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GEOLOGIC EVALUATION OF LIMESTONE RESOURCES IN THE DEVIL'S SLIDE AREA, UTAH

Prepared for

Ideal Basic Industries
Devil's Slide Plant
Morgan, Utah

by

Bruce S. Sibbett

Earth Science Laboratory

University of Utah Research Institute
391 Chipeta Way, Suite C
Salt Lake City, Utah 84108
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EXECUTIVE SUMMARY

This report discusses a geologic evaluation of limestone reserves from several areas in the vicinity of Ideal Basic Industries' Devil's Slide Plant near Morgan, Utah. Geologic mapping and chemical analyses have been used to define the quality and quantity in the Powder Hollow, Kathryn Claims, Metz Hollow, and Taggarts areas.

Geologic mapping and chemical analyses have confirmed the continuation of the Twin Creek Limestone, currently mined at the Devil's Slide plant, to the south in Powder Hollow. The main production zone (Watton Canyon Member) thickens to 400 feet and the Devil's Slide bed thickens to 100 feet in the Powder Hollow area. Geologic reserves in the Watton Canyon Member are estimated to be 20.6 million tons of 42.6% CaO, within 100 to 150 feet of the surface and the Devil's Slide bed contains 1.2 million tons of 47.6% CaO within 50 feet of the surface. Seven drill holes are recommended in Powder Hollow to confirm the quality and quantity of rock, and determine rock characteristics controlling quarry design.

Geologic mapping and chemical analyses in the Kathryn Claims area have defined the quality of limestone in the Humbug Formation and the Doughnut Formation. Within one and one half miles of the freeway (about 7 miles from the plant) a total of about 24 million tons of limestone could be mined. The Humbug Formation within the Kathryn Claims themselves accounts for 3.7 million tons of 49.5% CaO rock. Additional reserves may be recovered from the Humbug Formation by blending or selective mining of limestone interbedded with dolomitic limestone. The Doughnut Formation contains 19 million tons of limestone at 50% CaO, half of which is on private land. Five to seven drill holes are recommended in the Kathryn Claims area to confirm the quality and quantity of limestone, and determine structural complications influencing reserves. Although the Kathryn Claims area has the disadvantages of distance from the plant, ownership and legal access problems, it contains easily mineable high quality rock.

Analysis of two samples from the Lodgepole Limestone at Metz Hollow indicates high magnesium content. No limestone of significant thickness was found in the Taggarts area.

INTRODUCTION

Examination of four areas for possible cement-grade limestone along the Weber River Canyon was carried out to identify future resource rocks for the Devil's Slide plant. The four study areas are between the Devil's Slide plant and Morgan, Utah, seven miles to the west. Geologic mapping was carried out in two of the areas, Powder Hollow and the Kathryn Claims area (Fig. 1), and samples were collected and analyzed from several measured geologic sections. Reconnaissance examination and two samples were collected from the Metz Hollow and Taggarts areas. The data and conclusions derived from this study, along with recommendations for drilling to confirm the resources identified, are presented in this report. A fifth component of this program is a regional study for other possible resource rocks within twenty miles of the plant. The regional report will be presented under separate cover.

GEOGRAPHY

The Devil's Slide plant and the study areas are located within the Wasatch Mountains, which have over 1600 feet of relief along the Weber River. Paleozoic to Mesozoic formations strike near north-south and generally dip to the east. The semi-arid climate results in thin soil, brush and grass cover on the steep canyon walls.

U.S. Highway 80N passes through the Weber Canyon as does the Union Pacific railroad line (Fig. 1). These main arteries are excellent for east-west travel but limit local access within the canyon. Freeway exits are present at the Devil's Slide, Taggarts, Round Valley and Morgan. Much of the land along the canyon is privately owned by local residents. Some land is owned by Utah State Division of Wildlife Resources. Mineral rights on the state land is divided between the state and the Union Pacific Railroad.

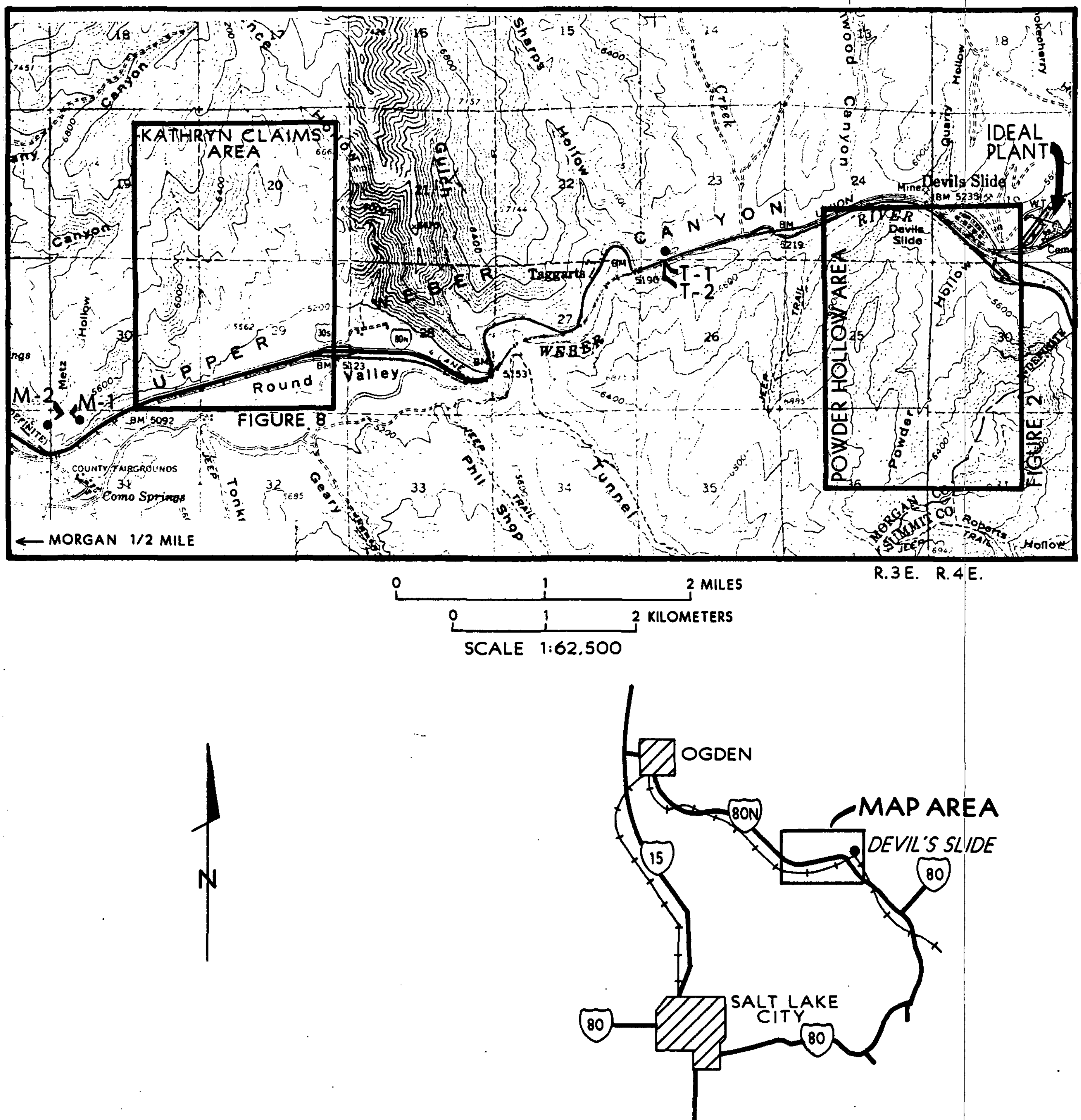

Figure 1 Location map and sample sites for Metz Hollow (M-1 and M-2) and Taggarts (T-1 and T-2) samples.

POWDER HOLLOW

Geology

The Twin Creek Limestone, which forms the resource rock at the Devil's Slide plant, continues along strike into Powder Hollow to the south of Weber Canyon. In the existing quarry area, and to the south, the Twin Creek Limestone is repeated on the east by faulting (Mullens and Laraway, 1964). Current production comes primarily from the western belt of the repeated Twin Creek Limestone section. The western section is exposed on the west side of Powder Hollow (Fig. 2). The repeated section to the east thins and is covered by conglomerate one-half mile south of the Weber River and was not included in this study.

The Jurassic Twin Creek Limestone is exposed along strike for one and one-half miles on the west side of Powder Hollow (Fig. 2). The Nugget Sandstone, a thick, crossbedded Jurassic sandtone underlies the Twin Creek Limestone and forms the ridge crest west of Powder Hollow. The Jurassic Preuss sandstone overlies the Twin Creek Limestone but is not exposed in the area due to faulting and Cretaceous cover (Mullens and Laraway, 1964). Conglomerates of the Cretaceous Echo Canyon Conglomerate and the Tertiary Wasatch Formations unconformably overlap older rocks to the north, east and south.

In Powder Hollow, the Twin Creek Limestone trends N15°E and dips 64° to 84° east at the north and south ends of the area. In the central area the formation is overturned, dipping 52° to 67° west. The overturned beds are bounded by northwest-trending faults (Fig. 2). A northeast-trending fault offsets the limestone beds along the drainage in the SE 1/4 Section 25, T4N, R3E.

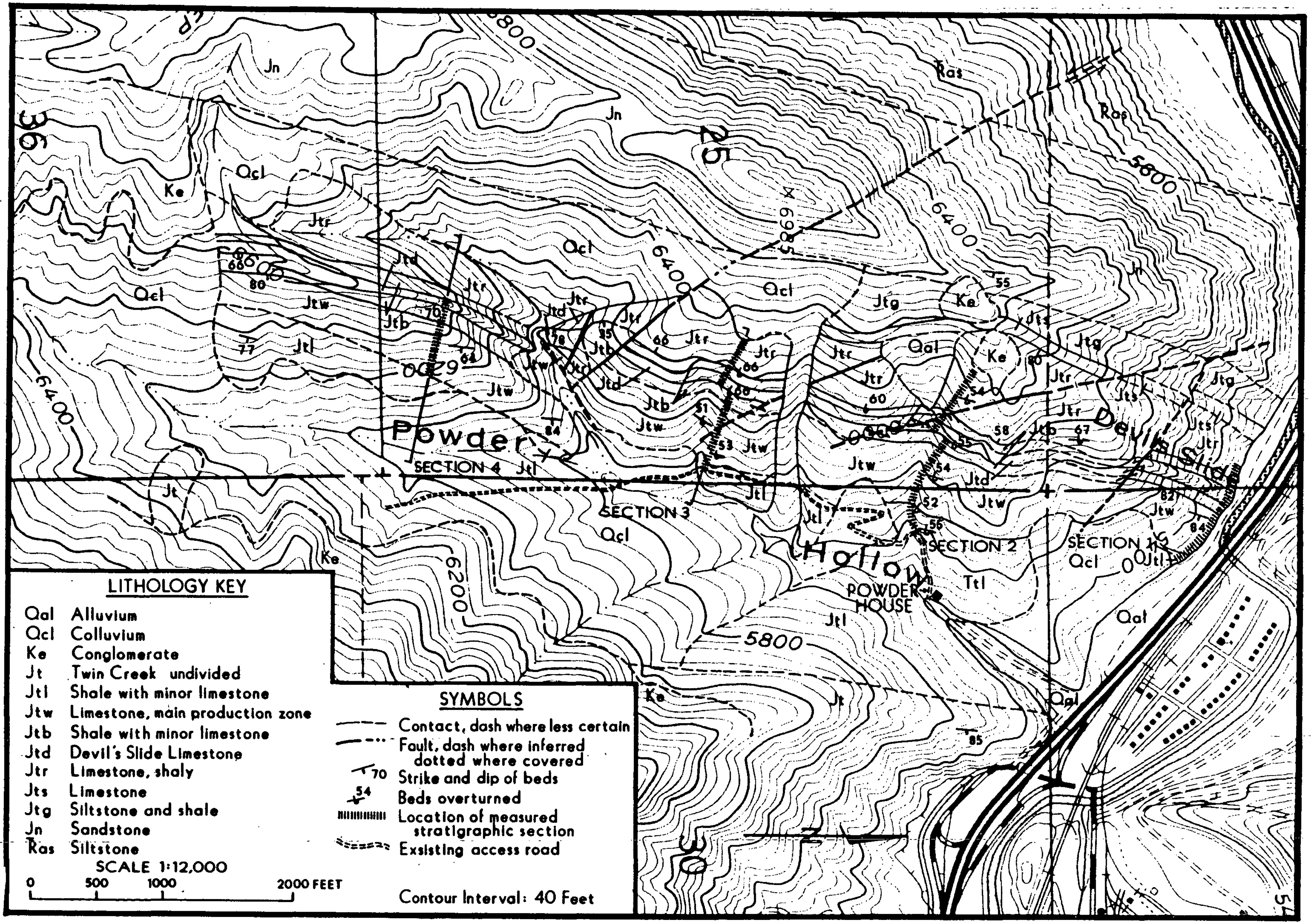

Figure 2 Geologic map of the Powder Hollow area

POWDER HOLLOW

Description of Map Units
Explanation for Figure 2

Qal	Alluvial deposits of the Weber River and tributaries.
Qcl	Colluvial deposits of quartzite boulders from the Echo Canyon Conglomerate and sandstone blocks from the Nugget Sandstone in a clay matrix covering slopes.
Ke	Echo Canyon Conglomerate, quartzite and sandstone boulders with a clay and sand matrix.
Jt	Twin Creek Limestone undivided.
Jtl	Leeds Creek Member of Twin Creek Limestone. Interbedded shale, sandstone and limestone, shaly limestone to shale dominant.
Jtw	Watton Canyon Member of Twin Creek Limestone. Micrite limestone, medium gray to olive brown, medium to thin bedded, 2-foot oolite at its base; 300 to 400 feet thick; averages 42.6% CaO, MgO averages 1.5%.
Jtb	Shale beds of the Boundary Ridge Member of the Twin Creek Limestone. Red, green or yellow siltstone to silty shale and thin limestone beds. Unit is 100 to 150 feet thick, east of the Devil's Slide limestone and 50 to 120 feet thick west of the Devil's Slide.
Jtd	Devil's Slide limestone unit of the Boundary Ridge Member. Brown oolite and gray micrite, 60 to 100 feet thick, averages 47.6% CaO and 1.24% MgO.
Jtr	Rich Member of Twin Creek Limestone, thick shaly limestone with shale unit at base, dark gray micrite. The limestone is 300 to 470 feet thick and averages 42.0% CaO, and 1.61% MgO.
Jts	Slide Rock Member of the Twin Creek Limestone, fossiliferous, medium to thin bedded, less than 100 feet thick.
Jtg	Gypsum Spring Member of the Twin Creek Limestone, red beds, siltstone and shale.
Jn	Nugget Sandstone cross-bedded, medium-grained sandstone.
T̄as	Ankareh Formation, siltstone and claystone.

