Rejuvenating

&

Preserving

Infrastructure

Preserving Infrastructure Through Chemistry

SURTREAT Holding LLC is a privately held, Pennsylvania-based chemical technology company focused on developing proprietary solutions that restore the properties of deteriorating concrete, stone and steel structures. These solutions have been extensively tested and proven to significantly extend the usable life of parking garages, buildings, balconies, airports, highways, bridges, power plants and nuclear waste management facilities.

Many of our clients, including Government and Non-Government Agencies, Departments of Transportation, Public Utilities and the Private Sector typically report cost savings up to 90% over traditional repair and maintenance practices, resulting in accumulated annual savings well into the 100s of millions of dollars.

The Power of Chemistry

This overview is intended to provide some insight into the chemistry of infrastructure deterioration, the challenges it presents to asset portfolios, and the idea that there is a better way; a way that may be more politically challenging, but far more cost effective, environmentally friendly, and deliverable in a short time frame. A way that has empowered our clients with the economic toolset to rethink and restructure asset acquisition, facilities management, and planning of budgets, goals and objectives.

Environmental Impact:

After water, cement is the most consumed substance on earth. Approximately 5% of global CO2 emissions are directly attributed to the production of cement and roughly 5 tons of new concrete are produced every year for each person on the planet.

Application of SURTREAT® chemical treatments will slow or stop reinforced concrete from deteriorating. It will extend useable life indefinitely, and significantly reduce lifetime impact on the environment. SURTREAT products are water-based and environmentally friendly.

Note:

A secondary support document (SURTREAT®Technical Reporting and Publications) has also been provided that contains technical summaries and reports published by NASA (National Aeronautics and Space Administration) referring to our joint venture in the research and development of Chemical Rebar Corrosion Inhibition.

Reports further detail efforts by The U.S. Army Corps of Engineers who led a collaboration of U.S. Military testing which resulted in the inclusion of specifications for our unique solutions in the proprietary U.S. Military Unified Guide Specification.

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Concrete Formation and Deterioration through Chemistry

Hardened concrete is largely formed through the chemically process of hydration and curing. Conversely, concrete deteriorates largely by chemical means; carbonation/loss of pH, the presence of aggressive and hostile chemicals through infiltration, breakdown of the cement bonds associated with aging, impact of the environment, etc.

Good Chemistry = Good Concrete / Bad Chemistry = Bad Concrete

The corrosion of reinforcing steel (rebar) is the most common cause of failure in reinforced concrete structures. The problem with embedding steel in concrete, is that while it looks protected, it isn't. In fresh new concrete, rebar is protected by high pH and low contamination levels. Concrete is inherently porous which allows a variety of contaminants to penetrate it.

When water and oxygen are present it creates an electrochemical reaction between different pieces or segments of a single piece of rebar, which causes the steel to rust. When it rusts, steel must expand, and can expand up to four times its size, causing the rigid concrete to crack and fail.

Once started, rebar corrosion cannot be stopped using traditional patch-over methods where unsound concrete is removed and the hole filled with a patch material or new concrete. Placing new patch material (no chlorides present) next to existing concrete (chloride contaminated) soon creates an electrochemical reaction between or along the rebar.

Repair in this manner is now known to actually aggravate and increase the corrosion process in areas surrounding the patch and repairing then becomes a never-ending process. This "anode ring effect" can result in cracking and delamination in as little as 18-24 months following the repair.

In addition to the electrochemical rusting process which physically damages the concrete as mentioned above, the process of deterioration can also involve loss of pH and infiltration of aggressive and hostile chemicals, all contributing to the breakdown of chemical bonds. As time passes, the pH of concrete falls, the concrete becomes infiltrated by chlorides and other contaminants and electrochemical activity increases.

These deteriorative processes can be chemically inhibited or reversed.

This "anode ring effect" can result in cracking and delamination in as little as 18-24 months following the repair.

