DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE U.S. DEPARTMENT OF ENERGY

OPEN-FILE REPORT 88-664

Base from U.S. Geological Survey 1:100,000 Indian Springs, 1976; Beatty, Pahranagat Range, 1978; Pahute Mesa, 1979

Universal Transverse Mercator
Base latitude 37° 00'
Central meridian 116° 15'

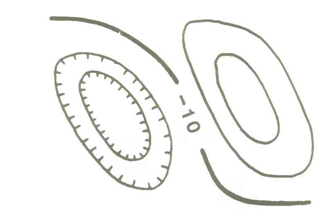
SCALE 1:100 000

KILOMETERS — MILES — FEET

ELEVATION CONTOUR INTERVAL 50 METERS

Partly funded by the U.S. Department of Energy–Yucca Mountain Project. Interagency agreement DE-AI08-78ET44802

EXPLANATION



GRAVITY ANOMALY CONTOURS
Contour intervals 2 and 10 mGal. Hachures indicate gravity low. Contours were computer generated based on a 250-meter grid derived from scattered gravity data. Although the data have been edited, caution should be exercised when interpreting anomalies controlled by only a single gravity station.

• GRAVITY STATION

■ GRAVITY BASE STATION

▲ HIGH PRECISION GRAVITY STATION

★ ABSOLUTE GRAVITY STATION

DISCUSSION

The isostatic gravity map of the Nevada Test Site (NTS) and vicinity is based on about 16,000 gravity stations. Principal facts of the gravity data were listed by Harris and others (1989) and their report included descriptions of base stations, high-precision and absolute gravity stations, and data accuracy. Observed gravity values were referenced to the International Gravity Standardization Net 1971 gravity datum described by Morelli (1974) and reduced using the Geodetic Reference System 1967 formula for the normal gravity on the ellipsoid (International Union of Geodesy and Geophysics, 1971). Free-air, Bouguer, curvature, and terrain corrections for a standard reduction density of 2.67 g/cm^3 were made to compute complete Bouguer anomalies. Terrain corrections were made to a radial distance of 166.7 km from each station using a digital elevation model and a computer procedure by Plouff (1977) and, in general, include manually estimated inner-zone terrain corrections. Finally, isostatic corrections were made using a procedure by Simpson and others (1983) based on an Airy-Heiskanen model with local compensation (Heiskanen and Moritz, 1967) with an upper-crustal density of 2.67 g/cm^3, a crustal thickness of 25 km, and a density contrast between the lower-crust and upper-mantle of 0.4 g/cm^3. Isostatic corrections help remove the effects of long-wavelength anomalies related to topography and their compensating masses and, thus, enhance short- to moderate-wavelength anomalies caused by near surface geologic features.

REFERENCES

Harris, R. N., Ponce, D. A., Healey, D. L., and Oliver, H. W., 1989, Principal facts for about 16,000 gravity stations in the Nevada Test Site and vicinity: U.S. Geological Survey Open-File Report [in press].

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Morelli, C., ed., 1974, The International Gravity Standardization Net 1971: International Association of Geodesy Special Publication No. 4, 194 p.

Plouff, Donald, 1977, Preliminary documentation for a FORTRAN program to compute gravity terrain corrections based on topography digitized on a geographic grid: U.S. Geological Survey Open-File Report 77-535, 45 p.

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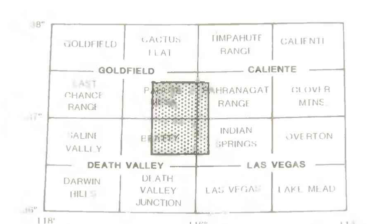

INDEX MAP SHOWING AREA OF STUDY

GRAVITY ANOMALY CONTOUR INTERVALS 2 AND 10 MILLIGALS

ISOSTATIC GRAVITY MAP OF THE NEVADA TEST SITE AND VICINITY, NEVADA

By
D. A. Ponce, R. N. Harris, and H. W. Oliver

1988