Subsurface Geologic Interpretations along Cross Sections Nye-1, Nye-2, and Nye-3, southern Nye County, Nevada-- 2002

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Richard W. Spengler * and Robert P. Dickerson**
*** U.S. Geological Survey, Denver, Colorado ** S. M. Stoller Corporation, Lafayette, Colorado**

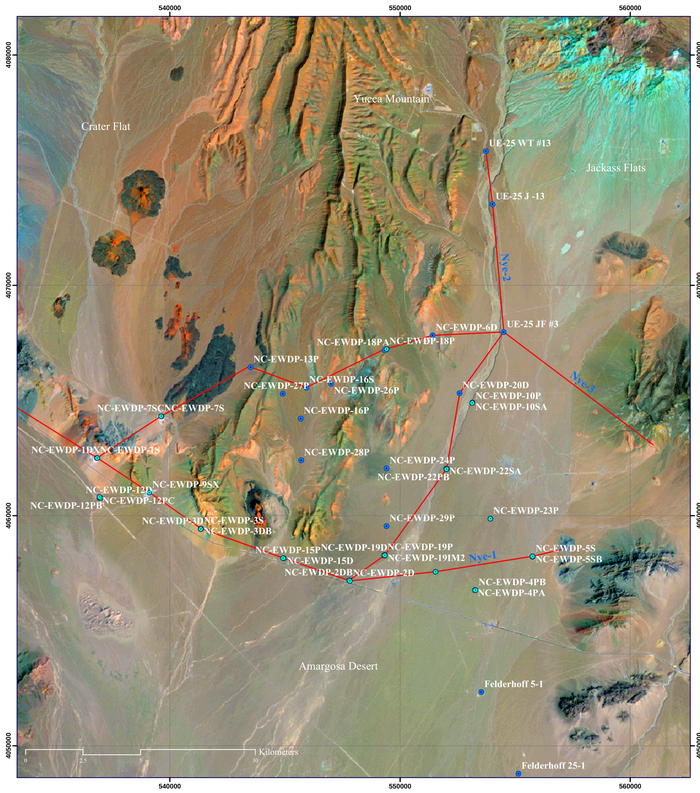

Figure 1.--Map showing locations of drilled and proposed boreholes of Nye County's Early Warning Drilling Program (NC-EWDP), selected boreholes of the Yucca Mountain Project, Felderhoff drill holes, and cross sections Nye-1, Nye-2, and Nye-3. Boreholes coded in light green represent holes that have been drilled as part of drilling phases I, II, and III, and where subsurface information is currently (10/2002) available. Map projection and Datum for all Maps are UTM, Zone 11, NAD-27; original map scale of figures 1-4 is 1:100,000. Original scale of cross sections is 1:25,000 (see plate 2).