Measured Stratigraphic Sections

Four stratigraphic sections of the Twin Creek Limestone were measured in Powder Hollow to determine the thickness and continuity of limestone beds. The locations of the measured sections are indicated on Figure 2, and they are presented in Figure 3 with member names and correlation of beds between sections. Cross sections were drawn along three of the measured sections and are presented as Figures 4, 5 and 6. From base to top, or west to east on Figure 2, the Twin Creek Limestone members are the Gypsum Spring siltstone and shale, Side Rock limestone, Rich limestone, Boundary Ridge limestone and shale beds, Watton Canyon limestone, and Leeds Creek shale and sandstone (Imlay, 1967). The Gypsum Spring Member and the Slide Rock Member were mapped but not included in the measured sections.

The Rich Member is a shaly micrite limestone grading to shale near the base. This limestone bed is exposed west of the Devil's Slide on the south side of Weber Canyon but is absent due to faulting north of the canyon in the quarry area. An exposed thickness of 474 feet in stratigraphic section 2, and 300 feet in stratigraphic section 3 was measured with the lower contact covered at both locations.

The Boundary Ridge Member consists of limestone and siltstone to shale beds (Imlay, 1967). The main limestone bed within the member forms the Devil's Slide. Two thickly bedded, resistant oolite beds with a less resistant micrite compose the slide. A second micrite unit overlays the oolite to the east (Figs. 3 and 4) and is mapped with the Devil's Slide unit on Figure 2. The Boundary Ridge Member varies from 235 to 400 feet thick in Powder Hollow. The Devil's Slide unit is in the middle of that member and is 57 to 113 feet thick. The measured beds are shown at true thickness in the stratigraphic columns (Fig. 3).

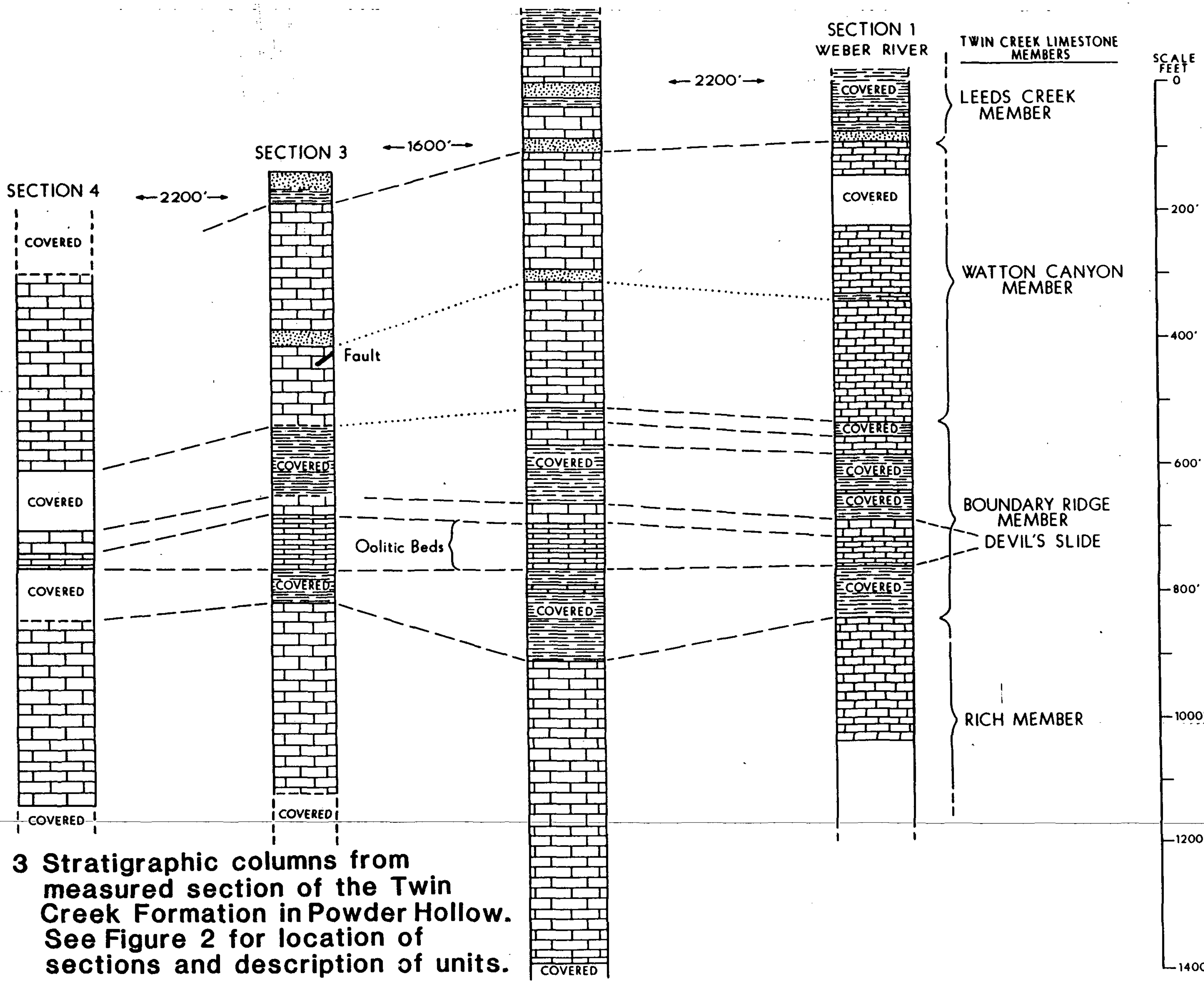

Figure 3 Stratigraphic columns from measured section of the Twin Creek Formation in Powder Hollow. See Figure 2 for location of sections and description of units.

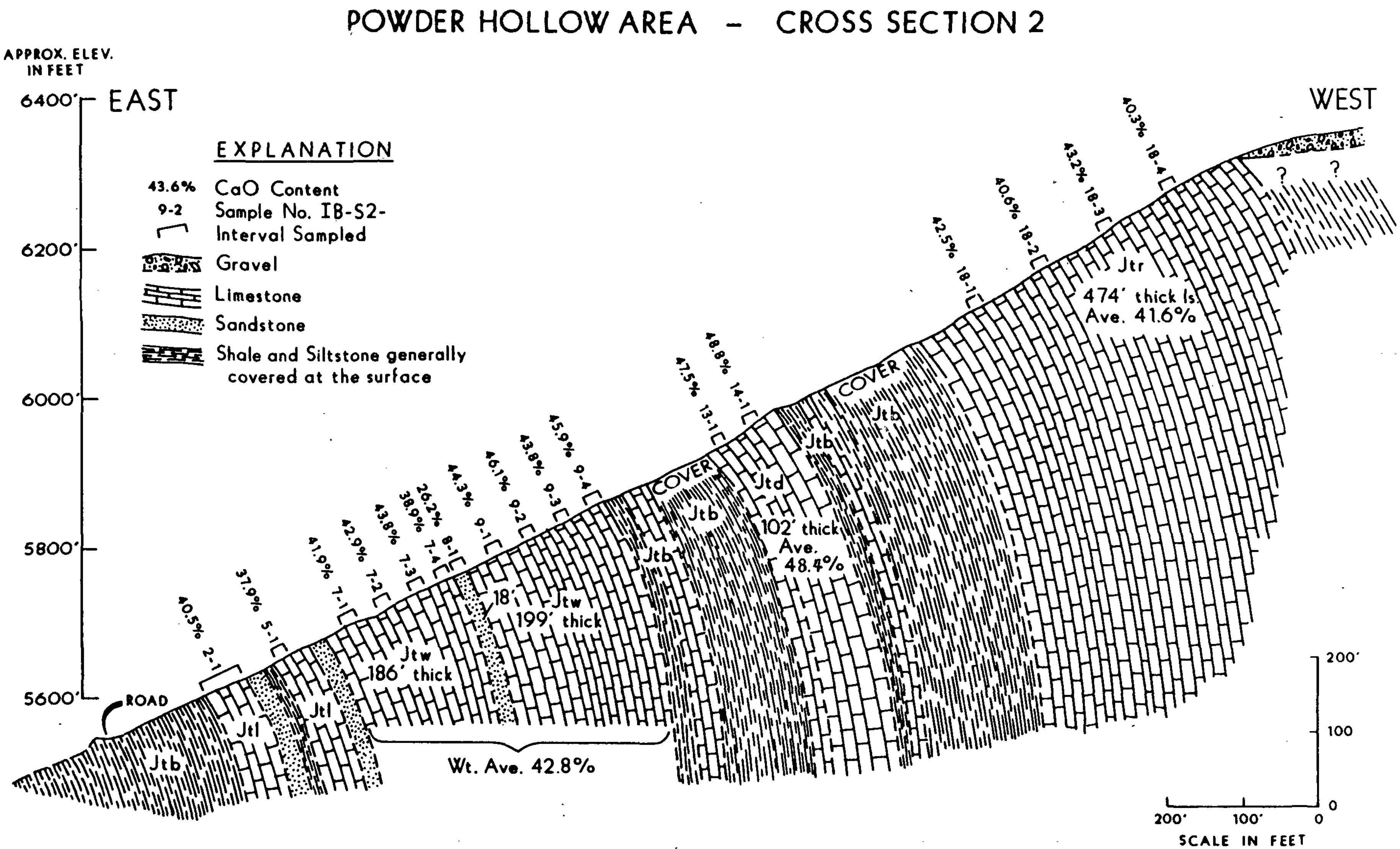

Figure 4 Cross section drawn from measured stratigraphic section starting approximately 500 feet east of the old powder house and extending N77°W up the hill. See Figure 2 for location. Weighted averages shown for limestone units.

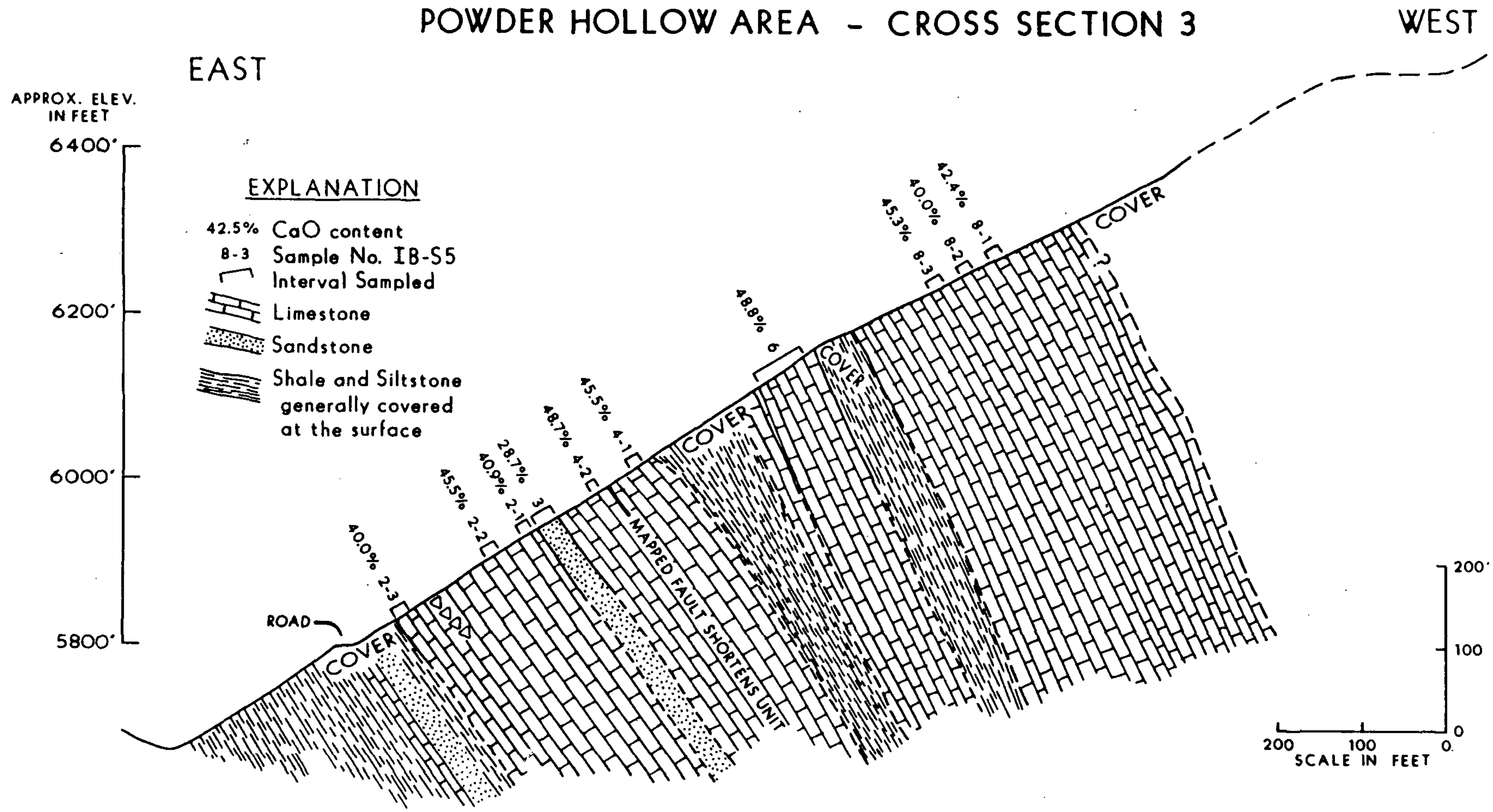

Figure 5 Cross section drawn from measured stratigraphic section from the access road 2000 feet southwest of the old powder house. See Figure 2 for location.

