   1 -3  0 [ -3 -1  0] 0.203 0.000 0.000
  0  0  1   1  3  0 [  3 -1  0] 0.203 0.000 0.000
```

	d	%
a=	5.199	0.5
b=	8.132	0.5
α=	82.377	0.4

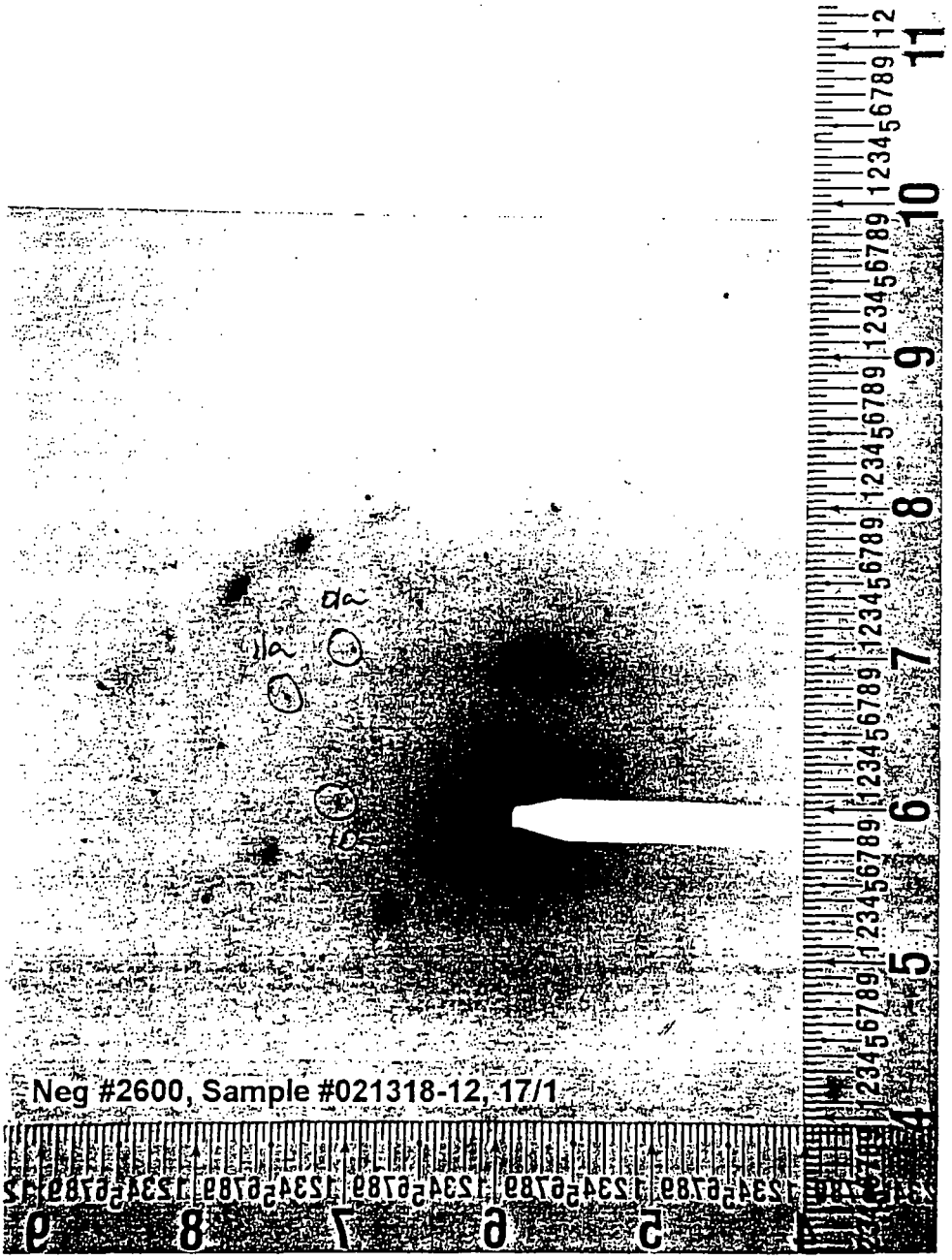


Negative # 2581, Sample # 021318, 29/1

WINGHTE
[310]

```
;
; File : C:\Images\Nikon Cam Pics\ED patterns\TIFF Images by Negative #
\2581.tif, Phase Identification
;
;  U1        V1      [Zone axes] U^Verr Uerr  Verr
;-----------------------------------------------
Richterite      : Lattice=Monoclinic , Base-centered (C)
  0  0 -1   1 -3  0 [  3  1  0] 0.057 0.000 0.001
  0  0 -1   1  3  0 [ -3  1  0] 0.057 0.000 0.001
;-----------------------------------------------
Winchite        : Lattice=Monoclinic , Base-centered (C)
  0  0 -1   1 -3  0 [  3  1  0] 0.052 0.001 0.000
  0  0 -1   1  3  0 [ -3  1  0] 0.052 0.001 0.000
```

	d	%
a =	5.166	0.5
b =	5.177	0.5
β =	82.528	0.1

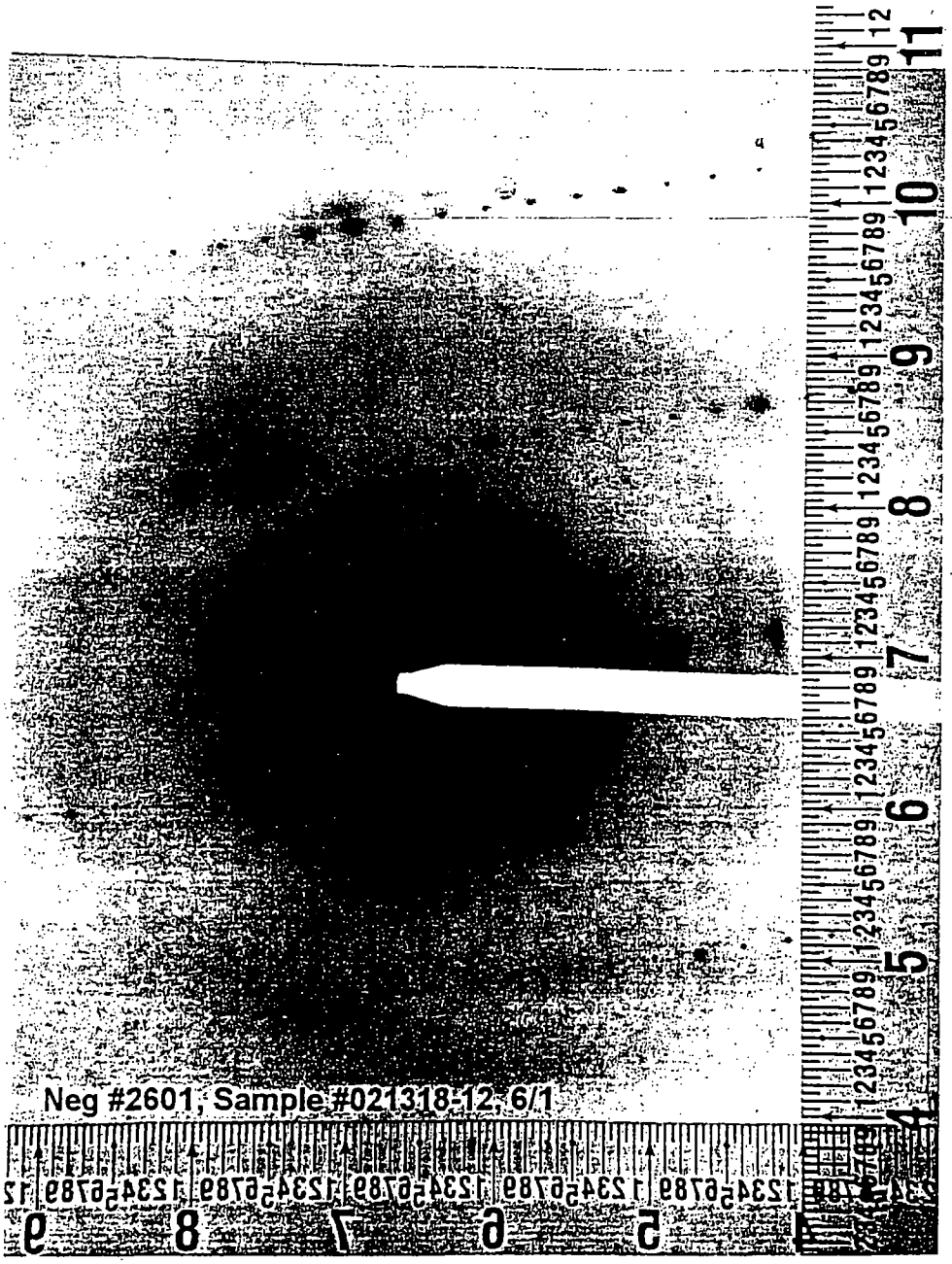


~~[illegible]~~ ~~[illegible]~~ ACMNCLITE

[310]

```
;
; File : C:\Images\Nikon Cam Pics\ED patterns\TIFF Images by Negative #
\2600.tif, Phase Identification
;
;  U1        V1      [Zone axes] U^Verr Uerr  Verr
;-----------------------------------------------
Actinolite      : Lattice=Monoclinic , Base-centered (C)
  1 -1 -1   1  5  0 [ -5  1 -6] 0.017 0.002 0.001
  1  1 -1   1 -5  0 [  5  1  6] 0.017 0.002 0.001
;-----------------------------------------------
FerroActnlite   : Lattice=Monoclinic , Base-centered (C)
  1 -1 -1   1  5  0 [ -5  1 -6] 0.020 0.000 0.000
  1  1 -1   1 -5  0 [  5  1  6] 0.020 0.000 0.000
```

	Å	%
a =	4.957	0.8
b =	3.443	0.8
γ =	80.869	0.1



WINCHIE

[301]

```
;
; File : C:\Images\Nikon Cam Pics\ED patterns\TIFF Images by Negative #
\2601.tif, Phase Identification
;
;  U1        V1     [Zone axes] U^Verr Uerr  Verr
;-----------------------------------------------
Tremolite      : Lattice=Monoclinic , Base-centered (C)
  0 -2  0   1  1 -3 [ -6  0 -2] 0.509 0.000 0.002
  0 -2  0   5  1 -2 [ -4  0-10] 0.500 0.000 0.003
  0  2  0   1 -1 -3 [  6  0  2] 0.509 0.000 0.002
  0  2  0   5 -1 -2 [  4  0 10] 0.500 0.000 0.003
;-----------------------------------------------
Richterite     : Lattice=Monoclinic , Base-centered (C)
  0 -2  0   1  1 -3 [ -6  0 -2] 0.519 0.000 0.002
