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Mineral Exploration Consultants
Economic Minerals Including Ground Water

ECONOMIC SILVER DEPOSITS: BY REDUCTION BUBBLE?

For A Confidential Client

by

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4735 Heaton Road
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INTRODUCTION

In pursuit of sandstone-type uranium deposits and development of the geochemical cell concept (Rackley, 1968), it became apparent that processes which operate to deposit uranium on solution fronts also deposit other economic minerals in much the same way. Because copper and silver deposits in sandstone have been described in detail in the literature, these elements were included with others in a list of likely ones to be found associated with solution fronts. On the basis of literature review Silver Reef, Utah was considered to be a good place to prove the presence of a solution front containing mostly silver.

FIELD EXAMINATION OF SILVER REEF, UTAH

Upon logging holes from earlier exploration by King Resources and General Exploration and Mining Company, it became apparent that the host rock for silver deposits, the so-called Leeds sandstone (Proctor, 1953), rather than being an unconformable separate unit is in fact a white-bleached former reddish sandstone... apparently the most permeable sandstone unit in this part of the Triassic Chinle formation. Reduction of reddish clays to greenish hues in and around the white-bleached sandstone and other clues clearly signal overall reduction of diagenic origin wherein white-bleached sandstone were developed from reddish ones in the Chinle formation.

Figure 1 shows the location of the logged holes, previous claims, topography, etc. Figure 2 is a generalized cross section of exploratory holes number 7, 8, 9, and 10, and Figure 3 is a larger-scale, more detailed cross section upon which

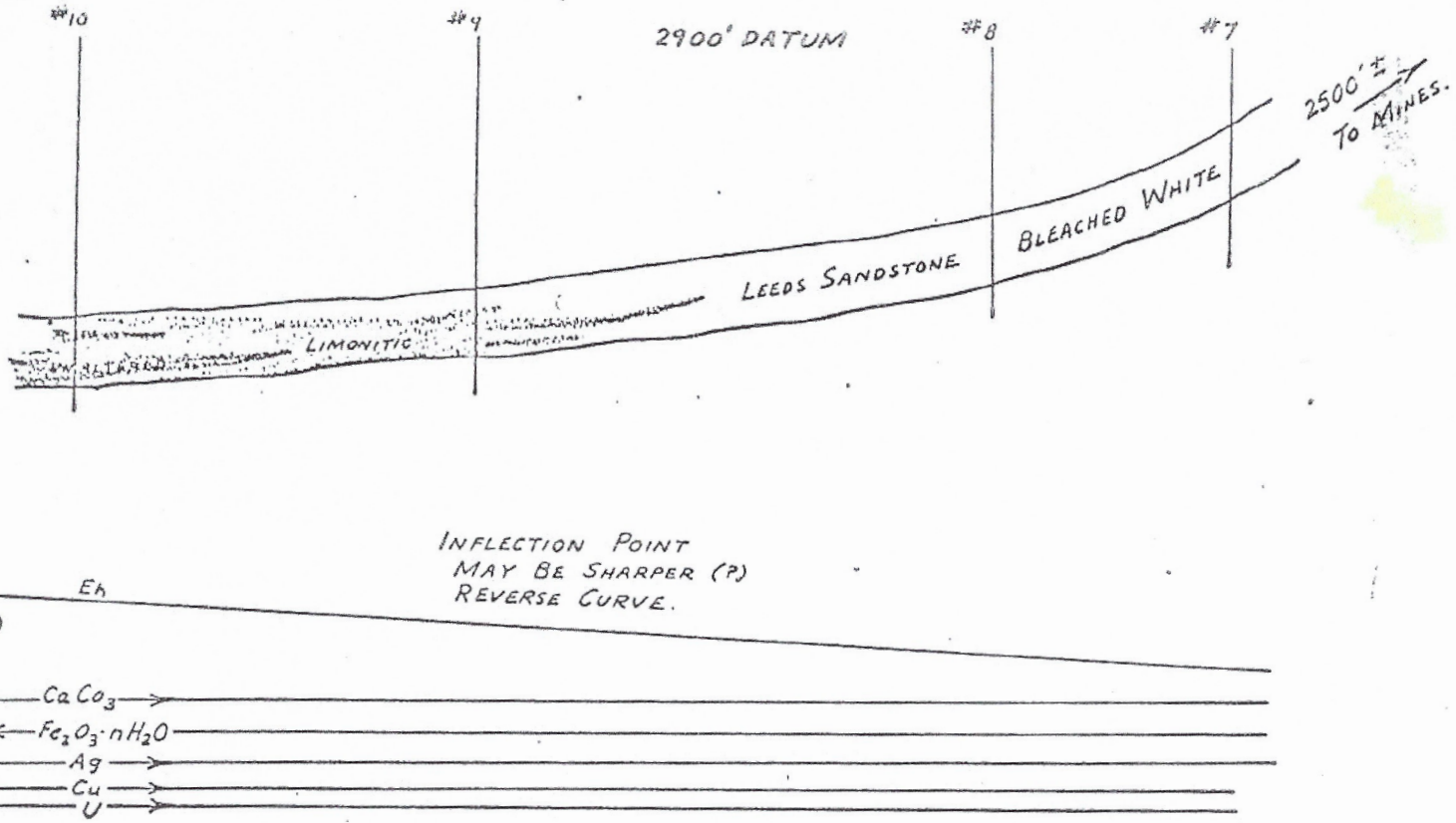
Figure 2 is based. In the Appendix are detailed lithologic logs of the exploratory holes 7, 8, 9, and 10.

Note that Figures 2 and 3 and supporting data show an overall chemico-physical situation that is opposite to what one would expect in terms of "down-dip" exploration for a uranium solution front.

A field examination was made at Silver Reef. The work clearly shows (1) that the so-called Leeds sandstone is epigenitically white-bleached reddish Chinle sandstone, (2) that there is symmetry of pertinent chemico-physical characteristics about the axis of the major anticline (the Virgin anticline), (3) that there are fuzzy horizontal bands of mineralization grading upward from hydrated iron oxides (limonite) through copper and then silver to uranium-vanadium, and (4) that the topographically and structurally high nose of the anticline is the only place where these (upper) horizontal mineralization bands have been preserved. Note the analogy with water-oil-gas zoning in a petroleum reservoir in Figure 3.

Thus it becomes apparent that the Virgin anticline is a structurally high mineralized reduction bubble in an otherwise lower aquifer (see Figure 3). Whether the hydrodynamics of the ground water flow has been significantly altered thus inhibiting mineralization by changing one or more of the necessary chemico-physical parameters for selective mineralization or whether the aquifer must first be "flushed" or affected in such a way that a chemico-physical change must occur before a reduction bubble can form are primary questions which remain unanswered. The source of the metals and of the reductants are more clearly understood. The aquifer could have been the source of the metallic elements (syngenetic in trace amounts) as well as the source of the reductant via methane evolving from the sparse carbon trash in the aquifer and driven by hydraulic pressures into structural highs together with entrained metallics. Erickson (1954) and others have demonstrated that hydrocarbons can carry small but significant amounts of metallic ions in the state which is capable of being reduced to sulphides by gaseous reductants.


Silver Reef
Leeds
Spring
Buckeye Reef
Upper limb
Lower limb
Numerous Pits
Bottom limb
Reef white but unmined
Fig. 1



CROSS SECTION
Looking North Through
HOLES 7, 8, 9 AND 10

Fig. 2

scale: 1 in. = 200 ft.