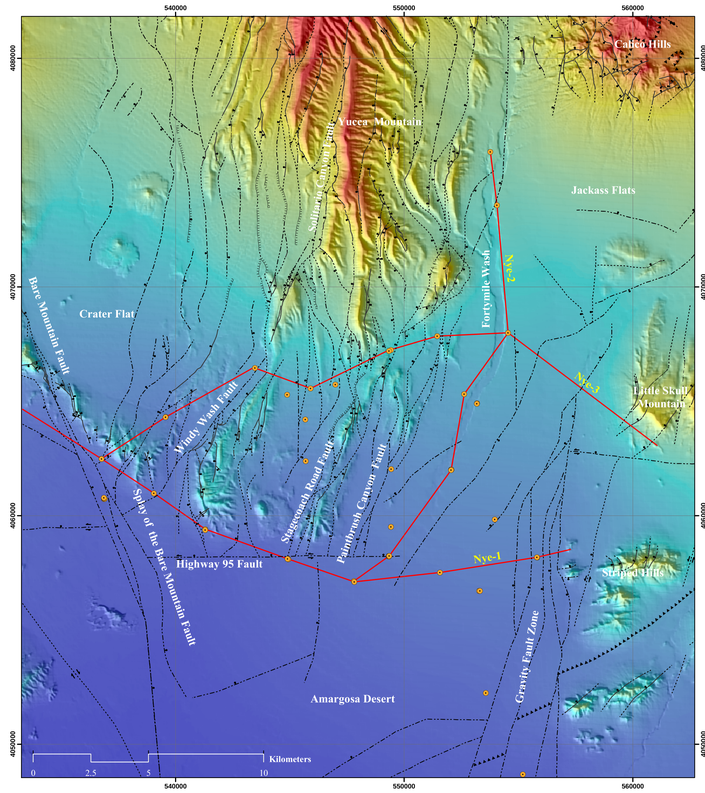

Figure 2.--Map showing fault traces in the vicinity of cross sections Nye-1, Nye-2, and Nye-3, southern and central Yucca Mountain, northern Amargosa Desert, and Fortymile Wash (modified from Potter and others, 2002, based on geophysical data, shown in figure 3). Ball and bar symbols shown on down thrown side of faults, opposed arrows indicate relative movement where inferred. Where thrust or reverse faults are shown, teeth are on upper plate. Refer to explanation of figure 2 for additional details regarding fault symbols.