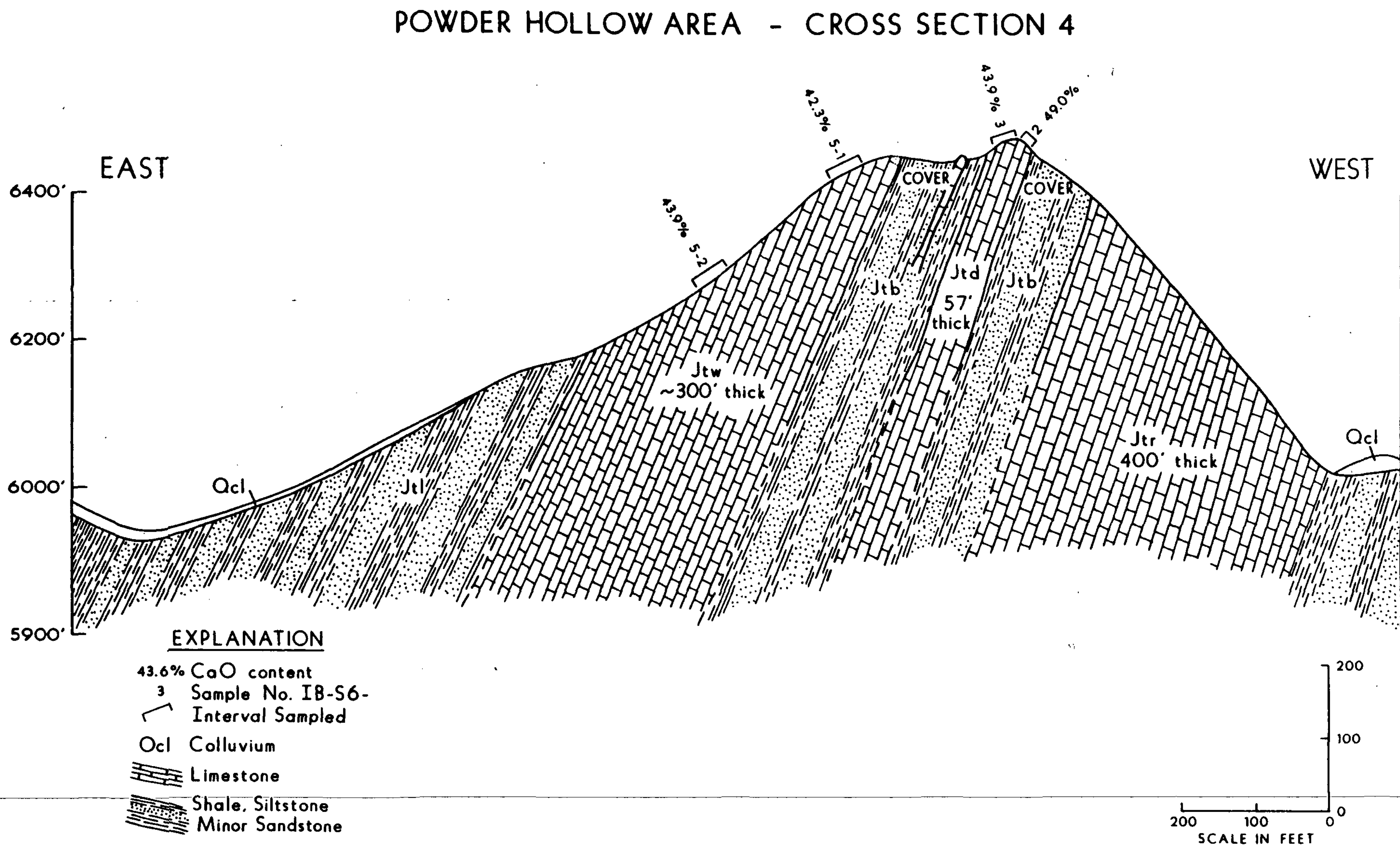

Figure 6 Cross section drawn from measured stratigraphic section approximately 4000 feet south-southwest from the powder house. See Figure 2 for location.

The Watton Canyon Member is the main production unit in the quarry. This medium-bedded micrite is 308 to 403 feet thick. A calcareous sandstone bed 18 to 26 feet thick is present in the middle of the Watton Canyon limestone (Figs. 3, 4 and 5). This sandstone parting is present at Birch Creek in Rich County and Burr Fork in Salt Lake County (Imlay, 1967). It therefore continues to the south in Powder Hollow to where section 4 was measured but was not seen due to poor exposure.

The Leeds Creek Member stratigraphically overlies the Watton Canyon Member but is exposed lower on the hill in the overturned section. The Leeds Creek consists mainly of shaly limestone (Imlay, 1967), however, the exposed base in Powder Hollow contains interbedded limestone, standstone and shale to siltstone (Fig. 3). Most of the member is covered by colluvium in Powder Hollow.

Rock Quality

A total of 31 chip samples were collected along sample traverses in Powder Hollow. The sampled intervals and CaO content of the samples are shown on Figures 4, 5, and 6. The analyses are tabulated in Table 1 and the complete 37-element analyses appear in the Appendix. Seventeen of these were taken from the Watton Canyon Member of the Twin Creek Limestone which is the unit currently being mined at the Devil's Slide quarry. As discussed above, the Watton Canyon Member is divided in half by a sandstone parting (Figs. 4 and 5). Seven samples taken from the stratigraphic upper half, which crops out lower on the hill in the overturned section, average 42.0% CaO. The lower half of the Watton Canyon Member averages 45.0% CaO for the 8 samples collected. The entire Watton Canyon averages 42.6% CaO and 1.5% MgO when the sandstone bed with 27.5% CaO, which composes 6% of the thickness, is included.

(Fig. 4). The resource could be upgraded to 44% CaO if the sandstone parting and an adjacent twenty foot thick low grade zone are split out as waste. The averages given are arithmetic means, except for weighting the sandstone's composition relative to its 6% of the total thickness. A weighted average was calculated by multiplying each sample value by the fraction of the total measured thickness represented by that sample and summing the products. Each sample represents the thickness from the mid point between it and the next sample on one side to the mid point between it and the sample on the other side (Parks, 1957). Weighted averages based on the stratigraphic thickness represented by each sample were calculated for the analyses of samples along cross section 2 (Fig. 4). The weighted averages are only slightly different from the arithmetic averages for this traverse.

The Devil's Slide unit averages 47.6% CaO and 1.24% MgO for 5 samples (Table 1). The oolite bed is about 49% CaO but the lower quality of the micrite bed reduces the average.

The Rich Member of the Twin Creek Formation averages 42.0% CaO and 1.61% MgO for the seven samples analyzed (Table 1). Although its quality may be marginal, the CaO content is equal to that of the upper half of the Watton Canyon Member and the MgO average of 1.61% is less than the 1.76% MgO in the upper Watton Canyon Member. Also, the thickness of the Rich Member, 300 to 474 feet exposed, makes the unit of interest for additional reserves in Powder Hollow.

Reserve Estimates

The reserve estimates given here are geologic reserves rather than minable reserves. To calculate minable reserves, a quarry design would be needed, which would require rock competency testing to determine what slope

TABLE 1
ICP ANALYSIS OF SAMPLES FROM POWDER HOLLOW
(Percent)

Sample #	CaO	MgO	Al_2O_3	Fe_2O_3	K_2O	Na_2O	SiO_2
(Leeds Creek Member)							
IB-S2 2-1	40.52	1.82	3.78	1.54	1.12	0.197	
IB-S2 5-1	37.85	1.61	3.63	1.81	1.20	0.156	
(Watton Canyon-Production Unit)							
IB-S2 7-1	41.92	1.36	2.40	1.11	0.821	0.065	9.51
IB-S2 7-2	42.91	1.31	2.53	1.04	0.742	0.121	10.3
IB-S2 7-3	43.82	1.51	2.12	0.822	0.637	0.119	
IB-S2 7-4	38.97	1.68	4.20	1.60	1.28	0.280	17.6
IB-S5 2-1	40.91	1.74	3.20	1.14	1.05	0.171	
IB-S5 2-2	45.47	1.48	2.13	0.822	0.627	0.131	
IB-S5 2-3	40.04	3.24	2.81	1.19	0.915	0.147	
IB-S2 8-1	26.22	2.01	6.18	2.09	1.49	0.737	32.6
IB-S5 3	28.70	2.48	5.61	1.64	1.32	0.580	
IB-S2 9-1	44.26	1.20	2.13	0.720	0.551	0.349	
IB-S2 9-2	46.05	0.768	1.47	0.637	0.387	0.203	
IB-S2 9-3	43.57	1.65	2.35	0.849	0.651	0.196	
IB-S2 9-4	45.88	1.18	1.82	0.904	0.556	0.077	
IB-S5 4-1	45.46	0.965	1.96	0.824	0.587	0.040	
IB-S5 4-2	48.72	1.39	1.09	0.529	0.319	0.079	
IB-S6 5-1	42.25	1.41	2.06	0.788	0.661	0.194	
IB-S6 5-2	43.92	1.33	1.78	0.789	0.504	0.125	
(Devil's Slide Unit)							
IB-S2 13-1	47.50	1.41	1.65	0.633	0.400	0.184	
IB-S2 14-1	48.83	1.06	0.682	0.486	0.164	0.094	2.81
IB-S5 6	48.83	1.07	0.645	0.358	0.166	0.055	
IB-S6 2	48.97	1.19	0.592	0.440	0.155	0.051	
IB-S6 3	43.94	1.47	1.90	0.532	0.366	0.362	
(Rich Member)							
IB-S2 18-1	42.49	1.94	3.36	1.40	0.768	0.247	11.9
IB-S2 18-2	40.56	1.45	4.22	1.82	1.07	0.081	
IB-S2 18-3	43.22	1.35	2.91	1.32	0.699	0.090	
IB-S2 18-4	40.32	1.70	3.88	1.61	0.983	0.163	13.7
IB-S5 8-1	42.43	1.75	3.05	1.38	0.748	0.129	
IB-S5 8-2	39.97	1.74	4.00	1.57	0.946	0.200	
IB-S5 8-3	45.33	1.32	2.28	1.08	0.545	0.098	

angle could be used on the high wall. For purposes of estimating geologic reserves, it was assumed that the Watton Canyon Member (the main production zone) could be mined an average of 100 feet down dip from the outcrop in the north block between the powder house and the northeast-trending fault in the SE 1/4 of Section 25 (Fig. 2). The northern limit of this block is 600 feet south of the northeast corner of Section 25. The rock north of this is considered unavailable because mining would be visible above the Devil's Slide from the highway, and, therefore, environmentally objectionable. The Watton Canyon Member is 403 feet thick at stratigraphic section 2 where best exposed. The limestone is slightly thinner at stratigraphic section 3 but this is due to cover and a minor fault.

A mining depth of 100 feet, a bed thickness of 403 feet and a strike length of 2900 feet were assumed, yielding 4.3 million cubic yards, or 9.9 million tons of rock (2.3 tons per yd^3). The average composition, as reported above, is 42.6% CaO.

For the Devil's Slide unit, which averages 100 feet thick in the north block, it was assumed that rock could be mined 50 feet down dip along the 2900 feet of outcrop for 537,000 yd^3 or 1.2 million tons of 47.6% CaO rock. The tonnage is small, but the higher quality of the rock makes it noteworthy. The two small, fault-bounded blocks of Devil's Slide limestone in the SE 1/4 of Section 25 were not included in the reserve estimate.

The south block contains the Watton Canyon Member from the wash in the SE 1/4 of Section 25 to the southern end of exposure in the NE 1/4 of Section 36 (Fig. 2). The Watton Member is about 300 feet thick in this 2800-foot long block and dips 64° to 84° east (Figs. 2 and 6). Because of the more favorable dip, it was assumed that this block could be quarried to a depth of 150 feet recovering 4.7 million yd^3 or 10.7 million tons.

No reserves are added for the Devil's Slide unit in the south block because of an exposed thickness of only 57 feet. If it could be mined to a depth of 90 feet, a million tons could be recovered, however.

Estimated reserves for Powder Hollow total 21.8 million tons based on the measured thickness and assuming mining down dip 100 to 150 feet as explained above. The actual production grade would probably be the same as currently produced at the Devil's Slide quarry except for the higher quality rock from the Devil's Slide unit. The Rich Member could provide significant additional reserves if it met quality requirements.

Drilling Program Design

The rock quality and reserve estimates discussed above are sufficient to recommend drilling to confirm and better define the resource. Core drilling is also needed to determine rock properties for pit design. Drill holes oriented normal to the bedding are preferable as the most efficient way to evaluate a bedded resource. However, in Powder Hollow the steep dip into the hill would require holes inclined 25° to 35°, nearly parallel to the slope of the hillside. Holes drilled at angles lower than about 35° require a "QU" pump-in system which is more costly for HQ size core drilling. It is, therefore, recommended that beds which dip 52° to 66° to the west in the northern half of Powder Hollow be drilled from the top with holes inclined 40° to 45° to the east (Fig. 7). Locating each hole just up hill from the unit to be tested will minimize the depth required. At least one deep hole, number 3 or 4, should be drilled through the Devil's Slide unit, Watton Canyon Member and the waste rock on both sides of the Devil's Slide unit to determine rock properties for quarry design. This deep hole would also test the main production bed (Watton Canyon Member) deeper in the hill side. At least one