SILVER REEF AREA, WASHINGTON COUNTY, UTAH

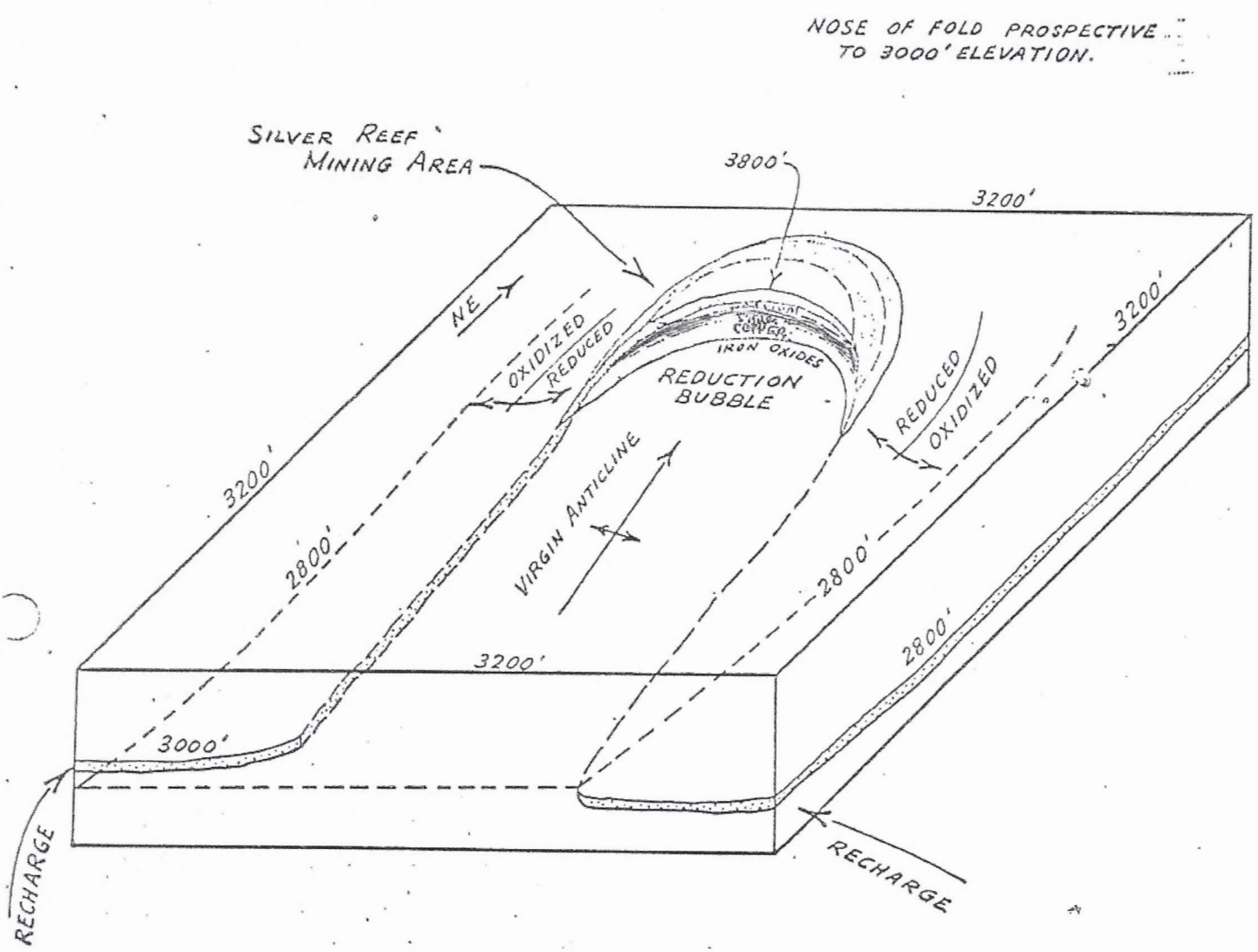


Fig. 3

INFERRED RELATIONSHIP OF MINERALIZATION
SILVER REEF AREA, WASHINGTON COUNTY, UTAH

Based on the logging and field work done, the rate of change of Eh and pH are so gradual under these circumstances as to produce only broad fuzzy mineral bands rather than abrupt dumping and high concentrations of metals over short distances, as in uranium solution fronts (see Figure 4). (Compare Figure 2 and 4) Figures 5A and 5B show in cross section some of the differences between a solution front and the proposed concept: a reduction bubble.

A new M.S. Thesis describing silver mineralizations at the Lady Belle Mine near Eagle, Colorado (Costin, 1970) has been released. This Thesis clearly indicates that here, as at Silver Reef, Utah, silver is associated with a white-bleached red bed.....the Triassic Entrada sandstone in Costin's case.

RAMIFICATIONS

In identifying the Silver Reef mineralization as being of a reduction bubble type origin, and that the Lady Belle Mine is probably similar, it becomes clear that this hypothesis might have broad applicability and tremendous economic potential.

Other areas have been considered for trying out this hypothesis: (1) Cement anticline in Oklahoma, (2) the X, Y and Z anticlines of Central Pennsylvania, (3) the Lyons formation of Northeastern Colorado, where Pan Am oil geologists made direct correlations between whitening of red beds and structural highs (see Figure 6), and (4) other areas with reported bleaching over structural highs.

FOLLOW-UP EXPLORATION

The following general exploration procedures would be most applicable:

(1) Location of structures having minor copper and uranium mineralization.

or

(2) Broad definition of structures having potential bleaching near structual highs.

(3) Surface mapping in virgin areas to identify if possible Figure 2 type relationships regarding bleached (or reduced) and oxidized lithologies.

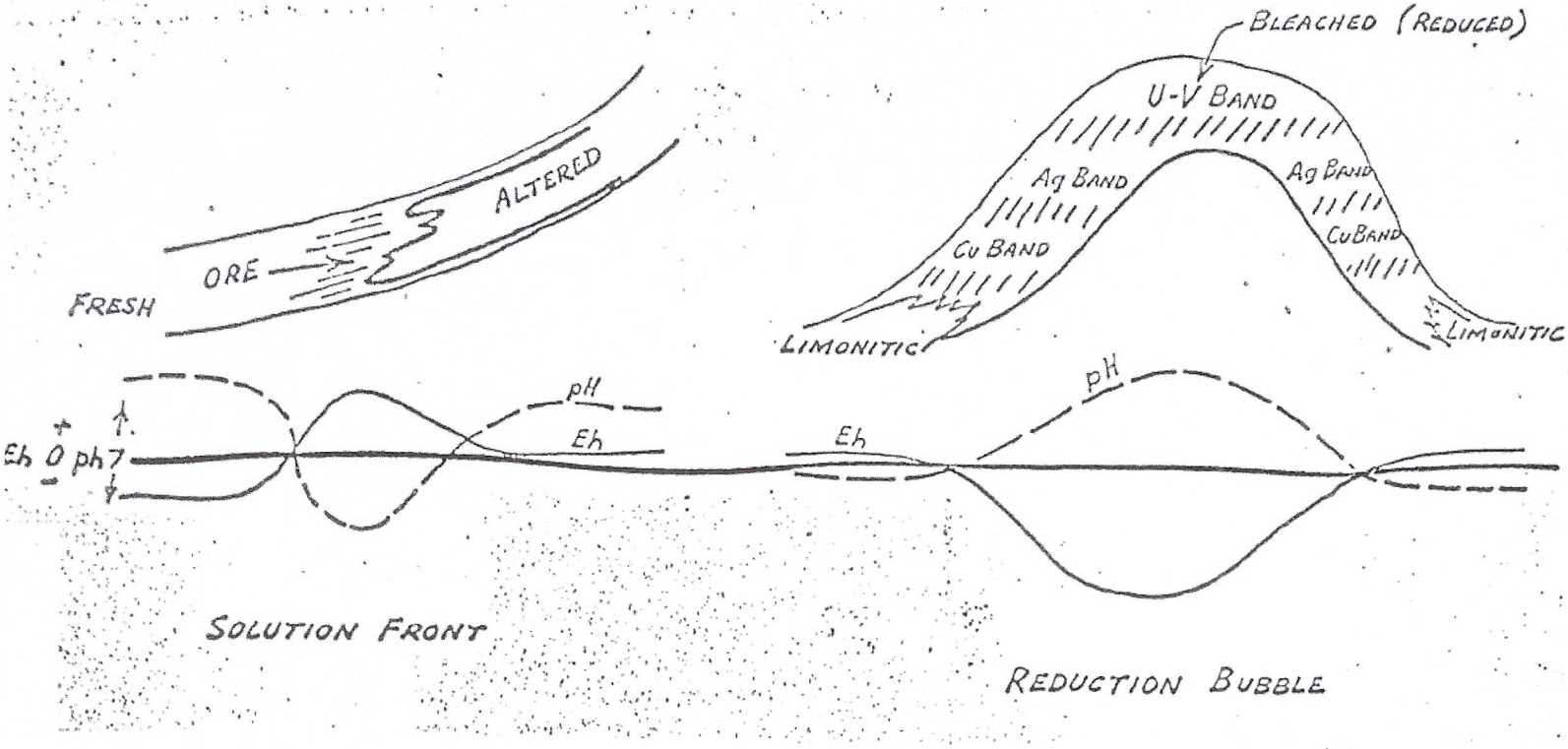


Figure 5A

Figure 5B

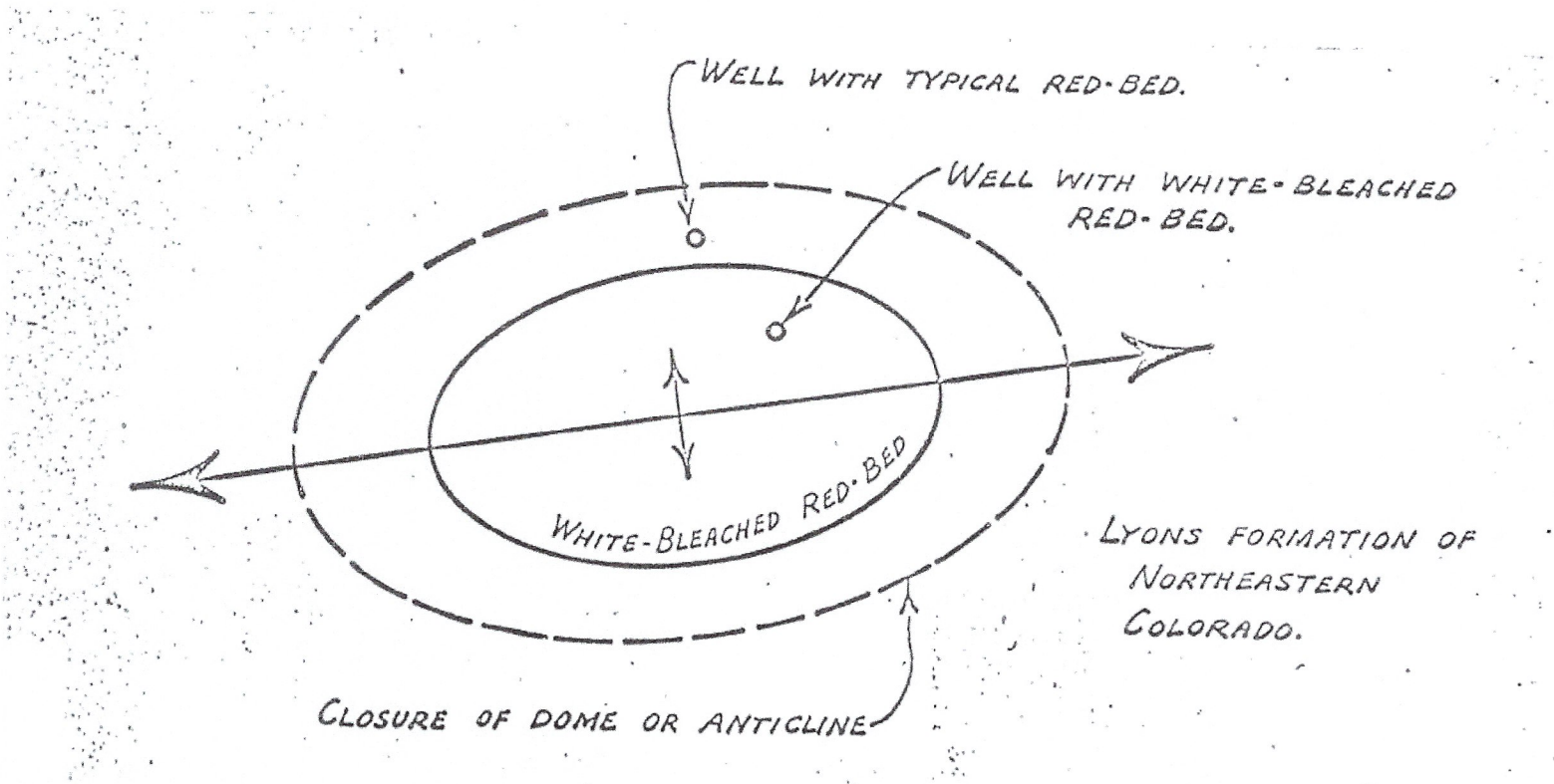


Figure 6

(4) Exploratory drilling either to support surface mapping results or to establish relationships as expected.

