

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

All lithologic units are part of the Oak Spring formation of Miocene(?) or younger age¹.



tr4
Tuff, red and white, pumiceous, generally coarse, minor amount of fine and lapilli material; generally indistinct, irregular, very thick beds; rare thin beds and laminae; lower 10 to 15 feet is red with 1 to 5 percent lithic fragments and a 1-foot thick zone containing scattered angular cobbles of welded tuff. Above 15 feet the tuff is predominantly white and tannish white, with a few discontinuous interbeds of red; contains 5 to 10 percent fine to coarse lithic fragments which are conspicuous, and has rare porcelaneous beds 0.2 to 1 foot thick. G₁, a porcelaneous bed in a thin-bedded 2-foot thick interval, 10 to 30 feet above the base is useful as a marker bed. The basal contact is gradational and on a surface with a relief of as much as about 25 feet; upper contact is not yet exposed in tunnel workings. Unit is more than 50 feet thick.



F
Tuff, white with a few red interbeds 1 to 2 feet thick, fine to coarse, thin- to thick-bedded; about 10 percent conspicuous coarse lithic fragments in lower 5 feet, 5 to 10 percent fine to coarse lithic fragments in upper 28 feet; conspicuous bright orange-red fine tuff bed about 2 feet thick near middle of unit; rare porcelaneous layers as much as 0.5 foot thick, and common light-red layers 0.1 to 0.3 foot thick common in upper 10 feet. Sharp basal contact. Unit is about 30 feet thick.



E
Tuff, red and light-gray, coarse to lapilli, thick-bedded to very thick bedded; most red and gray layers are in lower 15 feet; upper 15 feet is mottled and crudely banded with red. Gradational basal contact. Unit is about 30 feet thick.



D
Tuff, light-gray with a few red and light-purple layers 0.05 to 0.2 foot thick, some red mottling at top; coarse, very thin to thin bedded in basal part grading up into very thick beds; coarse to lapilli lithic fragments abundant; as much as 10 percent lapilli pumice in some beds. Sharp basal contact. Unit is about 12 feet thick.



C
Tuff, light-gray to light greenish-gray with some medium-red layers in lower 5 feet and dark-red in upper 4 to 5 feet; thin bedded in lower 5 feet, very thick bedded in upper 9 feet; as much as 15 percent of white lapilli pumice with red coating in some layers; 2-foot thick zone about 4 feet below top with thin white opaline layers and nodules. Gradational basal contact. Unit is about 14 feet thick.



B
Tuff, light greenish-gray in lower 4 feet and red in upper 3 feet, coarse to lapilli, very thick bedded. Sharp irregular basal contact. Unit is about 7 feet thick.



A
Tuff, medium-gray and upper 0.5 foot reddish-brown, coarse to lapilli; thin bedded in lower 3 feet, thick to very thick bedded in upper 12 feet; top 0.5 foot contains hard nodular and spherical masses 0.2 to 0.5 foot in diameter, some of which protrude into unit above.



tr3
D
Tuff, reddish-brown with a very dark reddish brown zone about 4 feet thick near top and greenish-gray zone 10 feet thick at base; coarse, very thick bedded; abundant coarse lithic fragments in lower 10 feet, generally pumiceous; streaks and irregular iron-stained zones in lower 25 feet common. Gradational contacts. Unit is about 60 feet thick.



C
Tuff, light-gray banded with pale-yellow, red, and purple, fine to coarse, thin- to thick-bedded; common coarse pumice; fine to coarse lithic fragments generally abundant; bluish-white soft opalescent mineral abundant in some layers 20 feet from top. Very indefinite basal contact. Unit is about 75 feet thick.



B
Tuff, light-gray, mottled and banded with red and purple, coarse; thin bedded in upper 15 feet, very thick bedded in lower 9 feet; common coarse pumice; few lithic fragments compared with unit C. Gradational basal contact. Unit is about 24 feet thick.