  0  2  0   1 -1 -3 [  6  0  2] 0.519 0.000 0.002
;-----------------------------------------------
Winchite       : Lattice=Monoclinic , Base-centered (C)
  0 -2  0   1  1 -3 [ -6  0 -2] 0.535 0.000 0.001
  0  2  0   1 -1 -3 [  6  0  2] 0.535 0.000 0.001
;-----------------------------------------------
Hornblende     : Lattice=Monoclinic , Base-centered (C)
  0 -2  0   1  1 -3 [ -6  0 -2] 0.542 0.000 0.000
  0  2  0   1 -1 -3 [  6  0  2] 0.542 0.000 0.000
;-----------------------------------------------
Edenite        : Lattice=Monoclinic , Base-centered (C)
  0 -2  0   1  1 -3 [ -6  0 -2] 0.567 0.000 0.001
  0 -2  0   5  1 -2 [ -4  0-10] 0.565 0.000 0.001
  0  2  0   1 -1 -3 [  6  0  2] 0.567 0.000 0.001
  0  2  0   5 -1 -2 [  4  0 10] 0.565 0.000 0.001
```

	d	%
a=	9.027	0.5
b=	1.757	0.5
γ=	84.96	0.6

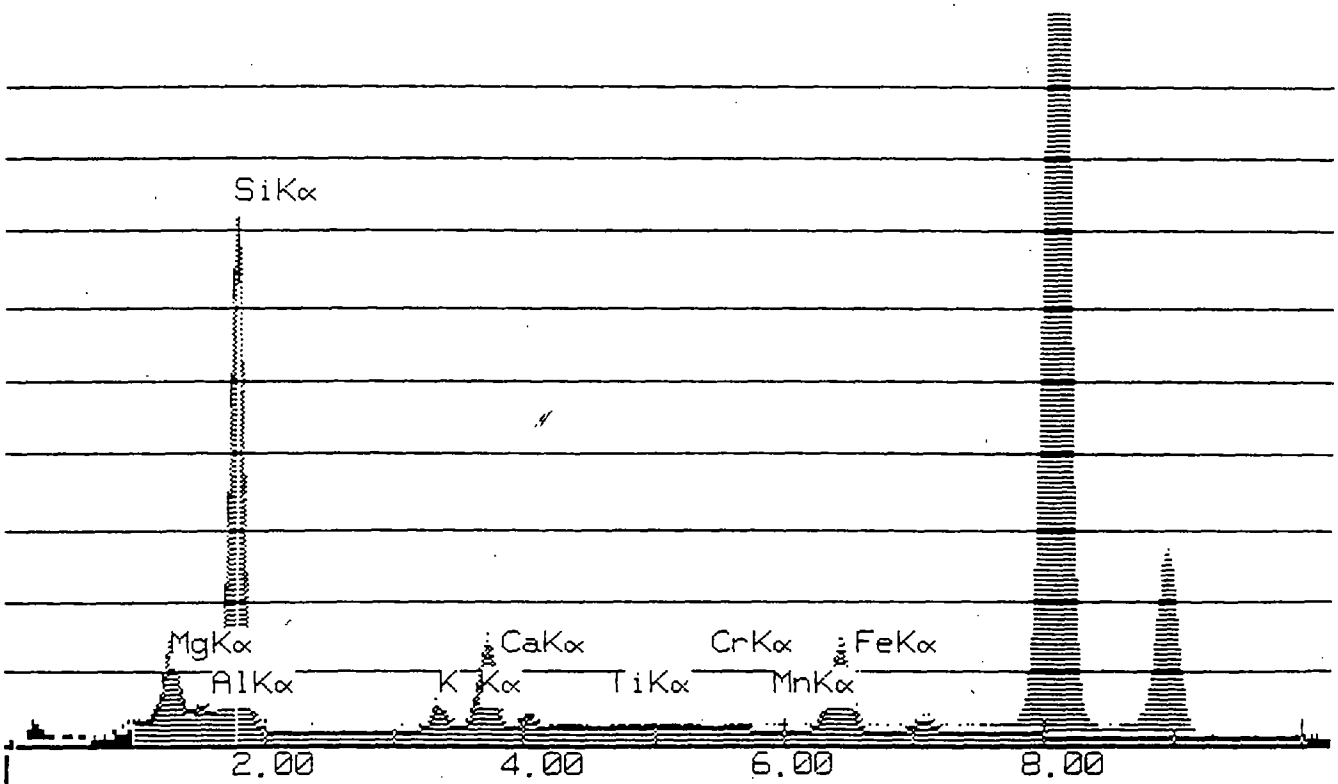
INTE-% :
LABEL = 021318-09 10/1 12673
04-NOV-:2 12:23:29
166.290 LIVE SECONDS

ELEM	CPS	WT % ELEM	WT % OXIDE
MGK	60.034	7.530	12.485
ALK	9.038	0.865	1.635
SIK	390.487	30.653	65.578
K K	22.425	1.590	1.915
CAK	77.130	5.509	7.708
CRK	1.672	0.134	0.196
FEK	86.361	7.332	10.483
TOTAL			100.000

USED PEIF: USER

36 Aut
Achsolite

04-NOV-02 12:25:56 SUPER QUANT
RATE= 3681CPS TIME= 166LSEC
FS= 8365/ 8365 PRST= 200LSEC
A =021318-09 10/1 12673



6296CNT 1.75KEV 10eV/ch A EDAX
A

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	65.578	Si+4	8.0000	8.0000							
Al2O3	1.635	Al+3	0.3273	0.0000	0.3273						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0.196	Cr+3	0.0667			0.0667	0.0000				
Fe(total)O	10.483	Fe+3	0.0542			0.0542	0.0000				
MgO	12.485	Mg+2	2.6739			2.6739	0.0000				
MnO	0	Fe+2	1.2631			1.2631	0.0000				
CaO	7.708	Mn+2	0.0000			0.0000	0.0000				
Na2O	0	Ca+2	1.2339					1.2339	0.0000		
K2O	1.915	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.4022							0.4022	0.0000
Total	100		Excess	T site	0.3273	C site	0.0000	B site	0	A site	0
			Total	8		4.3852		1.2339		0.4022	0.0000
			%Fill	100		87.703		61.6929			

Prefix	none
Name	probable actinolite Ca values below optimal levels
Modifier	Potassian
Group	Calcic Amphibole

Sample # 021318-09-10-1

Values		Satisfied Conditions
(Ca,Na)@B	1.23	(Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00	1 < Ca@B < 1.5 and (Na,K)@A < 0.5