(5) Selection of suitable cuttings for assay, in ppm for Ag, Cu, U, V, Fe+++, etc.

(6) Major drilling campaign for targeting silver mineralization.

The above has been only a brief outline of the approach. For any given area of potential, additional work should be carried out which considers the specific aspects within the area.

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Campbell, M. D., 1970, Preliminary Report on the Uranium-Silver Potential of Pennsylvania, 80p., May, (Unpublished United Nuclear Report)

Costin, P. C., 1970, Geology of the Lady Belle Mine and Vicinity, Bruch Creek Mining District, Eagle County, Colorado, M.S. Thesis, Colorado School Mines.

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McKay, E. S. and Hyden, H. J., (?) Permian of North Texas and Southern Oklahoma, pp. 208-216.

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WELL LOGS FOR EXPLORATORY HOLES

NUMBER 7, 8, 9, and 10

TOWNSHIP 41 S RANGE 14 W T.D. 909' P.D.

DEPTH	STRIP LOG	LITHOLOGY LOG	ANALYSIS OR RADIOACTIVITY

755 - 762.3
INTERBEDDED SILTSTONE, SANDSTONE, CLAYSTONE; SANDY PORTIONS PREDOMINANTLY PALE REDDISH BROWN (10 R 5/4); CLAYEY PORTIONS GRAYISH RED (10 R 4/2); FIRM; THIN; CRINKLY-BEDDED TENDENCY. SANDSTONE MODERATELY SORTED; SUBANGULAR TO SUBROUNDED; FINE TO MEDIUM GRAINED; QUARTZOSE; SPARSE YELLOWISH GRAY (5 Y 8/1) CALCAREOUS SPOTS IN SANDSTONE; THIN BANDS AND STRINGERS YELLOWISH-GRAY CALCAREOUS SANDSTONE TOWARD BASE

762.3 - 763.6
SANDSTONE; YELLOWISH GRAY (5 Y 8/1); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; SPARSE LABILES; LOCAL BLACK SPOTS; WEAKLY CALCAREOUS; CONTACTS ABOVE AND BELOW SUGGEST WHITISH AFTER REDDISH

763.6 - 783.0
SANDSTONE; PREDOMINANTLY MODERATE RED (5 R 6/4); TOP 2' HAS YELLOWISH GRAY (5 Y 8/1) STRINGERS AND SPOTS AS UNITS ABOVE; CLAYEY INTERBEDS ARE GRAYISH RED (5 R 4/2); FIRM; MOSTLY MASSIVE; SOME THIN BEDDING TOP 1/3RD; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; LOCALLY CALCAREOUS, ESPECIALLY C. WHITE SPOTS AND LOCAL REDDISH CALLS; MICACEOUS

783.0 - 788.9
SANDSTONE; PALE RED PURPLE (5 RP 6/2) GRADING DOWNWARD THROUGH PALE RED (5 R 6/4) AND MOTTLED INTERVAL TO YELLOWISH GRAY (5 Y 8/1); INTERBEDDED CLAY CALLS ARE DUSKY RED (5 R 2/4) AND PALE GREEN (10 G 6/2); FIRM; THIN BEDDED TENDENCY; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; LIGHTER COLORED INTERVALS CALCAREOUS; POSSIBLE TRACES GLAUCONITE; INTERBEDDED CLAY; RARE CONGLOMERATE, POSSIBLY INCLUDING SOME DETRITAL MATERIAL

788.9 - 791.5
CLAYSTONE; PREDOMINANTLY GRAYISH-RED (10 R 4/2); SOME MOTTLED AND BANDED GRAYISH-GREEN (5 G 5/2); FIRM; BEDDED TENDENCY; LOCALLY SILTY; LOCAL FLOATING SAND GRAINS; TRACE PYRITE OXIDIZING TO LIMONITE; FRACTURES CALCAREOUS; SOME SLICKENSIDES

791.5 - 796.1
PREDOMINANTLY SANDSTONE, PALE RED (10 R 6/4) STREAKED AND BANDED YELLOWISH GRAY (5 Y 8/1) AS UNIT 763.6 - 783.0; BED GREEN SILTY CLAYSTONE INTERBED

796.1 - 802.4
SILTSTONE; BROWNISH GRAY (5 YR 4/1); MICACEOUS; GRADING DOWNWARD TO SANDSTONE; MOTTLED REDDISH-BROWN AND LIGHT GRAY AND DOWNWARD TO PALE RED (10 R 6/2) WITH FAINT LIMONITIC OVERTONE AT BASE; FIRM; THIN BEDDED TENDENCY; GENERALLY WELL SORTED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; POSSIBLE TRACES GLAUCONITE

802.4 - 806.0
SANDSTONE; PREDOMINANTLY GRAYISH ORANGE (10 YR 7/4); SPARSE WHITISH SPOTS AND STRINGERS; DARK GREY-BROWN WHERE CLAYEY; FIRM; THIN-BEDDED TENDENCY, WITH SOME X-BEDDING; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; TRACES LABILES AND LOCAL BLACK ACCESSORIES; WHITISH SPOTS CALCAREOUS; VERSUTOID STRATIFICATION

806.0 - 808.4
CLAYSTONE GRADING DOWNWARD TO SILTSTONE; UPPER PART PRED. GRAYISH RED (10 R 4/2) AND DARK GREENISH GRAY (5 GY 4/1); LOWER PART PALE GREEN (10 G 6/2); FIRM; BEDDED TENDENCY; MICACEOUS

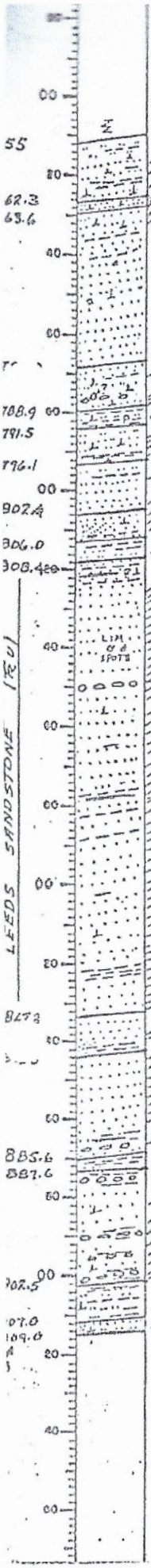
808.4 - 867.3
SANDSTONE; PREDOMINANTLY VERY LIGHT GRAY (N 8.5); TOP 4' THINLY INTERBEDDED GRAYISH RED (10 R 4/2) AND PALE RED (10 R 6/2); OTHERWISE CLAYEY SECTIONS GRAYISH TO GREENISH TINTED; FIRM; MASSIVE TO THIN BEDDED; WELL SORTED; SUBANGULAR TO SUBROUNDED; MOSTLY MEDIUM GRAINED; SOME COARSE; QUARTZOSE; SPARSE LABILES; LOCAL CONSPICUOUS BLACK ACCESSORIES; WEAKLY CALCAREOUS LOCALLY; CARBONACEOUS, MICACEOUS INTERBEDS. ALSO THIN GREENISH MASSIVE STRINGERS ... NOT MUCH EVIDENCE OF OXIDATION

867.3 - 872.5
SANDSTONE; VERY SIMILAR TO NEXT ABOVE EXCEPT COLOR PRED. GRAYISH PINK (5 R 8/2)

872.5 - 885.6
SANDSTONE; VERY LIGHT GRAY (N 8.5) AND OTHERWISE VIRTUALLY IDENTICAL TO UNIT 2ND ABOVE ... NOTE: COALY MATERIAL IS PRESENT (UNOXIDIZED)

885.6 - 887.6
CLAYSTONE; BROWNISH GRAY (5 YR 4/1) GRADING DOWNWARD TO PALE BROWN (5 YR 5/2); FIRM; MASSIVE TENDENCY; SILTY TOWARD BASE

887.6 - 902.5
SANDSTONE; PALE RED (10 R 6/2) GRADING DOWNWARD TO VERY LIGHT GRAY (N 8). FIRM; MASSIVE, EXCEPT INTERBEDDED ...