Our Technology

SURTREAT®'s solutions work by applying a combination of proprietary chemical formulations which penetrate the concrete microstructure in liquid and vapor states. These chemicals combine with the substrate materials to form new structures within concrete that increase density and strength. Anti-corrosion additives work further to pacify rust and create an environment that promotes the long-term health of reinforcing steel.

When prescribed to target specific deficiencies, these products reduce the effects of weather, salt and other hostile chemicals, thereby slowing or stopping the deteriorative process and strengthening the reinforced concrete for decades.

Our penetrating chemical technology enables us to deliver inhibitors through concrete and rust and deposit it directly onto the surface of the steel rebar within the reinforced concrete structure(s).

Our Solution

We create a non-corrosive environment within concrete structures by isolating moisture from the rebar, by not allowing chloride penetration even under static pressure (such as applied by car tires), by moderating pH and by complexing and removing existing chlorides.

Corrosion inhibitors used as part of the SURTREAT® process are direct contact inhibitors being delivered to the embedded steel surfaces to prevent the deleterious action from starting and to insulate and pacify active sites.

Importantly, the application of SURTREAT® does not prohibit concrete from drying; concrete retains its ability to "breathe".

SURTREAT® application addresses the causes of deterioration by improving;

- **Compressive, flexural and tensile strength of the concrete**
- **Water-soluble chloride content reduction**
- **Moderation of pH (in carbonated structures)**
- **Static pressure resistance**
- **Gas resistivity of concrete**
- **Chemical resistivity**
- **Corrosion reduction of the embedded reinforcement**

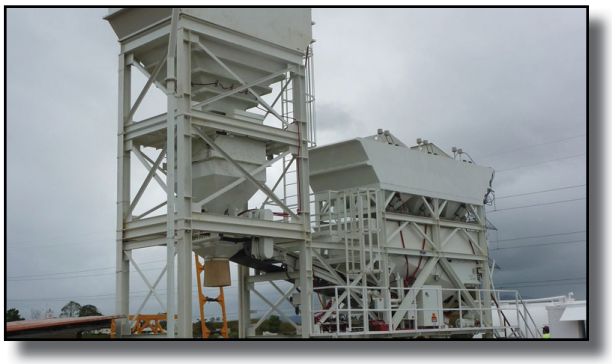
New Concrete Structure Preservation and Protection

Surface protection of new concrete is widely recognized in the construction industry and is the preferred method of structure preservation. Although coating or sealing will slow down the contamination and breakdown of concrete, the expense has a finite life cycle and requires replenishing in a timely manner.

Unfortunately, sealants remain permeable to chloride under pressure (such as static head applied by auto tire traffic) thus require maintenance and reapplications and rarely achieve desired protection levels within many concrete applications especially those specific to parking garages.

SURTREAT® can be incorporated in new construction concrete and because it isn't consumed in the process, will provide a permanent solution for structure preservation and protection without altering the structure's appearance

Importantly, aside from prohibiting water penetration, resisting static pressure and chemical breakdown when exposed to hostile and aggressive environments, it will also resist pitting/spalling due to freeze/thaw cycles.



SURTREAT® protects against the incongruities associated with modern day construction and the vulnerabilities associated with the logistics of moving concrete from the plant to the construction site.

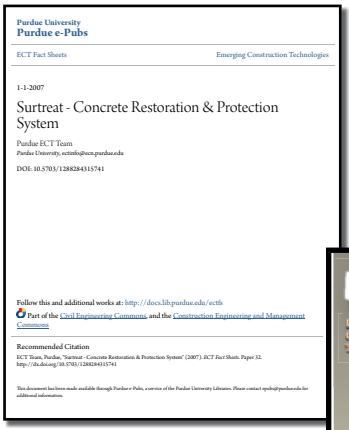
Our technology, easily implementable in the plant mixing process, ensures the concrete mix will have the ability to compensate for potential challenges that can be associated with:

- **The ingredients and mixing of concrete,**
- **The variances of engineering and structural design**
- **The pouring-placement protocols administered on the construction site**

The Benefits to Your Bottom Line

It is typically standard practice for companies, municipalities etc. to track what deficiencies exist within their portfolio of building and parking assets, infrastructure components such as bridges, roadways, marine moorings, ramps etc. and what it will cost to remedy those deficiencies and raise the condition of the assets to a state of good repair (SOGR). Each asset has a history of maintenance expenditures along with new requirements that has a ripple effect on expense allocation and long term fiscal planning.

