



One Mile Down the Road

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Granite Construction always has been a heavy contender in the California market and makes continued efforts to maintain its status as a Fortune 500, top-100 company. Recently the company embarked on a venture to take an acquired mom-and-pop operation (R.C. Collet) to a higher standard by maximizing reserves and plant capacity. The Capay site, located in Yolo County, is now permitted for 1 million tpy and later will be vertically integrated with an asphalt and concrete facility.

Bringing the Capay site to this new level involved demolishing its old plant, moving it one mile down the road and rebuilding it with the addition of several new screens and a 16-cubic-yard **Rohr** clamshell dredge. This was accomplished by both internal employees and outside contractors working 10- to 12-hour days, six days a week.

But it was more than just hard labor that went into this move, explains Steve Grant, plant construction project manager. He and on-site plant superintendent, Ben Adamo, were tasked with having to do it cost effectively without sacrificing the needs of its client base.



Plant construction project manager, Steve Grant, and onsite plant superintendent, Ben Adamo.

DEVELOPING A STRATEGY

The first step in planning a strategy for the demolition and transport was to create equipment inventories that were filed away in thick, three-ringed binders. As this was completed, Grant, Adamo and the team began planning how to incorporate new and old equipment into the new plant. They needed a plan that could be executed quickly, smoothly and without interruption.

This required having a solid foundation, new stationary steel support towers and complete infrastructure including fresh- and slurry-water piping, electrical motor control centers and all of the A-frame support bends for the field conveyor in place before a single bolt was loosened. So in March of 2005, the company broke ground to create a 125- × 63-foot slab buried 7½ feet in the ground. On Aug. 25, 2006, production at the original plant was halted and, piece by piece, components were dismantled and hauled down the road on flat-bed trailers. Production resumed in December 2006 and is permitted to run until 2009. Grant says the demolition phase was completed in one week, which was twice as fast as their most optimistic estimate — and it was done without incident.

During the operation's downtime, Granite Construction relied on 500,000 tons of stockpile to hold it over. Adamo says they anticipated the move and started building a reserve more than a year ahead of time. Fortunately, there was enough to carry them through the storm. But, he confesses, the group was getting nervous as sands depleted.

The conveyors were the first to come down. They were built by Spaulding Equipment Co. in a modular fashion with 20-foot-long trusses bolted together. This allowed every conveyor to be disassembled and re-configured down the road. Motors, gearboxes and pulleys were reinstalled according to a very precise “recipe,” Grant says. Half a dozen new conveyors also were added to the line, including Kolberg-Pioneer radial stackers and a Thor telescoping stacker. A local fabricating company, NMI, provided the feed belt and helped with much of the steel erection.

The total length of conveyor in the new plant stretches 5,150 feet. There are 5,700 feet of

overland pit conveyors and another 600 feet of floating conveyor from the dredge. In hindsight, all of the conveyors would have been new.

“I would not suggest utilizing existing conveyors for an adjacent project,” Grant says. “It probably would have been smoother to take that equipment down and ship it to another facility that didn't have a time constraint.” Adamo adds that there was an obvious cost savings to utilizing as much of the old equipment as possible, but time was more essential as stockpiles dwindled. They also had a limited amount of space to work with.

Another big challenge, Grant says, was working with the local electric company. He says this is a long process and recommends getting them involved early. To ensure that the plant didn't brown out the community, two source points needed to be installed. The all-electric dredge alone requires a 12,000-volt, 2,500-amp supply to its 2,200-hp system.



MOVING WET MATERIAL

Granite Construction had to dig a small pond with an excavator to erect the 345-ton dredge, which sits 45 feet high, 50 feet wide and 100 feet long. Over the next 22 years, this 16-cubic-yard clamshell will be digging out a 200-acre lake that will later serve as a recreational site for nearby residents. The dredge was the most essential addition to the new operation. In order to maximize reserves, Granite Construction needed to reach deep.

And, with 200 feet of cable, the clamshell easily will extract its 155 feet of permitted reserves. Until Granite Construction can reach its ultimate goal of a 1,000-tph production from the dredge, it will be assisted by Cat 633 paddle-wheel scrapers that continue to extract dry material in the same manner that was employed by R.C. Collet.

As the machines continue taking down the high wall, they dump into a drive-over hopper above the field conveyor. At times, they bulldoze with a Cat D9R directly into the dredge hole in order to feed the plant. The combined efforts of the dredge and scrapers are extracting 950 tph of material feed. Six hundred of those tons are being produced by the dredge.

The dredging operation also is the start of the washing process. As material is extracted, there is a loosening of the fines that adhere to the rock. Then it goes over four Metso Minerals polyurethane dewatering screens that are equipped with spray bars. Two are for sands and two are for coarse aggregate. The dried material then is transported to the processing plant on an overland conveyor.

The sands and wash water are pumped through a set of cyclones as part of the dewatering process. Overflow is pumped to an onshore water clarifier, provided by Tons Per Hour Co.

Clean water returns to the pond where the dredge is operating and the clays go to a settling pond. The Capay site is operating in this manner in order to conform to its reclamation plan. Adamo says the lake bottom needs to be free of fines, so it can serve as a ground-water recharge point. And the settling pond eventually will be transformed back into agricultural land.

The TPH C1256E 3500 clarifiers have a unique design, according to Grant. He explains that the typical models consist of round tanks with a rotating rake above a conical bottom. These are rectangular in shape and made of steel. With the help of a flocculent, material settles to the bottom where chain-mounted rakes scrape the sediment into a cone at the farthest end. Static head in the discharge cone dewateres and thickens the material to 40 to 50% solids, which is pumped to the settling ponds. Clean water rises and is extracted off of weirs at the top of the tanks.