Ca@B	1.23	(Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.40	Si > 7.5
Mg/(Mg+Fe2)	0.68	(Mg/(Mg+Fe2))< 0.9
Si	8.00	

Mineral Analysis Program (Version 5.0)

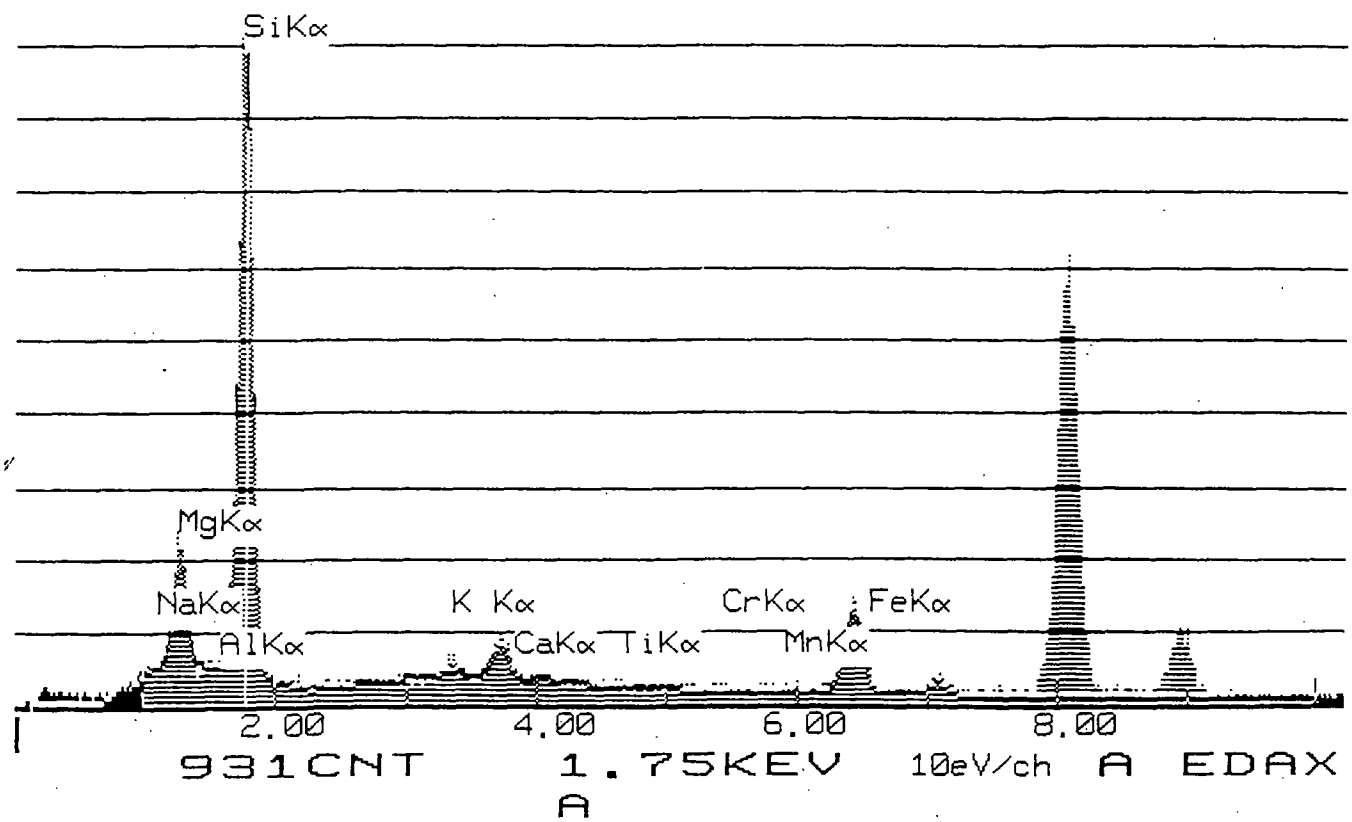
INTE-% :
LABEL = 021318-09 29/1 12674
04-NOV-:2 12:37:23
191.756 LIVE SECONDS

BG Auto
Non Asbestos

ELEM	CPS	WT % ELEM	WT % OXIDE
MGK	9.090	9.679	16.049
SIK	50.496	33.653	71.996
K K	0.589	0.355	0.427
CAK	3.124	1.894	2.650
FEK	8.615	6.210	8.878
TOTAL			100.000

USED PEIF: USER

04-NOV-02 12:40:07 SUPER QUANT
RATE= 6CPS TIME= 192LSEC
FS= 1012/ 1012 PRST= 200LSEC
A =021318-09 29/1 12674



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	71.996	Si+4	8.0000	8.0000							
Al2O3	0	Al+3	0.0000	0.0000	**0.0000**						
TiO2	0	Ti+4	0.0000	0.0000	**0.0000**						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	8.878	Fe+3	0.5102			0.5102	0.0000				
MgO	16.049	Mg+2	3.4237			3.4237	**0.0000**				
MnO	0	Fe+2	0.6875			0.6875	**0.0000**				
CaO	2.65	Mn+2	0.0000			0.0000	**0.0000**				
Na2O	0	Ca+2	0.6233					0.6233	0.0000		
K2O	0.427	Na+	0.0000					0.0000	**0.0000**	0.0000	0.0000
		K+	0.2245							0.2245	0.0000
Total	100		Excess	T site	0.0000	C site	0.0000	B site	0	A site	0
			Total	8		4.6214		0.6233		0.2245	0.0000
Prefix			%Fill	100		92.4281		31.1668			
Name											
Modifier											
Group	Neither Amphibole nor Pyroxene										

Sample # 021318-09-29-1

Values Satisfied Conditions

Mineral Analysis Program (Version 5.0)

INTE-% :
LABEL = 021318-12 2/1 12675
04-NOV-:2 14:07:18
22.114 LIVE SECONDS

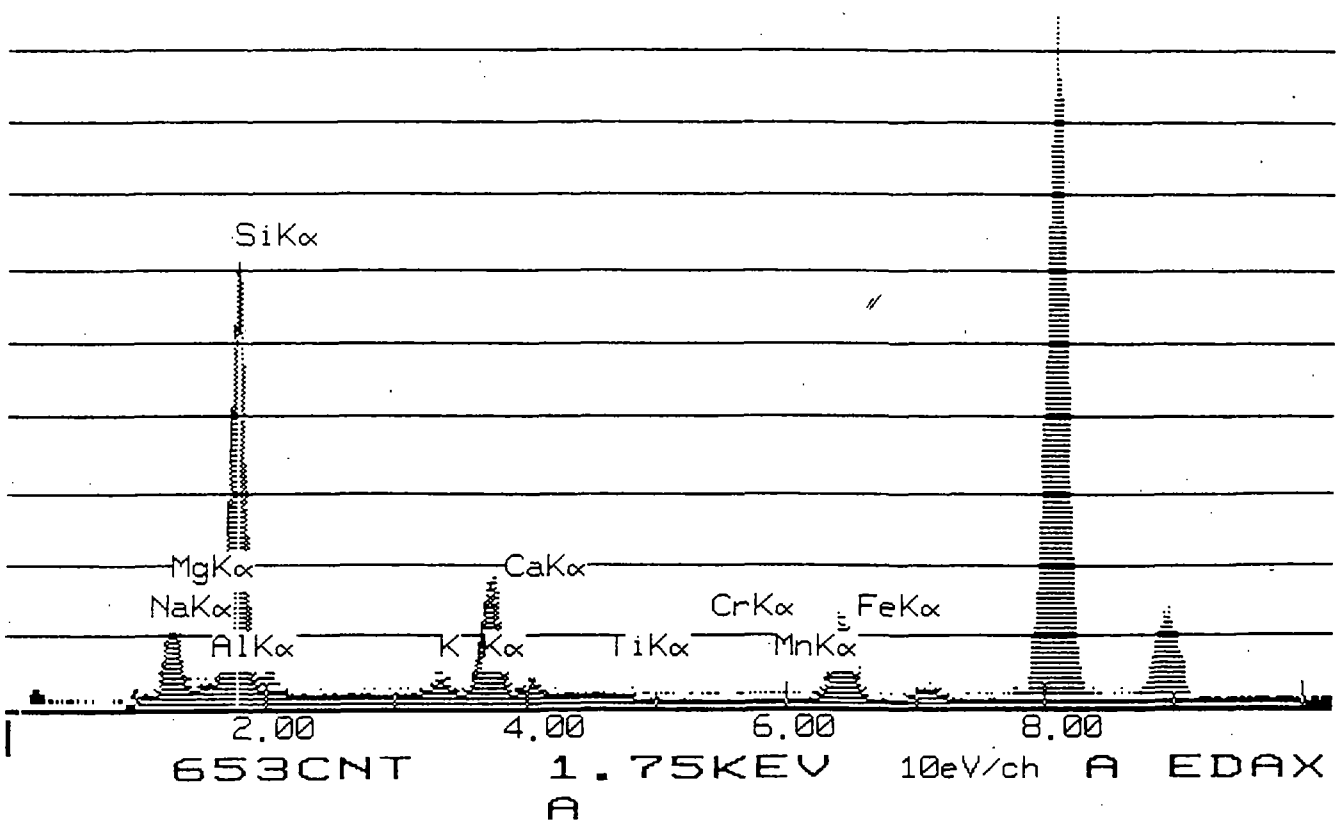
ELEM	CPS	WT % ELEM	WT % OXIDE
NAK	1.485	0.392	0.528
MGK	64.665	9.987	16.560
ALK	1.537	0.181	0.343
SIK	287.691	27.809	59.494
K K	10.717	0.936	1.127
CAK	88.812	7.811	10.930
CRK	1.492	0.147	0.215
MNK	1.809	0.185	0.239
FEK	70.679	7.389	10.565

TOTAL			100.000

USED PEIF: USER

by auto
Antrobus

04-NOV-02 14:09:57 SUPER QUANT
RATE= 7CPS TIME= 22LSEC
FS= 1019/ 1019 PRST= 200LSEC
A =021318-12 2/1 12675



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	59.494	Si+4	8.0000	8.0000							
Al2O3	0.343	Al+3	0.0700	0.0000	**0.0700**						
TiO2	0	Ti+4	0.0000	0.0000	**0.0000**						
Cr2O3	0.215	Cr+3	0.0330			0.0330	0.0000				
Fe(total)O	10.565	Fe+3	0.0200			0.0200	0.0000				
