

Series XII, 2002

This geologic map of the Falmouth 30 x 60 minute in these sand and gravel deposits originally came from quadrangle and Kentucky portions of the Madison and present-day southern Ohio and Indiana, but some came Cincinnati 30 x 60 minute quadrangles was digitally compiled from as far away as the northeastern United States and Canada. Many igneous and metamorphic rocks can be found in these deposits. The composition, size, and shape 2's are products of a cooperative mapping project between of these sand and gravel deposits were described by Amaral ECONOMIC AND ENGINEERING GEOLOGY Limestone, sand, and gravel are the principal mineral esources in the Falmouth, Madison, and Cincinnati

quadrangles. Limestone suitable for construction aggregate were necessary for compilation of regional maps and for and agricultural products is being mined from the Lexington Limestone and High Bridge Group (Tyrone and Camp Nelson Limestones) in Gallatin and Pendleton Counties. Cumulative production from these mines is estimated at gh Bridge Group was reported by Dever (1974). Two erground limestone mines operate near the crest of the Cincinnati Arch, one located at Carntown in Pendleton County, and the other in northern Gallatin County. Sand d gravel occur in Pleistocene glacial deposits in Boone nton, Pendleton, and Gallatin Counties. The locations of mineral, sand, and gravel operations were mapped by Anderson and Dever (2001). The sand and gravel industry produces about 2 million tons annually in this area. The mapped area is in the extreme northern part of the Central Kentucky Mineral District, in which approximately ive to 10 known mineral veins contain barite, galena, and The 7.5-minute quadrangle maps were digitally compiled sphalerite, and minor amounts of fluorite and calcite (Anderson and others, 1982). Several of the veins occur along Big Twin Creek in Owen County in the southern par of the Falmouth quadrangle. These veins are the northwestern extension of the Gratz vein, a large composite

vein, which has been traced for several miles and extend from Lockport in Henry County to Big Twin Creek, Th and (3) resolving discrepancies in Quaternary alluvium vein was mined in the early 1900's, during World War II ndaries and inferred contacts. The metadata portion of and in the 1960's. Most veins are too small to be the digital file provides detailed information about the economically mined unless they are developed as a by conversion process. Formation codes were assigned using product of a limestone mining operation. All mines are now inactive and urban encroachment and industrial development are preventing many of these veins from being considered for future mining or geologic examination These veins are usually north-trending, vertical, 1 to 8 feet in width, and extend for several thousand feet along strike. Several cores have been drilled to test the Knox Group in bodies and found small amounts of barite, galena, and sphalerite. The Cincinnati Gas and Electric No. 1 Bender core. Campbell County, in which the High Bridge Group

had a 4- to 5-foot section of galena in the Knox at 858 feet William Weigel, geologic consultant, verbal communication, Several minor oil and gas fields occur in the northern Kentucky area (Wilson and Sutton, 1976), The Carlisle Gas ield in Carroll County and the Sparta and Glencoe Ga GEOLOGIC SETTING AND STRUCTURAL GEOLOGY
The geology of the Falmouth, Cincinnati, and Madison
The geology of the Falmouth, Cincinnati, and Madison
The geology of the Falmouth, Cincinnati, and Madison exington Limestone. Some of the wells in Carroll and Gallatin Counties were originally drilled in the late 1800's but the fields were developed in the 1920's to 1930's (Jillson 1932). Most of the wells had an initial production of 100.00 cubic feet of gas per day or less, but production diminished after a few years. Cumulative production is not known. The an estimated 4 to 5 million cubic feet per day from a depth of 500 feet, but diminished to 100 thousand cubic feet pe day. Other wells in the quadrangle have had shows of oil and lacustrine, terrace, and alluvial deposits; they contain clay, silt, sand, and gravel deposits and may be locally penetrated the Knox Group, but no production has ever een recorded, and two basement tests also reported no

The Eagle Creek Gas Storage Field was active in northwestern Grant County during the 1960's as a storage facility for Cincinnati Gas and Electric Company, but currently it is abandoned. The gas storage reservoir was located in an erosional remnant along an unconformity surface at the top of the Knox Dolomite. Surface faults exposed in the southeastern part of the Slope instability in the Kope. Point Pleasant, and Clavi Ferry Formations affects construction and engineering projects, Landslides, soil creep, and rock falls may occur in colluvial wedges at the base of slopes or valley Sometimes this process may take many years before embankments or slopes in these formations begin to fail Water saturation is the primary cause of failure because part of the map, high structure-contour elevations at the causes heaving and movement of sediments. Roads and other structures built on these sediments should have variations and increasing thickness of the Kope Formation at the expense of the Fairview Formation. The Fairview is Gibbons, 1971) in several 7.5-minute quadrangles in the are too low for adequate septic tank drainage. Glacial northeastern part of the 30 x 60 minute quadrangle. This lacustrine deposits also have a high shrink-swell potential The Falmouth, Madison, and Cincinnati quadrangles

quality of groundwater in this area is discussed in U. During the Pleistocene, there were at least three major episodes of glaciation in the region: the pre-Illinoian, the Illinoian, and the Wisconsinan Stages. The pre-Illinoian Stage occurred during part of the early Pleistocene Kansan Stage occurred during part of the early Pleistocene Kansan and Nebraskan ages (Swadley, 1979), about 500,000 years ago. The most recent Wisconsinan glaciers occurred about 21,000 years ago. The preglacial Kentucky and Licking Rivers were north-trending and connected to the transcontinental Teays River System in what is now Ohio (Swadley, 1971; Amaral, 1994). The most recent glaciation (Swadley, 1971; Amaral, 1994). The most recent glaciation agricultural use. (Swadley, 19/1; Amaral, 1994). The most recent glaciation formed several proglacial lakes, which blocked or altered the drainage of the ancestral Kentucky and Licking Rivers (Amaral, 1994) and may account for sharp 90° drainage bends along Eagle Creek and enlarged alluvial meanders along the Licking River. These lakes also allowed icerafting (icebergs) of sediments into what is now northern Kentucky, or Licking Rivers may provide adequate water (up to 500 gallons per day) at shallow depths for farms or commercial operations. Some alluvial wells may produce resulting in glacial erratics being deposited far from the southern terminus of the glaciers. Before the glaciers made a staggered withdrawal, their meltwaters caused the proglacial lakes to overflow and breach along existing north-trending Kentucky and Licking River drainage divides. This resulted in the capture of the ancestral Kentucky and Licking Rivers and formation of the current position of the Ohio River (Amaral, 1994). These glacial-fluvial processes eroded local and distant bedrock facies and distributed them as sand and gravel deposits along the ancestral Ohio River in what is now north-central Kentucky. Most of the sediment

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