755 - 762.3
INTERBEDDED SILTSTONE, SANDSTONE, CLAYSTONE; SANDY PORTIONS PREDOMINANTLY PALE REDDISH BROWN (10 R 5/4); CLAYEY PORTIONS GRAYISH RED (10 R 4/2); FIRM; THIN; CRINKLY-BEDDED TENDENCY. SANDSTONE MODERATELY SORTED; SUBANGULAR TO SUBROUNDED; FINE TO MEDIUM GRAINED; QUARTZOSE; SPARSE YELLOWISH GRAY (5 Y 8/1) CALCAREOUS SPOTS IN SANDSTONE; THIN LENSES AND STRINGERS YELLOWISH-GRAY CALCAREOUS SANDSTONE TOWARD BASE

762.3 - 763.6
SANDSTONE; YELLOWISH GRAY (5 Y 8/1); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; SPARSE LABILES; LOCAL BLACK SPOTS; WEAKLY CALCAREOUS; CONTACTS ABOVE AND BELOW SUGGEST WHITISH ABOVE REDDISH

763.6 - 783.0
SANDSTONE; PREDOMINANTLY MODERATE RED (5 R 6/4); TOP 2' HAS YELLOWISH GRAY (5 Y 8/1) STRINGERS AND SPOTS AS UNITS ABOVE; CLAYEY INTERBEDS ARE GRAYISH RED (5 R 4/2); FIRM; MOSTLY MASSIVE - SOME THIN BEDDING TOP 1/2 FT; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; LOCALLY CALCAREOUS, ESPECIALLY C. WHITE SPOTS AND LOCAL REDDISH CALLS; MICACEOUS

783.0 - 788.9
SANDSTONE; PALE RED PURPLE (5 RP 6/2) GRADING DOWNWARD THROUGH PALE RED (5 R 6/2) AND MOTTLED INTERVAL TO YELLOWISH GRAY (5 Y 8/1); INTERBEDDED CLAY GALLS ARE DUSKY RED (5 R 3/4) AND PALE GREEN (10 G 6/2); FIRM; THIN BEDDED TENDENCY; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; LIGHTER COLORED INTERVALS CALCAREOUS; POSSIBLE TRACES GLAUCONITE; INTERBEDDED CLAY-GALL CONGLOMERATE, POSSIBLY INCLUDING SOME ORGANIC MATERIAL

788.9 - 791.5
CLAYSTONE; PREDOMINANTLY GRAYISH-RED (10 R 4/2); SOME MOTTLED AND BANDED GRAYISH-GREEN (5 G 5/2); FIRM; BEDDED TENDENCY; LOCALLY SILTY; LOCAL FLOATING SAND GRAINS; TRACE PYRITE OXIDIZING TO LIMONITE; FRACTURES CALCAREOUS; SOME SLICKENSIDES

791.5 - 796.1
PREDOMINANTLY SANDSTONE, PALE RED (10 R 6/2) STREAKED AND BANDED YELLOWISH GRAY (5 Y 8/1) AS UNIT 763.6 - 783.0; RED & GREEN SILTY CLAYSTONE INTERBED

796.1 - 802.4
SILTSTONE; BROWNISH GRAY (5 YR 4/1); MICACEOUS; GRADING DOWNWARD TO SANDSTONE; MOTTLED REDDISH-BROWN AND LIGHT GRAY AND DOWNWARD TO PALE RED (10 R 6/2) WITH FAINT LIMONITIC OVERTONE AT BASE; FIRM; THIN BEDDED TENDENCY; GENERALLY WELL SORTED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; POSSIBLE TRACES GLAUCONITE

802.4 - 806.0
SANDSTONE; PREDOMINANTLY GRAYISH ORANGE (10 YR 7/4); SPARSE WHITISH SPOTS AND STRINGERS; DARK GREY-BROWN WHERE CLAYEY; FIRM; THIN-BEDDED TENDENCY WITH SOME X-BEDDING; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; TRACES LABILES AND LOCAL BLACK ACCESSORIES; WHITISH SPOTS CALCAREOUS; UBIQUITOUS LIMONITE PAINT

806.0 - 808.4
CLAYSTONE GRADING DOWNWARD TO SILTSTONE; UPPER PART PRED. GRAYISH RED (10 R 4/2) AND DARK GREENISH GRAY (5 GY 4/1); LOWER PART PALE GREEN (10 G 6/2); FIRM; BEDDED TENDENCY; MICACEOUS

808.4 - 867.3
SANDSTONE; PREDOMINANTLY VERY LIGHT GRAY (N 8.5); TOP 4' THINLY INTERBEDDED GRAYISH RED (10 R 4/2) AND PALE RED (10 R 6/2); OTHERWISE CLAYEY SECTIONS GRAYISH TO GREENISH TINTED; FIRM; MASSIVE TO THIN BEDDED; WELL SORTED; SUBANGULAR TO SUBROUNDED; MOSTLY MEDIUM GRAINED; SOME COARSE; QUARTZOSE; SPARSE LABILES; LOCAL CONSPICUOUS BLACK ACCESSORIES; WEAKLY CALCAREOUS LOCALLY; CARBONACEOUS, MICACEOUS INTERBEDS; ALSO THIN GREENISH MUDSTONE STRINGERS .... NOT MUCH EVIDENCE OF OXIDATION

867.3 - 872.5
SANDSTONE; VERY SIMILAR TO NEXT ABOVE, EXCEPT COLOR PRED. GRAYISH PINK (5 R 8/2)

872.5 - 885.6
SANDSTONE; VERY LIGHT GRAY (N 8.5) AND OTHERWISE VIRTUALLY IDENTICAL TO UNIT 2ND ABOVE .... NOTE: COALY MARINE IS REMAIN (UNOXIDIZED)

885.6 - 887.6
CLAYSTONE; BROWNISH GRAY (5 YR 4/1) GRADING DOWNWARD TO PALE BROWN (5 YR 5/2); FIRM; MASSIVE TENDENCY; SILTY TOWARD BASE

887.6 - 902.5
SANDSTONE; PALE RED (10 R 6/2) GRADING DOWNWARD TO VERY LIGHT GRAY (N 8); FIRM; MASSIVE, EXCEPT INTERBEDDED CLAY-GALL CONGLOMERATE; WELL SORTED OTHERWISE; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; WEAK TRACES .... $Ca\,CO_3$

902.5 - 907.0
CLAYSTONE, PREDOMINANTLY DARK GREENISH GRAY (5 G 4/1) AND LIGHT OLIVE GRAY (5 Y 6/1) WITH INFLUX OF GRAYISH RED (5 R 4/2) TOWARD BASE; FIRM; BEDDED TENDENCY; VERY SILTY; LOCALLY CALCAREOUS

907.0 - 909.0
SANDSTONE AND SILTSTONE; PALE RED (5 R 6/2); FIRM; MASSIVE TENDENCY; WELL SORTED; FINE GRAINED; QUARTZOSE; VERY WEAKLY CALCAREOUS

NORTH ____ EAST 330 E/W LOGGED BY E.M. SHOCKEY DATE FEB 17, 1978

TOWNSHIP 41 S. RANGE 14 W T.D. 990 P.D. ____

DEPTH	STRIP LOG	LITHOLOGY LOG	ANALYSIS OR RADIOACTIVITY

830.0 – 838.0
SILTSTONE; GRAYISH-RED (10 R 4/2); FIRM; MASSIVE TENDENCY; CLAYEY; MICACEOUS

833.0 – 848.0
INTERBEDDED SILTSTONE, SANDSTONE, CLAYSTONE; OVERALL COLOR PALE REDDISH BROWN (10 R 5/4); CLAYEY BANDS DARKER; FIRM; THIN-CRINKLY-BEDDED TENDENCY; SANDY PORTIONS MODERATELY WELL SORTED AND QUARTZOSE; IRREGULAR WHITISH SPOTS AND BANDS ARE CALCAREOUS

848.0 – 848.8
CLAYSTONE; GRAYISH RED (10 R 4/2); FIRM; MASSIVE TENDENCY; SILTY; MICACEOUS

848.8 – 850.3
INTERBEDDED SILTSTONE, SANDSTONE, AND CLAYSTONE; VIRTUALLY IDENTICAL TO UNIT 2ND ABOVE

850.3 – 851.6
SANDSTONE; PINKISH GRAY (5 YR 8/1); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; SPARSE EXOTICS; CALCAREOUS; WHITE MOTTLED

851.6 – 856.5
SANDSTONE; PREDOMINANTLY PALE REDDISH BROWN (10 R 5/4) BUT WITH WHITISH SPOTS AND BANDS AS SANDSTONE NEXT ABOVE; FIRM; MASSIVE TENDENCY; WELL SORTED; MOSTLY MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; WHITISH AREAS GENERALLY CALCAREOUS; EMBAYMENTS OF COLOR SHOW LIME AFTER RED

856.5 – 857.3
SANDSTONE; PINKISH GRAY (5 YR 8/1); FIRM; MASSIVE; OTHERWISE SIMILAR TO UNIT 2ND ABOVE, EXCEPT NON CALCAREOUS; FAINT PINK SUGGESTS REDUCT "RED BED"

857.3 – 859.8
CLAYSTONE; GRAYISH RED (10 R 4/2); FIRM; SILTY TO SANDY; MICACEOUS

859.8 – 870.6
SANDSTONE; TOP AND BOTTOM 2' VERY LIGHT GRAY (N 8); MIDDLE PART PALE REDDISH BROWN; FIRM; MOSTLY MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; GREENISH GLAUCONITE?; NEARLY CALCAREOUS IN WHITE AREAS; COLOR CHANGES ARE GRADUAL

870.6 – 873.3
CLAYSTONE; PRED. GRAYISH RED PURPLE (5 PP 4/2); SOME REDDER; FIRM; BEDDED TENDENCY; SILTY; MICACEOUS

873.3 – 875.2
SANDSTONE; GRAYISH-ORANGE-PINK (10 R 8/2); CALCAREOUS; OTHERWISE AS 850.3–851.6

875.2 – 879.8
CLAYSTONE; UPPER AND LOWER PARTS REDDISH WITH WHITISH SPOTS AND BANDS, AS UNIT 851.6–856.5; MEDIAL PART OLIVE GRAY (5 Y 4/1) AND LIGHT OLIVE GRAY (5 Y 6/1); SILTY; WHITISH AREAS GENERALLY WEAKLY CALCAREOUS

