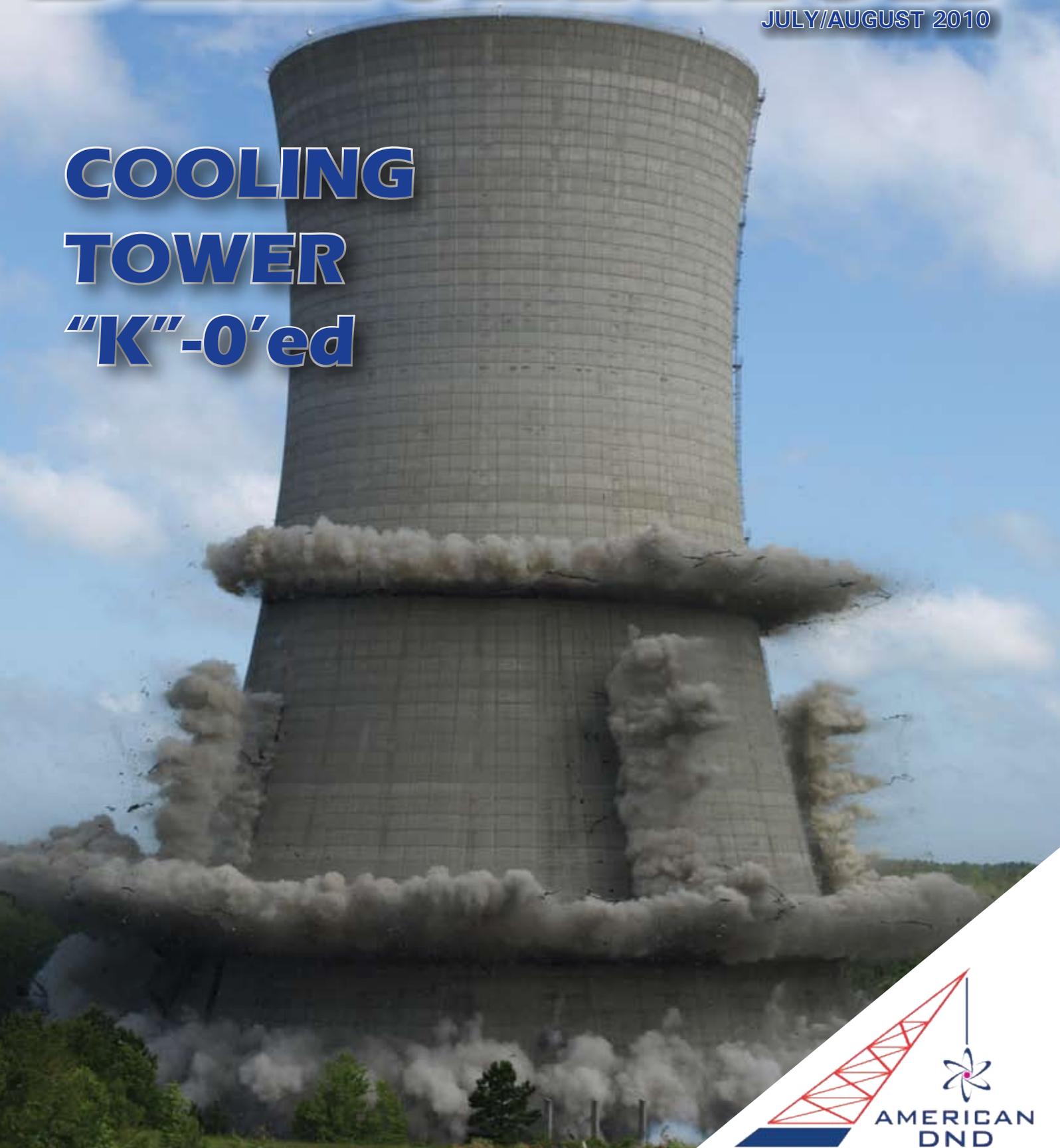


# DEMOLITION®

JULY/AUGUST 2010

## COOLING TOWER "K"-0'ed



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866-699-5515



**A** team of NDA Members lead by American DND, Inc. of Buffalo, New York subcontracting with Controlled Demolition, Inc. (CDI) of Phoenix, Maryland, and LVI Services of North Carolina Inc. (LVI) worked closely together to safely and successfully imploded the second largest cooling tower ever demolished, worldwide, on May 25, 2010 at 10:00 AM, EST.

