# *ARUNDEL'S GREENSPRING QUARRY, 1877-1999*

**By**
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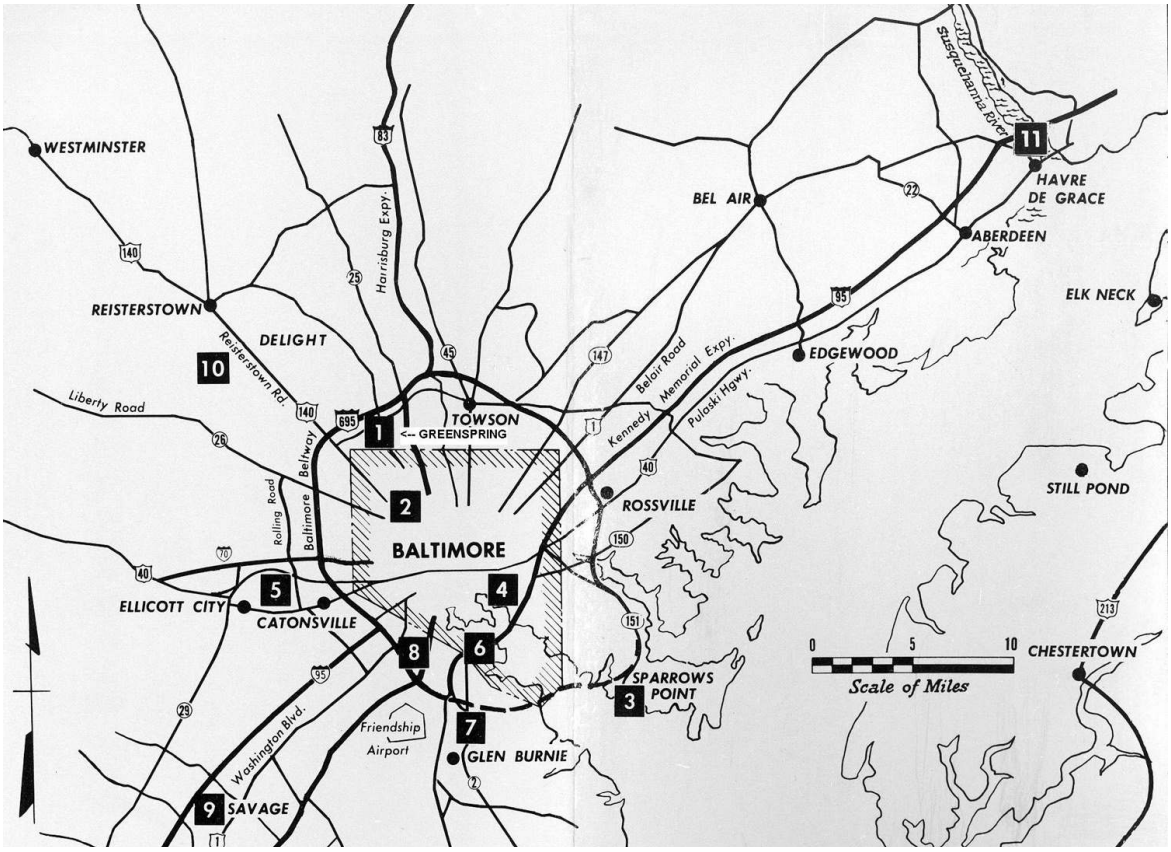
The Greenspring Quarry served as one of the long-standing crushed stone operations of the Arundel Corporation. Arundel was a major Baltimore construction materials firm that produced road-building stone products and ready-mix concrete from multiple locations in the Mid-Atlantic area. Founded in 1919 by Frank Furst, its first president, the company was a consolidation of six different dredging and construction enterprises with common business interests. Arundel was a significant player for more than fifty years in major dredging projects and in the construction of dams and power plants.

This history of Greenspring Quarry is an example of mining history from the aggregates industry; not pure mining to some, but nearly every element of Greenspring's operations aligns with traditional mining except for the type of material produced. Greenspring's proximity to downtown Baltimore, its location "inside the beltway" in an increasingly urbanized community and landscape, presented its own survival challenges. These little-recognized aspects of mining history are certainly worth considering.

## Earliest References to the Greenspring Quarry

The general area in the vicinity of Greenspring and Smith avenues north of Baltimore, Maryland, has a history of early mining operations. These included the chromite mines operated at Bare Hills in the early 1800s, as well as the Bare Hills Copper Mine, an important producer from the 1840s to 1880s. During the latter period what would one day become Arundel Corporation's Greenspring Quarry appeared. Sidney's 1850 map of Baltimore County does not show a limestone quarry in this area, but it does show the other important mining operations of the period.[1] Quarry lore claims that railroad ballast came from Greenspring Quarry or another one nearby during the Civil War.




*Greenspring Quarry is located just to the northwest of Baltimore, and is labeled 1 on this map of Arundel Corporation facilities, c. 1968.*

*The old lime kiln near the Wellwood Branch creek.*

*McMahon Brothers Quarries, Mount Washington (7)*

The McMahon Brothers operate two quarries on the west side of Green Spring Avenue one-half mile north of Smith Avenue, and 2 miles northwest of Mount Washington. Captain Boyle, a retired sea captain, first opened the main quarry, and the present operators obtained it in 1910. The former operations were only for carbonate sand, and the greater part of the development has been in the last 15 years.

The main pit near the road is a large circular opening 300 feet in diameter and 100 feet deep. The overburden is thin and little water occurs in the quarry. The rock is a medium-grained, impure dolomite, which is strongly banded, and looks much like a common gneiss at a distance. It carries considerable brown mica (phlogopite), which, with the variations in coarseness of the carbonate grains, are arranged in bands one-quarter inch to 2 feet thick. The banding and main jointing is N. 70° E. 50° S., which causes the rock to break into thick slabs, 1 to 3 feet across.

The smaller quarry is 1,000 feet west of the main pit along the same ridge and is 200 feet long, 100 feet wide, and 60 feet deep. The overburden is 10 feet thick. Only a little water comes into the pit. The rock is similar to that in the larger opening, though its fracture is somewhat more uniform and most of the building stone produced is gotten here.

The equipment consists of 1 gasoline shovel, 2 cranes, 2 boom derricks, a 450-foot cable way, 2 air compressors, 2 jaw crushers, and a 400-ton bin. The machinery is operated by 10 electric motors.

The stone from these openings is usually crushed, though considerable building stone is gotten out at times. Formerly small pits to the south of the main opening were worked for carbonate sand, though this is now largely obtained from the dust of the crusher. The following sizes are produced: dust (concrete sand and macadam): five-eighths inch (with dust and stone in septic tanks and wash tubs): 1-inch (concrete and tarring roads): 1½-inch, 2-inch, 2½-inch, 3-inch, and 3½-inch (for concrete). About 300 tons are produced in a day. Most of this goes for county, state and private roads.

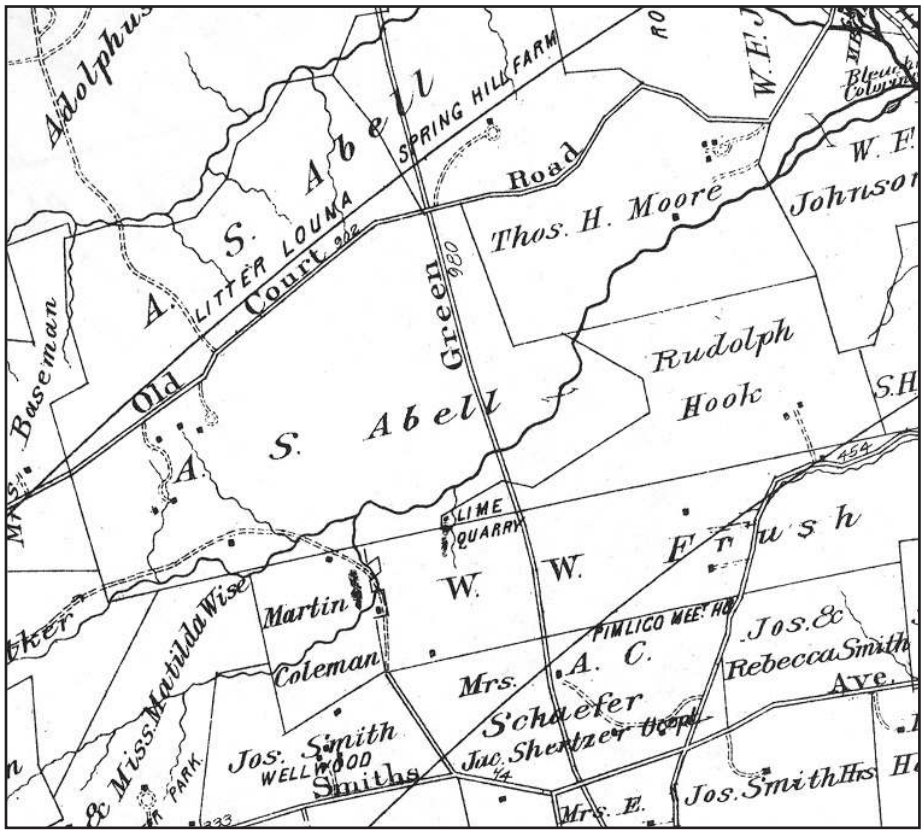
*A 1929 description of Greenspring Quarry in "Mineral Resources of Baltimore County."*