879.8 – 890.0
SANDSTONE; PREDOMINANTLY LIGHT GRAY (N 7); DARKER WHERE STREAKED WITH CARBON OR CLAY; FIRM; THIN BEDDED; WELL SORTED; MOSTLY MEDIUM GRAINED, SOME COARSE; SUBROUNDED TO SUBANGULAR; QUARTZOSE; CARBONACEOUS AND GREENISH CLAY STRINGERS.... DEFINITELY NOT OXIDIZED

890.0 – 893.0 (OUT OF ORDER!)
SANDSTONE; TOP 2' PALE RED (10 R 6/2); BOTTOM 1' GRAYISH ORANGE (10 YR 7/4); FIRM; MASSIVE TENDENCY; OTHER PARAMETERS AS ABOVE; CALCAREOUS; LIMONITIC

893.0 – 895.4
CLAYSTONE, GRADING DOWNWARD TO SILTSTONE; PREDOMINANTLY DARK GREENISH GRAY (5 GY 5/1); LOCAL SPARSE LIMONITE STAIN; FIRM; BEDDED TENDENCY; LOCAL $CaCO_3$

895.0 – 907.2
SANDSTONE; TOP 4' LIGHT BROWNISH GRAY (5 YR 6/1); NEXT 1'2 VERY LT. GRAY (N 8); THIS GIVES WAY GRADUALLY TO PALE RED (10 R 5.5/3); BOTTOM 2" GRAYISH ORANGE (10 YR 7/4); FIRM; BEDDED TO MASSIVE; OTHERWISE AS ABOVE; TOP 4' CALC.; WHITE-CALCAREOUS

907.2 – 908.8
CLAYSTONE AND CLAY-GALL CONGLOMERATE; MEDIUM DARK GRAY (N 4) TO MEDIUM GRAY (N 7); LOCAL LIMONITE (INDIGENOUS?); FIRM; CONSPICUOUS BEDDING; SLIGHTLY CALC.

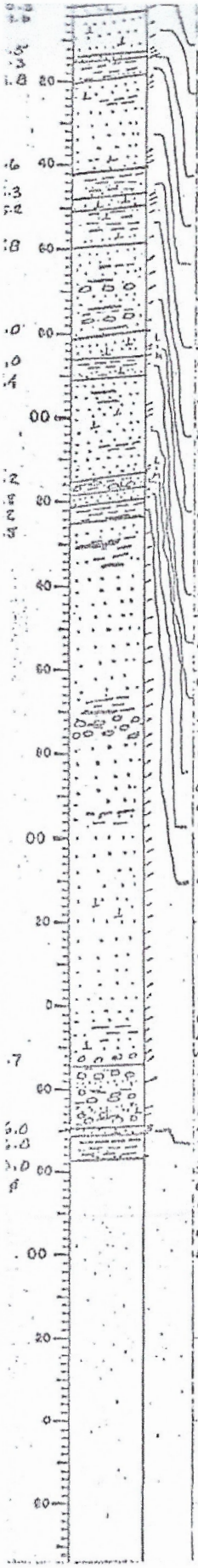
908.8 – 910.2 (NOTE "WHITE" TOP (BOTTOM NOTE AND ABOVE)
SANDSTONE; GRADING DOWNWARD FROM GRAYISH ORANGE PINK (10 R 8/2) THROUGH PALE RED (10 R 6/2) TO VERY LIGHT GRAY (N 8); OTHERWISE AS ABOVE; WHITE CALCAREOUS

910.2 – 912.5 (NOTE "REDUCTION" AT TOP OF WHITE SAND)
CLAYSTONE; GRAYISH RED GRADING (VARIEGATED) DOWNWARD TO PALE GREEN (10 G 6/2)

912.5 – 978.7
SANDSTONE; PREDOMINANTLY VERY LIGHT GRAY (N 8 TO N 8 5); LOCALLY SOME-WHAT DARKER WHERE CLAYEY OR CARBONACEOUS; FIRM; MASSIVE TO THIN-BEDDED; WELL SORTED; MEDIUM GRAINED; QUARTZOSE WITH SPARSE EXOTICS; TRACES $CaCO_3$ TOWARD BASE; CARBONACEOUS AND CLAYEY AS INDICATED .... NOTE – ALL CLAY, INCL. BASAL GALLS ARE GREENISH OR GRAYISH (REDUCED)

978.7 – 986.0
CLAY-GALL CONGLOMERATE; UPPER PART PREDOMINANTLY GRAYISH RED (10 R 4/2) BECOMING VARIEGATED GREENISH TOWARD BASE; MATRIX IS WHITISH SANDSTONE AND CONGLOMERATE; LOCALLY CALCAREOUS TOWARD BASE

986.0 – 986.8
SANDSTONE; VERY LIGHT GRAY (N 8); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; CALCAREOUS



INTERBEDDED SILTSTONE, SANDSTONE, AND CLAYSTONE; VIRTUALLY IDENTICAL TO UNIT 2ND ABOVE

850.7 - 851.6
SANDSTONE; PINKISH GRAY (5 YR 8/1); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; SPARSE EXOTICS; CALCAREOUS; WHITE MOTTLED

851.6 - 856.5
SANDSTONE; PREDOMINANTLY PALE REDDISH BROWN (10R 5/4) BUT WITH WHITISH SPOTS AND BANDS AS SANDSTONE NEXT ABOVE; FIRM; MASSIVE TENDENCY; WELL SORTED; MOSTLY MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; WHITISH AREAS GENERALLY CALCAREOUS; EMBAYMENTS OF COLOR SHOW WHITE MOTTLED

856.5 - 857.3
SANDSTONE; PINKISH GRAY (5YR 8/1); FIRM; MASSIVE OTHERWISE SIMILAR TO UNIT 2ND ABOVE, EXCEPT NON CALCAREOUS; FAINT PINK SUGGESTS REDUCT "RED BED"

857.3 - 859.8
CLAYSTONE; GRAYISH RED (10R 4/2); FIRM; SILTY TO SANDY; MICACEOUS

859.8 - 870.6
SANDSTONE; TOP AND BOTTOM 2' VERY LIGHT GRAY (N 8); MIDDLE PART PALE REDDISH BROWN; FIRM; MOSTLY MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; GREENISH GLAUCONITE?; NEARLY CALCAREOUS IN WHITE AREAS; COLOR CHANGES ARE GRADUAL

870.6 - 873.3
CLAYSTONE; PRED. GRAYISH RED PURPLE (5RP 4/2); SOME REDDER; FIRM; BEDDED TENDENCY; SILTY; MICACEOUS

873.3 - 875.2
SANDSTONE; GRAYISH ORANGE PINK (10R 8/2); CALCAREOUS; OTHERWISE AS 850.3-851.6

875.2 - 879.8
CLAYSTONE; UPPER AND LOWER PARTS REDDISH WITH WHITISH SPOTS AND BANDS, AS UNIT 851.6-856.5; MEDIAL PART OLIVE GRAY (5Y 4/1) AND LIGHT OLIVE GRAY (5Y 6/1); SILTY; WHITISH AREAS GENERALLY WEAKLY CALCAREOUS

879.8 - 890.0
SANDSTONE; PREDOMINANTLY LIGHT GRAY (N 7); DARKER WHERE STREAKED WITH CARBON OR CLAY; FIRM; THIN BEDDED; WELL SORTED; MOSTLY MEDIUM GRAINED, SOME COARSE; SUBROUNDED TO SUBANGULAR; QUARTZOSE; CARBONACEOUS AND GREENISH CLAY STRINGERS....DEFINITELY NOT OXIDIZED

890.0 - 893.0 (OUT OF ORDER!)
SANDSTONE; TOP 2' PALE RED (10R 6/2); BOTTOM 1' GRAYISH ORANGE (10 YR 7/4); FIRM; MASSIVE TENDENCY; OTHER PARAMETERS AS ABOVE; CALCAREOUS; LIMONITIC

895.0 - 895.4
CLAYSTONE GRADING DOWNWARD TO SILTSTONE; PREDOMINANTLY DARK GREENISH GRAY (5 GY 5/1); LOCAL SPARSE LIMONITE STAIN; FIRM; BEDDED TENDENCY; LOCAL $CaCO_3$

893.0 - 907.2
SANDSTONE; TOP 4' LIGHT BROWNISH GRAY (5 YR 6/1); NEXT 1'2 VERY LT. GRAY (N 8); THIS GIVES WAY GRADUALLY TO PALE RED (10 R 5.5/3); BOTTOM 2" GRAYISH ORANGE (10 YR 7/4); FIRM; BEDDED TO MASSIVE; OTHERWISE AS ABOVE; TOP 4' CALC.; WHITE CALCAREOUS

907.2 - 908.8
CLAYSTONE AND CLAY-GALL CONGLOMERATE; MEDIUM DARK GRAY (N4) TO MEDIUM GRAY (N7); LOCAL LIMONITE (INDIGENOUS?); FIRM; CONSPICUOUS BEDDING; SLIGHTLY CALC.