The 185-3K or “K” Area Cooling Tower was built in 1992 to cool the water from

a reactor in support of a National Defense Initiative. When the National Defense Initiative no longer existed, the Cooling Tower became obsolete and no other economical use was available due to its unique and dedicated design and location in a remote part of the Savannah River Site (SRS), located south of Aiken, South Carolina.

The decision by the Department of Energy (DOE) to demolish the Cooling Tower eliminated ongoing carrying costs to

# “COOLING TOWER K-O’ed”

## Implosion of the Savannah River Site 185-3K Cooling Tower

AIKEN, SOUTH CAROLINA

“The Cooling Tower Demolition Project is unlike any other closure initiative taking place at the site”, said Dewitt Beeler, Savannah River Nuclear Solutions (SRNS) Director of Area D&D Projects. “It isn’t every day that we deal with the demolition of a structure the size of the ‘K’ Cooling Tower, and it was clear early in the process that we needed expert help.”

After weighing a variety of demolition possibilities, SRS Managers chose to hire American DND to complete the work. For the implosion portion of the project, American DND partnered with the experienced team of CDI - a family-owned company with more than six decades of experience in the explosives felling of manmade structures.

For the cleanup effort following the implosion, American DND teamed with LVI. The LVI Team headed by Rich McManus brought extensive resources and heavy equipment to perform size reduction and load-out of the resultant debris pile.

The implosion occurred right on time at 10:00 AM EST on Tuesday, May 25th, 2010. The controlled failure of the massive cooling tower into its own footprint was textbook and the resultant debris pile was well-fractured and neatly contained – the entire operation went perfectly from every perspective. Let us take you back in time with this “Countdown to Detonation”:

the taxpayer and reduces the footprint of unnecessary facilities at SRS.

“The demolition of the ‘K’ Cooling Tower marks the achievement of a significant milestone in the Recovery Act mission at SRS. It has allowed us to create new jobs while reducing the site’s cleanup footprint”, said Rita Stubblefield, Deputy Federal Project Director for the DOE. The project is funded under the American Recovery & Reinvestment Act (ARRA).

### **#10: D-10 Years (July 2000)**

American DND Managers were performing work at this very same cooling tower site. Working with a former employer under an Asset Reduction Program, they removed the electrical transformer station, 2000 HP electric vertical shaft water pumps and other infrastructure.

It's not often in a demolition contractor's career that you have an opportunity to return to the same project to continue demolition work started nearly a decade earlier!

### **#9: D-7 Years (2003)**

Nearly a decade prior, the DOE had begun research to determine whether or not there was any beneficial reuse for the Cooling Tower and to search out the safest method to demolish such a structure. Ultimately the DOE selected "implosion" as the safest approach to ensure the fewest amount of man hours at risk for demolishing this unique structure at one of the DOE's premier facilities.

### **#8: D-6 Years (January 2004)**

American DND was founded in January 2004 with the focus of performing Demolition & Nuclear Decommissioning (DND) Projects across the country with "high quality customer service and performance" as their Core Mission Statement.

By the end of 2006 American DND had qualified as a Service Disabled Veteran Owned Small Business (SDVOSB) with more managerial experience in the performance of radiological and nuclear decommissioning than many other demolition contractors combined.

In 2009, American DND was ranked the #1 Fastest Growing Company in Western New York by Business First Magazine. Since 2007, American DND has been ranked as one of the Top 100 Service Disabled Veteran Owned Companies on a National Basis by the [www. diversitybusiness.com](http://www.diversitybusiness.com) organization.