Balancing and prioritizing SOGR requirements with budgets over time can be challenging, especially when dealing with unexpected expenditures. This presents us with an opportunity to measure the potential for an assured ROI by incorporating SURTREAT® into ongoing SOGR requirements.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ECT Fact Sheets | Emerging Construction Technologies

1-1-2007

Surtreat - Concrete Restoration & Protection System

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DOI: 10.5703/1288284315741

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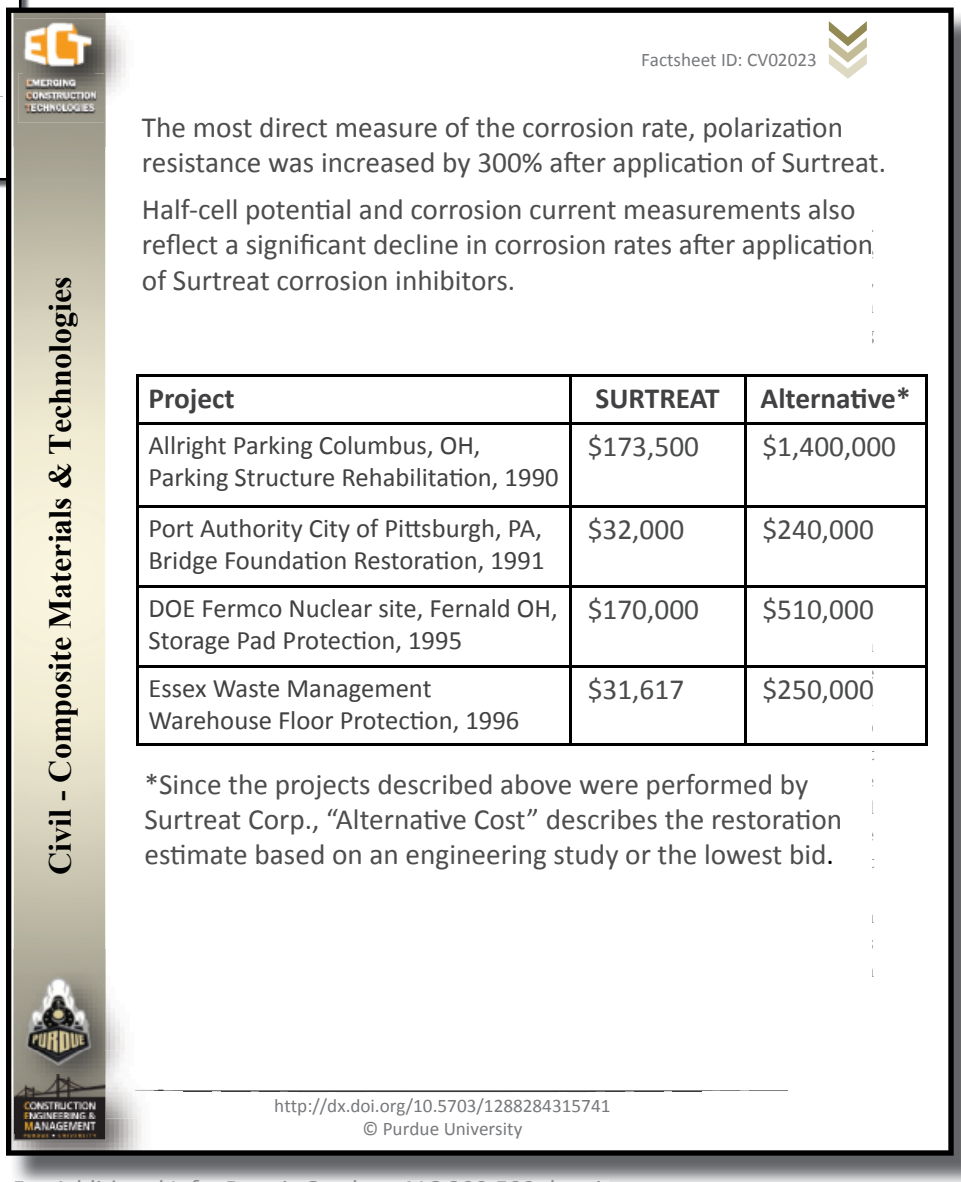
To illustrate the immediate potential to achieve cost benefits by incorporating SURTREAT® into your SOGR process, we reference an evaluation performed by Purdue University, Emerging Construction Technologies in 2007 termed ECT Fact Sheet and titled SURTREAT® - Concrete Restoration & Protection.