Data Sources for Cross Sections Nye-1, Nye-2, and Nye-3

Cross Section	Cross Section Element	Data Type	Data Source	QA Status
Nye-1	Drill hole NC-EWDP-1DX	Depths of stratigraphic units	DTN:GS000808314211.005	Q
	Drill hole NC-EWDP-9SX	Depths of stratigraphic units	DTN:GS000808314211.005	Q
	Drill hole NC-EWDP-3D	Depths of stratigraphic units	DTN:GS000808314211.005	Q
	Drill hole NC-EWDP-15D	Depths of stratigraphic units	DTN:GS020108314211.001	N/A-Corroborative data only
	Drill hole NC-EWDP-2DB	Depths of stratigraphic units	DTN:GS011108314211.001	Q
	Drill hole Washburn	Drill hole location only	DTN: MO0105GSC01040.000, MOL, 19990804.0309	Q
	Drill hole NC-EWDP-5S	Drill hole location only	DTN: MO0105GSC01040.000, MOL, 19990804.0309	Q
	Drill hole NC-EWDP-2DB	Depths of stratigraphic units	DTN:GS011108314211.001	Q
Nye-2	Drill hole NC-EWDP-19D1	Depths of stratigraphic units	DTN:GS011108314211.001	Q
	Drill hole NC-EWDP-22SA	Depths of stratigraphic units	DTN:GS030108314211.001	Q
	Drill Hole NC-EWDP-10SA	Depths of stratigraphic units	DTN:GS030108314211.001	Q
	Proposed site for Drill hole NC-EWDP-20D	Proposed location only	Nye County WEB site (Nyecounty.com)	N/A - Corroborative data only, slight changes to proposed drill site location may occur with no impact on cross sections.
	Drill hole JF#3	Depths of stratigraphic units	From USGS WRIR-95-4245; DTN: MO0106STRATHFM.007, MOL.20010731.0030	Q
	Drill hole UE-25 J#13	Depths of stratigraphic units	DTN: MO0004QGFMPICK.000	Q
	Drill Hole UE-25 WT#13	Depths of stratigraphic units	DTN:MO0004QGFMPICK.000	Q
	Corroborative data indirectly used to help locate the top of Paleozoic strata along lines of section	Vertical and horizontal locations of seismic refraction velocity layers	Mooney, W. D. and Schapper, S. G., 1995, Chapter 5: Seismic Refraction Investigations, pp. 99-117, in Major Results of Geophysical Investigations at Yucca Mountain and Vicinity, southern Nevada, eds. Oliver, H. W., Ponce, D. A., and Hunter, W. Clay, U. S. Geological Survey Open-File Report 95-74, 184 p. MOL.19980305.0122; DTN: GS950108314212.001; TIC#237829	N/A - Corroborative data only
Nye-3	Drill hole NC-EWDP-1DX	Depths of stratigraphic units	DTN:GS000808314211.005	Q
	Drill hole NC-EWDP-7SC	Depths of stratigraphic units	DTN:GS020108314211.001	N/A - Corroborative data only
	Proposed site for Drill hole NC-EWDP-13S	Proposed location only	Nye County WEB site, Nyecounty.com	N/A - Corroborative data only, slight changes to proposed drill site location may occur with no impact on cross sections.
	Proposed site for Drill hole NC-EWDP-16S	Proposed location only	Nye County WEB site, Nyecounty.com	N/A - Corroborative data only, slight changes to proposed drill site location may occur with no impact on cross sections.
	Proposed site for Drill hole NC-EWDP-18P	Depths of stratigraphic units	DTN:GS030108314211.001	Q
	Proposed site for Drill hole NC-EWDP-6D	Proposed location only	Nye County WEB site, Nyecounty.com	N/A - Corroborative data only, slight changes to proposed drill site location may occur with no impact on cross sections.
All Cross Sections	Drill Hole JF#3	Depths of stratigraphic units	From Plume, R. W., and La Camera, R. J, 1996, Hydrogeology of Rocks Penetrated by Test Well JF-3, Jackass Flats, Nye County, Nevada, USGS Water-Resources Investigations Report 95-4245. DTN:MO0106STRATHFM.007, MOL.20010731.0030	Q
	Surface profiles	Digital Topography (NAD27 Datum) USGS DEM from Topopah Spring West and Busted Butte 7.5-minute Quadrangles	Digital Elevation Model data obtained from the USGS U.S. GeoData database. DTN: GS000200001221.003.	Technical Information-Documented and substantiated information from an electronic database.
	Potentiometric surface	Top of water table along cross sections	Tucci, P. 2002, Potentiometric-surface map, assuming perched conditions north of Yucca Mountain, in the saturated zone site-scale model. DTN: GS010608312332.001	Q
	Corroborative data indirectly used to help locate the top of Paleozoic strata along lines of section.	Gravity Profiles	Ponce, D.A., Blakely, R. J., Morin, R.L., and Mankinen, E.A., 2001, Isostatic gravity map of the Death Valley groundwater model area, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map, MF-2381-C, scale 1:250,000.	N/A – Corroborative data only
	Corroborative data used to help locate the top of Paleozoic strata along lines of section	Gravity Profiles	Ponce, D.A., Mankinen, E.A., Davidson, J.G., Morin, R.L., and Blakely, R.J., 1999, Digital isostatic gravity map of the Nevada Test Site and vicinity, Nye, Lincoln, and Clark Counties, Nevada, and Inyo County, California: U. S. Geological Survey Open-File Report 99-554, scale 1:120,000. MOL.20020709.0295, TIC#251219	N/A – Corroborative data only
	Corroborative data used to help locate the top of pre-Cenozoic strata along lines of section.	Depth-to–Basement map	Blakely, R. J., and Ponce, D.A., 2001, Depth to basement map of the Death Valley groundwater model area, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2381-E, scale 1:250,000.	N/A – Corroborative data only
	Corroborative data indirectly used to aid in identifying possible buried structures.	Aeromagnetic Data	Ponce, D.A., and Blakely, R. J., 2001, Aeromagnetic map of the Death Valley groundwater model area, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2381-D, scale 1:250,000.	N/A – Corroborative data only
	Corroborative data indirectly used to aid in identifying possible buried structures.	Aeromagnetic Data	Ponce, D.A., 1999, Digital aeromagnetic map of the Nevada Test Site and vicinity, Nye, Lincoln, and Clark Counties, Nevada, and Inyo County, California: U. S. Geological Survey Open-File Report 99-554, scale 1:120,000 MOL.20020709.0295, TIC#251219	N/A – Corroborative data only
	Surface locations of exposed, inferred faults, and stratigraphic contacts	Surface locations of exposed, inferred faults, and stratigraphic contacts	Potter, C. J., Dickerson, R. P., Sweetkind, D.S., Drake, R.M. II, Taylor, E.M., Fridrich, C. J., San Juan, C. J., and Day, W.C., 2002, Geologic map of the Yucca Mountain region: U. S. Geological Survey Miscellaneous Investigations Series Map I-2755, scale 1:50,000, DTN: GS 010908314221.001, MOL.20020416.0184	Q
	Corroborative data for surface locations of exposed and inferred faults	Surface locations of exposed and inferred faults	Potter, C.J., Sweetkind, D.S., Dickerson, R.P., and Killgore, M.L., 2001, Hydrostructural map of the Death Valley regional flow system and surrounding areas, Nevada and California: U. S. Geological Survey Miscellaneous Investigations Series Map MF-2372, scale 1:350,000	N/A – Corroborative data only
	Corroborative data indirectly used to aid in identifying locations of inferred subsurface faults and thicknesses of subsurface strata	Inferred subsurface faults and thicknesses of subsurface strata	Sweetkind, D.S., Dickerson, R.P., Blakely, R., and Denning, P., 2001, Interpretive geologic cross sections of the Death Valley regional flow system and surrounding areas, Nevada and California: U.S. Geological Survey Miscellaneous Field Investigations Series Map MF-2370, scale 1:100,000 TIC# 251903	N/A – Corroborative data only
	Corroborative data indirectly used to aid in identifying locations of inferred subsurface faults and thicknesses of subsurface strata	Inferred subsurface faults and thicknesses of subsurface strata	Sweetkind, D.S., Dickerson, R.P., Blakely, R., and Denning, P., 2001, Interpretive geologic cross sections of the Death Valley regional flow system and surrounding areas, Nevada and California: U.S. Geological Survey Miscellaneous Field Investigations Series Map MF-2370, scale 1:100,000 TIC# 251903	N/A – Corroborative data only
	Drill hole locations-Nye County Phase I	Surveyed locations	DTN: MO0105GSC01040.000 MOL, 19990804.0309	Q
	Drill hole locations-Nye County phase II	Surveyed locations	DTN: MO0106GSC01043.000, MOL, 20001018.0054	Q
	Drill hole locations-Nye County phase III	Surveyed locations	DTN: MO0206GSC02074.000 and MO0203GSC02034.000	Q
	Drill hole locations of selected YMP boreholes	Surveyed locations	DTN: MO0103COV01031.000	Q