The first definite reference to the quarry appears in G. M. Hopkins' 1877 *Atlas of Baltimore County, Maryland*.[2] The Third District map, below, shows a lime quarry to the west of Greenspring Avenue and north of Smith Avenue, primarily on the A. S. Abell property, but possibly also on the W. W. Frush tract. The remains of an old lime kiln once stood visible adjacent to the Wellwood Branch, a small stream southeast of the quarry that flows into Moores Branch. The kiln was constructed from flat pieces of Setters Quartzite.

The first mention of the quarry in geological literature appears in the 1929 publication "Mineral Resources of Baltimore County."[3] This article provides sufficient detail to make it worth reproducing in its entirety (opposite).

Of note in the article is the size of the excavations, the dimensions of which indicate that some seven hundred thousand tons of limestone had been produced from these quarries in all the years prior to 1929. This figure includes dimension stone as well as crushed stone. The equipment list is also intriguing, especially its mention of a "cable way."

This cableway was likely an overhead hoisting bucket system manufactured by Lambert Hoisting Engine Company of Newark, New Jersey. Cable drums moved a skip suspended from a carriage riding on a cable strung between two towers and spanning some four hundred feet over the one hundred-foot deep quarry. The author once discovered a mostly-buried piece of sixteen-pound rail entangled in the roots of a sycamore tree near the old plant site. As a forerunner to the mine hoist used for the final fifteen years of operations at the site, did the quarry once pull mine cars up an inclined tramway?




*The lime quarry on the Abell and Frush Properties as shown on the 1877* Atlas of Baltimore County.

INVENTORY OF TANGIBLES
GREEN SPRING PLANT

1 P & H 3/4 Yd. Gas Shove
1 Link Belt 1¼ yd. Gas Shovel with 55 ft. boom for crane work
3½ yd. General Cranes with 2 Owens ½ yd. buckets "Gas"
1 Austin Crane 35 ft. boom ½ yd. bucket "Electric"
1 24 x 36 Kennedy Jaw Crusher
1 Belt Elevator, buckets, 48" x 24' revolving screen, chutes,etc.
1 Champion crusher, belts, jack shafts, and platform
1 Chain Elevator, Revolving Screen, chutes, etc.
Wooden Bins, concrete foundations with steel beams
1 No. 2 Climax Crusher (in place but not in use)
1 100 H. P. Motor (Kennedy Crusher)
1 25 H. P. Motor (Elevator)
1 40 H. P. Motor (Champion Crusher)
1 2 Ft. Symons Cone Crusher, conveyor, elevator, etc.
1 40 H. P. Motor on Rockwood Base with belts, etc.(Symons Crusher)
1 Elevator with extra motor
1 3' x 8' Niagara Vibrating Screen, with chutes
1 Blaw-Knox 3 beam Scale and Batcher Plant
5 Mack Trucks in delivery service
1 Ford Truck " "
4 Mack Trucks, hauling from quarry to crusher
1 Set Wooden Bins, concrete foundation, and steel beams
1 12 x 10 Ingersoll Rand Compressor with Building
Air Tank, Air lines, etc.
1 55 H. P. Compressor Motor
Outside wiring connecting various units
Office Building and Equipment
1 20 Ton Howe Scale
Garages and Shop buildings
1 400 Ft. Center Lambert 3 Ton cableway with 50 H.P.Motor and
Hoisting Engine complete,not in use;also 3 hoisting engines
2 derricks, partially dismantled
5 Jap Drills, hose, line oilers, fittings, etc.
Blacksmith Shop, forge, tools, steel. 2 welding outfits, etc.
1 2" Discharge F.M. pump with suction and discharge lines
Crushed stone on hand
Crushed Stone Dust
Miscellaneous lot of odds and ends and spare parts

*Arundel's "Inventory of Tangibles" when the company acquired Greenspring Quarry in 1937.*

Geological descriptions of quarries always interest mineral collectors. This 1929 account accurately describes the quarry's rock, although it is now recognized as "Cockeysville Marble," a metamorphosed limestone. Early quarries in the picturesque "limestone" valleys around Baltimore County often mined the easy, sugary decomposed dolomitic carbonate sands before getting into the harder bedrock materials.

A brief examination of deeds and purchase records illuminates other details of the early Greenspring Quarry. George McMahon and his two sons acquired at least two small parcels of land in 1912 from Ellen Boyle, likely the widow of the early quarry operator Capt. Boyle. Ellen Boyle's brother, John Coleman, gave her this land in 1885, the only consideration mentioned in the deed being "brotherly love and affection and one dollar." Coleman owned an adjacent farm and had purchased the twenty-nine-acre parcel from the Frush family in 1884. The 1898 Bromley Third District map of Baltimore County shows T. A. Boyle as the property owner and includes a shaded spot on the western property line adjacent to the Coleman farm.[4] Could this be another representation of an original quarry pit that served the early lime kiln?

When George McMahon died in 1919 he left his estate to his three children John, Harry, and Emma. They purchased the main seventy-seven-acre quarry parcel from the Green Spring Land Company in 1922, most of it being former property of Coleman or Abell. The impress of an old corporate seal reveals that McMahon Brothers, Incorporated, was registered as a company in 1923. Each of George's children held one hundred shares of capital stock, thus a one-third interest in the company.[5]

### Arundel Purchases Greenspring Quarry, 1937

The Arundel Corporation purchased all of the capital stock of McMahon Brothers in June 1937 for $152,387.85, and land underlain with stone for another $90,000.[6] With this purchase came the quarry parcel, the equipment and business, and a three-year non-competition agreement from the McMahons. The quarry equipment list from this purchase (opposite) is interesting.

Equipment and buildings were valued at $66,050 and $20,420, respectively. More-mobile Mack trucks had replaced the earlier technology of a cableway to transport material from the quarry. Most of the other equipment would be recognized in a quarry today, except that it was much smaller. The quarry delivered products to its customers with a small fleet of trucks.

### Greenspring Quarry in the 1940s and 1950s

Charles Ostrander and Walter Price of the Natural History Society of Maryland published a popular booklet for mineral collectors called *Minerals of Maryland* in 1940.[7] The authors described interesting minerals that could be found in the McMahon Quarry, apparently unaware that Arundel had purchased the property. The company purchased another 66 acres to the north of the quarry from the Green Spring Land Company in 1945, and in 1959 acquired an additional 156 acres on both sides of Green Spring Avenue for $327,000 in cash when the Green Spring Land Company was dissolved.[8]

During the 1950s the company used chain-drive trucks in the quarry and operated a binder plant—composed of a cone crusher, screen, bucket elevators, and conveyors—on the north side of the quarry near the old dynamite magazine. It manufactured number 6 stone and screenings.