Authored by the Purdue ECT Team, the study comprises four SURTREAT® client applications evaluated by recognized experts and validated by the end users (SURTREAT® clients).


ECT
EMERGING CONSTRUCTION TECHNOLOGIES

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Factsheet ID: CV02023

The most direct measure of the corrosion rate, polarization resistance was increased by 300% after application of Surtreat.

Half-cell potential and corrosion current measurements also reflect a significant decline in corrosion rates after application of Surtreat corrosion inhibitors.

Project	SURTREAT	Alternative*
Allright Parking Columbus, OH, Parking Structure Rehabilitation, 1990	$173,500	$1,400,000
Port Authority City of Pittsburgh, PA, Bridge Foundation Restoration, 1991	$32,000	$240,000
DOE Fermco Nuclear site, Fernald OH, Storage Pad Protection, 1995	$170,000	$510,000
Essex Waste Management Warehouse Floor Protection, 1996	$31,617	$250,000

*Since the projects described above were performed by Surtreat Corp., "Alternative Cost" describes the restoration estimate based on an engineering study or the lowest bid.

PURDUE

CONSTRUCTION ENGINEERING & MANAGEMENT

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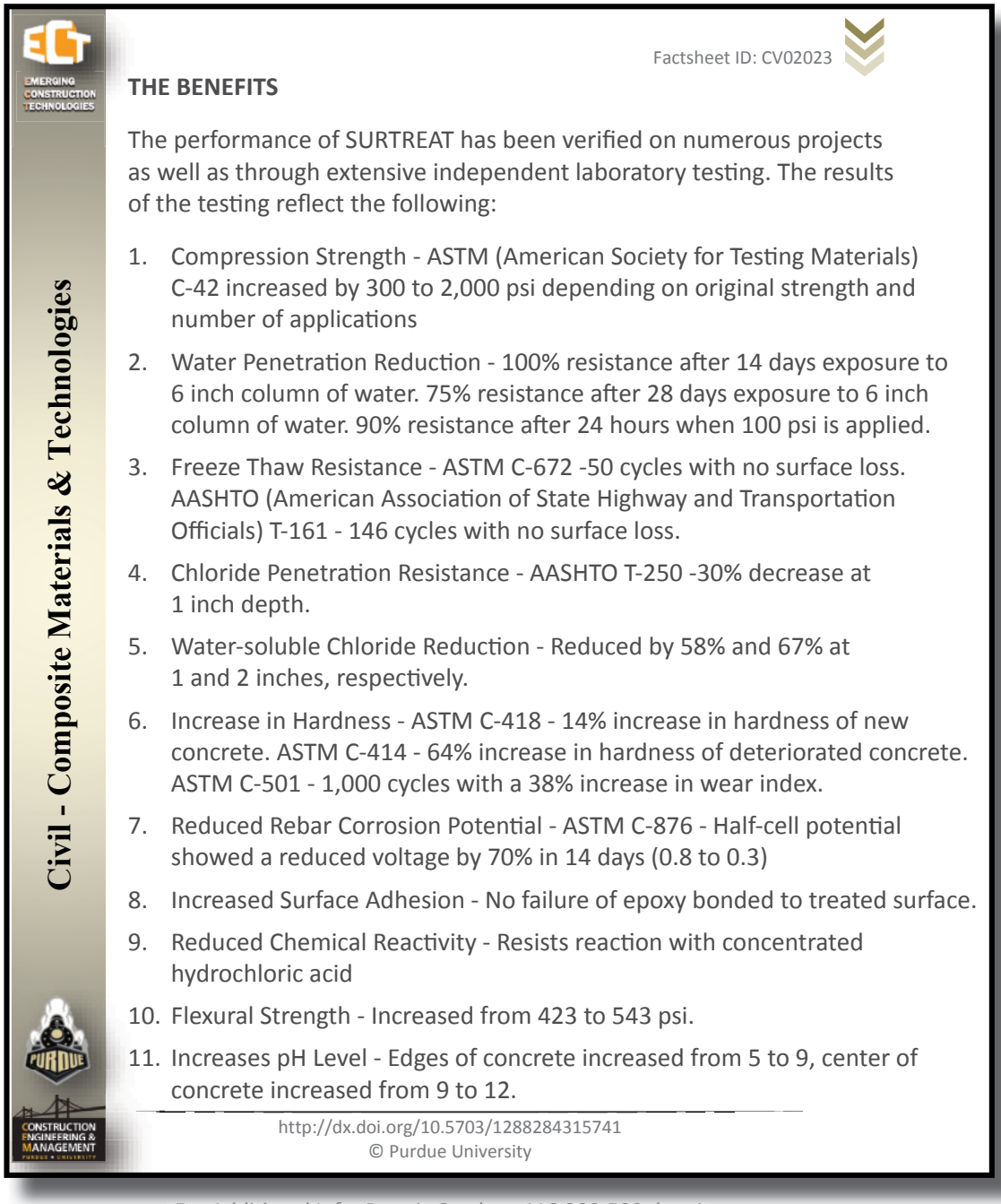
The Benefits to Your Bottom Line