908.8 - 910.2 (NOTE "WHITE" TOP / BOTTOM NOTE AND ABOVE)
SANDSTONE; GRADING DOWNWARD FROM GRAYISH ORANGE PINK (10R 8/2) THROUGH PALE RED (10R 6/2) TO VERY LIGHT GRAY (N 8); OTHERWISE AS ABOVE; WHITE CALCAREOUS

910.2 - 912.5 (NOTE "REDUCTION" AT TOP OF WHITE SAND)
CLAYSTONE; GRAYISH RED GRADING (VARIEGATED) DOWNWARD TO PALE GREEN (10G 6/2)

912.5 - 978.7
SANDSTONE; PREDOMINANTLY VERY LIGHT GRAY (N 8 TO N 8S); LOCALLY SOME WHAT DARKER WHITE CLAYEY OR CARBONACEOUS; FIRM; MASSIVE TO THIN-BEDDED; WELL SORTED; MEDIUM GRAINED; QUARTZOSE WITH SPARSE EXOTICS; TRACES $CaCO_3$ TOWARD BASE; CARBONACEOUS AND CLAYEY AS INDICATED .... NOTE - ALL CLAY, INCL. BASAL GALLS ARE GREENISH OR GRAYISH (REDUCED)

978.7 - 986.0
CLAYGALL CONGLOMERATE; UPPER PART PREDOMINANTLY GRAYISH RED (10R 4/2) BECOMING VARIEGATED GREENISH TOWARD BASE; MATRIX IS WHITISH SANDSTONE AND CONGLOMERATE; LOCALLY CALCAREOUS TOWARD BASE

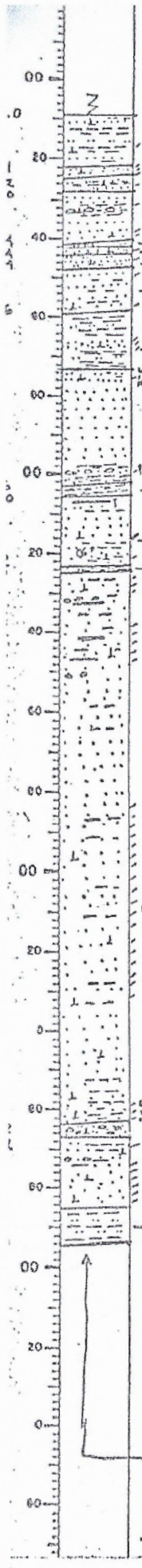
986.0 - 986.8
SANDSTONE; VERY LIGHT GRAY (N 8); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; CALCAREOUS

986.8 - 990.0
CLAYSTONE; MEDIUM GREENISH GRAY (5G 5/1) TO LIGHT OLIVE GRAY (5Y 6/1); FIRM; BEDDED TENDENCY; SILTY

NORTH 3660' N/S EAST 50' E/W LOGGED BY P.N. SHOCKEY DATE FEB. 20, 1970

SECTION 1 TOWNSHIP 41S RANGE 14W T.D. FEB-RGE 1401 P.D.

DEPTH	STRIP LOG	LITHOLOGY LOG	ANALYSIS OR RADIOACTIVITY
20			
40			
60			
80			
00			
.0	Z	1255.0 - 1261.1 INTERBEDDED SILTSTONE, SANDSTONE, AND CLAYSTONE; OVERALL COLOR PALE REDDISH BROWN (10 R 5/4); CLAYEY SECTIONS DARKER; FIRM; THIN-, CRINKLY BEDDED; SANDY INTERVALS QUARTZOSE; IRREGULAR WHITE SPOTS CALCAREOUS	
20		1261.1 - 1262.2 SANDSTONE; YELLOWISH GRAY (5Y 8/1); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED. SUBANGULAR TO SUBROUNDED; QUARTZOSE WITH SPARSE EXOTICS; CALCAREOUS; WHITE AREAS REDUCED	
		1262.2 - 1264.0 INTERBEDDED SILTSTONE, SANDSTONE, AND CLAYSTONE, AS UNIT 2ND ABOVE	
40		1264.0 - 1270.4 (NOTE REDUCTION OF CLAYEY STRINGERS) SANDSTONE; PREDOMINANTLY PALE RED (5R 6/4), BUT DUSKY RED (5R 3/4) IN CLAY-GALL CONGLOMERATE SECTION AND LOCALLY BLEACHED GRAYISH ORANGE PINK (10R 8/2); FIRM; MASSIVE TO THIN BEDDED; GENERALLY WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; BLEACHED AREAS ARE CALCAREOUS AND CLAYEY STRINGERS ARE REDUCED TO GREENISH-GOWEST TRACES LIMONITE PAINT	
60		1270.4 - 1271.4 SILTSTONE; GRAYISH RED (5R 4/2); FIRM; MASSIVE; CLAYEY; MICACEOUS	
		1271.4 - 1272.4 SANDSTONE; PALE RED (5R 6/4) STREAKED AND SPOTTED PINKISH GRAY (5YR 8/1); LIGHTER AREAS CALCAREOUS; OTHERWISE SIMILAR TO UNIT 1264.0 - 1270.4	
		1272.4 - 1274.6 (NOTE REDUCTION OF CLAYEY STRINGERS) SILTSTONE; GRAYISH RED (5R 4/2) WITH MEDIAL SANDY INTERBED PINKISH GRAY (5YR 8/1); OTHER CHARACTERISTICS AS ABOVE; LIGHTER SANDY AREAS CALCAREOUS WITH GREENISH CLAY	
00		1274.4 - 1279.6 (NOTE RETENTION OF TOP AND BOTTOM OF SANDY UNIT) SANDSTONE; PREDOMINANTLY PALE RED (5R 6/4) BUT VERY LT. GRAY (N8) TOP 2" AND BOTTOM 12"; FIRM; SIMILAR TO COUNTERPARTS ABOVE; WHISPY CLAY INTERBEDS ARE REDUCED TO GREENISH IN BLEACHED AREAS	
		1279.6 - 1287.0 (NOTE REDUCTION FEATURES) CLAYSTONE AND SILTSTONE; VARIEGATED GRAYISH RED (5R 4/2) AND DARK GREENISH GRAY (5G 4/1); SILTY SECTIONS LIGHT OLIVE GRAY (5Y 6/1); MEDIAL SANDSTONE IS VERY PALE ORANGE (10YR 8/2); ALL FIRM; BEDDED TENDENCY; ALL SIMILAR TO COUNTERPARTS; BLEACHED SANDSTONE IS CALCAREOUS WITH GREENISH CLAY STRINGERS; ALSO TOP OF THIS UNIT IS GREENISH BENEATH BLEACHED SAND ABOVE	
20		1287.0 - 1301.6 SILTSTONE GRADING DOWNWARD TO SANDSTONE; TOP 2.5' MOTTLED GRAYISH RED (5R 4/2), YELLOWISH GRAY (5Y 8/1) AND MODERATE YELLOW (5Y 7/6); REMAINDER MOSTLY PALE RED (5R 6/2) MOTTLED LIGHTER AND LIGHTENING DOWNWARD TO GRAYISH PINK (5R 8/2) TOWARD BASE; FIRM; MASSIVE ABOVE; THIN-BEDDED BELOW; WELL SORTED; MEDIUM GRAINED; QUARTZOSE; CLAYEY AND CALCAREOUS AS INDICATED; NOTE "LIMONITE" PAINT	
		1301.6 - 1303.0 CLAYSTONE; MOSTLY MEDIUM GRAY (N5); SILTY SECTIONS LIGHT OLIVE GRAY (5Y 6/1); FIRM; THIN-BEDDED; CLAY BALLS AT TOP; LIMY FRACTURES; BASE IS DISTANCE GREENISH	
		1303.0 - 1312.0 SANDSTONE; GRAYISH PINK (5R 7/2) GRADING DOWNWARD TO PALE RED (5R 6/2) MOTTLED YELLOWISH GRAY (5Y 8/1) LOCALLY IN LOWER PART; FIRM; THIN BEDDED; QUARTZOSE, CLAYEY, CALCAREOUS, CARBONACEOUS AS INDICATED	
		1312.0 - 1312.5 SILTSTONE; GREENISH GRAY (5GY 6/1); FIRM; VERY CLAYEY	
00		1312.5 - 1383.2 NOTE: SO-CALLED "LIMONITE" MAY BE JAROSITE, ETC. SANDSTONE; VERY LIGHT GRAY (N8) TO LIGHT GRAY (N7) TOP 20'; PALE RED (10R 6/2) NEXT 17'; VERY LIGHT GRAY (N8) TO YELLOWISH GRAY (5Y 7/2) NEXT 12'; BASAL PART GRAYISH PINK (5R 7/2) TO VERY PALE ORANGE (10YR 8/2); YELLOWISH AND ORANGISH COLORS ARE "LIMONITE" OVERTONES OR PAINT; FIRM; THIN BEDDED TO MASSIVE; GENERALLY WELL SORTED; MOSTLY MEDIUM GRAINED; LOCAL "CLAY GALL" CONGLOMERATE; QUARTZOSE; SPARSE EXOTICS; LOCAL CONSPICUOUS BLACK ACCESSORIES; LOCAL SPARSE IRON OXIDE SPOTS (AROUND CLAY BALLS?); MORE CALCAREOUS THAN UP-DIP, ESP. WHITISH LIMY SPOTS TOWARD BASE; PRESUMABLY CARBONACEOUS AS INDICATED; NOT SO MUCH EVIDENCE OF "REDUCTION" ALONG MARGINS AND INTERNALLY	
20		1383.2 - 1385.2 CLAYGALL CONGLOMERATE; ESSENTIALLY GRAYISH RED (5R 4/2), GIVING WAY DOWNWARD TO OLIVE GRAY (5Y 4/1); LOCALLY CALCAREOUS	
		1385.2 - 1394.4 SANDSTONE; TOP 1/2 RED GRAYISH RED (10R 4/2) WITH LIGHTER STREAKS; REMAINDER	
60			



1255.0 - 1261.1

INTERBEDDED SILTSTONE, SANDSTONE, AND CLAYSTONE; OVERALL COLOR PALE REDDISH BROWN (10 R 5/4); CLAYEY SECTIONS DARKER; FIRM; THIN-, CRINKLY BEDDED; SANDY INTERVALS QUARTZOSE; IRREGULAR WHITE SPOTS CALCAREOUS

1261.1 - 1262.2

SANDSTONE: YELLOWISH GRAY (5Y 8/1); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE WITH SPARSE EXOTICS; CALCAREOUS; WHITE AREAS ECD