### Greenspring Quarry in the 1960s

Increased interstate highway funding was likely the impetus for Greenspring's modernization and expansion in the 1960s. Demand for base material and concrete aggregate for the Balti-

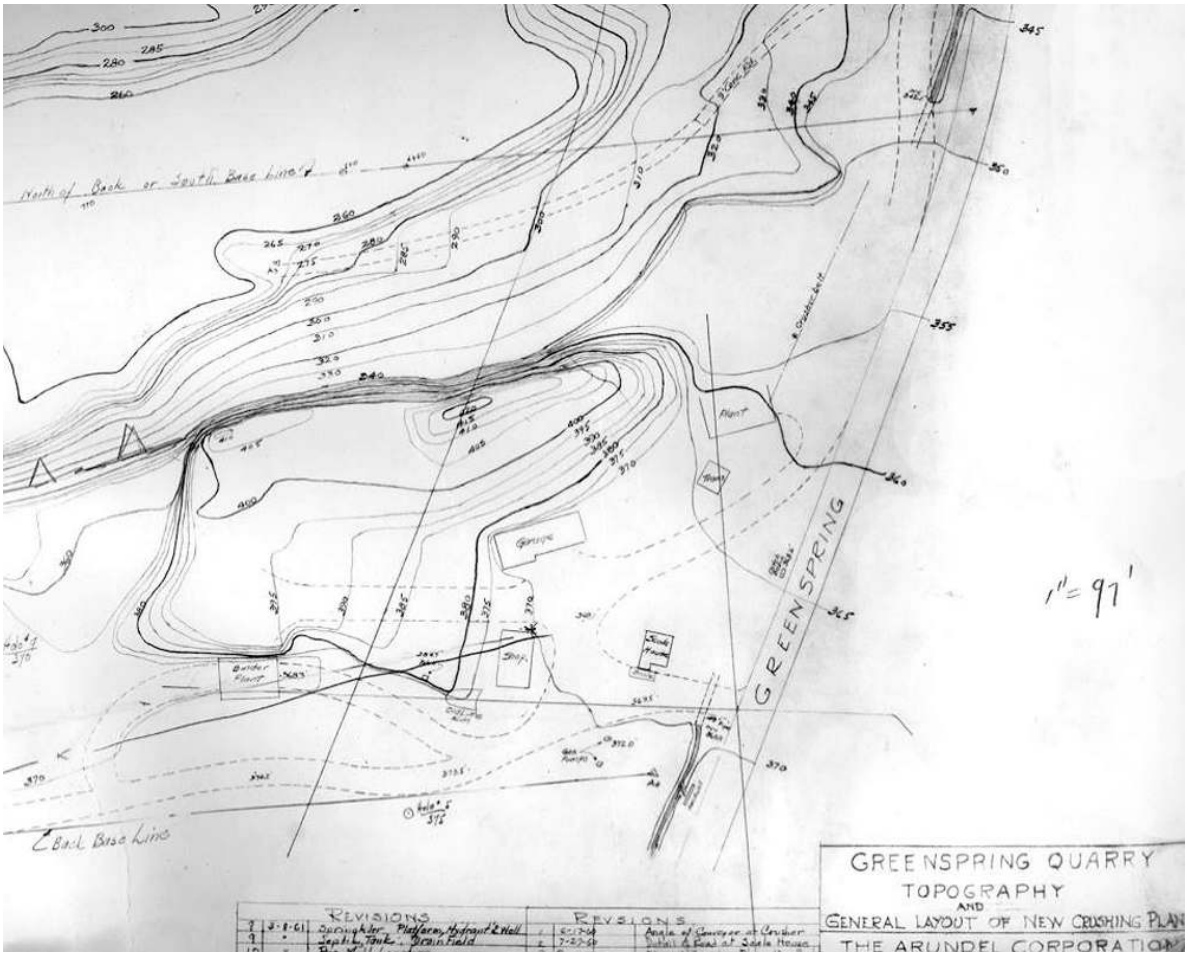
*Arundel's Greenspring Lab, the former McMahon house.*

*G. Edgar Harr well drilling at the Greenspring Quarry, 13 August 1956.*

more Beltway taxed the capacity of the old Greenspring plant, with its dated crushers, wooden bins, and bucket elevators.[9] Once Arundel's geologist, M. A. Timlin, had confirmed adequate reserves, the company signed a contract with the Baltimore design engineering firm of F. Lester Simon in June 1960 to "fully design and detail a new stone crushing plant."[10]

Simon had done similar work for Arundel at other sites over the years. Arundel provided preliminary layout drawings, and civil engineer Frank J. Yount designed the new plant for Simon. Over six months, Yount and his associates prepared more than one hundred design and detail drawings, plus many fabrication drawings, for a modern 350-ton per hour plant. Site work included constructing a new entrance and scale house and relocating Moore's Branch creek and its tributary, which ran between the two quarry pits. Arundel's dredging shipyard in Fairfield fabricated the steel for the project and its Construction Division built the plant with the assistance of a Baltimore steel erecting firm.[11]

Assembling the necessary components delayed construction of the new plant. All of the conveyors, two red 6 by 14-foot Tyler screens, and the surge tank feeder were transferred from Sutton Dam site in West Virginia once the Construction Division had finished that project. The four-foot Symons tertiary crusher came from a floating dredge plant in Brooklyn. The 36-inch Superior-McCully gyratory primary crusher came




*The old Greenspring plant, shop, and binder plant, located southeast of the Quarry, 1961.*

*The new Greenspring crushing and screening plant in 1961.*

from Hawaii, while Tyler 800 and 900 screens and a 4.25-inch secondary crusher were among the equipment Arundel purchased new.

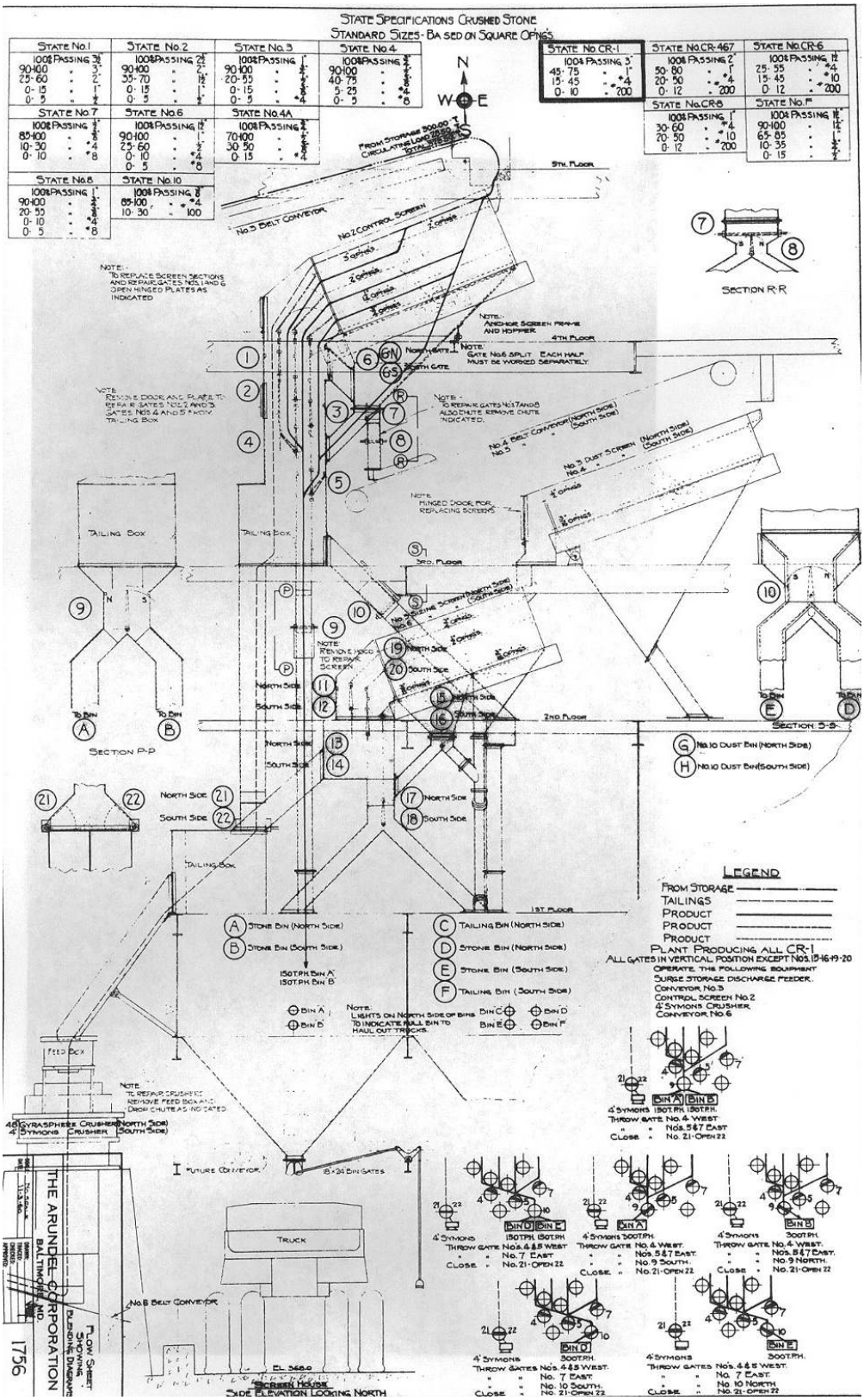
The new Greenspring plant was completed in 1961.[12] By then construction of the beltway was in full swing and the new plant's production quickly sold out. Ed Beck, who started with Arundel in 1958, was the first operator of the screening plant. He related that the plant exhibited much wear when first operated, with a lot of stone-on-steel contact. Operators had to run the plant for eight to ten hours, then repair it for three or four more hours. Stockpiles remained empty for nearly two years because the company was unable to build up its inventory in advance as planned.