MgO	16.56	Mg+2	3.4452			3.4452	**0.0000**				
MnO	0.239	Fe+2	1.2279			1.2279	**0.0000**				
CaO	10.93	Mn+2	0.0483			0.0483	**0.0000**				
Na2O	0.528	Ca+2	1.6428					1.6428	0.0000		
K2O	1.127	Na+	0.1763					0.1763	**0.0000**	0.0000	0.0000
		K+	0.2138							0.2138	0.0000
Total	100.001		Excess	T site	0.0700	C site	0.0000	B site	0	A site	0
			Total	8		4.8444		1.8191		0.2138	0.0000
			%Fill	100		96.8879		90.9561			

Prefix	none
Name	actinolite
Modifier	none
Group	Calcic Amphibole

Sample # 021318-12-2-1

Values		Satisfied Conditions
(Ca,Na)@B	1.82	(Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.18	Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.64	(Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.21	Si > 7.5
Mg/(Mg+Fe2)	0.74	(Mg/(Mg+Fe2))< 0.9
Si	8.00	

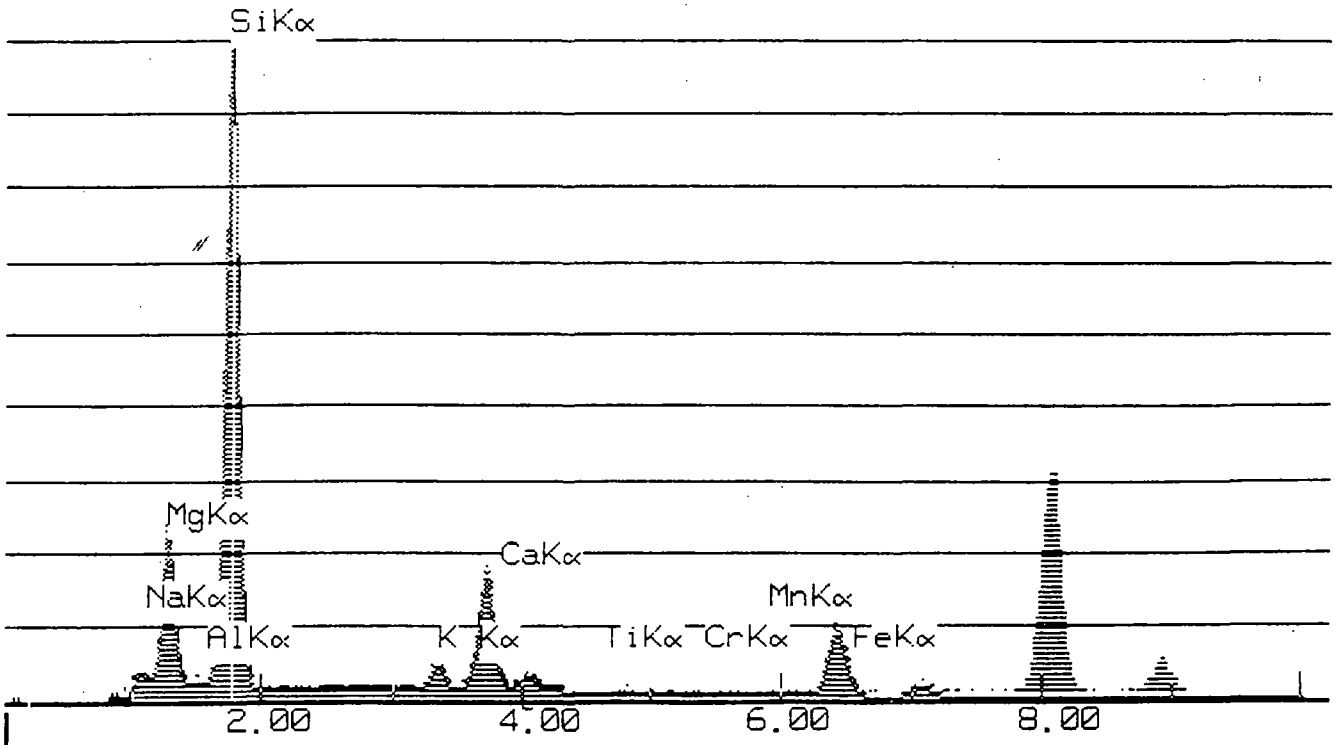
INTE-% :
LABEL = 021318-12 6/1 12676
04-NOV-:2 14:23:21
34.869 LIVE SECONDS

ELEM	CPS	WT % ELEM	WT % OXIDE
NAK	16.038	2.171	2.927
MGK	136.082	10.793	17.896
ALK	3.585	0.217	0.410
SIK	602.689	29.917	64.004
K K	23.890	1.071	1.290
CAK	116.551	5.264	7.366
MNK	1.118	0.059	0.076
FEK	78.580	4.219	6.032
TOTAL			100.000

Gr Auto
Wischitz

USED PEIF: USER

04-NOV-02 14:25:54 SUPER QUANT
RATE= 9CPS TIME= 35LSEC
FS= 2134/ 2134 PRST= 200LSEC
A =021318-12 6/1 12676



1911CNT 1.75KEV 10eV/ch A EDAX
A

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	64.004	Si+4	8.0000	8.0000							
Al2O3	0.41	Al+3	0.1054	0.0000	0.1054						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	6.032	Fe+3	0.0321			0.0321	0.0000				
MgO	17.896	Mg+2	3.6691			3.6691	0.0000				
MnO	0.076	Fe+2	0.7253			0.7253	0.0000				
CaO	7.366	Mn+2	0.0673			0.0673	0.0000				
Na2O	2.927	Ca+2	1.1289					1.1289	0.0000		
K2O	1.29	Na+	0.8591					0.8591	0.0000	0.0000	0.0000
		K+	0.2641							0.2641	0.0000
Total	100.001		Excess	T site	0.1054	C site	0.0000	B site	0	A site	0
			Total	8		4.5992		1.9880		0.2641	0.0000
			%Fill	100		91.9832		99.4025			

Prefix	none
Name	winchite
Modifier	Potassian
Group	Sodic-Calcic Amphibole

Sample # 021318-12-6-1

Values		Satisfied Conditions
(Ca,Na)@B	1.99	(Ca,Na)@B >= 1 and 0.5 <= Na@B < 1.5
Na@B	0.86	(Na,K)@A < 0.5
Na,K)@A	0.26	(Mg/(Mg+Fe2))>= 0.5
Mg/(Mg+Fe2)	0.83	Si > 7.5
Si	8.00	