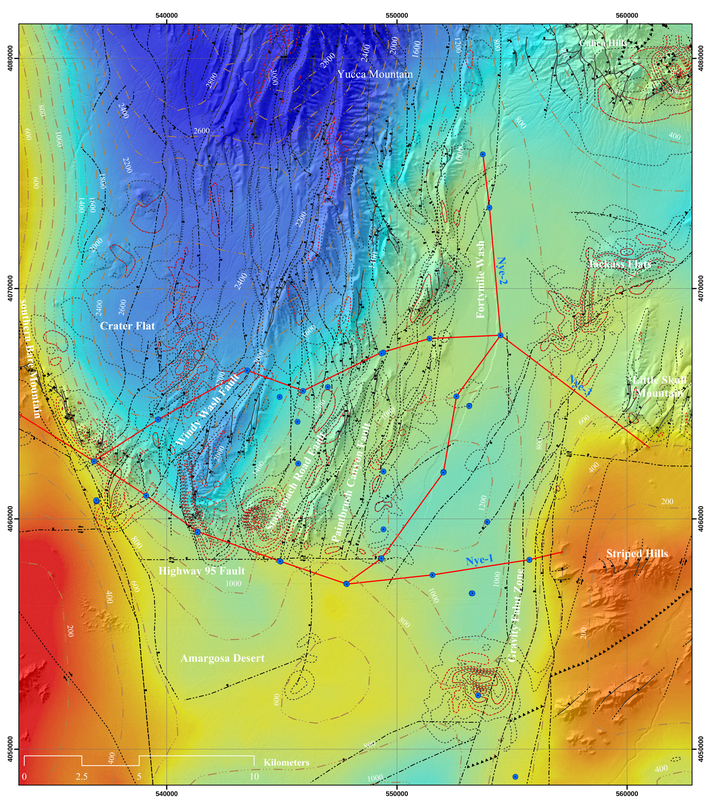

Figure 3.--Map showing isostatic gravity anomalies, moderate to steep aeromagnetic gradients, and depth to pre-Cenozoic basement rock (see Blakely and Ponce, 2001) in the vicinity of cross sections Nye-1, Nye-2, and Nye-3, and in relation to surface fault traces in central and southern Yucca Mountain, northern Amargosa Desert, and Fortymile Wash. Fault traces are modified from Potter and others, 2002. Refer to the explanation of figure 2 for details of the fault symbols. Refer to the explanation of figure 3 for additional geophysical symbols. Note that the contours showing depth to pre-Cenozoic basement was developed from a 200-m grid that used basement outcrops from a 1:125,000-scale geologic map. Therefore, locations of the 200-m contour are not precisely located, particularly near Striped Hills and southern Bare Mountain, where extensive exposures of Paleozoic rocks occur.