Other quarry improvements during the decade included adding a Barber-Greene dense-graded pugmill plant to the site in 1963, erecting a dry-batch ready-mix concrete plant in 1964, and building a wash plant to provide clean concrete stone in 1967. The dense-graded plant blended various stone sizes together to make a tightly packing road base product and featured the flexibility to add portland cement, liquid asphalt, calcium chloride flake, or water to the product.

Greenspring's superintendent at the time was Arthur Bull, a "shovel-man." Front-end loaders of the time being small, awkward, and uncommon, Bull retained Northwest 1.5-cubic-yard, chain-driven cable shovels to load customers' trucks from the stockpiles, just as they had at the old plant. Production in the early 1960s was probably only a couple of hundred thousand tons per year. Old Mack tandem dump trucks initially emptied the bins and dumped stone products onto the stockpiles. Later the quarry acquired orange MX-30s for this duty.

### Greenspring Quarry in the 1970s

Continued growth in commercial and public-works construction demanded greater quantities




*The finishing plant's flowsheet, from 1961.*

of quality stone from Greenspring Quarry. Arundel's ready-mix concrete plants consumed large amounts of number 67 stone for their concrete mixes. The closing of other quarries and plants left Greenspring essentially Arundel's lone stone producer in the Baltimore metropolitan area. Arundel purchased the Delight Quarry in 1964 and brought it fully on line in 1968, but its serpentinite stone did not make a suitable aggregate for concrete and was used mostly in road-base applications.

At the beginning of the 1970s Greenspring Quarry's equipment included Northwest 80-D 2.5-cubic-yard cable shovels used to load R-35 Euclid haul trucks. In the winter of 1975-76, Arundel Greenspring purchased the first Caterpillar 245 hydraulic shovel used east of the Mississippi River. Its productivity necessitated moving to larger haul trucks, so the company acquired Cat 773 fifty-ton haul trucks. Arundel also adopted a couple Cat 988B loaders mid-decade as support machines for the 4-cubic-yard Cat 245. The company converted cable shovel no. 2057 into an air-operated drop-ball machine, and traded in the other manual 80-D, which went to Argentina. For years the quarry had featured two separate pits divided by a center haul road. As the quarry expanded this center road was mined out and replaced with a long circuitous incline located on the south wall of the quarry.

At the plant, Euclid R-25s now hauled product to stockpiles. About 1972 the spider on top of the gyratory crusher cracked, and was replaced with a Baxter jaw crusher made in Leeds, England. This crusher proved an operational nightmare and a Pioneer 42 by 48-inch jaw crusher had

*Greenspring Quarry pit operations in 1961.*

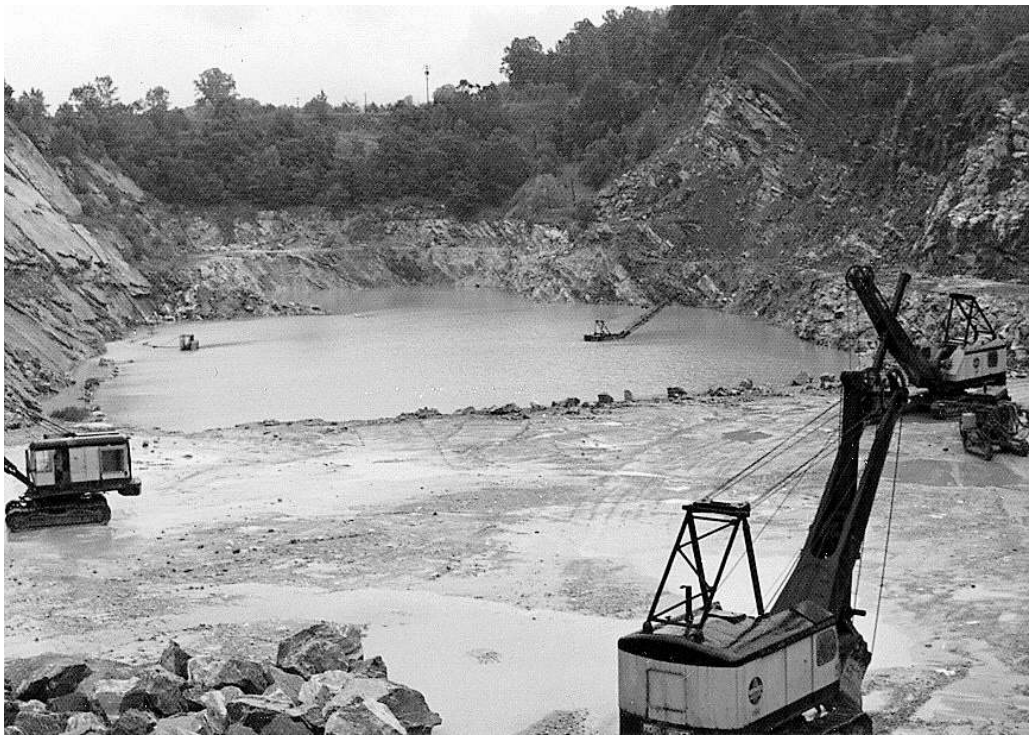
to be installed as a second primary to maintain production.[13] To further supplement production, an arrangement of conveyors and a screen were attached to the secondary crusher circuit. Originally, a diesel-powered Missouri-Rogers hammer mill operated as a tertiary crusher, but that was replaced with a four-foot standard crusher brought from Sadler's Friend Sand and Gravel operation near Petersburg, Virginia.

In 1978 Arundel refurbished the McMahons' former residence, located on the Boyle parcels that the company had purchased in 1954. The mansion was rezoned and reemployed as Arundel Corporation's Greenspring Lab, providing quality control and laboratory services for crushed stone, gravel, and ready-mix concrete.

In response to increasing environmental awareness, Arundel installed a new Johnson-March dust suppression system in the plant in 1972, improving dust control significantly over the old baghouse located in the screening plant. *Pit & Quarry* featured this project in a 1973 article.[14] The quarry received its first surface-mining permit under new state mining law and regulations in 1977, and the decade also saw an increased emphasis on safety.

Fortunately nobody was injured by a huge landslide that occurred in the mid-1970s. The crew arrived one morning to find that a thirty-by six hundred-foot slab from the sloping north wall had slid into the quarry, cutting off access to the mobile equipment and damaging the quarry's pump and water pipes, among other things. To deal with the mess, workers used a Koehring crane to lift an air-track drill up onto the slab, then systematically drilled and blasted it away. Before that landslide, Tropical Storm Agnes had delivered a natural disaster to the quarry in June 1972. Brown, muddy water from Moores Branch partially flooded the pit, inundating equipment

*The 42 by 48-inch Pioneer primary jaw crusher, no. 2.*



*Pit flooding at Greenspring Quarry caused by Tropical Storm Agnes, 23 June 1972.*

*Agnes' high-water mark, 23 June 1972.*

parked in the lower levels and washing out the banks of the sediment ponds, carrying sediment downstream.