Mineral Analysis Program (Version 5.0)

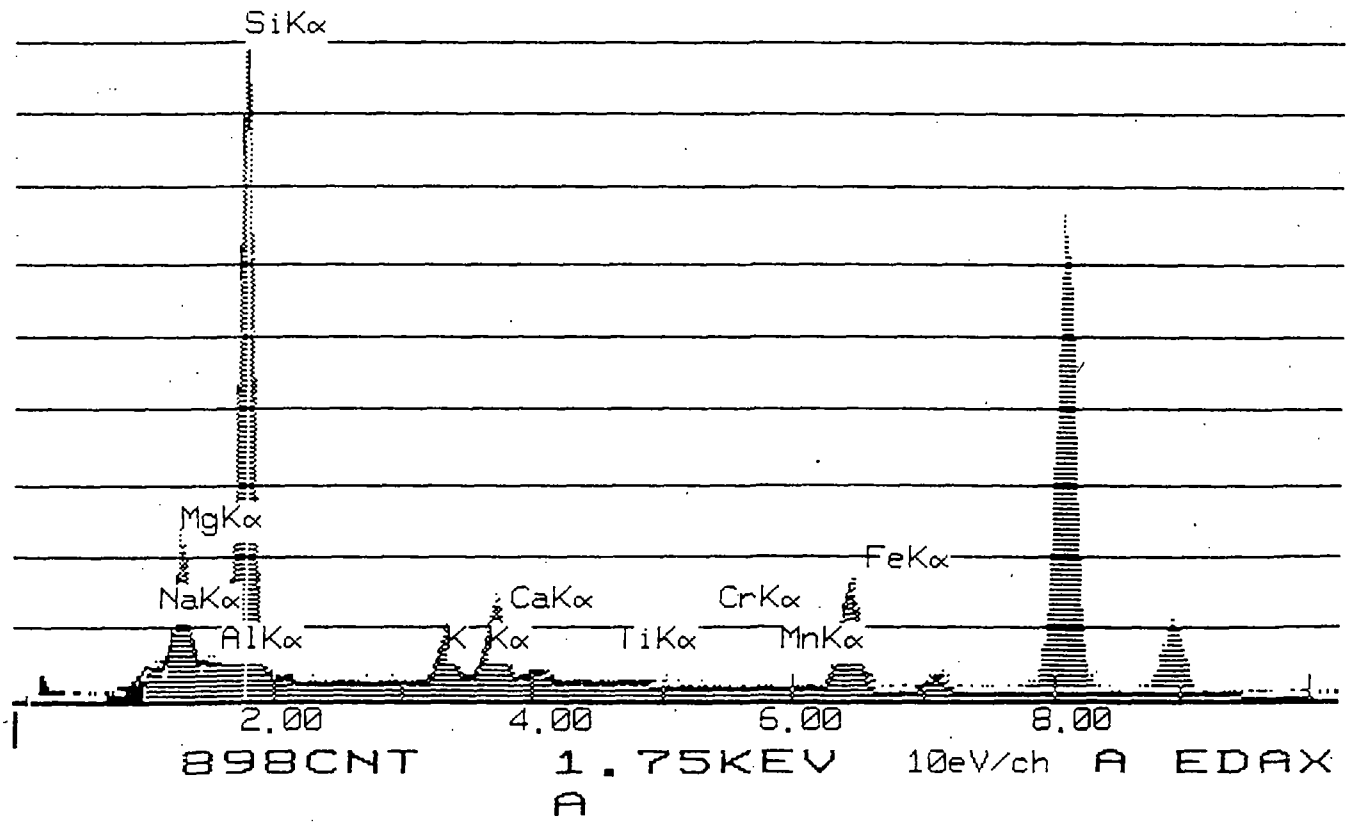
INTE-% :
LABEL = 021318-12 15/1 12677
04-NOV-:2 14:18:30
27.226 LIVE SECONDS

BG Clot
Non Asbestos

ELEM	CPS	WT % ELEM	WT % OXIDE
MGK	64.057	8.942	14.827
ALK	1.873	0.200	0.377
SIK	352.718	30.816	65.927
K K	32.653	2.576	3.103
CAK	48.851	3.883	5.434
MNK	1.249	0.116	0.149
FEK	75.370	7.122	10.182
TOTAL			100.000

USED PEIF: USER

04-NOV-02 14:21:04 SUPER QUANT
RATE= 7551CPS TIME= 27LSEC
FS= 1013/ 1013 PRST= 200LSEC
A =021318-12 15/1 12677



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	65.927	Si+4	8.0000	8.0000							
Al2O3	0.377	Al+3	0.1309	0.0000	**0.1309**						
TiO2	0	Ti+4	0.0000	0.0000	**0.0000**						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	10.182	Fe+3	0.1586			0.1586	0.0000				
MgO	14.827	Mg+2	3.1467			3.1467	**0.0000**				
MnO	0.149	Fe+2	1.1180			1.1180	**0.0000**				
CaO	5.434	Mn+2	0.1194			0.1194	**0.0000**				
Na2O	0	Ca+2	0.9109					0.9109	0.0000		
K2O	3.103	Na+	0.0000					0.0000	**0.0000**	0.0000	0.0000
		K+	0.6083							0.6083	0.0000
Total	99.999		Excess	T site	**0.1309**	C site	**0.0000**	B site	**0**	A site	**0**
			Total	8		4.6737		**0.9109**		**0.6083**	**0.0000**
Prefix			%Fill	100		93.4734		45.5429			
Name											
Modifier											
Group	Neither Amphibole nor Pyroxene										

Sample # 021318-12-15-1

Values Satisfied Conditions

Mineral Analysis Program (Version 5.0)

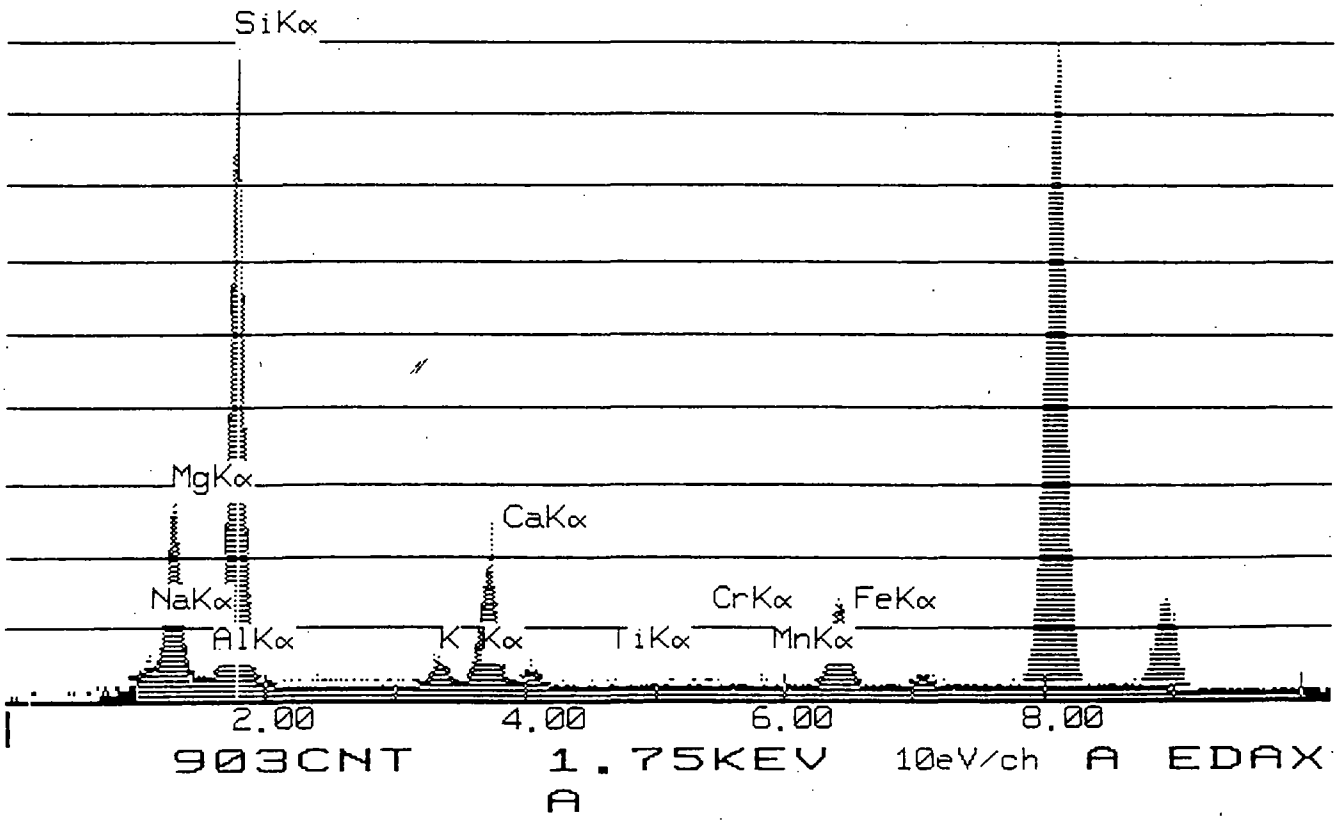
INTE-% :
LABEL = 021318-12 17/1 12678
04-NOV-:2 14:29:21
37.271 LIVE SECONDS

ELEM	CPS	WT % ELEM	WT % OXIDE
NAK	2.085	0.656	0.884
MGK	67.371	12.415	20.585
SIK	244.263	28.171	60.268
K K	12.422	1.294	1.559
CAK	57.336	6.017	8.419
CRK	0.993	0.117	0.171
FEK	45.504	5.676	8.115
TOTAL			100.000

USED PEIF: USER

Sb - Chert
Actinolite

04-NOV-02 14:31:51 SUPER QUANT
RATE= 40CPS TIME= 37LSEC
FS= 1039/ 1039 PRST= 200LSEC
A =021318-12 17/1 12678



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	60.268	Si+4	8.0000	8.0000							
Al2O3	0	Al+3	0.0000	0.0000	**0.0000**						
TiO2	0	Ti+4	0.0000	0.0000	**0.0000**						
Cr2O3	0.171	Cr+3	0.0263			0.0263	0.0000				
Fe(total)O	8.115	Fe+3	0.4119			0.4119	0.0000				
MgO	20.585	Mg+2	4.1762			4.1762	**0.0000**				
MnO	0	Fe+2	0.4845			0.3856	**0.0989**				
