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## Archaeological X-ray Fluorescence Reports

### Title

An Energy-Dispersive X-Ray Fluorescence Analysis of Obsidian Artifacts from Madera Quemado Pueblo (LA 91220), Southern New Mexico

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# BERKELEY ARCHAEOLOGICAL



## XRF LAB

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### LETTER REPORT

## AN ENERGY-DISPERSIVE X-RAY FLUORESCENCE ANALYSIS OF OBSIDIAN ARTIFACTS FROM MADERA QUEMADO PUEBLO (LA 91220), SOUTHERN NEW MEXICO

9 November 2007

Myles Miller  
Geo-Marine, Inc.  
5613 Abilene Trail  
Austin, TX 78749

Dear Myles,

The obsidian source provenance assemblage at Madera Quemado is quite diverse (Table 1, Figures 1 and 2). While the Cerro Toledo Rhyolite, Bear Springs Peak (Jemez Mountains), and Mount Taylor could have been procured in the Rio Grande alluvium, the Cow Canyon and Red Hill obsidian had to be procured from the primary sources (Church 2000; Shackley 2005). The remaining soil on these artifacts did not seem to hinder source assignment. Source determination was made using source standards at Berkeley (<http://www.swxrflab.net/>; Shackley 2005).

The samples were analyzed with a Spectrace (Thermo) *QuanX* EDXRF spectrometer in the Archaeological XRF Laboratory, University of California, Berkeley. Instrumental methods can be found at <http://www.swxrflab.net/analysis.htm>. Analysis of the USGS RGM-1 standard indicates high machine precision for the elements of interest (Govindaraju 1994; Table 1 here).

Sincerely,

M. Steven Shackley  
Professor and Director

VOICE: (510) 642-2533  
INTERNET: [shackley@berkeley.edu](mailto:shackley@berkeley.edu)  
<http://www.swxrflab.net/>

## REFERENCES CITED

Church, T.

2000 Distribution and Sources of Obsidian in the Rio Grande Gravels of New Mexico.  
*Geoarchaeology* 15:649-678.

Govindaraju, K.

1994 1994 Compilation of Working Values and Sample Description for 383  
Geostandards. *Geostandards Newsletter* 18 (special issue).

Shackley, M.S.

2005 *Obsidian: Geology and Archaeology in the North American Southwest*. University of Arizona Press, Tucson.

Table 1. Elemental concentrations for the archaeological samples. All measurements in parts per million (ppm).

Lot#	Ti	Mn	Fe	Rb	Sr	Y	Zr	Nb	Source
362	884	588	9220	196	5	65	168	109	Cerro Toledo Rhy, NM
411	1096	554	8584	190	5	60	169	93	Cerro Toledo Rhy, NM
444	1099	485	9875	178	14	59	162	93	Cerro Toledo Rhy, NM
445	1181	468	7967	107	44	19	95	53	Bear Springs Pk, NM
446	1659	629	13631	192	17	68	176	97	Cerro Toledo Rhy, NM
450	1408	477	11001	164	18	62	151	75	Cerro Toledo Rhy, NM
452	1116	893	9307	497	17	74	107	189	Mount Taylor
465	1074	434	7446	112	68	16	110	46	Cow Canyon, AZ
531	955	490	6282	142	13	15	68	53	Red Hill, NM
607	1201	540	10061	182	16	58	161	88	Cerro Toledo Rhy, NM
745	972	539	8422	190	10	58	166	97	Cerro Toledo Rhy, NM
1259	1064	569	9020	196	7	63	174	95	Cerro Toledo Rhy, NM
1335	1818	705	15346	188	28	59	176	102	Cerro Toledo Rhy, NM
1368	766	579	8063	178	7	67	165	91	Cerro Toledo Rhy, NM
1388	1183	604	10472	218	10	60	179	98	Cerro Toledo Rhy, NM
RGM1-S3	1669	308	13020	147	111	23	221	10	standard