Illustrated in the Purdue ECT Fact Sheet, if all four assets were part of the same portfolio, the Facilities Management and Planning Budget, without the benefits of SURTREAT®, would have allocated $2.4ml for rehabilitation, restoration and preventive maintenance of said assets.

The SURTREAT® solutions as delivered were expensed at $407,117 or 17% of the Alternate industry solutions. If you factor in that the SURTREAT® treatments occurred over five fiscal years, notice that the first project yield is in excess of $1.2ml. The potential long-term effect this type of cost saving can have on future SOGR budgeting and planning is extensive.

Additionally, given that each asset treated by SURTREAT® is no longer subject to deteriorative corrosion, the structures articulated below can be reinforced years later with retreatments. Surplus funds can be moved to the bottom line or allocated to other assets in need of attention.



EMERGING CONSTRUCTION TECHNOLOGIES

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THE BENEFITS

The performance of SURTREAT has been verified on numerous projects as well as through extensive independent laboratory testing. The results of the testing reflect the following:

1. Compression Strength - ASTM (American Society for Testing Materials) C-42 increased by 300 to 2,000 psi depending on original strength and number of applications
2. Water Penetration Reduction - 100% resistance after 14 days exposure to 6 inch column of water. 75% resistance after 28 days exposure to 6 inch column of water. 90% resistance after 24 hours when 100 psi is applied.
3. Freeze Thaw Resistance - ASTM C-672 -50 cycles with no surface loss. AASHTO (American Association of State Highway and Transportation Officials) T-161 - 146 cycles with no surface loss.
4. Chloride Penetration Resistance - AASHTO T-250 -30% decrease at 1 inch depth.
5. Water-soluble Chloride Reduction - Reduced by 58% and 67% at 1 and 2 inches, respectively.
6. Increase in Hardness - ASTM C-418 - 14% increase in hardness of new concrete. ASTM C-414 - 64% increase in hardness of deteriorated concrete. ASTM C-501 - 1,000 cycles with a 38% increase in wear index.
7. Reduced Rebar Corrosion Potential - ASTM C-876 - Half-cell potential showed a reduced voltage by 70% in 14 days (0.8 to 0.3)
8. Increased Surface Adhesion - No failure of epoxy bonded to treated surface.
9. Reduced Chemical Reactivity - Resists reaction with concentrated hydrochloric acid
10. Flexural Strength - Increased from 423 to 543 psi.
11. Increases pH Level - Edges of concrete increased from 5 to 9, center of concrete increased from 9 to 12.