CaO	8.419	Mn+2	0.0000			0.0000	**0.0000**				
Na2O	0.884	Ca+2	1.2403					1.2403	0.0000		
K2O	1.559	Na+	0.2610					0.2610	**0.0000**	0.0000	0.0000
		K+	0.2816							0.2816	0.0000
Total	100.001		Excess	T site	0.0000	C site	0.0989	B site	0	A site	0
			Total	8		5.0000		1.5013		0.2816	0.0000
			%Fill	100		100		75.0654			

Prefix	none
Name	probable actinolite Ca values below optimal levels
Modifier	Potassian
Group	Calcic Amphibole

Sample # 021318-12-17-1

Values		Satisfied Conditions
(Ca,Na)@B	1.50	(Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.26	1 < Ca@B < 1.5 and (Na,K)@A < 0.5
Ca@B	1.24	(Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.28	Si > 7.5
Mg/(Mg+Fe2)	0.90	(Mg/(Mg+Fe2))< 0.9
Si	8.00	

Mineral Analysis Program (Version 5.0)

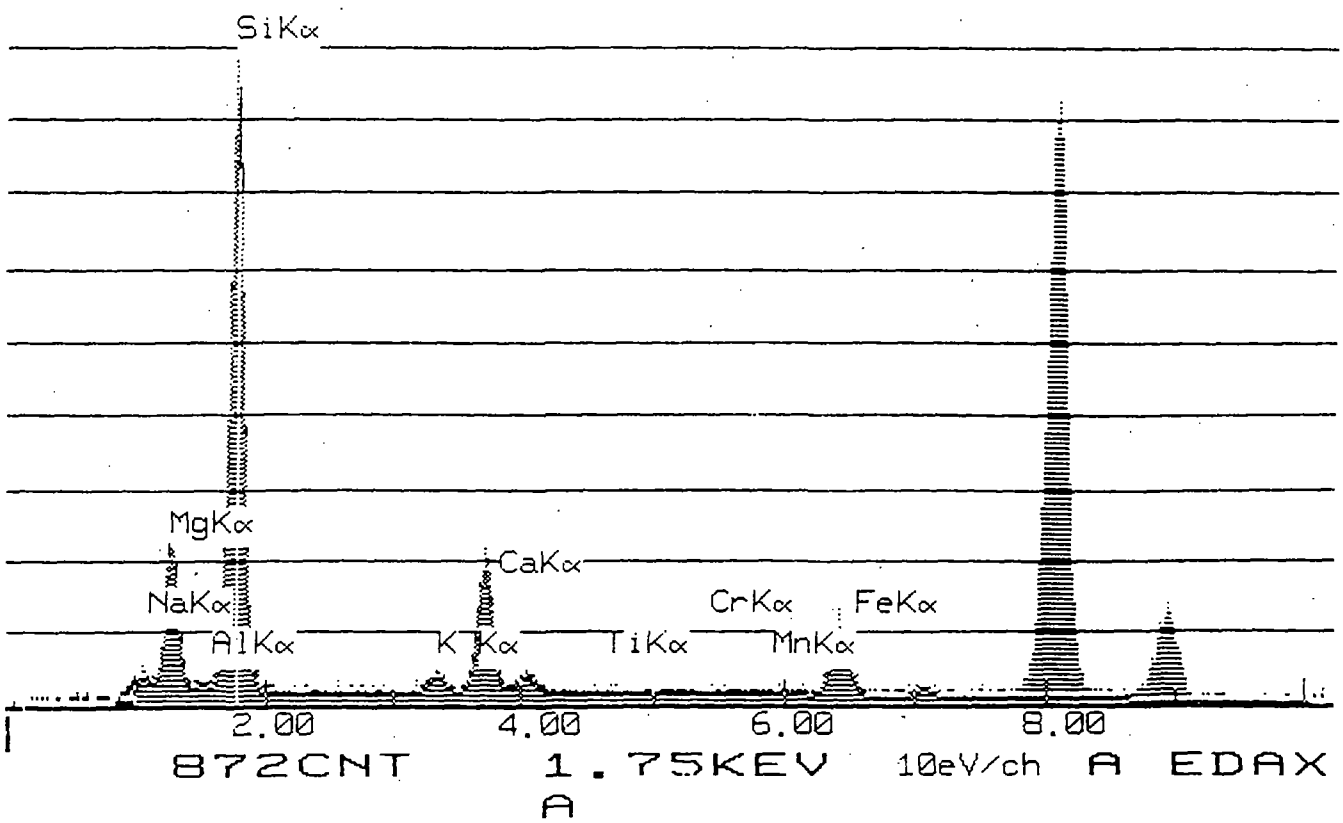
INTE-% :
LABEL = 021318-12 20/1 12679
04-NOV-:2 14:35:31
56.186 LIVE SECONDS

BG Auto
Wischitz

ELEM	CPS	WT % ELEM	WT % OXIDE
NAK	4.773	2.237	3.015
MGK	41.665	11.438	18.965
ALK	1.584	0.332	0.627
SIK	166.431	28.595	61.175
K K	5.446	0.845	1.018
CAK	39.583	6.188	8.658
CRK	0.320	0.056	0.082
FEK	24.312	4.518	6.459
TOTAL			100.000

USED PEIF: USER

04-NOV-02 14:38:03 SUPER QUANT
RATE= 658CPS TIME= 56LSEC
FS= 1024/ 1024 PRST= 200LSEC
A =021318-12 20/1 12679



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	61.175	Si+4	8.0000	8.0000							
Al2O3	0.627	Al+3	0.1199	0.0000	**0.1199**						
TiO2	0	Ti+4	0.0000	0.0000	**0.0000**						
Cr2O3	0.082	Cr+3	0.0222			0.0222	0.0000				
Fe(total)O	6.459	Fe+3	0.0194			0.0194	0.0000				
MgO	18.965	Mg+2	3.8737			3.8737	**0.0000**				
MnO	0	Fe+2	0.7514			0.7514	**0.0000**				
CaO	8.658	Mn+2	0.0000			0.0000	**0.0000**				
Na2O	3.015	Ca+2	1.2906					1.2906	0.0000		
K2O	1.018	Na+	0.8398					0.7094	**0.1304**	0.1304	0.0000
		K+	0.1973							0.1973	0.0000
Total	99.999		Excess	T site	**0.1199**	C site	**0.0000**	B site	**0.1304256**	A site	**0**
			Total	8		4.7867		2.0000		0.3277	0.0000
			%Fill	100		95.7333		100			

Prefix	none
Name	winchite
Modifier	none
Group	Sodic-Calcic Amphibole

Sample # 021318-12-20-1

Values		Satisfied Conditions
(Ca,Na)@B	2.00	(Ca,Na)@B >= 1 and 0.5 <= Na@B < 1.5
Na@B	0.71	(Na,K)@A < 0.5
Na,K)@A	0.33	(Mg/(Mg+Fe2))>= 0.5
Mg/(Mg+Fe2)	0.84	Si > 7.5
Si	8.00	