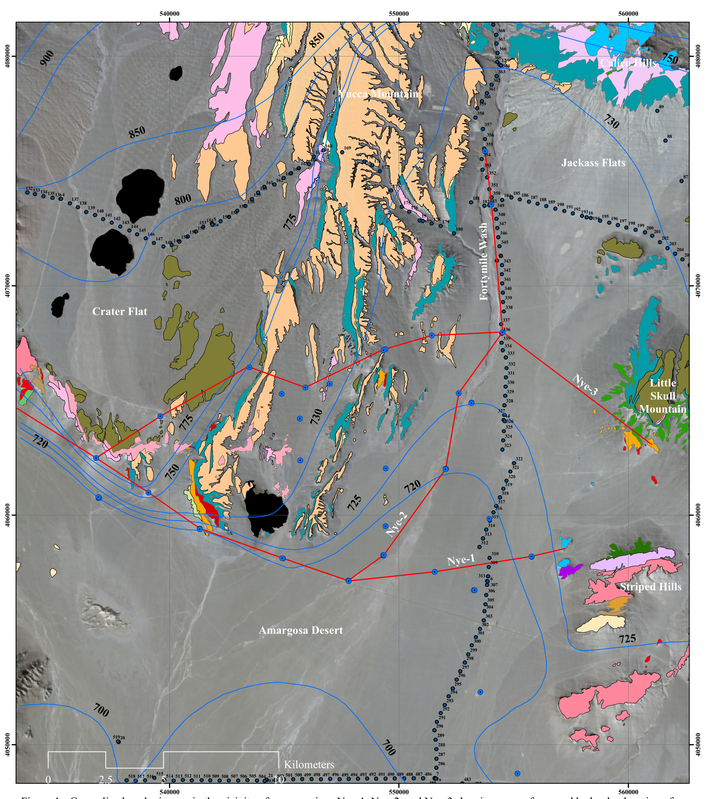

Figure 4.--Generalized geologic map in the vicinity of cross sections Nye-1, Nye-2, and Nye-3 showing areas of exposed bedrock, elevation of potentiometric surface (in meters with variable contour spacing) and locations of seismometer recording stations used in the seismic refraction survey (see Mooney and Schapper, 1995). Part of the seismic refraction profile along Fortymile Wash was integrated with cross section Nye-2. As shown, the seismic profile is closely aligned with the northern part of Nye-2 from station 354 to station 336. South of station 336 the seismic profile progressively deviates from cross section Nye-2, where station 311 was tied to drill hole NC-EWDP-2DB,which is nearly 6 km to the west. As shown along cross section Nye-2 (see plate 2), seismic refraction velocity layers do not appear perturbed by the assumed variations in rock properties in the vicinity of the inferred location of the CP thrust, shedding some doubt as to its presence beneath Fortymile Wash.

Explanation of Figure 2

- Existing and Planned Drill Holes of the NC-EWDP
- Locations of Nye-1, Nye-2, and Nye-3
- Fault Scarps in Surficial Deposits
- Exposed Faults
- Faults-Approximately Located
- Faults Concealed Beneath Surficial Deposits
- Faults Located Using Geophysical Data
- Thrusts and Reverse Faults

Digital Elevation Model

meters

High : 2020

Low : 714

Explanation of Figure 3

- Existing and Planned Drill Holes of the NC-EWDP
- Locations of Cross Sections Nye-1, Nye-2, and Nye-3
- Steep Aeromagnetic Gradients
- Moderately Steep Aeromagnetic Gradients
- Depth to Top of pre-Cenozoic Basement (200-m Contour Interval)

Isostatic Gravity

mGals

High : 13.87

Low : -40.78

Explanation of Figure 4

- Existing and Planned Drilled Holes of the NC-EWDP
- Locations of Cross Sections Nye-1, Nye-2, and Nye-3
- Elevation of potentiometric surface (in meters)
- Seismometer recording stations (1985)
- Quaternary Basalt
- Young Tertiary Volcanics and Basalts (Trx, Tby, and Tvy)
- Ammonia Tanks Tuff (Tma)
- Rainier Mesa Tuff (Tmr)
- Tiva Canyon Tuff (Tpc)
- Paintbrush Group (undivided), includes Yucca Mountain Tuff, Pah Canyon Tuff, and bedded tuffs
- Topopah Spring Tuff (Tpt)
- Calico Hills Formation (Tac)
- Wahmonie Formation (Tw)
- Prow Pass Tuff (Tcp)
- Bullfrog Tuff (Tcb)
- Pre-Bullfrog bedded tuff and sedimentary rocks undivided (Tcbbt and Tcbss)
- Tram Tuff (Tct)
- Lithic Ridge Tuff and older tuffs (Trl, Trlbt, and Trr)
- Pre-volcanic Sedimentary Rocks (Tge)
- Devonian Sedimentary Rocks-undifferentiated
- Silurian Sedimentary Rocks-undifferentiated
- Ordovician Sedimentary Rocks-undifferentiated
- Cambrian Nopah Formation
- Cambrian Bonanza King Formation
- Cambrian Carrara Formation
- Cambrian Zabriskie Quartzite
- Proterozoic/Cambrian Wood Canyon Formation