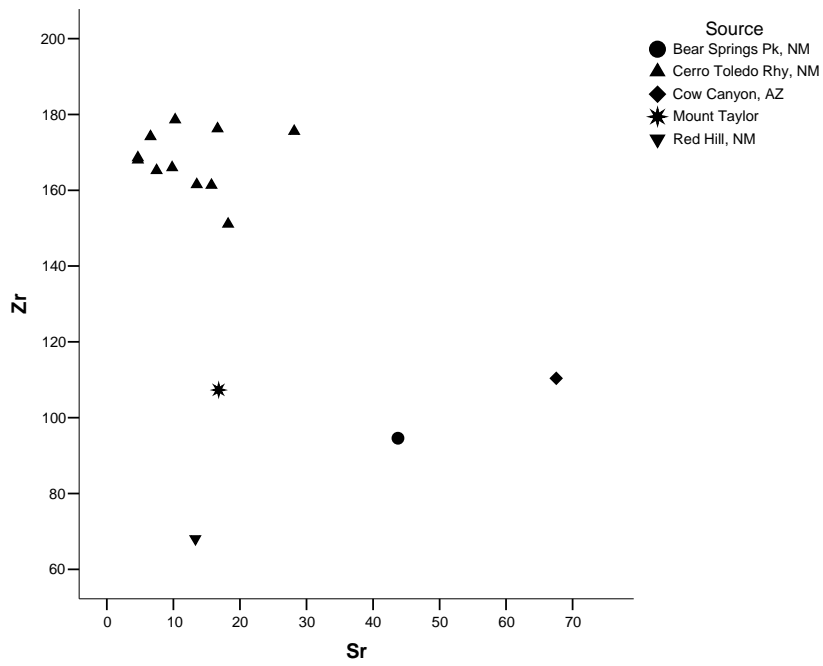


Figure 1. Zr versus Sr biplot of the archaeological specimens.

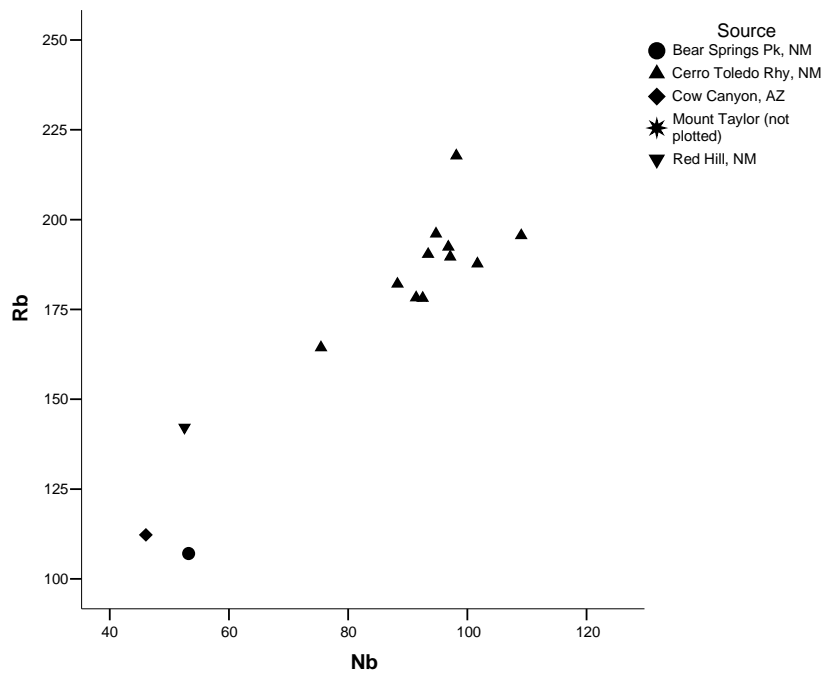


Figure 2. Rb versus Nb biplot of the archaeological specimens. Mount Taylor removed for clarity.