



Case Study

application | Geothermal Plant, Subgrade Stabilization
location | Brawley, CA
product | Mirafi® HP570

job owner | ORMAT
engineer | Black Eagle Geotechnical
contractor | PCL/Mountain Oak

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

Mirafi® HP570 high strength woven geotextile was used to provide subgrade stabilization in the construction of the North Brawley Geothermal Plant. This new power generating plant located on Western Avenue, just north of town will produce 50 megawatt power using geothermal steam to drive electric producing turbines. The steam generators, condensers and turbines are heavy equipment that vibrate in operation (see photo). However, the location for this critical project is a poor one; a sheep farm (see photo) in a heavily used agricultural area where fields are commonly flooded and subterranean drain tiles lie below the surface to carry excess water to the Salton Sea. The site is further complicated by being located along the San Andreas Fault. This high seismic area has swarms of low seismic events where small earthquakes can be felt daily. The use of Mirafi® HP570 provided an effective solution for such a complicated project site. White Cap Palm Springs delivered the 25,000 SY of Mirafi® HP570 and provided the contractor onsite support.

THE DESIGN

The onsite soils consist of high plastic clay. In order to provide stabilization for the equipment pads, the design called for 2 layers of Mirafi® HP570 sewn panels. Overlapping was not used due to the soft soils. Stabilization is achieved by Mirafi® HP570 through:

- Separation of the structural backfill from the underlying soft soil.
- Filtration of water through the geotextile to relieve poor water pressure.
- Tensile Support provided by the geotextile which exceeds biaxial geogrid.

The design required 95 percent compaction of the structural backfill over the Mirafi® HP570 geotextile.

THE CONSTRUCTION

With the clay soil and shallow groundwater table, the initial construction process was tedious. In the first week of construction, the contractor spent 3 days with equipment stuck in the mud. The heavy equipment brought to the site (scrapers and loaders) initially could not operate on the soft subgrade. Fortunately the contractor found aircraft carrier cable from a local source to “pluck each one out.” Only with the use of a tracked dozer and big-tired rock truck could the contractor make any initial progress. Once the lower Mirafi® HP570 geotextile layer was set in place, construction commenced on schedule.

In the location of 10 equipment pads, the site was overexcavated 4 feet and the subgrade was prepared using a sheepsfoot roller.



Project site on a sheep farm in agricultural area with soft clay soil.



Mirafi® HP570 sewn panels placed on the subgrade.



Heavy geothermal power equipment placed on stabilized Mirafi® HP570 platform.

Protective & Outdoor Fabrics | Geosynthetics
Aerospace Composites | Industrial Fabrics
Armour Composites | Synthetic Grass

The first layer of Mirafi® HP570 was spread out over the rough compacted subgrade (see photo). The lower Mirafi® HP570 layer consists of 6 field sewn panels, measuring 170 feet in length. The fully sewn Mirafi® HP570 layer was dragged in place by hand using C-clamps and nylon straps attached to a boom truck (see photo). After placing and compacting a 12 inch thick layer of Caltrans Class 3 granular sand a second fully sewn panel of Mirafi® HP570 was placed in the opposite direction. The purpose was to create a stable biaxial platform over the soft subgrade. A 2 foot layer of compacted Class 3 structural backfill completed the equipment platform with 12 inches of native soil cover on top. The equipment footings up to 16 inches thick were dug below the native soil cover to rest on the completed structural soil platform.



Mirafi® HP570 pulled in place using C-clamps at field sewn joints.

THE PERFORMANCE

A geothermal plant in southern California was constructed on an undesirable site with poor soil conditions, high water table and in a high seismic area through the use of multiple layers of Mirafi® HP 570 high performance woven geotextile. The geotextile provides the soil separation, water filtration and tensile strength necessary to stabilize the project site for both the short term construction operations and the long term support of heavy vibrating power generating equipment. As part of the foundation design, Mirafi® HP570 may be used in the solution of stabilizing unsuitable soils, dampening seismic waves and controlling liquefaction potential for office, retail and storage buildings, roads and highways, water and crude oil storage tanks, heavy equipment pads and earthen structures.



C-clamp at field sewn joint.

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