A
Tuff, generally dark red, minor light-red, pinkish-gray, and light purplish-red in upper 12 feet, fine to coarse; indistinct thick to very thick beds; coarse and minor lapilli pumice common; angular phenocrysts of feldspar, sanidine, and quartz abundant and conspicuous. Gradational contact. Unit is 39 feet thick.



tr2
E
Tuff, pink and white, fine to coarse, poorly bedded. About 15 feet thick.



D
Tuff, greenish-gray, fine, thin- to very thin bedded with local channeling; common dark-gray to black clayey sand. About 12 feet thick.



C
Tuff, red, and white interbeds, fine to coarse, thin- to thick-bedded; parts of some red beds are porcelaneous; prominent 5-foot thick red fine tuff bed at base. About 40 feet thick.



B
Tuff, red with minor white, reddish-purple layers and mottling common in some white beds; white and reddish-purple fine pisolitic bed 4 feet thick at base. About 50 feet thick.



A
Tuff, white with common reddish-brown and reddish-purple layers and mottling; fine to coarse. About 70 feet thick.



tr1
K
Tuff, red and light-gray, fine to coarse; some pumiceous red beds with much hematite. About 15 feet thick.



J
Tuff, red, with white bed 4 feet thick at top; fine to coarse, thin to thick bedded; few porcelaneous beds less than 1 foot thick. About 25 feet thick.



I
Tuff, dark brick-red at base, grades to light-purple at top; fine, very thick bedded; coarse pumice and lithic fragments common; 0.2 to 0.5 foot of red shaly tuff at base. About 15 feet thick.



H
Tuff, dark brick-red, fine, very thick bedded. About 10 feet thick.



G
Tuff, red and white, coarse, thick-bedded with some scour and fill structure. About 30 feet thick.



F
Tuff, white at base grading up to red; fine, evenly bedded; pumiceous at top. About 15 feet thick.



E
Tuff, red and pink, thin-bedded. About 8 feet thick.



D
Tuff, red, fine, thin- to thick-bedded, pumiceous. About 20 feet thick.



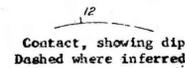
C
Tuff, light-gray, fine, very thick bedded. About 15 feet thick.



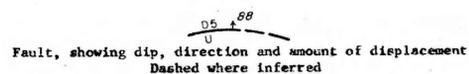
B
Tuff, reddish-brown, fine, poorly bedded; pumiceous and sandy. About 25 feet thick.



A
Tuff, red and white, fine to coarse, well-bedded, sandy. About 100 feet thick.



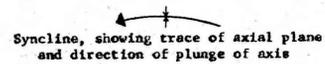
Contact, showing dip
Dashed where inferred



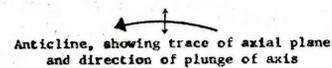
Fault, showing dip, direction and amount of displacement
Dashed where inferred



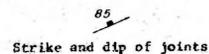
Fault, showing relative horizontal movement



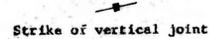
Syncline, showing trace of axial plane
and direction of plunge of axis



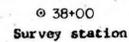
Anticline, showing trace of axial plane
and direction of plunge of axis



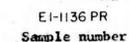
Strike and dip of joints



Strike of vertical joint



38+00
Survey station



E-1136 PR
Sample number

NOTE: Some rooms, alcoves, and other workings are not shown. The height of the tunnels ranges from about 8 to 16 feet but is shown in cross section at an average height of 15 feet.

¹ Lithologic unit symbols tr4, tr3, tr2, and tr1 are equivalent to the T₀₄, T₀₃, T₀₂, and T₀₁ units of the Oak Spring formation as divided by Hansen and Lonke (1957).

This report and/or map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.



PLEASE REPLACE IN POCKET
IN BACK OF BOUND VOLUME

FIGURE 8 - EXPLANATION FOR FIGURES 3 THROUGH 7

(300)
167/2
-10.172
Op. 2