### The Boom Years of the 1980s

The 1980s proved an interesting decade for Greenspring. Tough financial times for Arundel combined with massive public and commercial projects that demanded large quantities of the stone and other aggregates used in Arundel's concrete mixes. Arundel's Greenspring and other construction materials operations kept the company alive in the early 1980s, when failed real estate and construction projects put it in a dire financial situation. Greenspring crossed the one million ton-per-year barrier in 1983, working much overtime, and again in 1987 and 1989. Few major projects undertaken around Baltimore in those years did not incorporate Greenspring stone.[15]

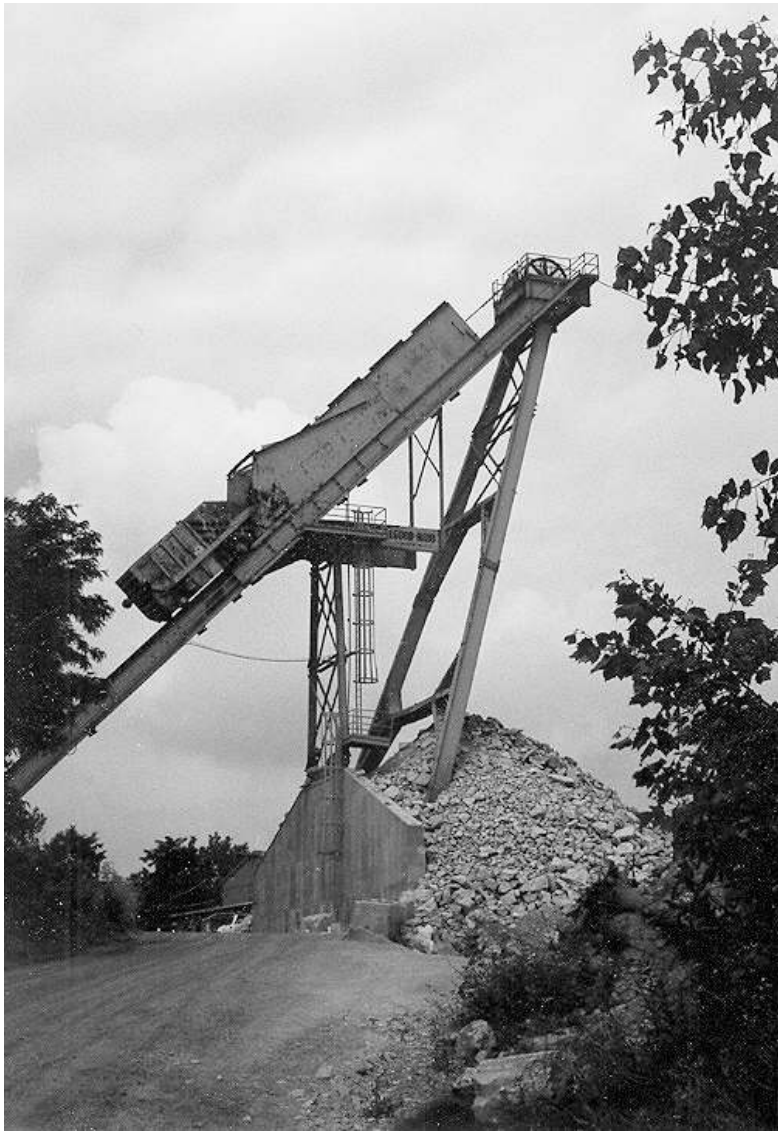
In *Minerals of the Washington, D.C. Area*, published in the first year of the decade, Lawrence Bernstein gave a geologic description of Greenspring Quarry and described the occurrence of twenty-three minerals found in the quarry.[16] During his years employed at the quarry, the author observed a mafic dike that Bernstein referred to in the north quarry wall. The south wall featured several simple pegmatite dikes up to a foot or two wide with large, black schorl crystals. Most of the good minerals seem to have been found in the eastern half of the quarry. Several vertical faults

*The newly installed slope hoist starting up in 1985.*

cut perpendicularly right through the quarry and the fault gouge could be traced on both sides. One distinctive shallow-angle fault was clearly evident from the overlook on the south wall of the quarry.

Diamond-core drilling at Greenspring in the 1980s confirmed additional reserves dipping under thick overburden to the south. These reserves justified a significant capital expenditure to extend the life of the quarry for another fifteen years. Preliminary planning for expansion had begun as early as 1968, when Greenspring had only a seven to eight year reserve remaining.[17]

Ed Beck, Greenspring's general superintendent, and engineer Rod Meyers conducted studies comparing the merits of in-pit crushing and conveying against the existing system of multiple truck hauls out of the quarry. One advantage of in-pit crushing was the additional reserves to be gained by mining the haul road benches. The company installed an automated mine-hoist on a 45-degree angle on the sloping four hundred-foot north wall of the pit. The hoist was designed to use a single car to carry shot rock delivered by fifty-ton haul trucks operating in the hole. Basically, two four hundred-horsepower DC electric motors lifted twenty-six tons of rock out of the quarry every three minutes. The quarry flooded



*The skip car dumped twenty-six tons of shot rock every three minutes, then descended for more.*

again in 1984 as Moores Branch broke through its banks after a heavy rainstorm. This delayed construction of the slope hoist, hindering further production.

Arundel secured a $3 million industrial revenue bond to finance the slope hoist project. Elgood-Mayo, based in Lancaster, Pennsylvania, designed and constructed the slope hoist, with the main hoisting drum and drive components furnished by John Hepburn, Ltd., of Canada. A mechanical Lilly Controller served as safety back-up to the programmable logic controller (PLC) system that operated the hoist. The 1985 Arundel annual report and a February 1987 *Rock Products* article give all of the technical details of this unique quarry apparatus.[18]

Hearing the guys at Greenspring over the CB radio would make you think that "Elgood" was a living, breathing entity. You might hear "Elgood is not going up and down" or "Elgood's stuck in the dump position." Over the years Elgood (we were not sure whether that was a masculine or feminine name) experienced a number of interesting mechanical failures. The most notable incident occurred when a wheel broke and the skip wound up into the dump scroll of the head-frame in a tangled mess. Two heavy truck cranes and some creative field work got things fixed in a week, and the hoist made it through to the quarry's final moments.

Quarry workers also constructed a cantilevered steel observation platform overlooking the quarry, adjacent to the hoist, that once safely held all of Arundel's board of directors. Access to equipment in the quarry was provided at the east end by a steep one-lane road with multiple switchbacks, designated by the letters A, B, C, D, etc., and not designed for production.

Meanwhile, a massive dirt-moving campaign had been initiated to gain access to the marble to the south. Excavated by a Bucyrus-Erie 88B cable-shovel relocated from Maryland Slag, much of this material was stockpiled in large berms on the northern heights of the site, from where one could see downtown Baltimore in the distance. Trucks of Joseph J. Hock and other "gypsy" haulers moved a large portion of the overburden to an abandoned sand and gravel pit on Oregon Avenue in Linthicum to reclaim the site as an industrial park. John Bildstein was hired as stripping supervisor in 1985 and geologist Owen Neighbours oversaw the "Patapsco Fill Job" as we called the dirt emplacement at Linthicum.

In late 1987 Florida Rock Industries of Jacksonville, Florida, acquired Arundel. Consummated in January 1988 for forty dollars per share, the purchase brought many changes to Greenspring, but they took several years to unfold. Greenspring's ultimate fate had been secured a few years earlier, however, by an agreement between Arundel, the surrounding community associations, and Baltimore County for the planned phase-out of the quarry over fifteen years.

The company would carry out a reclamation development plan for the site, which would be rezoned as a commercial and residential area.[19] The growing community had so encroached upon Greenspring that sooner or later the long-extant quarry was going to be pushed out. New neighbors simply would not tolerate the noise, truck traffic, blasting vibration, and dust from a thriving quarry, even if these effects had been much reduced from earlier times. The last date of quarry operations would be 31 December 1999, but this seemed to be in the distant future.

Older elements of this homogeneous Jewish community would later voice their discontent when new residents and development came to the area. People had grown to appreciate the variety of wildlife—including deer, fox, hawks, geese, great blue herons, pigeons and songbirds—associated with the wooded quarry buffer areas. They had gotten used to the quarry, possibly preferring it to additional dense townhouse development and traffic. In 1985 Arundel had sold ninety-two acres on the east side of Greenspring Avenue for $4 million, at a nice profit, for townhouse construction. The area real estate market was so hot

that the company nearly sold the operating quarry for development, too.

The decade ended sadly for Greenspring, when it recorded its only fatality in June 1989. Inexperienced driller's helper Charles Fick was crushed when his pickup truck went under the rear wheels of a backing fifty-ton haul unit in the pit. The accident investigation determined he had been distracted by something. He was flown to the University of Maryland's Shock Trauma Center in Baltimore but died about a week later from massive trauma. Arundel had a modest safety program at the time, but it was based on having outside insurance. Since Florida Rock was self-insured, the importance of an effective safety program was paramount, and such a program was initiated at Arundel after Florida Rock assumed control.