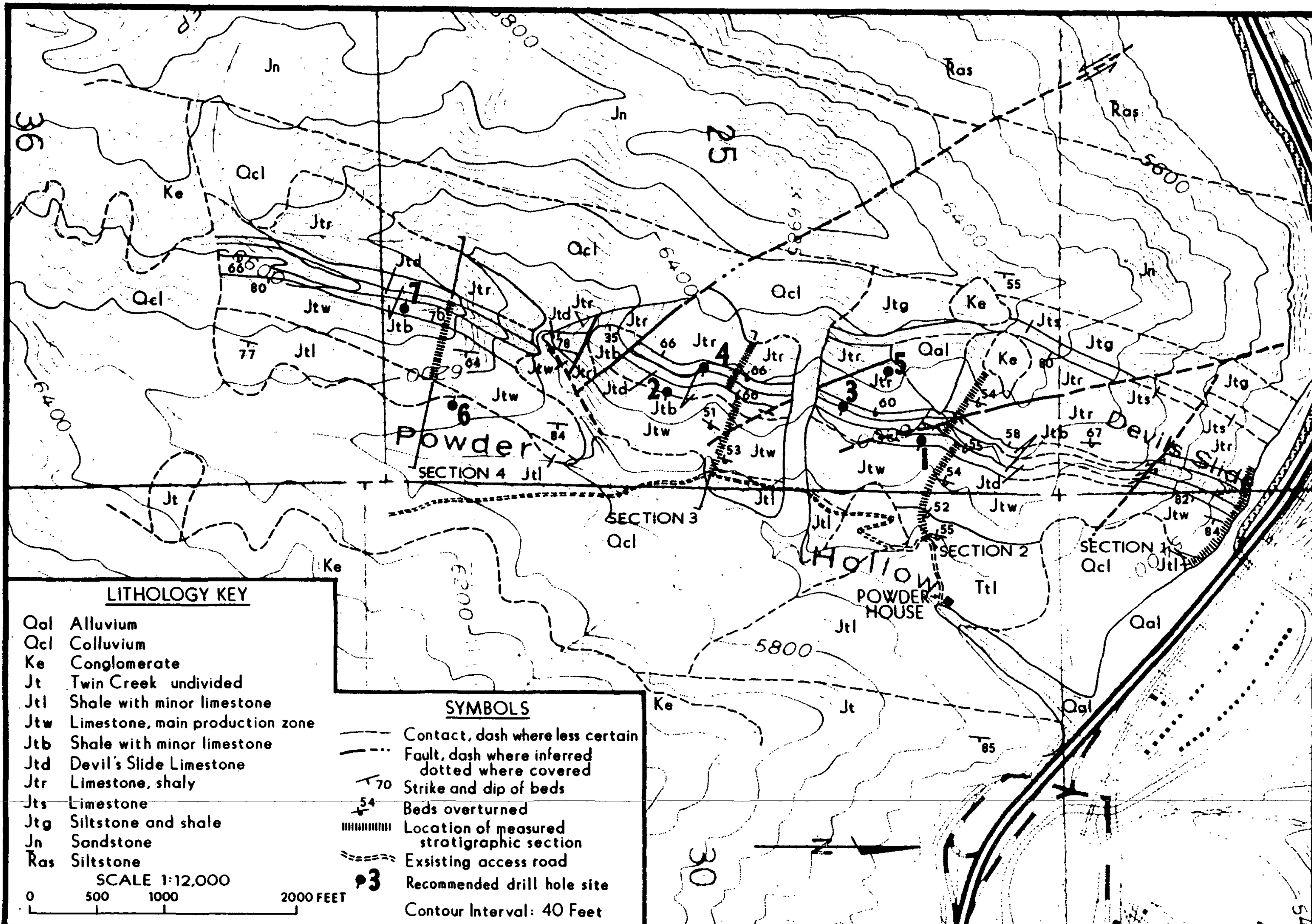

FIGURE 7 Recommended drill hole sites in Power Hollow

hole is recommended to test the Rich Member to determine if this thick unit is of acceptable quality and to test the mechanical character of waste rock between Rich and Devil's Slide beds. Also, the Devil's Slide unit in the south half of Powder Hollow should be drilled because of the high quality of the unit and the uncertainty of its thickness due to cover at both contacts. The following drill holes are therefore recommended for Powder Hollow.

Hole #	Depth (ft)	Inclination	Unit Tested
1	450	40° east	Watton Canyon
2	400	45° east	Watton Canyon
3	700	40° east	Devil's Slide and Watton Canyon
4	160	45° east	Devil's Slide
5	400	40° east	Rich Member
6	400	35° west	Watton Canyon
7	120	35° west	Devil's Slide
Total	2630		

The drill hole depths are estimates and each hole should be drilled to the base of the unit to be tested. Analysis of traverse samples indicates that the chemical quality of beds is fairly uniform along strike. Therefore, analysis of two holes per bed may be sufficient to confirm resource quality. All the recommended holes are needed to determine resource quantity, geometry and structural character of the resource beds.

KATHRYN CLAIMS AREA

Geology

Mississippian and Pennsylvanian rocks dip to the east in the Kathryn Claims area (Fig. 8). Two possible resource limestone formations are present, the Upper Humbug Formation and the Upper Doughnut Formation. The Lower Member of the Humbug Formation (Mhl) consists of sandstone with thin limestone and dolomite interbeds (Mullens and Laraway, 1973). The Upper Member of the Humbug Formation is divided into a lower unit (Mhm) and an upper unit (Mhc) on Figure 8. The lower unit is about 215 feet thick and consists of interbedded limestone and dolomitic limestone (Fig. 9). The upper unit is about 100 feet thick and consists of limestone with one thin dolomitic bed. All of the Upper Member consists of one- to four-foot thick micrite beds. Brachiopod and rugosa coral fossils are present in upper unit (Mhc).

The Lower Member of the Doughnut Formation overlies the Humbug Formation and consists of siltstone, shale and limestone (Mullens and Laraway, 1973). This formation is incompetent and poorly exposed in the map area.

The Upper Member of the Doughnut Formation is a dark gray micrite limestone containing chert nodules and is 236 feet thick (Fig. 10). Brachiopod and rugosa horn coral are abundant in the medium- to thick-bedded limestone.

The Round Valley Limestone overlies the Doughnut Formation and consists of chert-rich limestone, shale, and conglomerate. This formation was examined closely for possible high quality limestone but the abundant tan chert, shale partings and lack of thick, pure limestone units makes the formation unfavorable.

Beds in the Kathryn Claims area strike northeast and generally dip about 45° east. Much steeper dips occur near the northwest-trending faults, which

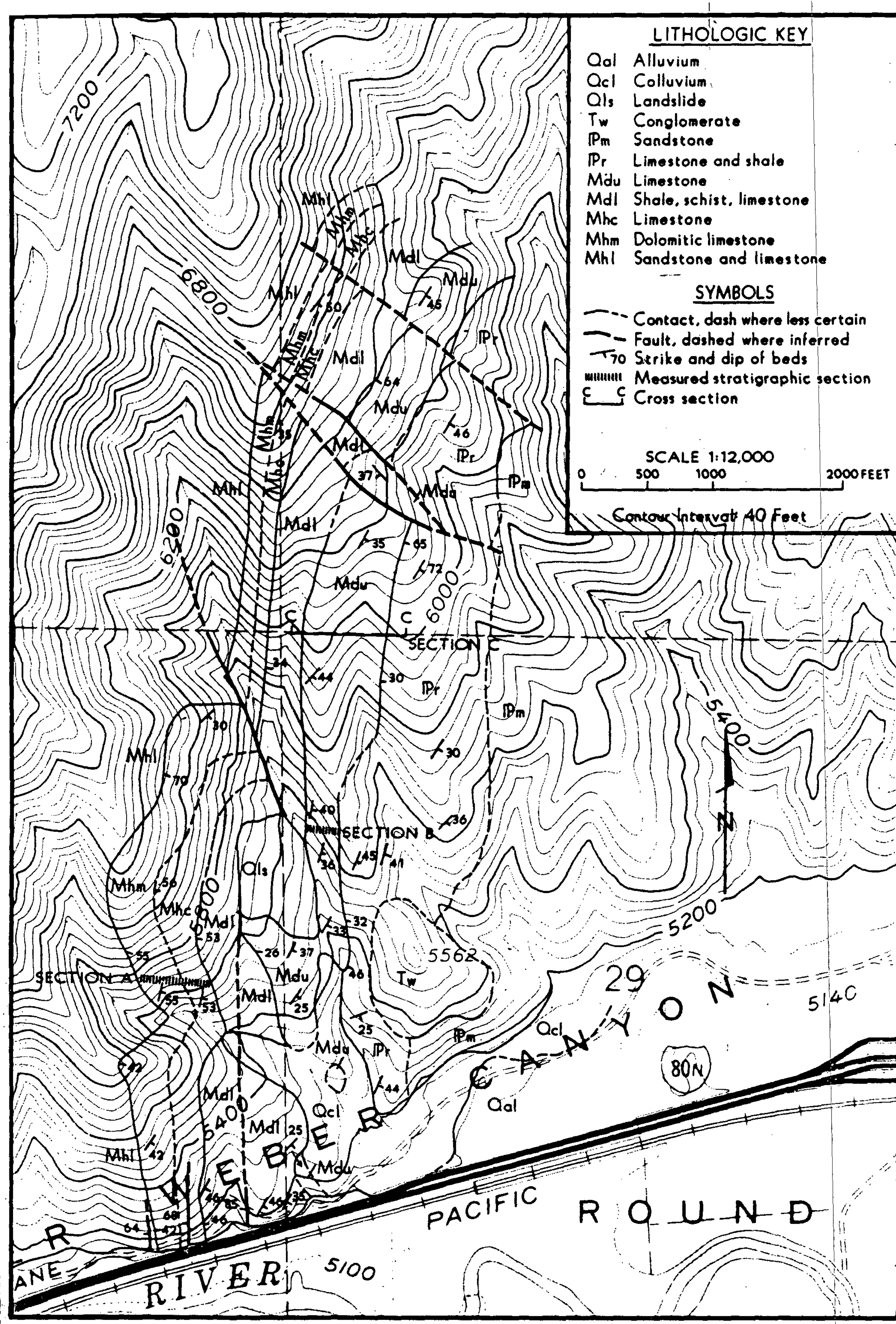

Figure 8 Geologic map of the Kathryn Claims area.

KATHRYN CLAIMS AREA

Description of Map Units
Explanation for Figure 8

Qal Alluvial deposits of the Weber River.

Qcl Colluvial and alluvial fan deposits, containing quartzite boulders of the Wasatch Formation and other materials.

Qls Landslide, mostly shale and siltstone.

Tw Wasatch Formation, rounded quartzite boulders with a reddish sand to clay matrix.

Pm Morgan Formation, reddish brown sandstone to siltstone.

Pr Round Valley Limestone, chert rich limestone, shale, limestone and chert conglomerate.

Mdu Doughnut Formation, Upper Member, 236-foot thick limestone, medium to thick bedded, dark-gray, micrite containing black chert nodules in some beds, brachipods and rugosa horn coral. Averages 50.0% CaO and 0.64% MgO.

Mdl Doughnut Formation, Lower Member, siltstone, shale and minor limestone beds, poor exposure.

Mhc Humbug Formation, upper limestone beds, 90 to 120 feet thick, dark to medium-gray micrite in 1- to 4-foot thick beds containing brachiopods and rugosa coral. Averages 49.5% CaO and 0.94% MgO.

Mhm Humbug Formation, limestone and dolomitic limestone, light to dark gray micrite, 1- to 3-foot thick beds. Averages 46.5% CaO and 2.85% MgO for 6 samples, MgO varies from 0.66 to 5.78%.

Mhl Humbug Formation, Lower Member, fine-grained sandstone and minor limestone and dolomite beds.

KATHRYN CLAIMS AREA - CROSS SECTION A

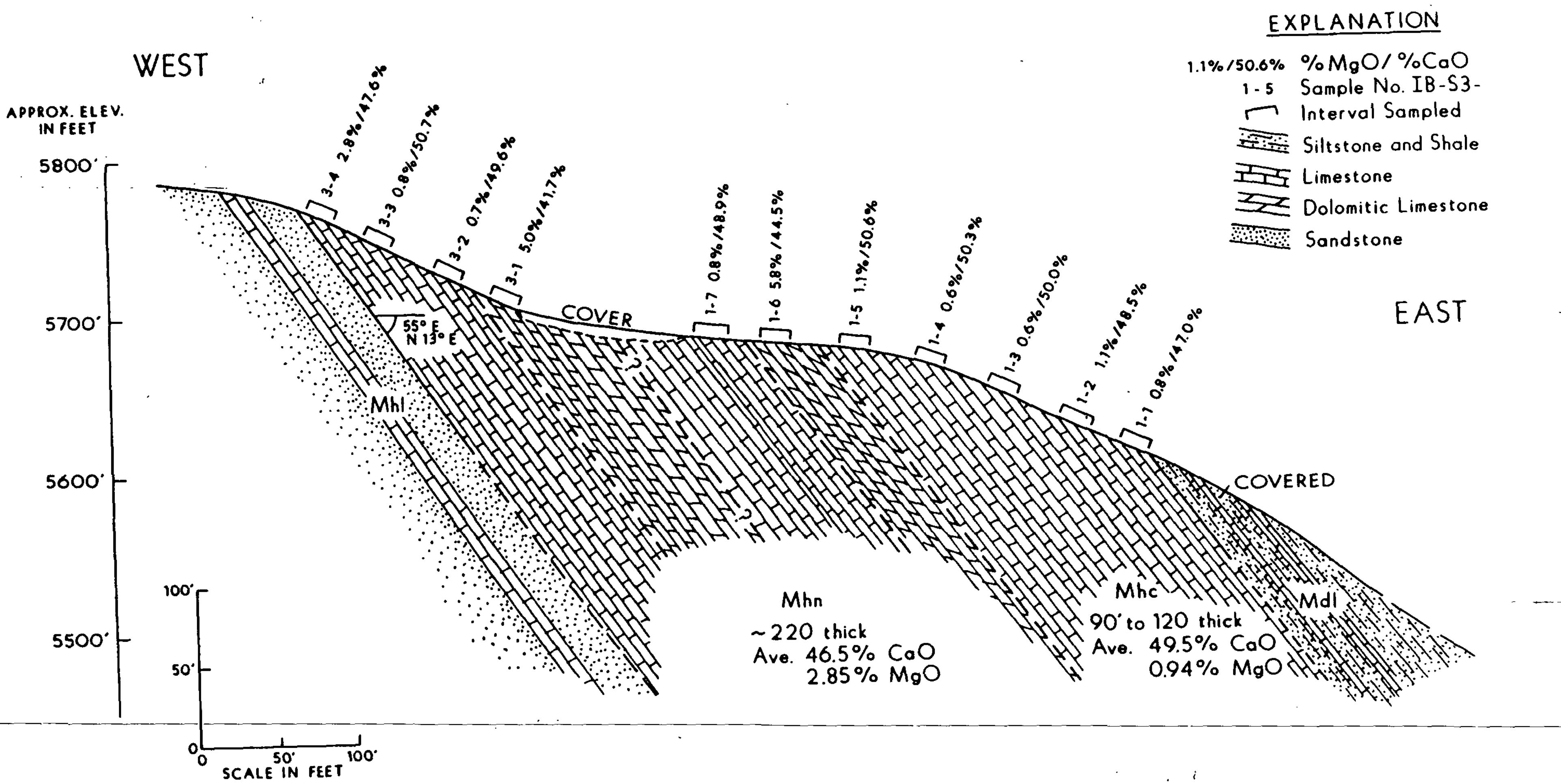

Figure 9 Cross section drawn from measured stratigraphic section trending N77°W across the Upper Humbug Formation. See Figure 8 for location of section.