Mineral Analysis Program (Version 5.0)

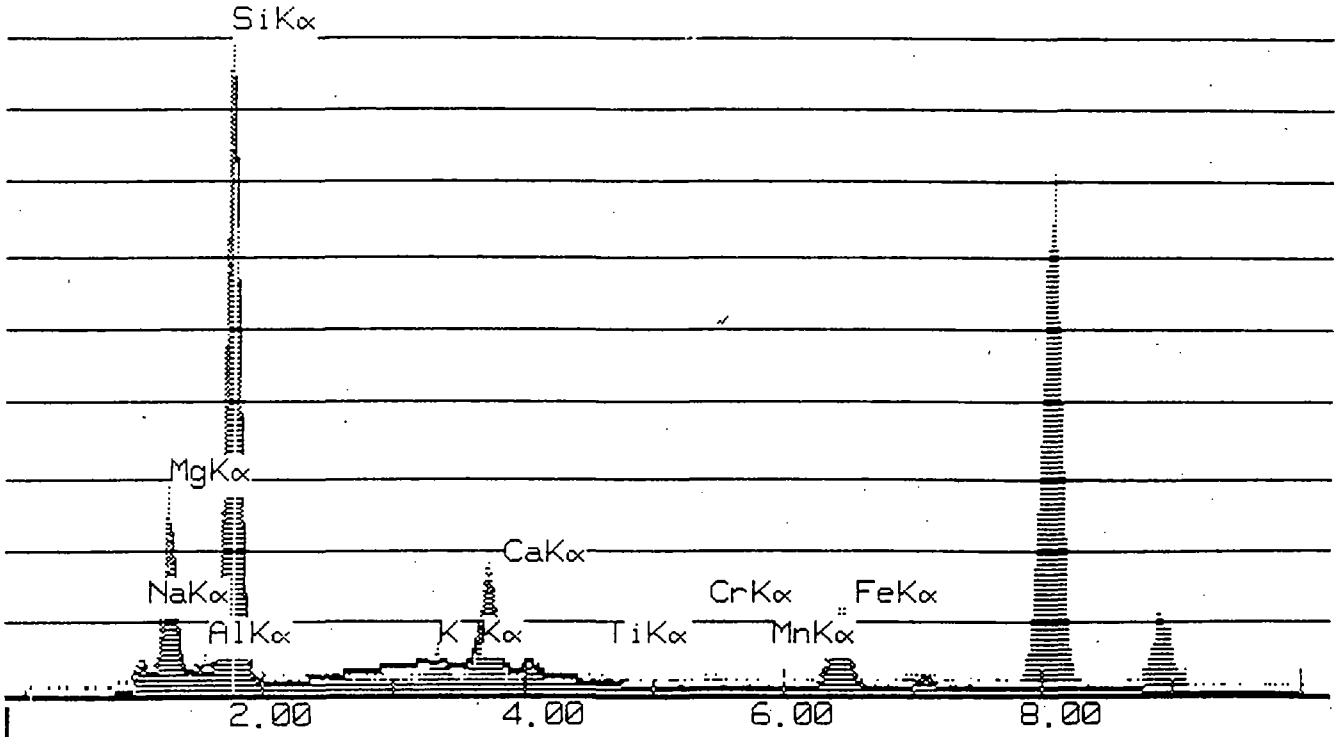
INTE-% :
LABEL = 021318-12 20/2 12680
04-NOV-:2 14:40:49
45.651 LIVE SECONDS

ELEM	CPS	WT % ELEM	WT % OXIDE
NAK	5.099	2.515	3.390
MGK	39.452	11.401	18.904
ALK	3.220	0.710	1.342
SIK	162.363	29.366	62.825
CAK	29.310	4.824	6.749
CRK	0.832	0.154	0.225
MNK	0.285	0.055	0.071
FEK	23.220	4.542	6.494
TOTAL			100.000

USED PEIF: USER

SG - Quartz
W-rich

04-NOV-02 14:43:42 SUPER QUANT
RATE= 21CPS TIME= 45LSEC
FS= 810/ 810 PRST= 200LSEC
A =021318-12 20/2 12680



644CNT 1.75KEV 10eV/ch A EDAX
A

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	62.825	Si+4	8.0000	8.0000							
Al2O3	1.342	Al+3	0.2352	0.0000	0.2352						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0.225	Cr+3	0.0405			0.0405	0.0000				
Fe(total)O	6.494	Fe+3	0.2691			0.2691	0.0000				
MgO	18.904	Mg+2	3.8058			3.8058	0.0000				
MnO	0.071	Fe+2	0.4756			0.4756	0.0000				
CaO	6.749	Mn+2	0.0442			0.0442	0.0000				
Na2O	3.39	Ca+2	1.0058					1.0058	0.0000		
K2O	0	Na+	0.9348					0.9348	0.0000	0.0000	0.0000
		K+	0.0000							0.0000	0.0000
Total	100		Excess	T site	0.2352	C site	0.0000	B site	0	A site	0
			Total	8		4.8703		1.9406		0.0000	0.0000
			%Fill	100		97.4063		97.0311			

Prefix	none
Name	winchite
Modifier	none
Group	Sodic-Calcic Amphibole

Sample # 021318-12-20-2

Values		Satisfied Conditions
(Ca,Na)@B	1.94	(Ca,Na)@B >= 1 and 0.5 <= Na@B < 1.5
Na@B	0.93	(Na,K)@A < 0.5
Na,K)@A	0.00	(Mg/(Mg+Fe2))>= 0.5
Mg/(Mg+Fe2)	0.89	Si > 7.5
Si	8.00	

Mineral Analysis Program (Version 5.0)

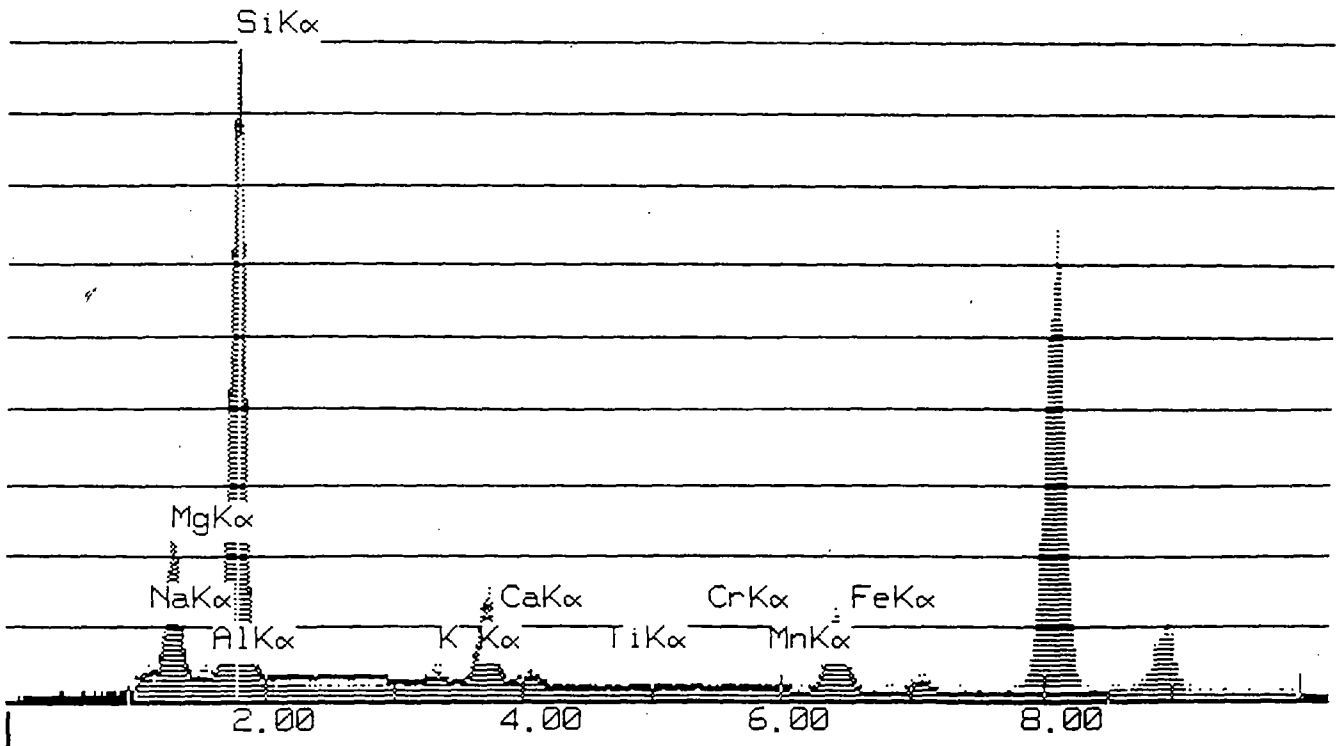
INTE-% :
LABEL = 021318-12 25/1 12681
04-NOV-:2 14:45:58
78.468 LIVE SECONDS

Bt nlamal
N.actite

ELEM	CPS	WT % ELEM	WT % OXIDE
NAK	2.835	1.664	2.243
MGK	32.994	11.345	18.812
SIK	142.058	30.572	65.404
K K	2.090	0.406	0.489
CAK	21.461	4.202	5.880
FEK	21.550	5.016	7.172
TOTAL			100.000

USED PEIF: USER

04-NOV-02 14:48:27 SUPER QUANT
RATE= 35CPS TIME= 78LSEC
FS= 1174/ 1174 PRST= 200LSEC
A =021318-12 25/1 12681



1087CNT 1.75KEV 10eV/ch A EDAX
A

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	65.404	Si+4	8.0000	8.0000							
Al2O3	0	Al+3	0.0000	0.0000	0.0000						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	7.172	Fe+3	0.3866			0.3866	0.0000				