### The Final Decade

By far Greenspring's most productive decade, the 1990s were also a time of turmoil. The recession at the decade's outset required changes from the ways things had been done for years. Arundel's management—under the leadership of George Brewer, brought in from Florida Rock—made many difficult operating decisions. The mass exodus of many experienced mid-level managers throughout Arundel began with an early-retirement program initiated in 1990.[20]

Labor negotiations became difficult, as Arundel sought reductions in work rules and stressed management rights and operational flexibility in order to compete in 1990s markets. That conflict came to a head when Local 37 of the International Union of Operating Engineers went on strike in the summer of 1994.[21] The strike lasted for two weeks as management scabs and employees from other non-union Florida Rock locations came in not only to maintain, but to boost production. The other two unions, Teamsters Local 311 and the Laborers International Union honored the picket line, but the customers came in and it was

*A blast at the Greenspring Quarry during the 1990s.*

*Pit operations in 1996.*

pretty much business as usual.[22]

The parties resolved the strike at the bargaining table and afterwards things settled down somewhat close to normal. For years there had been little labor unrest with the three unions at Arundel, except for the periodic grievance or fraudulent Worker's Compensation claim. However, Florida Rock felt it necessary, under its philosophy, to challenge and roll back the unions' gains over many years with Arundel in order to survive. With the new agreement, company drilling with Joy Mustang drills was phased-out at Greenspring. Harr Well-drilling and Piedmont Explosives conducted most of the drilling and blasting in the final years.

1991 saw one final Frank Yount project at Greenspring. While awaiting the sale of his house and looking forward to retirement in the South, Frank designed remote-controlled load-out conveyors to be located beneath the bins of the screening plant. This improvement allowed rapid loading of a single fifty-ton truck for stockpiling, eliminating three twenty-five-ton trucks.[23]

Other operating changes included letting customers load their own trucks from the wash plant bins and restoring the grizzly feeder in the number 1 primary crusher when the number 2 primary came off lease and we declined to purchase it. Such systematic changes added significant gains in productivity. Greenspring's headcount declined, mostly through attrition, as the quarry relied more on outside contractors and equipment suppliers for heavy maintenance. An O&K RH40-D hydraulic shovel with an eight-cubic-yard bucket became the main pit production machine and a Cat 330L excavator with a hydraulic hammer conducted secondary breakage, replacing the old headache ball cranes. Eventually the quarry used trucks of up to sixty-five tons in capacity.

One year, an early morning rumble and cloud of dust signaled that a large rockslide had wiped out the lower bents of the slope hoist, necessitating some creative repairs. Later, a reinforced concrete deflection wall was constructed to protect the lower hoist supports, and of course nary a rock fell after that. A notice-of-violation for dust prob-

*Plant operations in 1997.*
*The pugmill is to the right.*

*The slope hoist from below*
*in December of 1999.*

lems was another highlight of the 1990s. While Baltimore County was telling us how good a job we were doing, a Maryland Department of the Environment inspector had her own ideas about how much dust was allowable under the regulations. A compromise settlement was reached.

In 1992 the Greenspring Concrete Plant closed as scheduled in the community agreements. Late in life the company installed a new truck scale and scalehouse trailer at the quarry to improve shipping efficiency and dispatching using a computerized scale system. An Ortner dewatering machine was added to wash and clean screenings for asphalt sand, but it was sized too small and little product was purchased. The big Baltimore Beltway widening project of the late 1990s boosted sales at Greenspring and the Dick Corporation of Pittsburgh staged the job from the former concrete plant site, bought a lot of stone, and hauled hundreds of thousands of yards of excess fill material to Delight Quarry to be used in its final grading and reclamation.

Crowning Greenspring's achievements of the 1990s was its excellent safety record—more than three hundred thousand hours, representing nearly six years, worked without a lost-time accident. The quarry also completed ten MSHA safety inspections in a row without a citation. In 1998 Greenspring won Florida Rock's Plant-of-the-Year Award. A regular emphasis on safety and weekly Wednesday morning safety meetings contributed to this success. Moreover, teamwork and productivity increased, as Greenspring developed into a steady and reliable producer.

Greenspring reached nearly 1.4 million tons in its final year of production, with only eighteen employees on the payroll. The author estimates total production for its history to be thirty to thirty-five million tons, with a definite production of twenty-two million tons since 1975. Of this, the slope hoist handled more than fourteen million tons from 1986, representing some 560,000 loads of shot rock. The final blast occurred on 27 December 1999. Yet, a couple of million tons of accessible stone were left in the ground when the pumps were cut off—the starter burned out on 28 December—and the quarry halted production on 30 December.

Even more might have been gained had the quarry converted some years before to partial room-and-pillar underground mining to the south before the quarry became too deep, or if the knoll on the southeast corner had been shot out to work the stone beneath. These thoughts contributed to an uneasy feeling about the quarry's closure, which seemed to creep up on us just as things were going really well.

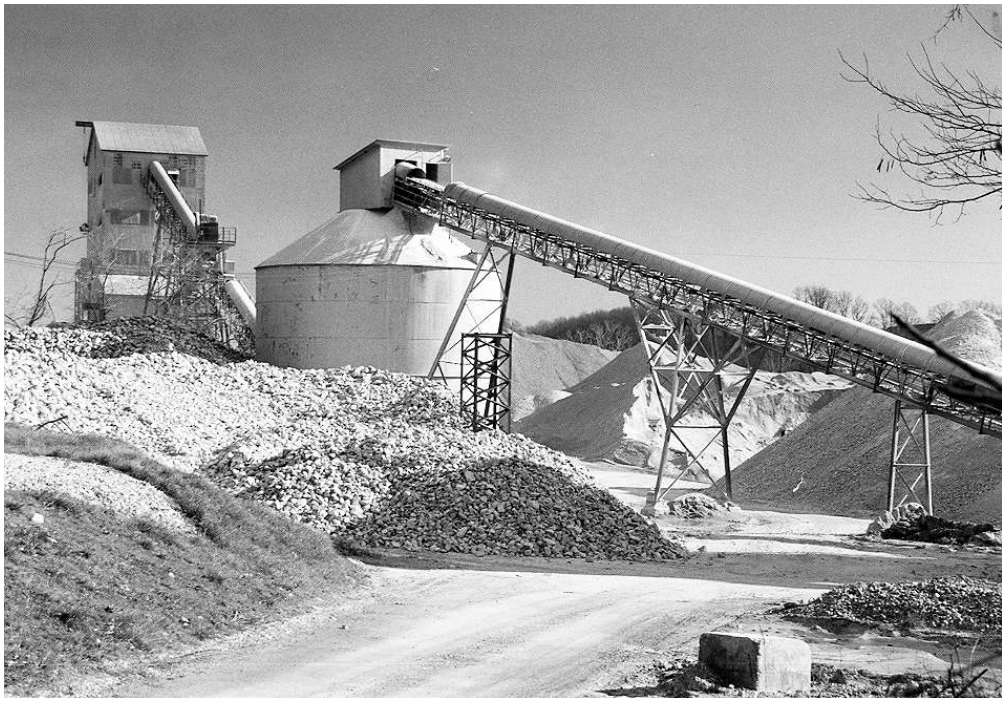
For its part, the community apparently wanted neither an operating quarry nor the area's redevelopment. The only people eager to visit the operation seemed to be the numerous scout groups we hosted in later years, mineral clubs that came in to collect, or home-schoolers who wanted a tour. Such is the legacy of Greenspring Quarry, of countless mines in years past, and certainly of many more in the future.

### The Bitter End

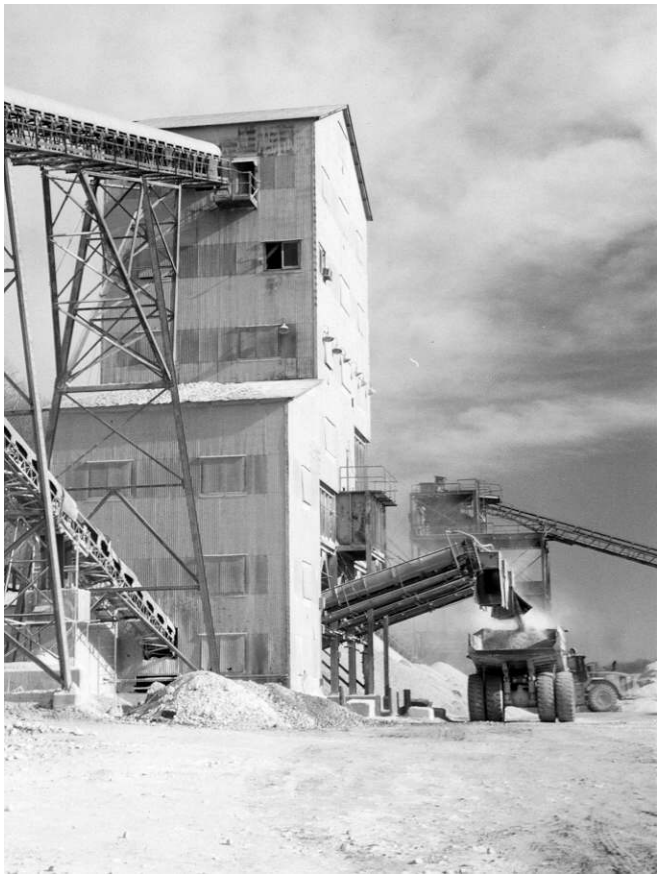
The company and county politicians finally reached an agreement in late December 1999 as to the ultimate type and density of development on the Greenspring property. Eventually 599 homes, mostly townhouses and condominiums, would be built on the site. An area for a community park would be set aside to the south on the shore of the lake to be created from the former quarry. The building density agreed to was 22 percent less than the 768 units proposed several months earlier, and lower still than the 1,000 units allowed under the 1984 agreement. The quarry asserted its right to sell its remaining 750,000 tons of accumulated inventory over the following year or so and retained three employees to do it.[24]