KATHRYN CLAIMS AREA - CROSS SECTION B

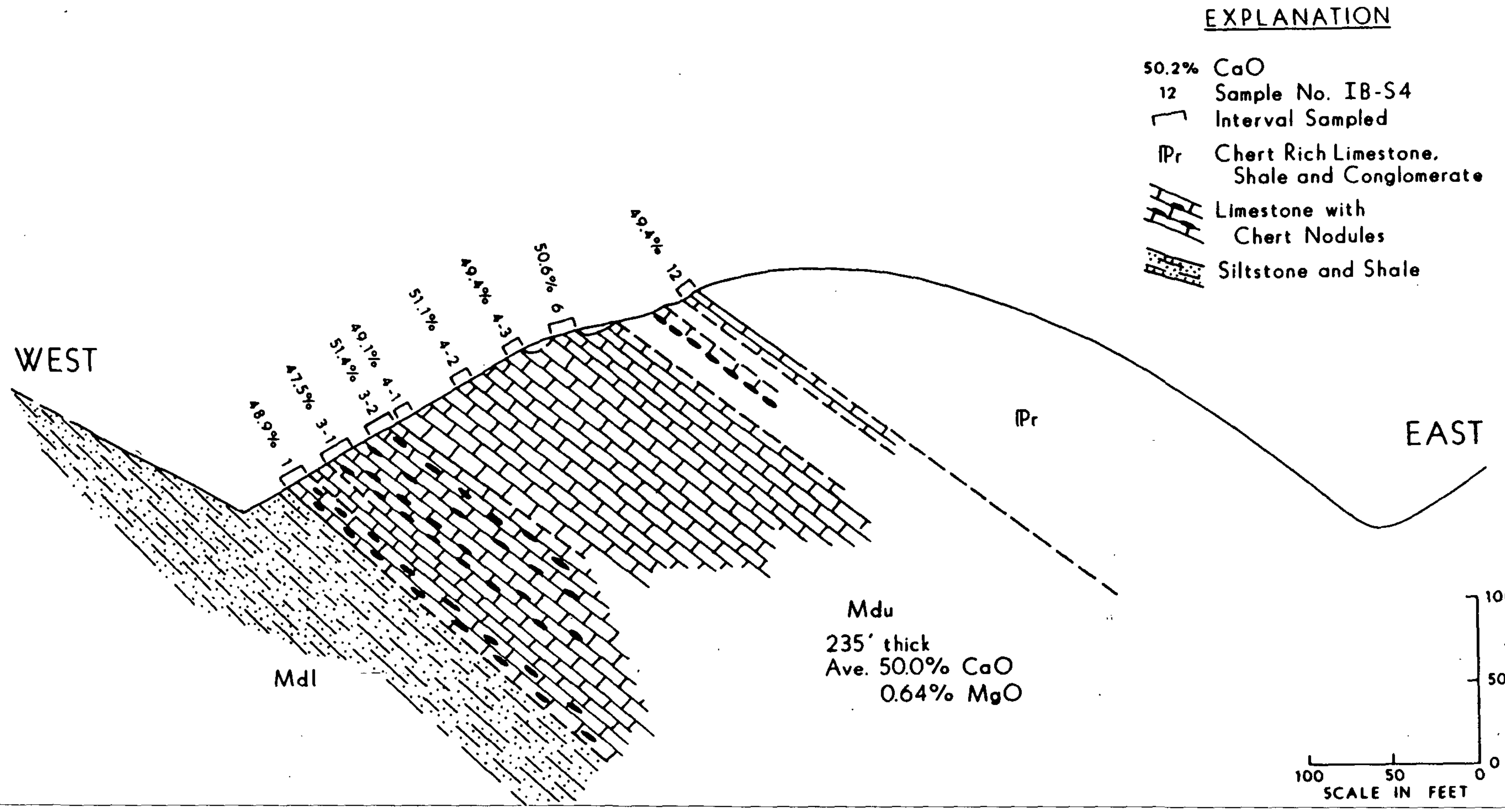

Figure 10 Cross section drawn from measured stratigraphic section of the Doughnut Formation, Upper member. See Figure 8 for location of section.

offset and rotate beds (Fig. 8). North- to north-northeast-trending faults dipping 64° to 85° west are exposed along the I-80N road cut. Because this trend is parallel to the outcrop of beds, the faults cannot be easily mapped on natural exposures. These faults may affect apparent thickness of formations in the study area.

Measured Stratigraphic Sections

Humbug Formation

Stratigraphic section A (see Fig. 8) was measured across the Upper Member of the Humbug Formation and used to draw cross section A (Fig. 9). The one- to four-foot thick light- to dark-gray micrite beds are uniform in physical character. Based on examination of the formation along the freeway cut, limestone beds continue under the covered part of the measured section. Field tests suggest that the dolomitic beds are lighter gray than the more pure limestone. The contact between the upper limestone unit (Mhc) and the dolomitic unit (Mhm) was selected on the basis of sample analysis and mapped on the aerial photographs.

Doughnut Formation

Stratigraphic section B (see Fig. 8) was measured across the Upper Member of the Doughnut Formation and used to draw cross-section B (Fig. 10). The Upper Doughnut Formation (Mdu) consists of 1- to 6-foot thick beds of dark gray micrite. Some beds contain nodules of black chert (Fig. 10). A second cross section (Fig. 11) was drawn across the Upper Doughnut Formation 1500 feet north of Section B (see Fig. 8) to facilitate calculation of reserves.

KATHRYN CLAIMS AREA – CROSS SECTION C

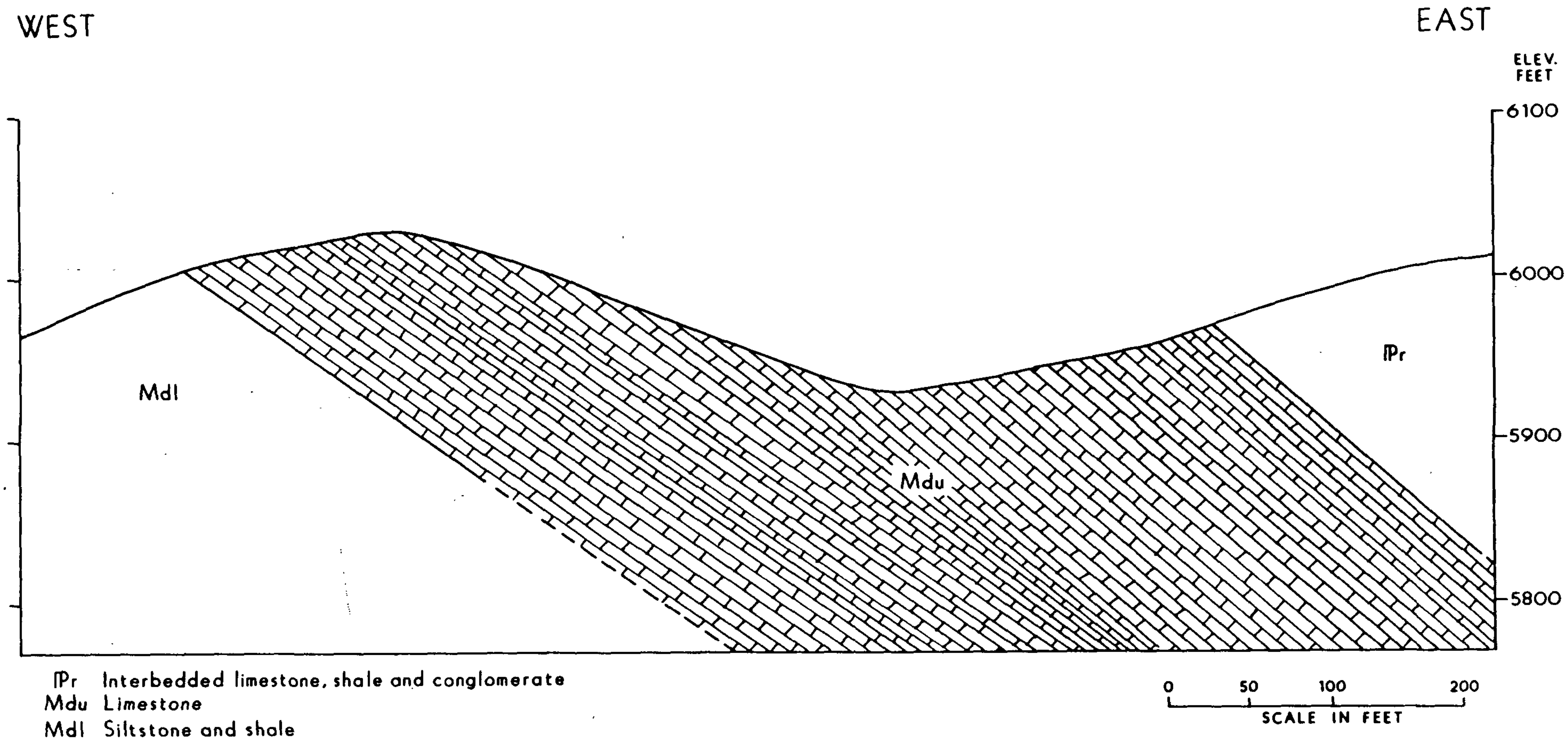

Figure 11 Cross section drawn from geologic map along boundary between sections 20 and 29, T4N, R3E. See Figure 8 for exact location.

Rock Quality

Humbug Formation

Eleven chip samples were collected from 20-foot sample intervals along measured Section A (Fig. 9) and analyses of these samples are tabulated in Table 2. The complete 37-element analyses of the samples are included in the Appendix. About the upper 100 feet of the formation is high-quality limestone with a weighted average of 49.5% of CaO and 0.94% MgO. Sample analyses were weighted relative to the stratigraphic thickness each represented for calculation of the average. The results are in close agreement with an average of 49.2% obtained from analyses of two core holes drilled into the formation by Ideal Basic Industries (Stienmier, 1979).

The lower unit (Mhm) consists of high-quality limestone (48.9 to 50.7% CaO) interbedded with dolomitic beds (Fig. 9). Although some chip samples contained up to 5.8% MgO, the weighted average for the 215-foot thick unit is 46.5% CaO and 2.85% MgO. This suggests, based on these few samples, that if the entire Upper Member of the Humbug Formation was quarried and blended, the resource would average 2.25 to 1.84% MgO, depending on whether an average computed by weighting each sample by the thickness represented (from mid point to mid point between samples) or an arithmetic average is used.

Doughnut Formation

Eight chip samples were collected across the Upper Member of the Doughnut Formation along stratigraphic Section B (Fig. 10) and analyses of these samples are tabulated in Table 2. The complete 37-element analyses of the samples are included in the Appendix. The sample traverse indicates high-quality rock for the entire thickness of 235 feet, with a weighted average of 50% CaO and 0.64% MgO. Each sample analysis was weighted relative to the thickness of the rock represented by the sample.

TABLE 2
ICP ANALYSIS OF SAMPLES FROM KATHRYN AREA, METZ HOLLOW AND TAGGARTS AREA
(Percent)

Sample #	CaO	MgO	Al_2O_3	Fe_2O_3	K_2O	Na_2O	SiO_2
Kathryn - Humbug Fm							
IB-S3 1-1	47.01	0.819	0.581	0.244	0.132	0.007	
IB-S3 1-2	48.52	1.21	0.546	0.246	0.186	0.007	
IB-S3 1-3	49.97	0.560	0.389	0.159	0.160	0.007	
IB-S3 1-4	50.30	0.594	0.528	0.193	0.216	0.007	
IB-S3 1-5	50.55	1.10	0.188	0.120	0.076	0.007	
IB-S3 1-6	44.45	5.78	0.476	0.268	0.194	0.014	
IB-S3 1-7	48.89	0.828	0.911	0.330	0.352	0.011	
IB-S3 3-1	41.70	5.04	0.881	0.411	0.368	0.017	
IB-S3 3-2	49.60	0.660	0.479	0.166	0.217	0.009	
IB-S3 3-3	50.68	0.843	0.193	0.129	0.087	0.007	
IB-S3 3-4	47.60	2.79	0.399	0.206	0.183	0.007	
Kathryn - Doughnut Fm							
IB-S4 1	48.90	0.488	0.461	0.371	0.062	0.017	
IB-S4 3-1	47.52	0.658	0.241	0.380	0.024	0.015	9.65
IB-S4 3-2	51.38	0.635	0.176	0.136	0.014	0.008	
IB-S4 4-1	49.11	1.31	0.114	0.105	0.007	0.015	2.51
IB-S4 4-2	51.10	0.554	0.126	0.107	0.008	0.010	
IB-S4 4-3	49.38	0.541	0.138	0.107	0.016	0.010	
IB-S4 6	50.60	0.707	0.231	0.175	0.031	0.011	
IB-S4 12	49.39	0.445	0.335	0.146	0.028	0.013	2.68
Metz Hollow							
IB-M 1	45.18	3.22	0.209	0.232	0.062	0.014	
IB-M 2	31.08	18.01	0.604	0.365	0.196	0.036	
Taggarts							
IB-T1	21.21	15.67	1.22	1.28	0.348	0.073	
IB-T2	34.48	6.26	0.460	0.178	0.194	0.023	

Reserve Estimates

Humbug Formation

Reserves for the Humbug Formation were estimated only for the upper unit (Mhc) of low magnesium limestone. Assuming a thickness of 90 feet, mining 280 feet down dip over the 2000 feet of exposure between the wash near measured Section A, and the northwest-trending fault to the north, 1.5 million yd^3 or 3.4 million tons are present. Another 1.4 million tons could be recovered along the outcrop trace between the fault and the north end of the mapped exposure. For this part of the Humbug Formation, only 100 feet down dip was included in the estimate because of the lower dip and overburden.

The lower limestone and dolomitic unit (Mhm) contains significant beds of high calcium, low magnesium rock as discussed above. If this rock were blended or dolomitic beds stripped out as waste, significant additional reserves could be added.