1262.2 - 1264.0

INTERBEDDED SILTSTONE, SANDSTONE, AND CLAYSTONE, AS UNIT 2ND ABOVE

1264.0 - 1270.4 (NOTE REDUCTION OF CLAYEY STRINGERS)

SANDSTONE; PREDOMINANTLY PALE RED (5R 6/4), BUT DUSKY RED (5R 3/4) IN CLAY-GALL CONGLOMERATE SECTION AND LOCALLY BLEACHED GRAYISH ORANGE PINK (10R 8/2); FIRM; MASSIVE TO THIN BEDDED; GENERALLY WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; BLEACHED AREAS ARE CALCAREOUS AND CLAYEY STRINGERS ARE REDUCED TO GREENISH-COLORS; TRACES LIMONITE PAINT

1270.4 - 1271.4

SILTSTONE; GRAYISH RED (5R 4/2); FIRM; MASSIVE; CLAYEY; MICACEOUS

1271.4 - 1272.4

SANDSTONE; PALE RED (5R 6/4) STREAKED AND SPOTTED PINKISH GRAY (5YR 8/1); LIGHTER AREAS CALCAREOUS; OTHERWISE SIMILAR TO UNIT 1264.0 - 1270.4

1272.4 - 1279.6 (NOTE REDUCTION OF CLAYEY STRINGERS)

SILTSTONE: GRAYISH RED (5R 4/2) WITH MEDIAL SANDY INTERBED PINKISH GRAY (5YR 8/1); OTHER CHARACTERISTICS AS ABOVE; LIGHTER SANDY AREAS CALCAREOUS WITH GREENISH CLAY

1272.4 - 1279.6 (NOTE ALTERATION AT TOP AND BOTTOM OF SANDY UNIT)

SANDSTONE; PREDOMINANTLY PALE RED (5R 6/4) BUT VERY LT. GRAY (N8) TOP 2" AND BOTTOM 12"; FIRM; SIMILAR TO COUNTERPARTS ABOVE; WHISPY CLAY INTERBEDS ARE REDUCED TO GREENISH IN BLEACHED AREAS

1279.6 - 1287.0 (NOTE REDUCTION FEATURES)

CLAYSTONE AND SILTSTONE; VARIEGATED GRAYISH RED (5R 4/2) AND DARK GREENISH GRAY (5G 4/1); SILTY SECTIONS LIGHT OLIVE GRAY (5Y 6/1); MEDIAL SANDSTONE IS VERY PALE ORANGE (10YR 8/2); ALL FIRM; BEDDED TENDENCY; ALL SIMILAR TO COUNTERPARTS; BLEACHED SANDSTONE IS CALCAREOUS WITH GREENISH CLAY STRINGERS; ALSO TOP OF THIS UNIT IS GREENISH BENEATH BLEACHED SAND ABOVE

1287.0 - 1301.6

SILTSTONE GRADING DOWNWARD TO SANDSTONE; TOP 2.5' MOTTLED GRAYISH RED (5R 4/2), YELLOWISH GRAY (5Y 8/1) AND MODERATE YELLOW (5Y 7/6); REMAINDER MOSTLY PALE RED (5R 6/2) MOTTLED LIGHTER AND LIGHTENING DOWNWARD TO GRAYISH PINK (5R 8/2) TOWARD BASE; FIRM; MASSIVE ABOVE; THIN-BEDDED BELOW; WELL SORTED; MEDIUM GRAINED; QUARTZOSE; CLAYEY AND CALCAREOUS AS INDICATED; NOTE LIMONITE PAINT

1301.6 - 1303.0

CLAYSTONE; MOSTLY MEDIUM GRAY (N5); SILTY SECTIONS LIGHT OLIVE GRAY (5Y 6/1); FIRM; THIN-BEDDED; CLAY RAILS AT TOP; LIMY FRACTURES; BASE IS DISTINCT REDDISH

1303.0 - 1312.0

SANDSTONE; GRAYISH PINK (5R 7/2) GRADING DOWNWARD TO PALE RED (5R 6/2) MOTTLED YELLOWISH GRAY (5Y 8/1) LOCALLY IN LOWER PART; FIRM; THIN BEDDED; QUARTZOSE, CLAYEY, CALCAREOUS, CARBONACEOUS AS INDICATED

1312.0 - 1312.5

SILTSTONE; GREENISH GRAY (5GY 6/1); FIRM; VERY CLAYEY

1312.5 - 1383.2 NOTE: SO-CALLED "LIMONITE" MAY BE JAROSITE, ETC.

SANDSTONE; VERY LIGHT GRAY (N8) TO LIGHT GRAY (N7) TOP 20'; PALE RED (10R 6/2) NEXT 17'. VERY LIGHT GRAY (N8) TO YELLOWISH GRAY (5Y 7/2) NEXT 12'; BASAL PART GRAYISH PINK (5R 7/2) TO VERY PALE ORANGE (10YR 8/2); YELLOWISH AND ORANGISH COLORS ARE "LIMONITE" OVERTONES OR PAINT; FIRM; THIN BEDDED TO MASSIVE; GENERALLY WELL SORTED; MOSTLY MEDIUM GRAINED; LOCAL "CLAY-GALL CONGLOMERATE"; QUARTZOSE; SPARSE EXOTICS; LOCAL CONSPICUOUS BLACK ACCESSORIES; LOCAL SPARSE IRON OXIDE SPOTS (AROUND CLAY GALLS?); MORE CALCAREOUS THAN UP-DIP, ESP. WHITISH LIMY SPOTS TOWARD BASE; PRESUMABLY CARBONACEOUS AS INDICATED; NOT SO MUCH EVIDENCE OF "REDUCTION" ALONG MARGINS AND INTERNALLY

1383.2 - 1385.2

CLAYGALL CONGLOMERATE; ESSENTIALLY GRAYISH RED (5R 4/2), GILING WAY DOWNWARD TO OLIVE GRAY (5Y 4/1); LOCALLY CALCAREOUS

1385.2 - 1394.4

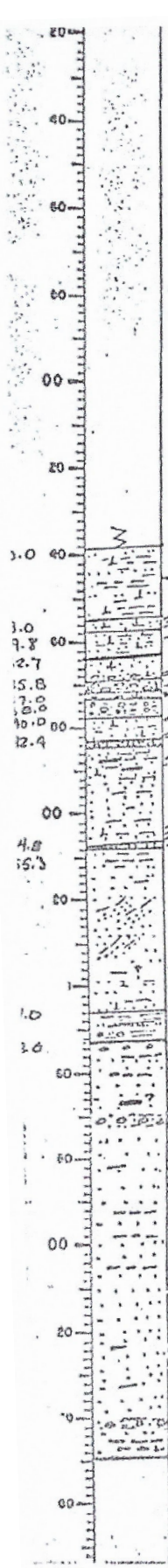
SANDSTONE; TOP 1/3RD GRAYISH RED (5R 4/2) WITH LIGHTER STREAKS; REMAINDER YELLOWISH GRAY (5Y 8/1) TO VERY PALE ORANGE (10 YR 8/2); FIRM; TOP 1/3RD THIN BEDDED; REMAINDER MASSIVE; QUARTZOSE; WELL SORTED; MEDIUM GRAINED; BLEACHED PORTIONS NOTICEABLY CALCAREOUS; CLAYEY ABOVE; ONLY FAINT REDUCTION AROUND MARGINS AND INTERNALLY

1394.4 - 1399.0

CLAYSTONE AND SILTSTONE; PREDOMINANTLY GRAYISH RED (5R 4/2) LOCALLY VARIEGATED GREENISH GRAY (5 GY 6/1); SILTY PORTIONS LIGHT OLIVE GRAY (5Y 6/1); FIRM; MASSIVE TO BEDDED; NOTE: UNLESS CORE IS MISLABELED, CLAYSTONE IS REDDISH RATHER THAN GREENISH BENEATH BLEACHED SANDSTONE NEXT ABOVE