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CONSTRUCTION ENGINEERING & MANAGEMENT

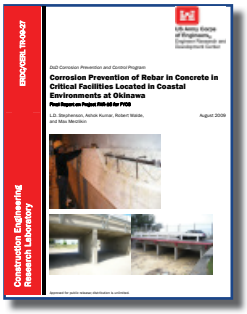
Proven by Scientific Development, Testing and Reporting

The secondary document that follows is the supporting documentation of the scientific development, testing and reporting of our 10-year collaboration with NASA (National Aeronautics and Space Administration), USACE (U.S. Army Corps of Engineers), NAVFAC (Naval Facilities Engineering Command) and AFCEC (Air Force Civil Engineering Center).

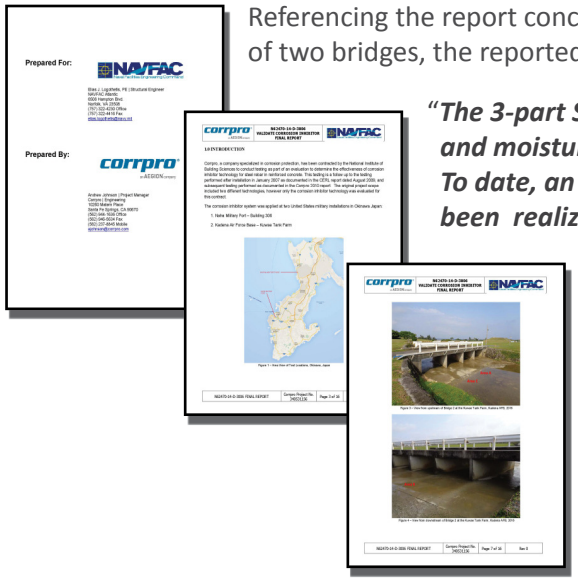
Space Shuttle Launch Pad 39A

We opened our doors in 1989 manufacturing proprietary chemical corrosion inhibition systems primarily for concrete restoration solutions focused on the challenges associated with structures exposed to hazardous environments.

Following our contracted work in 1996 on Space Shuttle Launch Pad 39A, we entered into a joint venture with NASA and the Kennedy Space Center in the field of Chemical Rebar Corrosion Inhibition.



Shortly thereafter, based on NASA's recommendation, the U.S. Army Corps of Engineers provided SURTREAT® with a grant to incorporate our corrosion inhibitors into their military spec primer for coating rusting steel. We further partnered with them by commencing a 10-year study of SURTREAT's technology-to-date applied on structures within two U.S. military installations in Okinawa Japan, the Naha Military Port and the Kadena Air Force Base (Kuwae Tank Farm).



Referencing the report concluding the ten year test period of the treatment of two bridges, the reported conclusion as quoted;

"The 3-part SURTREAT system, based upon measurements of corrosion rate and moisture penetration, is effectively protecting the rebar from corrosion. To date, an average reduction in the corrosion rate by 79 to 80% has been realized.

Results: Over 10 years later the concrete is stronger than when first poured and corrosion has been reduced approximately 80% which will significantly extend the life of these assets."

Today our proprietary chemical corrosion inhibition systems are incorporated in the approved specifications worldwide by the U.S. Military (U.S. Military Unified Guide Specification), U.S. Federal Highway Administration, Korean Construction Materials Institution, the European Union and the Russian Federation.

Additionally, our solutions have solved problems for Power Utilities, Nuclear Storage Facilities, Water Treatment Plants, DOTs (Department of Transportation), Port Authorities, Airports, Universities and the Private Sector around the world.

St. Luis Pass Bridge, TX

Alcosan Sewage Plant, PA

Eskom Nuclear Power Plant

Allright Parking, OH