Doughnut Formation

Reserves estimates for the Doughnut Formation were divided into reserves in Section 29 and Section 20. In addition to the greater thickness of high quality rock, the Doughnut Formation has a more favorable outcrop configuration than the Humbug Formation. The wide exposure north of measured Section B (Fig. 8) allows more rock to be quarried with little overburden (Fig. 11). Assuming that rock could be mined 100 feet into the outcrop in the narrow exposure area south of Section B and to a depth of 150 feet north of Section B, reserves of 4 million yd^3 or 9.4 million tons are present in the NW 1/4 of Section 29. Another 9.7 million tons of Doughnut limestone are present in the SW 1/4 of Section 20.

In total, 23.9 million tons of resource rock are estimated to be present in the Kathryn Claims study area. The Humbug Formation accounts for 4.8

million tons of 49.5% CaO rock, 3.7 million tons of which is on the present Kathryn claims (Fig. 12). The 19 million tons of 50% CaO Doughnut Formation lies half in Section 29, which is owned by Scott Rees and family, and half in Section 20 to the north. Section 20 belongs to the State of Utah Division of Wildlife Resources. The state owns the mineral rights on some of its land in Weber Canyon, and Union Pacific Railroad owns the mineral rights on other state land. The state-owned mineral rights are withdrawn from mineral entry.

Drilling Program Design

The rock quality and reserve estimates discussed above are based on limited sampling and mapping. The data are sufficient to indicate the presence of resource rocks, but core drilling is necessary to confirm the resource and design a mining plan.

To confirm the quality and quantity of the resource, five core holes are recommended for the Doughnut Formation (Fig. 12). These holes would be drilled normal to the formation bedding and all but one are sited near the top of the formation. Hole inclination and expected depth to penetrate the base of the formation would be as follows:

Hole #	Depth (ft)	Inclination
1	200	65° west
2	300	52° west
3	250	56° west
4	250	40° west
5	150	50° west
Total	1150	

Five holes are needed to demonstrate resource quantity because of the faulting and variation in the dip of beds. Detailed chemical analyses of only two of these holes should be sufficient to determine rock quality and lateral

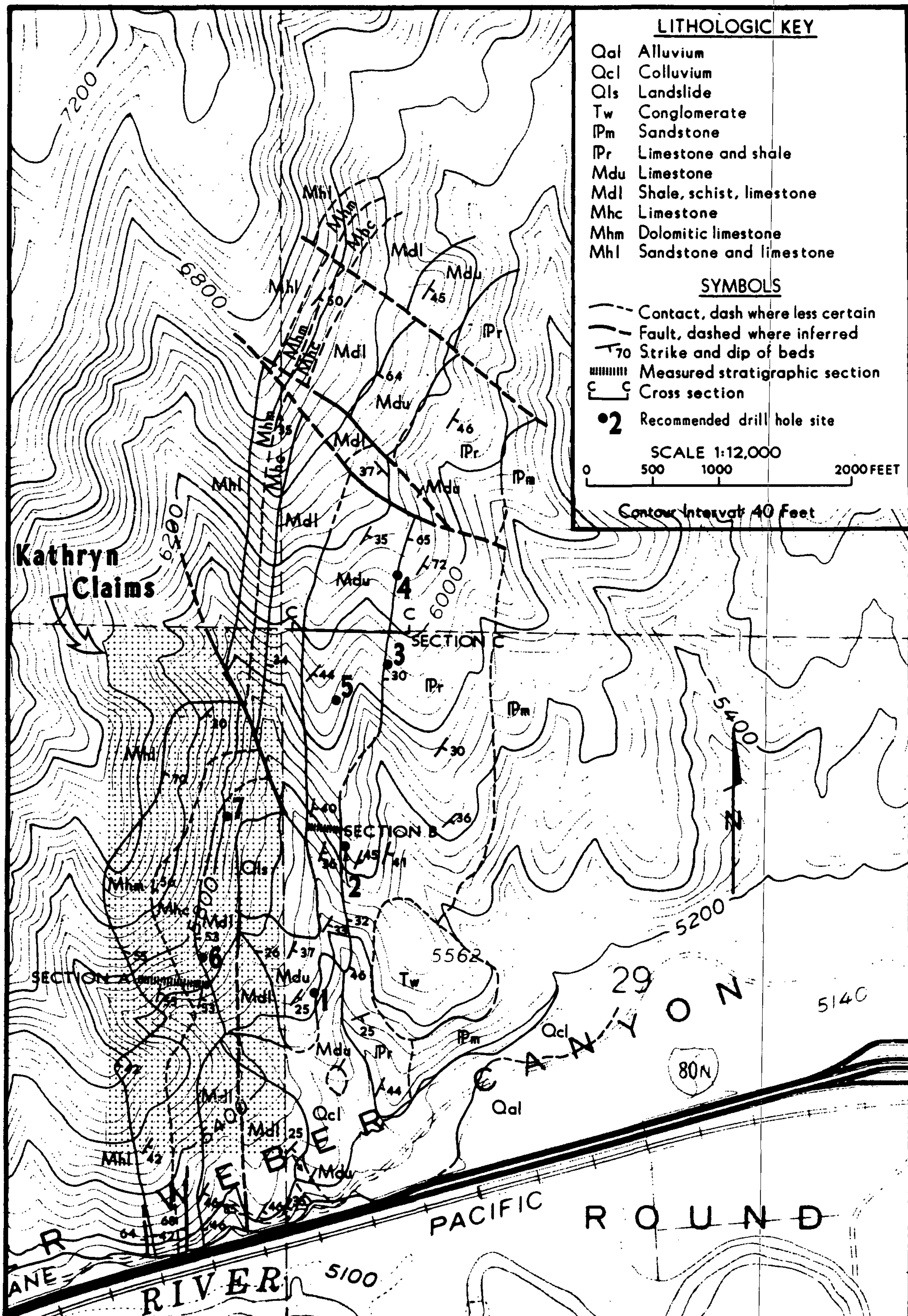

FIGURE 12. Recommended drill hole sites in the Kathryn Claims area

continuity of composition.

Two holes have been previously cored in the Humbug Formation (Stienmier, 1979), however these holes penetrated only the upper unit, Mhc. The sample traverse along Section A (Fig. 9) indicates the presence of significant zones of high-quality limestone in the lower unit, Mhm. The sampling is too sparse and sample intervals too large to define this possible resource.

Deep drill holes through the lower unit would be needed to determine if additional rock could be mined from between dolomitic beds or the entire unit blended to an acceptable resource. If Ideal Basic Industries is interested in defining additional reserves on the Kathryn Claims, drill holes 6 and 7 (Fig. 12) are recommended. Each hole would be inclined 40° and about 400 feet deep. A possible preliminary step, before drilling these holes, would be to complete detailed sampling along the freeway cut across the Humbug Formation to determine the distribution and thickness of dolomitic and high-quality limestone beds. If the results of this sample traverse were encouraging, drilling of holes 6 and 7, would be recommended.

METZ HOLLOW

Two samples were collected from the Metz Hollow area, which is located seven miles west of the Devil's Slide Plant (Fig. 1). The Lodgepole Limestone forms a long, north-trending ridge, north of the Weber River in the Metz Hollow area (Mullens and Laraway, 1973). An old quarry and kiln, where the pioneers made cement from the Lodgepole Limestone, are present near the highway. Sample M-1 was taken across the bedding of a thirty-foot thick exposure 1400 feet up Metz Hollow, and sample M-2 was taken across the beds exposed in the old quarry (Fig. 1). Analysis indicates high magnesium content in both samples (Table 2). In light of the better quality rock located in the Kathryn and Powder Hollow areas, no further work is recommended in the Metz Hollow area.

TAGGARTS AREA

The Taggarts area is located on the north side of the Weber River, three miles west of the cement plant. The Weber Quartzite underlies most of the Taggarts area (Mullens and Laraway, 1964), but a talus rock from the area had been analyzed as high quality limestone. A reconnaissance examination of the area found only a four-foot thick limestone bed and several calcareous chert units interbedded with thick quartzite near Taggarts. The Park City Formation is exposed about 2500 feet east of Taggarts (Mullens and Laraway, 1964). Samples T-1 and T-2 were collected across the middle and lower part, respectively, of the Park City Formation (Fig. 1). Analyses of these samples (Table 2) indicate an impure dolomite.

The examination of the Taggarts area shows that limestone of sufficient thickness and quality to be of interest is not present. No further study of the Taggarts area is recommended.

ANALYTICAL PRECISION

Two types of comparisons were made to document the reliability of analytical results presented in this report. Eight of the samples analyzed at the Earth Science Laboratory (ESL), University of Utah Research Institute (UURI) by Inductively Coupled Plasma (ICP) Spectrometry, were also analyzed using X-ray Fluorescence (XRF) by Ideal Basic Industries. Seven of the eight were samples collected as part of the study and one sample (1-1 on Table 3) was from the conveyor mill feed at the Devil's Slide Plant. Although some disagreement is evident between the two sets of analyses (Table 3), the average values for CaO by ICP and XRF are within 1.16%. The differences in MgO are somewhat greater but still comparable. There are considerable differences in SiO_2 values for seven of the eight samples. The ESL SiO_2 values were obtained by wet colorimetric analysis and should be fairly accurate. The high silica values in these eight samples are not representative of the formations studied. Samples S2-8-1, S2-18-1, S2-18-4 and S4-3-1 were analyzed for SiO_2 because high silica content was suspected. Samples S2-7-2, S2-14-1, S4-3-1 and S4-12, which average 6.4 percent SiO_2, are probably typical of the resources studied. CO_2 was analyzed in these eight samples and loss on ignition was also measured to obtain accurate analysis totals.

For a second comparison of analyses, six samples were analyzed by UURI for Ca by atomic absorption (AA) and these values compared to the numbers obtained by ICP and XRF (Table 4). The AA and ICP numbers are very similar and the XRF values differ slightly for some samples.

TABLE 3
COMPARISON OF ESL AND IDEAL ANALYSES*

	Sample #	CaO	MgO	Al_2O_3	Fe_2O_3	K_2O	Na_2O	P_2O_5	SiO_2	CO_2	LOI	Totals†
ESL	S2-7-2	42.91	1.31	2.53	1.04	0.742	0.121	0.045	10.3	36.0	37.87	97.00
Ideal		*41.13*	*1.26*	*5.09*	*1.25*	*0.87*	*0.11*	*0.07*	*17.45*			*101.14*
	S2-8-1	26.22	2.01	6.18	2.09	1.49	0.737	0.163	32.6	23.5	25.5	97.34
		26.16	*1.57*	*8.24*	*2.88*	*1.30*	*0.42*	*0.13*	*33.3*			*96.38*
	S2-14-1	48.83	1.06	0.682	0.489	0.164	0.094	0.018	2.81	41.8	42.4	96.50
		51.09	*0.99*	*1.56*	*0.75*	*0.13*	*0.13*	*0.03*	*4.13*			*100.2*
	S2-18-1	42.49	1.94	3.36	1.40	0.768	0.247	0.055	11.9	35.8	36.7	99.06
		38.26	*1.44*	*5.82*	*1.65*	*0.81*	*0.16*	*0.06*	*20.3*			*100.59*
	S2-18-4	40.32	1.70	3.88	1.61	0.983	0.163	0.053	13.7	34.2	35.9	98.53
		36.86	*1.33*	*6.32*	*1.75*	*1.04*	*0.09*	*0.06*	*21.44*			*99.6*
	S4-3-1	47.52	0.66	0.241	0.38	.024	.015	0.034	9.65	39.0	39.7	98.25
		46.60	*0.80*	*0.71*	*0.91*	*<.06*	*.05*	*0.04*	*15.84*			*102.5*
	S4-12	49.39	0.46	0.335	0.146	0.028	0.013	0.030	2.68	41.4	43.1	96.23
		53.12	*0.71*	*1.02*	*0.60*	*<0.06*	*0.10*	*0.04*	*4.22*			*102.35*
	1-1	40.02	2.32	3.59	1.59	0.936	0.314	0.086	15.4	34.6	35.0	99.45
		40.50	*1.36*	*3.53*	*1.63*	*0.57*	*0.15*	*0.06*	*11.17*			*92.41*
Average:	ESL	42.21	1.43						12.38			
	Ideal	*41.72*	*1.18*						*15.98*			

* ESL analyses are by Inductively Coupled Plasma Spectrometry (ICP). Ideal analyses are by X-ray Fluorescence (XRF). CaO and MgO values converted from carbonate using 0.560 ($CaCO_3$) = CaO value and 0.478 ($MgCO_3$) = MgO value.

† Totals for ESL analysis include LOI (loss on ignition), which consists of CO_2 plus water and free carbon. Values for TiO, BaO and MnO are a small fraction of one percent, but appear on the 37 element analyses in the Appendix, and are included in the ESL totals.

TABLE 4
COMPARISON OF Ca CONTENT BY AA, ICP AND XRF FOR SELECTED SAMPLES

Sample #	AA	ICP	XRF*
S2-7-1	29.3	29.96	--
S2-8-1	19.0	18.73	18.70
S2-14-1	34.05	34.9	36.52
S2-18-1	29.2	30.4	27.35
S4-3-1	32.4	33.96	33.31
S4-12	34.5	35.30	37.97

* Ca values converted from $CaCO_3$ values using 0.4005 ($CaCO_3$) = Ca value.

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APPENDIX

Thirty-seven element ICP analyses of samples.

Sample analyses are arranged in the same order as in Table 1 and Table 2.