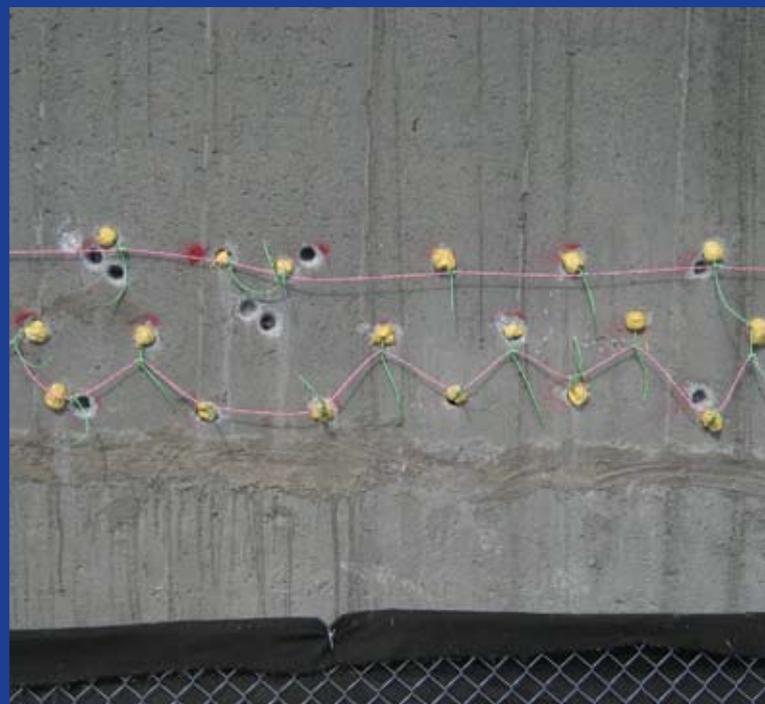
### **#7: D-4 Years (May 2006)**

CDI implodes the largest cooling tower ever demolished for PG&E at the former Trojan Nuclear Station in Rainier, Oregon. This tower was 499' tall and weighed approximately 41,000 tons.

As usual, the CDI Explosives Demolition Plan worked flawlessly for the Trojan Project and CDI brought their 'lessons learned' forward to enhance the design and implosion of the SRS Cooling Tower.

### **#6: D-9 Months (September 2, 2009)**

In response to an RFP issued by SRNS, American DND submitted multiple proposals with multiple options and Means & Methods of performing the same work.



The American DND options included three different implosion designs with three different blasters and multiple options for recycling the materials as part of an overall approach and comprehensive plan for the work. "We figured this proposal approach showed our abilities to review ALL options, and objectively present the 'Big Picture' to SRNS-DOE so they could select the Implosion design they were most comfortable with." said Bill Schaab, Vice President of ADND.

Following months of evaluation, the SRNS-DOE selected the CDI Implosion Design under American DND's proposal with CDI and LVI as Partnering Teammates offering the "Best Value" Offer to perform this one-of-a-kind project.

American DND's Safety Record and management experience at DOE facilities coupled with the experience, performance, resources and Safety Records of both CDI and LVI provided the best overall value to the government and included one of the industry's foremost Safety & Health Programs and Safety Record ever combined on a single 'DND' Team.

#### **#5: D-6 Months (December 2009)**

The Contract was awarded, and the comprehensive submittal process began.

The use of explosives on any DOE site poses unique challenges from coordination, logistics, permitting, security and safeguards viewpoint.

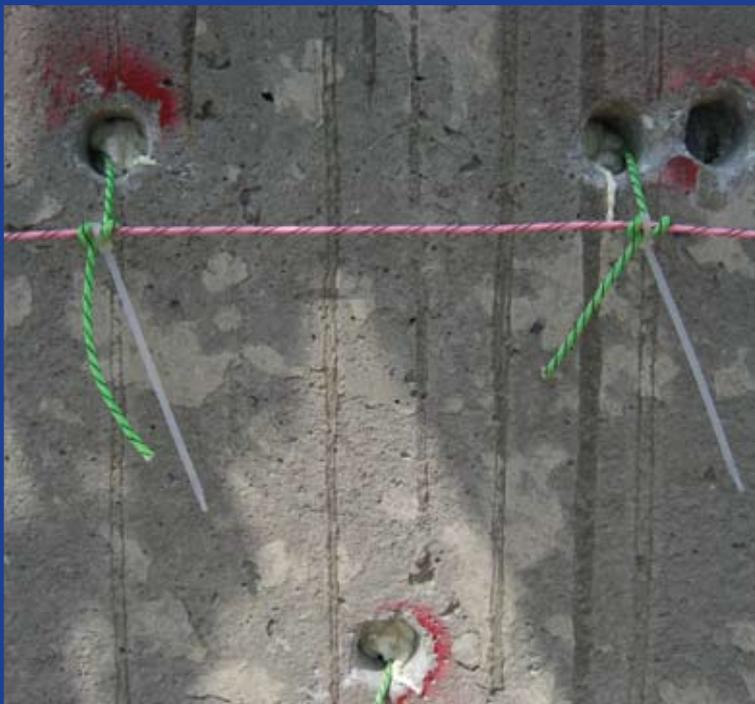
American DND's onsite Project Managers, Mike Furner and Todd Giolando, coupled with CDI's Management Team all worked diligently for three months to complete all permitting, submittals, Task Specific Packages (TSP's), Work Plans, Activity Hazard Assessments (AHA's), explosives permitting, designs and layout to help ensure a flawless project execution.