NOTE: LATER FOUND ANOTHER BOX WITH '2' CASE SIMILAR TO UNIT LAST DESCRIBED

DEPTH	STRIP LOG	LITHOLOGY LOG	ANALYSIS OR RADIOACTIVITY
20		1209.0 - 1212.0 INTERBEDDED SILTSTONE, SANDSTONE, CLAYSTONE; ESSENTIALLY GRAYISH RED (5R 4/2) WITH RANDOM WHITISH SPOTS; FIRM; TENDENCY TOWARD CRINKLY BEDDING; CLAYEY, QUARTZOSE; ALL CALCAREOUS, ESP. WHITE SPOTS	
40		1212.0 - 1220.5 (NOTE REDUCED MARGINS AND INTERIOR) SANDSTONE; GRAYISH-ORANGE PINK - (10R - 8/6); FIRM; MASSIVE TENDENCY; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; CALCAREOUS, ESP. UPPER PART; LOCAL BLACK SPOTS; WHISPY GREENISH CLAYSTONE	
60		1220.5 - 1228.5 SANDSTONE; PALE ORANGISH (10R 6/5); COLOR AND RK. TYPE GRADE FROM ABOVE; FIRM; MASSIVE TENDENCY; WELL SORTED; MEDIUM GRAINED SUBANGULAR TO SUBROUNDED; QUARTZOSE; TRACE $CaCO_3$ TOWARD TOP	
60		1228.5 - 1231.0 SANDSTONE; VERY LT. GRAY (N 8.5); VERY CALCAREOUS; OTHERWISE AS 1212.0-220.5	
00		1231.0 - 1233.0 CLAYSTONE AND SILTSTONE; MOSTLY DUSKY RED (5R 3/4) VARIEGATED AND BANDED LIGHT OLIVE GRAY (5Y 6/1); FIRM; THIN-BEDDED TENDENCY; SOME INTERBEDS STRONGLY CALCAREOUS NOTE: ABOVE AND IN OTHER CORES BLEACHING AT TOP AND BOTTOM OF AQUIFER	
20			
40			
60		NOTE: INTERVAL NOT LOGGED IS ALL SIMILAR TO UNITS NEXT ABOVE AND BELOW	
80			
00		1320.0 - 1328.0 INTERBEDDED SILTSTONE, SANDSTONE, AND CLAYSTONE; MOSTLY PALE RED (5R 6/2); SPARSE IRREGULAR WHITISH SPOTS; FIRM; CRINKLY BEDDED TENDENCY; QUARTZOSE AND CLAYEY; WHITISH SPOTS VERY CALCAREOUS	
20		1328.0 - 1329.8 SANDSTONE; YELLOWISH GRAY (5Y 8/1); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; CALCAREOUS; UPPER AND LOWER CONTACTS INDICATE WHITE AFTERWARD; FEEBLE EVIDENCE OF REDUCT.	
40		1329.8 - 1332.7 SIMILAR TO UNIT 2ND ABOVE; BUT SANDIER AND WITH MORE BLEACHING	
60		1332.7 - 1335.8 (NOTE UNQUESTION REDUCTION ASSOC. W/ BLEACHING AT BASE) SANDSTONE; OVERALL PALE RED (5R 6/3) BUT MOTTLED LIGHTER AND DARKER; BASAL 4" IS GRAYISH ORANGE PINK (10R 8/2); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; CALCAREOUS, ESPECIALLY WHERE BLEACHED; PERFECT GREEN RINDS AROUND RED CLAY CHIP @ BASE	
80		1335.8 - 1337.0 CLAYGALL CONGLOMERATE; MOSTLY GRAYISH RED (5R 4/2) WITH LIGHTER STRINGERS; FIRM; BEDDED TENDENCY; LOCALLY CALCAREOUS - NOTE: GREENISH TOP AND BOTTOM	
00		1337.0 - 1338.0 SANDSTONE GRADING DOWNWARD TO CLAYGALL CONGLOMERATE; YELLOWISH GRAY (5Y 8/1); FIRM; MASSIVE; ETC. AS ABOVE; CLAY CHIPS GREENISH (REDUCED)	
20		1338.0 - 1340.0 CLAYGALL CONGLOMERATE AS UNIT 2ND ABOVE; TINY QTZ-XL-FILLED GEODE	
40		1340.0 - 1342.4 (NOTE: ALTD. TOP AND BOTTOM, AS ELSEWHERE) SANDSTONE; MEDIAL PORTION PALE RED (5R 6/3); TOP AND BOTTOM VERY LT. GRAY (N 8); SIMILAR TO COUNTERPARTS; CALCAREOUS, ESP. TOP AND BOTTOM	
60		1342.4 - 1343.4 CLAYGALL CONGLOMERATE AS UNIT 2ND ABOVE; GREENISH (REDUCED) @ TOP	
80		1342.4 - 1354.8 SANDSTONE; GENERALLY PALE RED (10R 6.5/3) BUT BANDED LIGHTER AND DARKER; OVERTONES OF MODERATE YELLOW (5Y 7/6) C. 1344'; BASAL 3" PINKISH GRAY (5YR 8/1); FIRM; THINBEDDED; CLAYEY AND QUARTZOSE; CALCAREOUS AS INDICATED; DEFINITE CARBON TRASH AT TOP; CLAY CHIPS REDUCED IN BASAL BLEACH	
00		1354.8 - 1355.3 SILTSTONE; GRAYISH RED (5R 4/2); FIRM; MASSIVE; CLAYEY; MICACEOUS	
20		1355.3 - 1374.8 SANDSTONE; PREDOMINANTLY PALE RED (5R 6/4), BUT GRAYISH ORANGE PINK (5YR 6/2) 1370-1372' AND MINOR WHITISH BLEACH, ESP. TOWARD BASE; FIRM; MASSIVE TO THIN BEDDED; DISTINCT X-BEDDING MEDIALLY; GENERALLY WELL SORTED; MEDIUM GRAINED; QUARTZOSE; CLAYEY AND CALCAREOUS AS INDICATED; POSSIBLE CARBON TRASH	
40		1374.8 - 1378.0 CLAYSTONE; GRAYISH RED (5R 4/2) GRADING DOWNWARD THROUGH GREENISH GRAY (5GY 6/1) AND LIGHT OLIVE GRAY (5Y 6/1) TO MEDIUM GRAY (N 6); FIRM; MASSIVE TENDENCY; SILTY; MEDIAL "LIMESTONE" AS INDICATED	
60			
80		1378.0 - 1427.0	
00			



NOTE: INTERVAL NOT LOGGED IS ALL SIMILAR TO UNITS NEXT ABOVE AND BELOW

1320.0 - 1328.0

INTERBEDDED SILTSTONE, SANDSTONE, AND CLAYSTONE; MOSTLY PALE RED (5R 6/2); SPARSE IRREGULAR WHITISH SPOTS; FIRM; CRINKLY BEDDED TENDENCY; QUARTZOSE AND CLAYEY; WHITISH SPOTS VERY CALCAREOUS

1328.0 - 1329.8

SANDSTONE; YELLOWISH GRAY (5Y 8/1); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; CALCAREOUS. UPPER AND LOWER CONTACTS INDICATE WHITE WEATHERED; FEEBLE EVIDENCE OF REDUCT.

1329.8 - 1332.7

SIMILAR TO UNIT 2ND ABOVE; BUT SANDIER AND WITH MORE BLEACHING

1332.7 - 1335.8 (NOTE UNQUESTION REDUCTION ASSOC. W/ BLEACHING AT BASE)

SANDSTONE; OVERALL PALE RED (5R 6/3) BUT MOTTLED LIGHTER AND DARKER; BASAL 4" IS GRAYISH ORANGE PINK (10 R 8/2); FIRM; MASSIVE; WELL SORTED; MEDIUM GRAINED; SUBANGULAR TO SUBROUNDED; QUARTZOSE; CALCAREOUS, ESPECIALLY WHERE BLEACHED; PERFECT GREEN RINDS AROUND RED CLAY GALLS @ BASE

1335.8 - 1337.0

CLAYGALL CONGLOMERATE; MOSTLY GRAYISH RED (5R 4/2) WITH LIGHTER STRINGERS; FIRM; BEDDED TENDENCY; LOCALLY CALCAREOUS - NOTE: GREENISH TOP AND BOTTOM

1337.0 - 1338.0

SANDSTONE GRADING DOWNWARD TO CLAYGALL CONGLOMERATE; YELLOWISH GRAY (5Y 8/1); FIRM; MASSIVE; ETC. AS ABOVE; CLAY GALLS GREENISH (REDUCED)

1338.0 - 1340.0

CLAYGALL CONGLOMERATE AS UNIT 2ND ABOVE; TINY QTZ-AL-FILLED GEODE

1340.0 - 1342.4 (NOTE: ALTD. TOP AND BOTTOM; AS ELSEWHERE)

SANDSTONE; MEDIAL PORTION PALE RED (5R 6/2); TOP AND BOTTOM VERY LT. GRAY (N8); SIMILAR TO COUNTERPARTS; CALCAREOUS, ESP. TOP AND BOTTOM

1342.4 - 1343.4

CLAYGALL CONGLOMERATE AS UNIT 2ND ABOVE; GREENISH (REDUCED) @ TOP

1342.4 - 1354.8

SANDSTONE; GENERALLY PALE RED (10R 6.5/3) BUT BANDED LIGHTER AND DARKER; OVERTONES OF MODERATE YELLOW (5Y 7/6) C. 1344'; BASAL 8" PINKISH GRAY (5YR 8/1); FIRM; THINBEDDED; CLAYEY AND QUARTZOSE; CALCAREOUS AS INDICATED; DEFINITE CARBON TRASH AT TOP; CLAY GALLS REDUCED IN BASAL BLEACH

1354.8 - 1355.3

SILTSTONE; GRAYISH RED (5R 4/2); FIRM; MASSIVE; CLAYEY; MICACEOUS

1355.3 - 1374.8

SANDSTONE; PREDOMINANTLY PALE RED (5R 6/4), BUT GRAYISH ORANGE PINK (5 YR 6/2) 1370-1372' AND MINOR WHITISH BLEACH, ESP. TOWARD BASE; FIRM; MASSIVE TO THIN BEDDED; DISTINCT X-BEDDING MEDIALLY; GENERALLY WELL SORTED; MEDIUM GRAINED; QUARTZOSE; CLAYEY AND CALCAREOUS AS INDICATED; POSSIBLE CARBON TRASH

1374.8 - 1378.0

CLAYSTONE; GRAYISH RED (5R 4/2) GRADING DOWNWARD THROUGH GREENISH GRAY (5GY 6/1) AND LIGHT OLIVE GRAY (5Y 6/1) TO MEDIUM GRAY (N 6); FIRM; MASSIVE TENDENCY; SILTY; MEDIAL "LIMESTONE" AS INDICATED

1378.0 - 1427.0

SANDSTONE; BANDED COLORS; PALE RED (5R 6/2) GRADING TO GRAYISH ORANGE, TOP 9'; BLACKISH RED (5R 2/2) NEXT 2' (CLAYGALL CONGLOMERATE); GRAYISH ORANGE (10 YR 7/4) W/ SOME PINK NEXT 8'; PALE RED (5R 6/2) NEXT 11'; GRAYISH ORANGE NEXT 6'; PALE RED (5R 6/3) NEXT 11'; GRAYISH ORANGE" NEXT 1'; MIXED BELOW; FIRM; MASSIVE AND THIN-BEDDED; GENERALLY WELL SORTED; MOSTLY MEDIUM GRAINED; CARBONACEOUS AND CLAYEY AS INDICATED; QUARTZOSE; CONSPICUOUSLY LESS CALCAREOUS THAN CORRELATIVES THIS PROFILE

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