LIMESTONES

1 IB-S2 2-1

ELEMENT		CONCENTRATION
NA	% OX.	0.197
K	% OX.	1.12
CA	% OX.	40.52
MG	% OX.	1.82
FE	% OX.	1.54
AL	% OX.	3.78
SI	% OX.	< 3.21
TI	% OX.	0.165
P	% OX.	0.075
SR	PPM	323
BA	% OX.	0.009
V	PPM	< 500
CR	PPM	14
MN	% OX.	0.040
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	14
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	79
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	15
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	28
LA	PPM	13
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	52.484

LIMESTONES

2 IB-S2 5-1

ELEMENT		CONCENTRATION
NA	% OX.	0.156
K	% OX.	1.20
CA	% OX.	37.85
MG	% OX.	1.61
FE	% OX.	1.81
AL	% OX.	3.63
SI	% OX.	< 3.21
TI	% OX.	0.157
P	% OX.	0.061
SR	PPM	335
BA	% OX.	0.011
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.076
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	36
MO	PPM	< 100
PB	PPM	575
ZN	PPM	2605
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	7
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	15
LA	PPM	11
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	49.759

LIMESTONES

3 IB-S2 7-1

ELEMENT			CONCENTRATION
NA	% OX.		0.065
K	% OX.		0.821
CA	% OX.		41.92
MG	% OX.		1.36
FE	% OX.		1.11
AL	% OX.		2.40
SI	% OX.	<	3.21
TI	% OX.		0.105
P	% OX.		0.043
SR	PPM		259
BA	% OX.		0.007
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.027
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		34
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM		206
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		51.058

LIMESTONES

4 IB-S2 7-2

ELEMENT			CONCENTRATION
NA	% OX.		0.121
K	% OX.		0.742
CA	% OX.		42.91
MG	% OX.		1.31
FE	% OX.		1.04
AL	% OX.		2.53
SI	% OX.	<	3.21
TI	% OX.		0.100
P	% OX.		0.045
SR	PPM		284
BA	% OX.		0.012
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.023
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		23
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		7
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.044

LIMESTONES

5 IB-S2 7-3

ELEMENT			CONCENTRATION
NA	% OX.		0.119
K	% OX.		0.637
CA	% OX.		43.82
MG	% OX.		1.51
FE	% OX.		0.822
AL	% OX.		2.12
SI	% OX.	<	3.21
TI	% OX.		0.082
P	% OX.		0.038
SR	PPM		244
BA	% OX.		0.011
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.021
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		12
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		8
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.393

LIMESTONES

6 IB-S2 7-4

ELEMENT			CONCENTRATION
NA	% OX.		0.280
K	% OX.		1.28
CA	% OX.		38.97
MG	% OX.		1.68
FE	% OX.		1.60
AL	% OX.		4.20
SI	% OX.	<	3.21
TI	% OX.		0.166
P	% OX.		0.078
SR	PPM		263
BA	% OX.		0.015
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.029
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		49
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		15
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		16
LA	PPM		13
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		51.505

LIMESTONES

1 IB-S5 2-1

ELEMENT			CONCENTRATION
NA	% OX.		0.171
K	% OX.		1.05
CA	% OX.		40.91
MG	% OX.		1.74
FE	% OX.		1.14
AL	% OX.		3.20
SI	% OX.	<	3.21
TI	% OX.		0.132
P	% OX.		0.077
SR	PPM		268
BA	% OX.		0.011
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.029
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		30
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		14
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		23
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		51.661

LIMESTONES

2 IB-S5 2-2

ELEMENT			CONCENTRATION
NA	% OX.		0.131
K	% OX.		0.627
CA	% OX.		45.47
MG	% OX.		1.48
FE	% OX.		0.822
AL	% OX.		2.13
SI	% OX.	<	3.21
TI	% OX.		0.084
P	% OX.		0.045
SR	PPM		244
BA	% OX.		0.009
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.023
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		15
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		14
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		16
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		54.041

LIMESTONES

3 10-55 2-3

ELEMENT		CONCENTRATION
NA	% OX.	0.147
K	% OX.	0.915
CA	% OX.	40.04
MG	% OX.	3.24
FE	% OX.	1.19
AL	% OX.	2.81
SI	% OX.	< 3.21
TI	% OX.	0.125
P	% OX.	0.061
SR	PPM	310
BA	% OX.	0.007
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.035
CO	PPM	2
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	21
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	14
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	20
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	51.779

LIMESTONES

7 IB-S2 8-1

ELEMENT			CONCENTRATION
NA	% OX.		0.737
K	% OX.		1.49
CA	% OX.		26.22
MG	% OX.		2.01
FE	% OX.		2.09
AL	% OX.		6.18
SI	% OX.	<	3.21
TI	% OX.		0.249
P	% OX.		0.163
SR	PPM		168
BA	% OX.		0.064
V	PPM	<	500
CR	PPM		9
MN	% OX.		0.034
CO	PPM		4
NI	PPM		11
CU	PPM		18
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		52
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		34
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		49
LA	PPM		30
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		42.452

LIMESTONES

9

IB-S5 3

ELEMENT		CONCENTRATION
NA	% OX.	0.580
K	% OX.	1.32
CA	% OX.	28.70
MG	% OX.	2.48
FE	% OX.	1.64
AL	% OX.	5.61
SI	% OX.	< 3.21
TI	% OX.	0.217
P	% OX.	0.143
SR	PPM	186
BA	% OX.	0.084
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.026
CO	PPM	4
NI	PPM	< 10.0
CU	PPM	11
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	15
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	38
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	40
LA	PPM	24
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	43.999

LIMESTONES

8 IB-S2 9-1

ELEMENT		CONCENTRATION
NA	% OX.	0.349
K	% OX.	0.551
CA	% OX.	44.26
MG	% OX.	1.20
FE	% OX.	0.720
AL	% OX.	2.13
SI	% OX.	< 3.21
TI	% OX.	0.086
P	% OX.	0.044
SR	PPM	191
BA	% OX.	0.010
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.019
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	10
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	7
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	< 10.0
LA	PPM	11
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	52.580

LIMESTONES

9 IB-S2 9-2

ELEMENT			CONCENTRATION
NA	% OX.		0.203
K	% OX.		0.387
CA	% OX.		46.05
MG	% OX.		0.768
FE	% OX.		0.637
AL	% OX.		1.47
SI	% OX.	<	3.21
TI	% OX.		0.056
P	% OX.		0.031
SR	PPM		168
BA	% OX.		0.006
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.019
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		259
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.836

LIMESTONES

10 IB-S2 9-3

ELEMENT			CONCENTRATION
NA	% OX.		0.196
K	% OX.		0.651
CA	% OX.		43.57
MG	% OX.		1.65
FE	% OX.		0.849
AL	% OX.		2.35
SI	% OX.	<	3.21
TI	% OX.		0.087
P	% OX.		0.049
SR	PPM		201
BA	% OX.		0.007
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.018
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		24
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		9
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM		10
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.634

LIMESTONES

11 IB-S2 9-4

ELEMENT			CONCENTRATION
NA	% OX.		0.077
K	% OX.		0.556
CA	% OX.		45.88
MG	% OX.		1.18
FE	% OX.		0.904
AL	% OX.		1.82
SI	% OX.	<	3.21
TI	% OX.		0.080
P	% OX.		0.034
SR	PPM		176
BA	% OX.		0.007
V	PPM	<	500
CR	PPM		5
MN	% OX.		0.022
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		100
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM		224
U	PPM	<	5000
TE	PPM	<	100
SN	PPM		29
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM		13
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		53.773

LIMESTONES

4 IB-S5 4-1

ELEMENT			CONCENTRATION
NA	% OX.		0.040
K	% OX.		0.587
CA	% OX.		45.46
MG	% OX.		0.965
FE	% OX.		0.824
AL	% OX.		1.96
SI	% OX.	<	3.21
TI	% OX.		0.081
P	% OX.		0.036
SR	PPM		161
BA	% OX.		0.007
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.029
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		13
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		8
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		18
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		53.196

LIMESTONES

5 | IB-S5 4-2

ELEMENT		CONCENTRATION
NA	% OX.	0.079
K	% OX.	0.319
CA	% OX.	48.72
MG	% OX.	1.39
FE	% OX.	0.529
AL	% OX.	1.09
SI	% OX.	< 3.21
TI	% OX.	0.046
P	% OX.	0.031
SR	PPM	164
BA	% OX.	0.010
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.019
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	26
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	7
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	14
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	55.448

LIMESTONES

12 IB-S6 5-1

ELEMENT			CONCENTRATION
NA	% OX.		0.194
K	% OX.		0.661
CA	% OX.		42.25
MG	% OX.		1.41
FE	% OX.		0.788
AL	% OX.		2.26
SI	% OX.	<	3.21
TI	% OX.		0.096
P	% OX.		0.060
SR	PPM		181
BA	% OX.		0.009
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.023
CO	PPM		3
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		13
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		13
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		19
LA	PPM		10
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		50.966

LIMESTONES

13 IB-56 5-2

ELEMENT			CONCENTRATION
NA	% OX.		0.125
K	% OX.		0.504
CA	% OX.		43.92
MG	% OX.		1.33
FE	% OX.		0.789
AL	% OX.		1.78
SI	% OX.	<	3.21
TI	% OX.		0.072
P	% OX.		0.039
SR	PPM		210
BA	% OX.		0.011
V	PPM	<	500
CR	PPM		8
MN	% OX.		0.022
CO	PPM		3
NI	PPM		13
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		12
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		12
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		13
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		51.798

LIMESTONES

12 IB-S2 13-1

ELEMENT			CONCENTRATION
NA	% OX.		0.184
K	% OX.		0.400
CA	% OX.		47.50
MG	% OX.		1.41
FE	% OX.		0.633
AL	% OX.		1.65
SI	% OX.	<	3.21
TI	% OX.		0.076
P	% OX.		0.036
SR	PPM		193
BA	% OX.		0.014
V	PPM	<	500
CR	PPM		4
MN	% OX.		0.021
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM	<	10.0
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		5
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM		11
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		55.136

LIMESTONES

13 IB-S2 14-1

ELEMENT			CONCENTRATION
NA	% OX.		0.094
K	% OX.		0.164
CA	% OX.		48.83
MG	% OX.		1.06
FE	% OX.		0.486
AL	% OX.		0.682
SI	% OX.	<	3.21
TI	% OX.		0.034
P	% OX.		0.018
SR	PPM		261
BA	% OX.		0.006
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.013
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		41
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM		212
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		5
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		11
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		54.596

LIMESTONES

14 IB-S5-6

ELEMENT			CONCENTRATION
NA	% OX.		0.055
K	% OX.		0.166
CA	% OX.		48.83
MG	% OX.		1.07
FE	% OX.		0.358
AL	% OX.		0.645
SI	% OX.	<	3.21
TI	% OX.		0.032
P	% OX.		0.018
SR	PPM		272
BA	% OX.		0.007
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.012
CO	PPM		2
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		49
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		5
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		12
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		54.406

LIMESTONES

10 IB-S6 2

ELEMENT			CONCENTRATION
NA	% OX.		0.051
K	% OX.		0.155
CA	% OX.		48.97
MG	% OX.		1.19
FE	% OX.		0.440
AL	% OX.		0.592
SI	% OX.	<	3.21
TI	% OX.		0.028
P	% OX.		0.028
SR	PPM		236
BA	% OX.		0.006
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.015
CO	PPM		2
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		54
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		10
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		54.686

LIMESTONES

11 IB-S6 3

ELEMENT			CONCENTRATION
NA	% OX.		0.362
K	% OX.		0.366
CA	% OX.		43.94
MG	% OX.		1.47
FE	% OX.		0.532
AL	% OX.		1.90
SI	% OX.	<	3.21
TI	% OX.		0.076
P	% OX.		0.043
SR	PPM		165
BA	% OX.		0.011
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.022
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM		10
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		25
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		11
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		16
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		51.928

LIMESTONES

14 IB-S2 18-1

ELEMENT			CONCENTRATION
NA	% OX.		0.247
K	% OX.		0.768
CA	% OX.		42.49
MG	% OX.		1.94
FE	% OX.		1.40
AL	% OX.		3.36
SI	% OX.	<	3.21
TI	% OX.		0.156
P	% OX.		0.055
SR	PPM		506
BA	% OX.		0.008
V	PPM	<	500
CR	PPM		20
MN	% OX.		0.033
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		14
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		7
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		12
LA	PPM		18
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		53.672

LIMESTONES

15 IB S2 18-2

ELEMENT			CONCENTRATION
NA	% OX.		0.081
K	% OX.		1.07
CA	% OX.		40.56
MG	% OX.		1.45
FE	% OX.		1.82
AL	% OX.		4.22
SI	% OX.	<	3.21
TI	% OX.		0.186
P	% OX.		0.055
SR	PPM		355
BA	% OX.		0.007
V	PPM	<	500
CR	PPM		18
MN	% OX.		0.038
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM		11
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		28
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		8
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		15
LA	PPM		19
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.700

LIMESTONES

16 IB-S2 18-3

ELEMENT			CONCENTRATION
NA	% OX.		0.090
K	% OX.		0.699
CA	% OX.		43.22
MG	% OX.		1.35
FE	% OX.		1.32
AL	% OX.		2.91
SI	% OX.	<	3.21
TI	% OX.		0.128
P	% OX.		0.041
SR	PPM		424
BA	% OX.		0.007
V	PPM	<	500
CR	PPM		11
MN	% OX.		0.033
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		26
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		6
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM		17
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		53.002

LIMESTONES

17 IB-S2 18-4

ELEMENT			CONCENTRATION
NA	% OX.		0.163
K	% OX.		0.983
CA	% OX.		40.32
MG	% OX.		1.70
FE	% OX.		1.61
AL	% OX.		3.88
SI	% OX.	<	3.21
TI	% OX.		0.178
P	% OX.		0.053
SR	PPM		376
BA	% OX.		0.009
V	PPM	<	500
CR	PPM		42
MN	% OX.		0.034
CO	PPM	<	2.00
NI	PPM		19
CU	PPM		10
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		32
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		8
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		16
LA	PPM		21
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.155

LIMESTONES

6 TB-S5 8-1

ELEMENT			CONCENTRATION
NA	% OX.		0.129
K	% OX.		0.748
CA	% OX.		42.43
MG	% OX.		1.75
FE	% OX.		1.38
AL	% OX.		3.05
SI	% OX.	<	3.21
TI	% OX.		0.133
P	% OX.		0.054
SR	PPM		411
BA	% OX.		0.007
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.034
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		21
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		11
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		22
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.939

LIMESTONES

7 IB-S5 8-2

ELEMENT			CONCENTRATION
NA	% OX.		0.200
K	% OX.		0.946
CA	% OX.		39.97
MG	% OX.		1.74
FE	% OX.		1.57
AL	% OX.		4.00
SI	% OX.	<	3.21
TI	% OX.		0.178
P	% OX.		0.066
SR	PPM		375
BA	% OX.		0.017
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.034
CO	PPM		3
NI	PPM	<	10.0
CU	PPM		10
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		16
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		16
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		30
LA	PPM		15
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		51.919

LIMESTONES

8 IB-S5 8-3

ELEMENT		CONCENTRATION
NA	% OX.	0.098
K	% OX.	0.545
CA	% OX.	45.33
MG	% OX.	1.32
FE	% OX.	1.08
AL	% OX.	2.28
SI	% OX.	< 3.21
TI	% OX.	0.106
P	% OX.	0.039
SR	PPM	334
BA	% OX.	0.007
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.032
CO	PPM	3
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	13
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	9
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	20
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	54.043