MgO	18.812	Mg+2	3.8452			3.8452	0.0000				
MnO	0	Fe+2	0.4881			0.4881	0.0000				
CaO	5.88	Mn+2	0.0000			0.0000	0.0000				
Na2O	2.243	Ca+2	0.9389					0.9389	0.0000		
K2O	0.489	Na+	0.7210					0.7210	0.0000	0.0000	0.0000
		K+	0.1472							0.1472	0.0000
Total	100		Excess	T site	0.0000	C site	0.0000	B site	0	A site	0
			Total	8		4.7200		1.6599		0.1472	0.0000
Prefix	none		%Fill	100		94.3993		82.9962			
Name	winchite										
Modifier	none										
Group	Sodic-Calcic Amphibole										

Sample # 021318-12-25-1

Values		Satisfied Conditions
(Ca,Na)@B	1.66	(Ca,Na)@B >= 1 and 0.5 <= Na@B < 1.5
Na@B	0.72	(Na,K)@A < 0.5
Na,K)@A	0.15	(Mg/(Mg+Fe2))>= 0.5
Mg/(Mg+Fe2)	0.89	Si > 7.5
Si	8.00	

Mineral Analysis Program (Version 5.0)

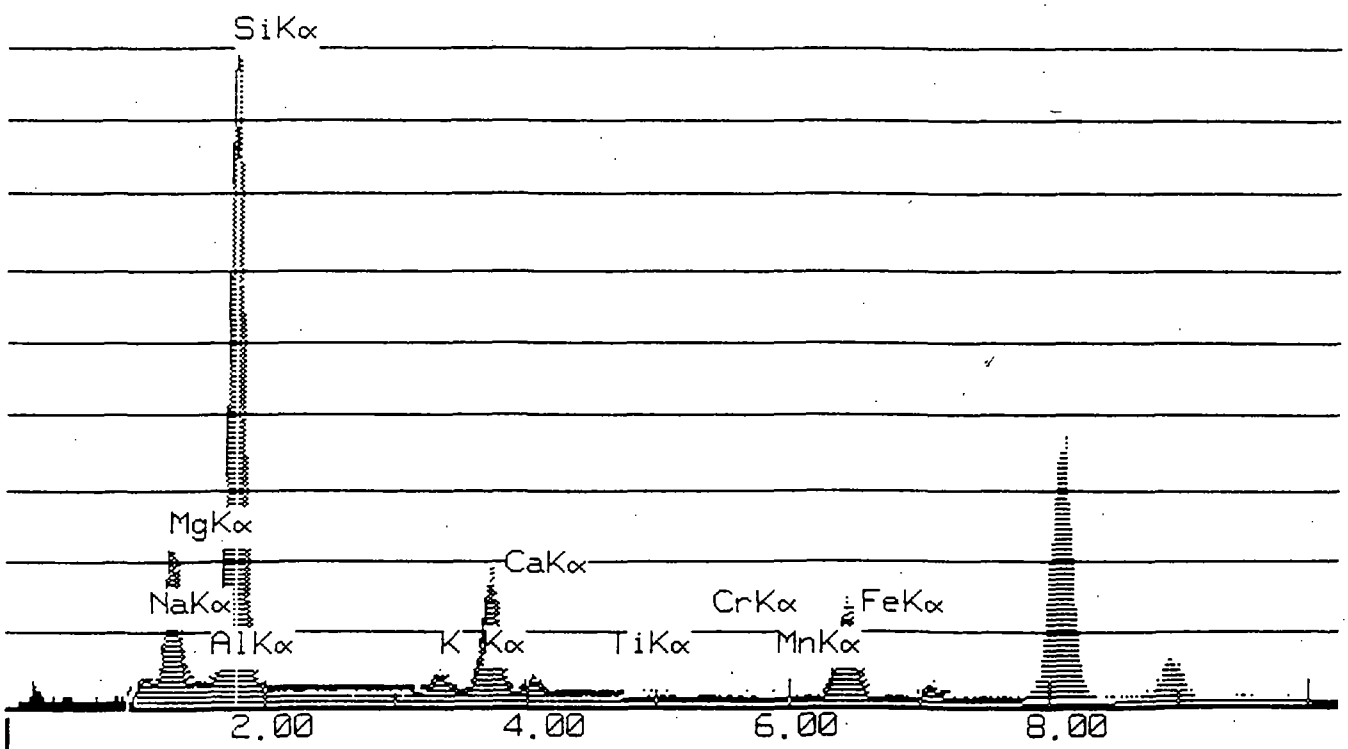
INTE-% :
LABEL = 021318-13 15/2 12682
04-NOV-:2 14:55:16
51.491 LIVE SECONDS

ELEM	CPS	WT % ELEM	WT % OXIDE
NAK	4.846	2.077	2.800
MGK	43.386	10.895	18.064
ALK	1.029	0.197	0.373
SIK	185.470	29.148	62.359
K K	5.088	0.722	0.870
CAK	37.657	5.385	7.535
FEK	32.919	5.595	8.000
TOTAL			100.000

USED PEIF: USER

BG ~~[illegible]~~ Normal
Nicolite

04-NOV-02 14:57:48 SUPER QUANT
RATE=35687CPS TIME= 51LSEC
FS= 1027/ 1027 PRST= 200LSEC
A =021318-13 15/2 12682



932CNT 1.75KEV 10eV/ch A EDAX
A

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	62.359	Si+4	8.0000	8.0000							
Al2O3	0.373	Al+3	0.0944	0.0000	**0.0944**						
TiO2	0	Ti+4	0.0000	0.0000	**0.0000**						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	8	Fe+3	0.0468			0.0468	0.0000				
MgO	18.064	Mg+2	3.7235			3.7235	**0.0000**				
MnO	0	Fe+2	0.9256			0.9256	**0.0000**				
CaO	7.535	Mn+2	0.0000			0.0000	**0.0000**				
Na2O	2.8	Ca+2	1.1533					1.1533	0.0000		
K2O	0.87	Na+	0.8192					0.8192	**0.0000**	0.0000	0.0000
		K+	0.1877							0.1877	0.0000
Total	100.001		Excess	T site	0.0944	C site	0.0000	B site	0	A site	0
			Total	8		4.7902		1.9725		0.1877	0.0000
			%Fill	100		95.8037		98.6239			

Prefix	none
Name	winchite
Modifier	none
Group	Sodic-Calcic Amphibole

Sample # 02318-13-15-2

Values		Satisfied Conditions
(Ca,Na)@B	1.97	(Ca,Na)@B >= 1 and 0.5 <= Na@B < 1.5
Na@B	0.82	(Na,K)@A < 0.5
Na,K)@A	0.19	(Mg/(Mg+Fe2))>= 0.5
Mg/(Mg+Fe2)	0.80	Si > 7.5
Si	8.00	

Mineral Analysis Program (Version 5.0)