One of American DND's mantras is the "Six- P's Principle": "Prior Proper Planning Prevents Poor Performance." This model most certainly applies to every aspect of work at a DOE facility and has paid big dividends in the safe and successful performance of this project.

#### **#4: D-2 Months (March 25, 2010)**

American DND mobilized the Project Team forces to the worksite location.

There were absolutely NO utilities to be found within an approximate six-mile radius. The only 'life' at the site were bees and wasps, wild pigs and boars, poisonous snakes, spiders and some wild turkeys!





The remote location and lack of infrastructure necessitated the Team bringing in drinking water, setting up generators and trailers, and installing repeater antennas to facilitate cell phone service - thereby establishing a "Mini-City/ Safe Zone" for the Team to work within.

Within a few days following mobilization, the site was buzzing with up to 30 craft workers performing preparatory activities to access locations up to 250' above grade for the drilling and placement of explosives.

### **#3: D-1 Month (April 2010)**

In keeping with DOE culture, the 'lessons learned' from prior projects were brought forward to this one to help ensure a perfect project.

Due to the height and configuration of the Cooling Tower, typical self-propelled man-lifts could not be utilized for drilling at all of the explosives locations. As such, CDI designed and fabricated a crane man-basket for the drilling of holes and placement of explosives and cover materials from elevations 100' to 250' above grade. The man basket was designed to meet all OSHA and ANSI standards, passed the rigorous testing and inspection requirements for use in a DOE facility and was positioned with a 150-ton Linkbelt crane with 300' of boom and jib.

This crane man-basket design captured CDI's many years of experience of in the performance of incredibly difficult and complex implosions on some of the most unique structures in the world.

### **#2: D-12 Days (May 14, 2010)**

A mere six weeks following Team mobilization, drilling operations were completed and explosives were arriving onsite. Approximately 3,900 holes had been drilled with over 50% of them located over at 120' above grade.

This was a big day for SRS as over 1,300 pounds of explosive was being delivered to one of the most secure National Defense DOE Facilities in the country. This certainly was not an everyday event for the security and safeguards personnel - everyone was on their toes, and "all hands on deck" was the path forward from here on out.

Once again, perfect planning, proper design, flawless execution, and a truly cooperative TEAM effort from the DOE, SRNS Staffers, and Security/Safeguards Personnel helped ensure a safe, on time and uneventful delivery/staging of the explosives onsite.

The project had been blessed with fantastic weather for the preceding two months.

“We experienced no more than three days of lost time due to high winds and other than a few windy days there were no real interruptions or delays to the work for weather concerns. We even stopped work to support a site-wide “Turkey Hunt” which was held for the benefit of local disabled persons.” said Mike Furner.

The CDI team’s hard work, efficient operations and the good weather all contributed greatly in advancing the project schedule and allowing the Team to accelerate the Detonation Date by more than two weeks. SRNS and DOE were exceptionally helpful when it came “maneuvering their ship” to support the new Detonation Date.

As usual on any blasting job, the Project Team was working expeditiously to load all 3,900 holes and connect over 13,000 feet of detonating cord in preparation for the final event.

### **#1: Detonation Day (May 25, 2010 @ 10:00 AM EST)**

The Project Team assembled at 6:00 AM on Detonation Day and began their final checks and countdown process.