LIMESTONES

18 IB-S3 1-1

ELEMENT			CONCENTRATION
NA	% OX.	<	0.007
K	% OX.		0.132
CA	% OX.		47.01
MG	% OX.		0.819
FE	% OX.		0.244
AL	% OX.		0.581
SI	% OX.	<	3.21
TI	% OX.		0.030
P	% OX.	<	0.005
SR	PPM		324
BA	% OX.		0.005
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.016
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM	<	10.0
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM		243
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM		11
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.060

LIMESTONES

18 IB-S3 1-2

ELEMENT		CONCENTRATION
NA	% OX.	< 0.007
K	% OX.	0.186
CA	% OX.	48.52
MG	% OX.	1.21
FE	% OX.	0.246
AL	% OX.	0.546
SI	% OX.	< 3.21
TI	% OX.	0.027
P	% OX.	0.006
SR	PPM	387
BA	% OX.	0.006
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.009
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	20
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	< 4.00
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	< 10.0
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	53.980

LIMESTONES

20 IB-S3 1-3

ELEMENT		CONCENTRATION	
NA	% OX.	<	0.007
K	% OX.		0.160
CA	% OX.		49.97
MG	% OX.		0.560
FE	% OX.		0.159
AL	% OX.		0.389
SI	% OX.	<	3.21
TI	% OX.		0.023
P	% OX.	<	0.005
SR	PPM		389
BA	% OX.		0.007
V	PPM	<	500
CR	PPM		8
MN	% OX.		0.005
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		12
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		54.489

LIMESTONES

21 IB S3 1-4

ELEMENT		CONCENTRATION	
NA	% OX.	<	0.007
K	% OX.		0.216
CA	% OX.		50.30
MG	% OX.		0.594
FE	% OX.		0.193
AL	% OX.		0.528
SI	% OX.	<	3.21
TI	% OX.		0.029
P	% OX.	<	0.005
SR	PPM		357
BA	% OX.		0.007
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.005
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		14
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		12
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		55.093

LIMESTONES

22 IB-S3 1-5

ELEMENT		CONCENTRATION
NA	% OX.	< 0.007
K	% OX.	0.076
CA	% OX.	50.55
MG	% OX.	1.10
FE	% OX.	0.120
AL	% OX.	0.188
SI	% OX.	< 3.21
TI	% OX.	0.013
P	% OX.	< 0.005
SR	PPM	301
BA	% OX.	0.006
V	PPM	< 500
CR	PPM	5
MN	% OX.	0.002
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	15
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	< 4.00
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	10
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	55.273

LIMESTONES

23 IB-S3 1-6

ELEMENT			CONCENTRATION
NA	% OX.		0.014
K	% OX.		0.194
CA	% OX.		44.45
MG	% OX.		5.78
FE	% OX.		0.268
AL	% OX.		0.476
SI	% OX.	<	3.21
TI	% OX.		0.020
P	% OX.	<	0.005
SR	PPM		244
BA	% OX.		0.007
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.004
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM	<	10.0
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		54.427

LIMESTONES

24 IB-S3 1-7

ELEMENT			CONCENTRATION
NA	% OX.		0.011
K	% OX.		0.352
CA	% OX.		48.89
MG	% OX.		0.828
FE	% OX.		0.330
AL	% OX.		0.911
SI	% OX.	<	3.21
TI	% OX.		0.038
P	% OX.		0.010
SR	PPM		276
BA	% OX.		0.007
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.007
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM	<	10.0
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		11
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		54.592

LIMESTONES

25 IB-S3 3-1

ELEMENT		CONCENTRATION
NA	% OX.	0.017
K	% OX.	0.368
CA	% OX.	41.70
MG	% OX.	5.04
FE	% OX.	0.411
AL	% OX.	0.881
SI	% OX.	< 3.21
TI	% OX.	0.038
P	% OX.	0.006
SR	PPM	178
BA	% OX.	0.006
V	PPM	< 500
CR	PPM	9
MN	% OX.	0.006
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	< 10.0
CD	PPM	< 10.0
AG	PPM	43
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	< 4.00
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	< 10.0
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	51.675

LIMESTONES

26 IB-S3 3-2

ELEMENT			CONCENTRATION
NA	% OX.		0.009
K	% OX.		0.217
CA	% OX.		49.60
MG	% OX.		0.660
FE	% OX.		0.166
AL	% OX.		0.479
SI	% OX.	<	3.21
TI	% OX.		0.027
P	% OX.	<	0.005
SR	PPM		255
BA	% OX.		0.006
V	PPM	<	500
CR	PPM		11
MN	% OX.		0.004
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM	<	10.0
CD	PPM	<	10.0
AG	PPM		14
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		11
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300

TOTAL 54.383

LIMESTONES

27 IB-S3 3-3

ELEMENT			CONCENTRATION
NA	% OX.	<	0.007
K	% OX.		0.087
CA	% OX.		50.68
MG	% OX.		0.843
FE	% OX.		0.129
AL	% OX.		0.193
SI	% OX.	<	3.21
TI	% OX.		0.013
P	% OX.	<	0.005
SR	PPM		189
BA	% OX.		0.006
V	PPM	<	500
CR	PPM		35
MN	% OX.		0.003
CO	PPM	<	2.00
NI	PPM		28
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM	<	10.0
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		10
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		55.174

LIMESTONES

28 IB-S3 3-4

ELEMENT		CONCENTRATION	
NA	% OX.	<	0.007
K	% OX.		0.183
CA	% OX.		47.60
MG	% OX.		2.79
FE	% OX.		0.206
AL	% OX.		0.399
SI	% OX.	<	3.21
TI	% OX.		0.020
F	% OX.	<	0.005
SR	PPM		165
BA	% OX.		0.009
V	PPM	<	500
CR	PPM		11
MN	% OX.		0.005
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM	<	10.0
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300

TOTAL 54.433

LIMESTONES

33 IB-S4 -1

ELEMENT			CONCENTRATION
NA	% OX.		0.017
K	% OX.		0.062
CA	% OX.		48.90
MG	% OX.		0.488
FE	% OX.		0.371
AL	% OX.		0.461
SI	% OX.	<	3.21
TI	% OX.		0.025
P	% OX.		0.019
SR	PPM		329
BA	% OX.		0.005
V	PPM	<	500
CR	PPM		13
MN	% OX.		0.010
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		18
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		53.569

LIMESTONES

34 IB-S4 3-1

ELEMENT		CONCENTRATION
NA	% OX.	0.015
K	% OX.	0.024
CA	% OX.	47.52
MG	% OX.	0.658
FE	% OX.	0.380
AL	% OX.	0.241
SI	% OX.	< 3.21
TI	% OX.	0.014
P	% OX.	0.034
SR	PPM	314
BA	% OX.	0.005
V	PPM	< 500
CR	PPM	26
MN	% OX.	0.006
CO	PPM	< 2.00
NI	PPM	16
CU	PPM	14
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	15
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	< 4.00
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	< 10.0
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	52.101

LIMESTONES

35 IB-S4 3-2

ELEMENT		CONCENTRATION
NA	% OX.	0.008
K	% OX.	0.014
CA	% OX.	51.38
MG	% OX.	0.635
FE	% OX.	0.136
AL	% OX.	0.176
SI	% OX.	< 3.21
TI	% OX.	0.013
P	% OX.	0.013
SR	PPM	352
BA	% OX.	0.005
V	PPM	< 500
CR	PPM	6
MN	% OX.	0.005
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	19
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	< 4.00
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	< 10.0
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	55.591

LIMESTONES

36 IB-S4 4-1

ELEMENT		CONCENTRATION
NA	% OX.	0.015
K	% OX.	0.007
CA	% OX.	49.11
MG	% OX.	1.31
FE	% OX.	0.105
AL	% OX.	0.114
SI	% OX.	< 3.21
TI	% OX.	0.009
P	% OX.	0.015
SR	PPM	295
BA	% OX.	0.006
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.004
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	14
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	< 4.00
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	< 10.0
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300

TOTAL 53.904

LIMESTONES

37 IB-S4 4-2

ELEMENT			CONCENTRATION
NA	% OX.		0.010
K	% OX.		0.008
CA	% OX.		51.10
MG	% OX.		0.554
FE	% OX.		0.107
AL	% OX.		0.126
SI	% OX.	<	3.21
TI	% OX.		0.011
P	% OX.		0.027
SR	PPM		319
BA	% OX.		0.005
V	PPM	<	500
CR	PPM		6
MN	% OX.		0.003
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		34
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		55.158

LIMESTONES

38 IB-S4 4-3

ELEMENT			CONCENTRATION
NA	% OX.		0.010
K	% OX.		0.016
CA	% OX.		49.38
MG	% OX.		0.541
FE	% OX.		0.107
AL	% OX.		0.138
SI	% OX.	<	3.21
TI	% OX.		0.010
P	% OX.		0.011
SR	PPM		414
BA	% OX.		0.005
V	PPM	<	500
CR	PPM		10
MN	% OX.		0.004
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM	<	10.0
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		53.430

LIMESTONES

39 IB-S4-6

ELEMENT		CONCENTRATION
NA	% OX.	0.011
K	% OX.	0.031
CA	% OX.	50.60
MG	% OX.	0.707
FE	% OX.	0.175
AL	% OX.	0.231
SI	% OX.	< 3.21
TI	% OX.	0.014
P	% OX.	0.015
SR	PPM	438
BA	% OX.	0.006
V	PPM	< 500
CR	PPM	21
MN	% OX.	0.007
CO	PPM	< 2.00
NI	PPM	10
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	35
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	< 4.00
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	< 10.0
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	55.003

LIMESTONES

40 IB- S4 -12

ELEMENT			CONCENTRATION
NA	% OX.		0.013
K	% OX.		0.028
CA	% OX.		49.39
MG	% OX.		0.445
FE	% OX.		0.146
AL	% OX.		0.335
SI	% OX.	<	3.21
TI	% OX.		0.022
P	% OX.		0.030
SR	PPM		483
BA	% OX.		0.006
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.015
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		25
CD	PPM	<	10.0
AG	PPM		18
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		11
LA	PPM	<	10.0
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		53.643

LIMESTONES

29 IB-M-1

ELEMENT		CONCENTRATION
NA	% OX.	0.014
K	% OX.	0.062
CA	% OX.	45.18
MG	% OX.	3.22
FE	% OX.	0.232
AL	% OX.	0.209
SI	% OX.	< 3.21
TI	% OX.	0.009
P	% OX.	0.018
SR	PPM	447
BA	% OX.	0.006
V	PPM	< 500
CR	PPM	< 4.00
MN	% OX.	0.002
CO	PPM	< 2.00
NI	PPM	< 10.0
CU	PPM	< 10.0
MO	PPM	< 100
PB	PPM	< 20.0
ZN	PPM	21
CD	PPM	< 10.0
AG	PPM	< 4.00
AU	PPM	< 16.0
AS	PPM	< 50.0
SB	PPM	< 60.0
BI	PPM	< 200
U	PPM	< 5000
TE	PPM	< 100
SN	PPM	< 10.0
W	PPM	< 2400
LI	PPM	< 4.00
BE	PPM	< 1.00
B	PPM	< 800
ZR	PPM	< 10.0
LA	PPM	< 10.0
CE	PPM	< 20.0
TH	PPM	< 300
	TOTAL	52.161

LIMESTONE SAMPLES

30 IB-M-2

ELEMENT			CONCENTRATION
NA	% OX.		0.036
K	% OX.		0.196
CA	% OX.		31.08
MG	% OX.		18.01
FE	% OX.		0.365
AL	% OX.		0.604
SI	% OX.	<	3.21
TI	% OX.		0.024
P	% OX.	<	0.005
SR	PPM		51
BA	% OX.		0.004
V	PPM	<	500
CR	PPM		22
MN	% OX.		0.004
CO	PPM	<	2.00
NI	PPM		13
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		35
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM		16
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		53.533

15 1B-T-1

ELEMENT			CONCENTRATION
NA	% OX.		0.073
K	% OX.		0.348
CA	% OX.		21.21
MG	% OX.		15.67
FE	% OX.		1.28
AL	% OX.		1.22
SI	% OX.	<	3.21
TI	% OX.		0.050
P	% OX.		0.960
SR	PPM		79
BA	% OX.		0.005
V	PPM	<	500
CR	PPM		82
MN	% OX.		0.013
CO	PPM		3
NI	PPM		13
CU	PPM		20
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		49
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM		210
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		5
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM		29
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		44.040

LIMESTONES

16 IB-T-2

ELEMENT			CONCENTRATION
NA	% OX.		0.023
K	% OX.		0.144
CA	% OX.		34.48
MG	% OX.		6.26
FE	% OX.		0.178
AL	% OX.		0.460
SI	% OX.	<	3.21
TI	% OX.		0.029
P	% OX.		0.284
SR	PPM		56
BA	% OX.		0.006
V	PPM	<	500
CR	PPM		17
MN	% OX.		0.012
CO	PPM	<	2.00
NI	PPM	<	10.0
CU	PPM	<	10.0
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		23
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM	<	4.00
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM	<	10.0
LA	PPM		21
CE	PPM	<	20.0
TH	PPM	<	300

TOTAL 45.092

LIMESTONES

23 IB 1-1

ELEMENT			CONCENTRATION
NA	% OX.		0.314
K	% OX.		0.936
CA	% OX.		40.02
MG	% OX.		2.32
FE	% OX.		1.59
AL	% OX.		3.59
SI	% OX.	<	3.21
TI	% OX.		0.154
P	% OX.		0.086
SR	PPM		193
BA	% OX.		0.014
V	PPM	<	500
CR	PPM	<	4.00
MN	% OX.		0.028
CO	PPM		3
NI	PPM	<	10.0
CU	PPM		17
MO	PPM	<	100
PB	PPM	<	20.0
ZN	PPM		46
CD	PPM	<	10.0
AG	PPM	<	4.00
AU	PPM	<	16.0
AS	PPM	<	50.0
SB	PPM	<	60.0
BI	PPM	<	200
U	PPM	<	5000
TE	PPM	<	100
SN	PPM	<	10.0
W	PPM	<	2400
LI	PPM		22
BE	PPM	<	1.00
B	PPM	<	800
ZR	PPM		28
LA	PPM		10
CE	PPM	<	20.0
TH	PPM	<	300
	TOTAL		52.249