On 29 December a videographer recorded quarry operations for posterity and employees posed for a group photograph in the bed of a Euclid R60 haul truck. The final day of mining op-


*Greenspring Quarry's employees at the end of operations, December 1999.*



*The surge tank and finishing plant in December 1999.*



*The finishing plant in December 1999.*

*The quarry viewed from the west end, December 1999.*

erations was Thursday, 30 December 1999. That morning the author and his son rode in Donald Nash's 65-ton Euclid truck with the last load to the hoist at about eleven a.m. *Baltimore Sun* reporters visited the quarry for a nice article that the newspaper published the next day.[25]

Shortly after noon employees and a few guests and alumni gathered for a final luncheon, exchanging stories and recalling with nostalgia their experiences over the years at the quarry. They received a "Greenspring History" packet and a copy of "The Arundel Story" a video featuring Greenspring's operations that the company made in the early 1970s. On a positive note, employees who did not retire were able to find positions at affiliated locations within the company. After lunch, the excavator finished digging out the hoist dump hopper, the last skip load was hoisted around three p. m., and then the rock was removed from the primary crusher dump hopper.

The next day, 31 December, the author escorted eager mineral collectors for a last collecting trip into the quarry's depths.[26] They opened up a nice area of calcite laced with pyrrhotite veins in the very bottom lift. The specimens smelled strongly of sulfur when the rock was fractured by the collectors' rock hammers. As the author took a few last glances about the quarry and snapped some final photos of the plant, he noticed turkey vultures circling overhead—precursors to the equipment vultures that would shortly appear to remove the mobile equipment and scavenge conveyors and some of the other plant equipment for use at other operations. The final sunset of the twentieth century set upon Greenspring's towering hoist headframe with its Christmas star still proudly shining—until even that power was disconnected.

**Reclamation: Greenspring Since 2000**

For two years after the quarry closed the com-

*The quarry viewed from the west end, June 2002.*

*Condominiums and office buildings seen from the gazebo, July 2007.*

pany continued to sell crushed stone inventory while simultaneously selling, removing, or scrapping equipment. Several of the newer conveyors went into a granite rip-rap circuit at the company's Springfield Quarry near Richmond, Virginia. The company sold the hoist system drum and drives to a firm that shipped them to Australia for use as an auxiliary underground hoist.

The company donated attractive zebra-striped boulders of Cockeysville Marble to the Baltimore Museum of Industry to be part of an outdoor "Aggregates Industry" display. In 2001 an effort failed to have Cockeysville Marble declared Maryland's state rock, which would have recognized this famous Baltimore building stone and the locations where it was mined.

The company transferred historic records and drawings from Greenspring Quarry, along with other historical materials on the Arundel Corporation, to the archives of the Baltimore Museum of Industry for preservation and access. The company also provided photographs and historical narratives to the property's developers for use in interpretive displays on the site.

Meanwhile, negotiations continued with the county, the state, and the neighborhood associations regarding the details of the ultimate development plan for the area. Since the mid-1990s, Arundel and its parent company, Florida Rock Industries, had engaged Koren Development Company of Columbia, Maryland, to oversee the design, planning, negotiations, and reclamation development of the quarry property. Steve Koren and his associates managed the consultants, lawyers, and contractors.

By 2002 the final plant and equipment had been removed from the property, and comprehensive sediment and erosion controls had been installed, trees cleared, and mass grading of the site commenced. The old McMahon house that served as Arundel's Greenspring Lab, where the author worked during the summer of 1983, was torn down.

Grading continued into 2003, as huge piles

of overburden from the northern portion of the site were emplaced in the east end of the quarry to permit the establishment of a cold water discharge and emergency spillway system. Once quarry pumping had stopped, Moores Branch had ceased to flow except during rainstorms. Constant stream flow was maintained thereafter through bypass piping, with only excess storm water being diverted into the lake slowly forming in the bottom of the quarry. Before the year 2000 nobody knew how long it would take the quarry to fill with water. Estimates had been that it would take five to ten years to fill the five hundred-foot deep hole that reaches at least fifty feet below sea level. More recently it appears that the quarry will not be completely filled with water until about 2011.

As 2004 approached, one could discern residential streets and commercial areas starting to form on the site. In March 2005 the property sold for more than $30 million to Beazer Homes and OBrecht Properties. Beazer got the majority of the site to establish high-end residential communities and OBrecht obtained the mostly flat former plant area to pursue its commercial ambitions. The following two years saw construction of many houses in the low-density areas around the perimeter of the property and luxury condominiums in apartment buildings overlooking the west and southwest parts of the quarry. As water slowly filled the pit, restoration work was undertaken on the adjacent stream and its tributaries to restore the ecology and establish wetlands.

By 2007, the primary commercial, office, and retail areas were mostly completed and many tenants open for business, including a Starbucks Coffee shop, a Fresh Market store, a Walgreens pharmacy, a Verizon cell phone store, a bank branch, and various eateries. The Life Bridge Health Pavilion at Quarry Lake, an extension of Sinai Hospital, occupies one of the major buildings.

The former plant site reclaimed with offices and retail stores, October 2008.

With such an extensive site, residential construction will continue for several years, although most construction has been completed adjacent to the quarry itself.[27] The emergency spillway constructed on the east end of the quarry is flanked by a park and gazebo originally the site of a sales office trailer. A health and fitness center is located next to the former quarry truck entrance.

The park has been landscaped and beautified as part of the main entrance to Quarry Lake at Greenspring, the name the developers chose to market their upscale development. The former quarry's employees always commuted from outside the area and did not live in the immediate community. They were farm boys or urban dwellers working in a homogeneous suburban Jewish neighborhood. Certainly none of them could even have come close to being able to afford to live in the luxury neighborhood that now surrounds the water-filled hole they dug.

In 2008 the Interstate Mining Compact Commission awarded Arundel's Greenspring Quarry the Kenes C. Bowling National Mine Reclamation Award for the best non-coal mine reclamation. Quality reclamation resulted in an aesthetic planned development around a picturesque lake. What a fitting end and lasting legacy for such an interesting site.[28]

## Conclusion

Crushed-stone quarries of the aggregates industry are not as glamorous as historic gold mines, nor do they evoke the tourist interest of silver mining towns in picturesque mountain settings. Generally, little public or corporate interest in industrial history exists, and mining sites thoroughly reclaimed as natural habitat or for development often possess few discernable features of their past histories. Moreover, an interest in local history often kindles too late to gather good workplace stories, important details, and facts by interviewing the old-timers who worked at a site for millions of cumulative man-hours. Yet, recording the history of Arundel's Greenspring Quarry for posterity while it is still fresh is worthwhile, as that history is in some way representative of the operation and final closure of a multitude of quarry or mining sites in the past. ■

*Johnny Johnsson served as Director of Environmental Affairs for the Arundel Corporation. He is a mining engineer and professional engineer with twenty years of experience at Arundel. He served as operations engineer from 1985 to 1990 before assuming responsibility for environmental permitting and compliance. In these positions he maintained a good rapport with employees and management, enabling him to record this history. He regularly participates in the annual Greenspring Quarry reunion cookouts hosted by former plant manager Johnny Bildstein.*

*This account was originally composed in 1999 and dedicated "to the many hardworking employees of the Greenspring Quarry over the years, on the eve of its final closure." All of the illustrations used are from the author's collection, accumulated while documenting the quarry's operations and history.*