Due to the height of the Tower, the FAA had to be notified as the strobe lights affixed atop the Tower would soon no longer be visible and the Tower, in itself a visual landmark for aircraft in the area, would soon be no more. The only 480-volt three-phase power line which ran to the lights on top was disconnected and removed and all personnel began to move to their appropriate Command Post and Security Positions throughout the immediately surrounding area.

Everything went flawlessly – on schedule and precisely per the planned countdown procedure. Site Security, DOE Facility personnel and the adjacent public roadway shutdowns were performed as planned and roadways were reopened again within 15 minutes following the implosion.

The total time to fell the Tower was approximately eight seconds from “Fire” to the top ring of the Tower coming to rest at grade. The dust cloud meandered harmlessly over unoccupied site areas and was fully dissipated within approximately 12 minutes following detonation. The seismic impact was less than 1/5th the allowable limit for ‘peak particle velocity.’

In their post-implosion site review, American DND calculated that a mere 1% of the tower debris came to rest outside the Cooling Tower Basin ‘footprint.’

## **CHALLENGES & CONCERNS**

As we all know in the Demolition Industry, after asbestos and lead, the next major ‘hot topic’ is the potential carcinogenic effects





of silica to the workers performing demolition and subsequent load-out activities of these large concrete structures.

To manage the airborne silica risk, American DND implemented an extensive Silica & Respirable Dust Air Monitoring Program under the guidance and supervision of their Safety Director, Mr. Mark Cotter, CSP, CIH with support from the local engineering firm of S&ME Engineering, Inc. that provided local South Carolina Engineers for both Storm Water Management Plans and CIH services.

The Industrial Hygiene & Safety Team of American DND implemented a well designed and comprehensive Respiratory Protection Plan and Personal Air Sampling Monitoring Program to ensure worker protection on this complex multi-employer work site. The regulatory requirements for the industrial hygiene air monitoring program were done in accordance to the American Conference of Governmental Industrial Hygienist (ACGIH) guidelines and as applicable, the Occupational Safety and Health Administration (OSHA) standards.

For work at DOE facilities, compliance with the ACGIH guidelines is required. ACGIH requirements are more restrictive than OSHA's resulting in a higher level of worker protection.

Based on a review of air monitoring analytical data, the Industrial Hygiene/

Safety Team generated various Negative Exposure Assessments (NEA's) which provided documented proof that engineering controls, administrative control measures and personal protective equipment (PPE) utilized for this project were effective. Airborne concentrations of Silica and Nuisance Dust were below the documented ACGIH - Threshold Limit Values (TLV's) and or the OSHA Permissible Exposure Limits (PEL's).

In addition to the air monitoring program extensive noise measurements were collected on selected work tasks as required for the American DND Hearing Conservation Program (HCP). The use of large pneumatic drills, hydraulic hammers, electric drills, grapples and concrete pulverizers on this job site are some of the most extreme and loudest demolition machines in the industry and presented a challenge for the IH/ Safety Team

American DND's proactive Hearing Conservation Program and implementation of Noise Safe Work Zones ensured workers wore the appropriate hearing protection to maintain regulatory compliance with the ACGIH Threshold Limit Values (TLV's) noise exposure guidelines.

## **LOAD-OUT & HAULING ACTIVITIES**

At the time this issue of Demolition Magazine was going to press, the DOE and



SRNS were finalizing the details to perform recycling of various components of the Tower. The goal is to recycle as much as is reasonably possible after weighing all factors and analysis of man-hours at risk.

The LVI Field Crews, led by Kelly Arnold, are just warming up their fleet of hydraulic excavators including three hammers, two concrete pulverizers, two grapples, rock buckets and shears. The fleet of excavators is complimented with a rubber-tired loader and four tractor trailer semis with steel-bodied dump trailers, all of which will work hard over the next three months to safely perform size reduction and load-out from the facility.

The LVI Team brings just the right mix of horsepower and equipment operations to mitigate manual labor and effectively move tons of debris in as short a timeframe as is safely possible. We wish them luck as they strive to achieve the same Safety Record as CDI did in the first half of the project!