The plant circulates 6,500 to 6,800 gpm. About 1,100 gpm are taken from the reserves of ground water, to make up for what is lost. Grant says the company operates 12 production-type pumps for freshwater, silt, slurry and minus-200-mesh waste slurry. It includes vertical-shaft Gallagher pumps, Warman pumps and two well pumps.

To fight abrasion when pumping manufactured sand, the Capay facility relies on flexible discharge hose to connect all of the 12-inch steel pipe at the elbows. So, when the hose wears at the bend of the material flow, only that component needs to be replaced. Also, by increasing the radius, wear is decreased. "We don't know (the wear life) yet," Adamo says. "We are hoping that we don't find out for quite some time." Another facility using the hose has been operating for four years without ever replacing it.



MOVING DRY MATERIAL

From the field conveyor, material is carried up 40 feet to a primary scalping screen that separates the 3-inch minus from the 3-inch plus. The 3-inch plus enters the primary jaw crusher, which crushes material that is stockpiled in a 8,000-ton-capacity surge pile. Three variable-speed belt feeders control the feed rate to the main plant.

A plant feed conveyor is responsible for carrying it 584 feet to the top of the 75-foot wash plant. The wet primary scalping screen on the main tower separates the coarse aggregate from the pea gravel and sand. Oversize receives additional washing from two rock washers. From there, material is delivered to another screen that separates the concrete aggregate. Everything larger than one-inch minus enters the crushing circuit to make mineral aggregates and base products. "It's pretty wash-intensive at our facility," Grant says.

There are two secondary crushers at the Capay site, one Texas and one ISC Model 83

vertical-shaft impactor. The ISC takes care of the larger stone and the Texas takes pea gravel for sand production.

According to Grant, the plant was configured to maximize production of the highest demand materials: concrete aggregates and concrete sand. This configuration involves both scalping the natural sands and washing and returning crusher products of the same size back to the sand system. This allows Granite Construction to blend manufactured sand with natural sand.

Everything is fully automated and computer controlled. The system is fairly sophisticated and features start-and-stop switches, Grant says. The Profibus feedback network reads amps and other operational and performance data through a modem. This allows operators to identify trends and predict and manage breakdowns before they occur. The plant also can be controlled via laptop, but the main computer rests in the control tower 50 feet in the air. This is where the operator controls everything. In addition to the bird's-eye view from the control tower, video cameras monitor material in the surge tunnel and near the jaw crusher.



MOVING FINISHED PRODUCT

Capay produces a variety of washed and crushed products, ranging from cobble sizes down to manufactured sands. According to Adamo, this site is one of the few that produces a washed chip for chip-sealed roads. Because of its location along Cache Creek, there is an abundance of large cobbles. The Capay site is the first upstream, and companies farther down are less fortunate. All products are stockpiled by several rotating stackers and one telescoping Thor. Material is loaded with two to three Cat 988 wheel loaders.

The load-out system consists of two Rice Lake scales and an automated ticketed system with a remote printer for drivers. Trucks proceed in a one-way traffic pattern and communicate with the weigh master through a speaker system. The loads crossing the scale are dependent on the loaders' skill. Adamo says the company had experimented with bucket scales but found that the loader operators performed better than the technology.

It turns out that, despite all of the power, motors and automation, it is still the people that make an operation work. "We have a pretty talented group," Grant adds. "When it was all said and done, the plant came down very, very smoothly. And it went up remarkably smoothly."

Grant specifically wants to thank plant foreman, Bert Swartz; plant engineer, Justin Toll; shift foreman, Aaron Carrion; and the Granite Construction crews for their significant

contributions to this project.



An Award-Winning Site

Granite Construction's Capay facility has received continued recognition for its environmental efficiencies.

The company took home the National Stone, Sand & Gravel Association's Environmental Excellence Award, presented at a Sept. 5 awards luncheon. Ben Adamo, on-site plant superintendent, says community relations efforts include hosting an open house with the chamber of commerce, local officials and residents of the community, giving them the opportunity to mix with Granite Construction employees.

As part of the site's reclamation plan, Granite Construction will donate land in three phases in order to build Capay Open Space Park, which is expected to open by October 2007. The company will perform reclamation and habitat restoration, concurrently with mining, before handing over each dedication area. The dredging operation will yield a 200-acre lake with reclaimed riparian habitat along the edges. The park will include picnic facilities, universal access to Cache Creek, and a trail system built with Granite Construction's resin-stabilized quarry fines.

Granite Construction won five additional awards for other operations at the NSSGA luncheon, but this marks its first gold recognition, says Adamo.

The awards are based on the extent to which an operation meets and exceeds technical, environmental and regulatory requirements.

Applications were judged on the following criteria:

- the quality and effectiveness of the operation's proactive environmental programs;
- the degree of employee involvement in environmental programs and community environmental outreach;
- the quality and effectiveness of an operation's pollution-prevention and waste-minimization programs;
- the extent to which an operation has implemented effective environmental control measures that produce measurable results above and beyond regulatory requirements.

To learn more about the reclamation effort at the Capay facility, visit:

http://rockproducts.com/mag/rock_formula_approval

Pacific Gas and Electric Co. also is cheering the Capay facility, calling it "state of the art when it comes to being energy-efficient." For exceeding the building standards, Granite Construction received a \$31,364 incentive rebate.

Some of the energy-efficiency measures include installation of 47 premium energy-efficient motors, eight variable-frequency drive pumps and 42 soft-start motors. These measures will save about 400,000 kW hours of electricity each year, which amounts to \$50,000 per year in energy savings.