## Notes:

1. J. C. Sidney & P. J. Browne, *Map of the City and County of Baltimore, Maryland from Original Surveys* (Baltimore: J. C. Sidney and P. J. Brown, 1850).
2. G. M. Hopkins, C.E., *Atlas of Baltimore County, Maryland* (Philadelphia: G. M. Hopkins, 1877).
3. Edward B. Mathews and Edward H. Watson, "Mineral Resources of Baltimore County," in *The Physical Features of Baltimore Coun*ty (Baltimore: Maryland Geological Survey, 1929), 246. The Greenspring Quarry is not mentioned in Edward B. Mathews and John Sharshall Grasty, *The Limestones of Maryland* (Maryland Geological Survey Special Publication, v. VIII, pt. III; Baltimore: Johns Hopkins Press, 1910).
4. George W. and Walter S. Bromley, civil engineers, *Atlas of Baltimore County, Maryland from Actual Surveys and Official Plans* (Philadelphia: G. W. Bromley & Co., 1898), Plate 17, Part of Third, Eighth, and Ninth districts.
5. Arundel Corporation, Real Estate Records, Deed from John McMahon, et al, to Arundel Corporation, 14 Sep. 1937, and various title searches. (Arundel Corporation real estate records, minute books, financial statements, contracts, annual reports and archives pertaining to this article were originally consulted at Arundel corporate headquarters in Sparks, MD.)
6. Arundel Corp., Minutes of the Meeting of the Board of Directors, 18 May 1938, Minutes Book no. 3., 29-30; Arundel Corp., Report of Financial Statements, Year 1937, Touche, Niven & Co., Certified Public Accountants, 11.
7. Charles W. Ostrander and Walter E. Price, Jr., *Minerals of Maryland* (Baltimore: Natural History Society of Maryland, 1940), 27. Ostrander and Price recorded: "The McMahon quarry, an opening in the Cockeysville Marble intruded by pegmatite, is located on the west side of Greenspring Avenue one-half mile north of Smith Avenue. The following minerals are found: pyrite crystals in cubes and octahedrons, brown tourmaline, phlogopite, calcite crystals and cleavages, Iceland spar, black tourmaline in microcline, sphalerite grains, minute garnets, fuchsite, epidote, muscovite, talc, dolomite, limonite, quartz crystals, pyrrhotite, rutile, sphene, serpentine, and graphite." I found or saw nearly all of these minerals at the quarry.
8. Arundel Corp. Real Estate Records, Deed from Greenspring Land Company to Arundel Corp., 13 Mar. 1959, and title search.
9. At the southeast corner of the property the author located an old concrete sump pit and pump and various crumbling reinforced-concrete foundations once associated with the old plant. The heaviest foundations were probably associated with the primary crusher installation.
10. Arundel Corp., Subcontract B-30036, F. Lester Simon, 21 June 1960.
11. Arundel Corp., Advice of New Contract no. C-357, 10 Oct. 1960. Frank Yount recalled only one design mistake in the plant, where he put a beam through a chute or vice-versa. A field fit relocated some steel to make it work, but Mr. Zepp, Arundel's operations manager, displayed no little emotion over the ordeal.
12. As originally laid out, final stone products would have been stockpiled in the lower yard by an overhead conveyor belt and shuttle conveyor system. But this portion of the $350,000 project was eliminated by President Warren Black due to its estimated additional cost of $100,000. Bin and truck load-out were substituted instead.
13. The purchase decision was attributed to hot-tempered Operations Manager Jim Peddigrew. Another poor-performing piece of English equipment was the Dudley rock breaker purchased in the early 1990s.
14. "Spray System Solves Dust Problems at Arundel Quarries," *Pit & Quarry* (Feb. 1973): 1-3. Although not environmentally related, at about this time Arundel also engaged in some public relations, producing a sixteen-millimeter film called "The Arundel Story." This movie features Greenspring's operations in the context of Arundel's Baltimore-based construction materials business; it survives to chronicle the quarry's operations and personnel of the 1970s.
15. Baltimore projects that consumed Greenspring stone and aggregate included the Fort McHenry Tunnel, Harbor Place and the Gallery, the Maryland Science Center, the new Orioles' and Ravens' stadiums at Camden Yards, the National Aquarium, the city's World Trade Center, Johns Hopkins Hospital, the Francis Scott Key Bridge, BWI Airport, the Hyatt-Regency, I-795, the Owings Mills Town Center, and the Baltimore Metro subway.
16. Lawrence R. Bernstein, *Minerals of the Washington, D.C. Area* (Baltimore: Maryland Geological Survey, 1980, 38-9). Bernstein wrote: "The Greenspring Quarry is a large opening in a predominantly gneissic facies of the Cockeysville Marble. The rock is primarily calc-gneiss, with scattered layers and lenses of calcite marble. Pegmatites and small quartz veins are common, and a fine-grained mafic dike (containing a high proportion of iron and magnesium minerals, here mostly amphiboles), at least fifty meters long and averaging ten centimeters in width, was also observed. Most of the unusual and well-crystallized minerals are found in and immediately adjacent to pegmatitic pods. Crystals of schorl and dravite, up to several centimeters long and a couple of centimeters wide, are common in this environment, and single crystals which apparently show extensive compositional variations between these two tourmaline end-members

are encountered. Muscovite, phlogopite, small cubic crystals of pyrite, and elongated silvery rutile crystals are also characteristic of these areas. Massive pyrrhotite is found throughout the marble layers, as are phlogopite and smaller amounts of dravite, gray scapolite, chalcopyrite, brown titanite, and tremolite. Some small, pale emerald-green crystals of chromian muscovite were also observed in this rock."

17. Arundel Corp., Minutes of the Meeting of the Board of Directors, 30 Apr. 1968, Minutes Book No. 8, 162.
18. Mitchell Rukavina, "Slope Hoist Rescues Quarry," *Rock Products* 90, no. 2 (Feb. 1987): 64-7; Arundel Corp., 1985 Annual Report, 3-4.
19. Amy Goldstein, "Arundel Corp., Citizens Agree on Quarry Issues," *Baltimore Sun*, 17 Oct. 1984, 18D. The blacktop plant, recently opened on quarry property leased from Arundel by Paving Material Supply (PMS), an affiliate of the now-defunct Ratrie-Robbins & Schweitzer (RRS), was promptly closed and relocated to Rosedale.
20. Arundel's vice president of operations, his administrative assistant, the purchasing manager, and Greenspring's general superintendent, Ed Beck, were among those to leave. The exodus reminded some of a day at Arundel in 1968, called Black Friday, when a man arrived from New York and terminated thirty-seven people.
21. "Strike Hits Arundel Gravel Yards," *Baltimore Sun*, 11 June 1994, 24C.
22. Quality Control Manager Dave Wherley operated the primary during the strike, while Frank Niner ran the loadout truck and geologist Owen Neighbours was stuck down in the pit. Property Manager Don Osborn ran lunches around for everyone. I don't recall hearing any real hassle or nasty comments when we crossed the picket line. We received a $100 per day strike bonus for working during the strike, which I used to purchase new living room furniture.

    I operated "Elmer's Plant" during the strike. Nicknamed for longtime plant operator Elmer Mentzel, this tall screen house structure had five screens and two tertiary crushers. We were making number 2s, number 57s, and number 10 dust at the time, and I distinctly remember one time when I set the surge tank feeder a little too high. While I was out on the screening floor pushing dust buildup from a chute down into a bin, a loud clatter of rocks sounded on the floor above. The crusher feed chute had backed all the way up to the top screen and overflowed, showering rocks down to the floor below. I rushed in and shut the feed off, and after the long delay of the conveyor clearing itself, proceeded upstairs to shovel a couple of tons of coarse rocks back into the screen discharge chute.
23. Johnny Johnsson, "'Home-Style Automation' Yields Real Cost Savings," *Stone Review* 8, No. 2 (Apr. 1992): 32-3.
24. Liz Atwood, "Old Quarry with a Future," *Baltimore Sun*, 18 Dec. 1998, 1C, 8C; David Nitkin, "County Councilman and Developer Reach Agreement on Greenspring Quarry Project," *Baltimore Sun*, 22 Dec. 1999, 3B; Barbara Pash, "Carving Out a Community," *Baltimore Jewish Times*, 9 Mar. 2001, 36-41.
25. Liz Atwood, "From Blasted Pit to Waterscape," *Baltimore Sun*, 31 Dec. 1999, 1D, 8D.
26. Jay L. Lininger, "The Greenspring Quarry, Towson, Maryland," in "The End of an Era on the Last Day of the Millenium," *Matrix, A Journal of the History of Minerals* 7, no. 3 (Fall 1999), 141-2.
27. Linell Smith, "Liquid Asset," *Baltimore Sun*, 30 May 2006, 1C, 2C.
28. Interstate Mining Compact Commission (Herndon, VA), press release, "IMCC Selects Recipients of National Reclamation Awards," 26 Mar. 2008, 1-3.