The end phase of the project will include final grading and seeding to match the existing contours and facilitate rainwater runoff. The resulting basin will be made safe with appropriate protective barriers and warning signs. All the turkeys, bees, wasps, snakes, wild pigs, and that rumored 'gator' will be able to return to their respective homes in the woods at SRS.

American DND greatly appreciates and expresses sincere 'thanks' to the SRNS Project Management Team and DOE Management for supporting the Project with professional dedicated oversight and providing a culture to help achieve the Safety Goal of a "Zero" rating across the board.

## **WRAP-UP**

The evening following the implosion, American DND held a Safety Recognition Party at the local VFW Post #5877 in Aiken, South Carolina. Over a 125 people enjoyed the Eddie Hill & the Hoggy Bottom Boys for an award-winning, southern-style BBQ dinner where the entire Project Team and all employees were recognized for their dedication and contributions to performing work safely and in a cooperative, professional manner.

Under American DND's Safety Incentive Program, over \$7,000 in Safety Incentive Bonus checks were handed out to all employees who helped in the performance of the first 7,000 man hours without a Lost Time Accident and achieving a Zero Incident Rating for the Project.

As reinforcement of a dedicated Safety Culture for the next half of the job, the LVI Size Reduction and Load-out Team was reminded of their responsibility to carry the torch forward and maintain the goal of "Zero".

With the 1st and 2nd largest Cooling Towers now demolished, American DND and CDI are now looking for their next - American DND is trying to figure out how to do a better job on the next one and how to take lessons learned from this one forward to further enhance their performance...so far, the only thing they can think to improve upon is to perhaps place the load-out trucks directly UNDERNEATH the next tower - and see if CDI can land the debris IN them! 🗑️

### COOLING TOWER SPECIFICATIONS

- o Year Built & Last Operational: 1992
- o Dimensions: 455' tall x 333' diameter at the base
- o Wall Thickness: Ranged from 36" thick at bottom lintel, to 8" at mid-point, and back to 24" at the top.
- o Concrete Volume: Approximately 13,000 cubic yards = 26,000 tons = 52,000,000 pounds
- o Metals: Approximately 1,400 - 1,600 tons of rebar, stainless steel, copper and aluminum
- o PVC Fill Material: Approximately 19,500 cubic yards of PVC fill and distribution piping
- o Trucking: Approximately 1,400 truckloads of material moved within a three month timeframe
- o Man Hours to Date: Over 7,000 man hours to date over nine weeks to perform drilling, explosives loading and detonation with Zero Accidents, Zero OSHA Recordables, Zero Lost Time Accidents and a Zero OSHA Incident Rating - Prior Proper Planning DOES Prevent Poor Performance!



## PROJECT WRAP UP

The project was completed shortly after the July/Aug. issue of Demolition Magazine was published. The picture below shows the project site as of 8/26/10, = only three months after the detonation date. The following items summarize the actual load out, debris cleanup and safety record for the entire job:

- Completed project one month ahead of schedule.
- Total time onsite from the date of initial mobilization to the date of final acceptance inspection and all demobilization was only five months.
- Safely performed over 18,500 man hours of work and achieved the Safety Goal for the following:  
ZERO OSHA Recordables ZERO Accidents ZERO Total Recordable Case (TRC) & DART Rates
- Earned 100% value for safety incentive bonus from the DOE/SRS.
- Paid out over \$18,500. U.S.D. in safety incentive bonus checks directly to the onsite Craft Labor & Project Management Team.
- Paid out over \$35,000. U.S.D. for safety incentive awards, lunches, hats, customized safety shirts, koozies and "catch of the week" suggestions offered by the Craft Personnel.
- Loaded, transported and dumped over 1,600 truckloads of concrete and PVC debris without incident.
- Recycled over 1,100 tons (125 truckloads) of steel rebar, stainless steel & aluminum piping, steel plates and copper wire from the Cooling Tower structure.
- Logged over 20,700 "over the road" miles of heavy hauling and trucking onsite without incident and zero traffic citations (averaged over 27 loads per workday).
- Placed 1,000 cubic yards of CLSM fill in a below grade sump pit within four working days.
- Site restoration included revegetating areas, barricades for future site protection, water runoff management and rip-rap placement.



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