

# UPFfront

A newsletter for the UPF Project



Volume 2, No. 2

## Y-12 and UT Prevention through Design Collaboration

The number of people and vehicles on Bear Creek Road will increase by 20% during construction of the Uranium Processing Facility. This includes an estimated 172,000 trips by heavy construction vehicles to haul dirt, concrete, and other construction materials. Mixing these vehicles with the 4,600 light vehicles already on-site could result in work delays, vehicle-related injuries, and property damage.

Continuing their partnership, Y-12 and the University of Tennessee, Knoxville, performed a Prevention through Design (PtD)

study on the ways to mitigate these increased risks. The study confirmed that building a new overpass and utilizing a haul road would increase safety and reduce vehicle-related injury and property damage costs by as much as 300% during UPF construction.

The goal of PtD is to prevent or reduce occupational injuries, illnesses and fatalities by including prevention considerations into designs that impact workers. UPF Construction Specialist Len Harley

developed the foundational work for the study, providing key concepts and safe design alternatives. The Y-12/UT team considered three options for how to manage traffic flow during the 10-year

construction of UPF before ultimately deciding on option C, which involved extending the existing haul road and constructing an overpass for light vehicles over Bear Creek Road at the UPF site.

“Separating heavy trucks from light vehicles was a safety no-brainer,” said Senior Nuclear Safety Specialist Gary Hagan, UPF Environment, Safety

and Health (ES&H) manager. In fact, option C will prevent an estimated 123 property damage incidents and vehicle-related injuries each year while also allowing workers to move dirt and concrete more efficiently.

UT Liaison Debbie Reed helped get UT involved to expand the analysis and quantify the safety benefits to create a more comprehensive picture. “This collaboration gives both Y-12 and UT the



The overpass will separate light vehicles from heavy construction vehicles on Bear Creek Road.

*Y-12 and UT cont. on pg. 2*

## Manager’s Message



Tony Giordano,  
Project Manager

Great news for the UPF project came on February 13th with the President’s budget request. An increase in funding to a planned \$340M from a planned \$190M reflects NNSA’s recognition of the importance of UPF. The project is busy preparing a plan and evaluating impacts resulting from this change in response to the 30-day plan, which includes transition out of 9212. We expect this new funding profile will accelerate getting into the field.

As you continue to do your jobs, please focus on safety on the project. We encourage everyone to complete the VPP Roadmaps and be prepared for the upcoming VPP status assessment April 9-20 (see VPP Roadmap, pg. 2).

The project is also rolling out the new ‘UPF Project Quality Dashboard,’ which tracks quality of performance and eliminates rework (see Quality Corner, pg. 3). The dashboard should be useful in your daily activities and reminds us to be diligent.

—Tony

## Y-12 and UT Prevention through Design Collaboration

Y-12 and UT cont. from pg. 1

opportunity to observe the Prevention through Design theory in practice. It also gives the analysis more depth since it comes from an unbiased source," Reed said.

As a doctoral candidate in the UT Department of Public Health and a member of the UPF ES&H Team, Jeffrey Miller was one of the main contributors to this study. "The customer requires that we integrate safety throughout the whole UPF project," Miller said. "With PtD, safety is embedded from the beginning and will help us safely construct and operate the facility."

Research Director Ed Taylor from UT's Construction Industry Research and Policy Center (CIRPC) also participated in the haul road and overpass analysis. "PtD is an emerging issue in construction safety," Taylor said. "This project illustrates how it can be utilized in a manner to improve productivity and not increase costs."

Some of the calculations done by UT and CIRPC showed the total cost (construction cost plus safety cost) of option A — using Bear Creek Road for all construction traffic, with flaggers to help direct — was clearly the highest. Option B, extending the haul road without adding an overpass, showed a substantial cost savings, but option C provided the best overall value. Researchers estimated that choosing option C could save as much \$19M through improved productivity and reduced safety costs.

"Through this collaboration with UT, we got a more accurate

representation of the value of the construction project, which equates to \$19M in savings," Miller said. "This is good for the customer and for us taxpayers."

It is also good for the university, which got access to a real-world PtD scenario. "UT benefited from this partnership by advancing CIRPC's knowledge of emerging issues in construction safety," Taylor said.

"This is another valuable example that shows Y-12 and UT's commitment to collaboration," Reed added.

While employee safety is priceless, the PtD study proves that the construction of a haul road and overpass will save money by preventing injuries and improving efficiency. With help from UT, the use of PtD is another way Y-12 demonstrates its strong safety culture.

**Y12 Haul Road and Overpass Construction — Saves Money by Preventing Injuries and Improving Efficiency**

Jeffrey B. Miller, Forest L. Horley, Edward L. Taylor, Parry B. Barber, Gerry F. Hagen

**Introduction**  
The National Energy Facility (NEF) is a manufacturing facility that is being designed and constructed at the Y-12 National Security Complex to ensure the long-term reliability, safety, and security of the enriched uranium supply for the National Nuclear Security Administration. The NEF Project Team is leading the Prevention through Design (PtD) concept to prevent injuries and illnesses in the workforce. One example of PtD was the need to determine the value and cost effectiveness of managing traffic during the construction of the NEF.

**Problem Statement**  
During PtD construction, the number of people per vehicle in the Y-12 site will increase by approximately 20%. An estimated 260,000 trips will be required by heavy construction vehicles on local roads, corridors, and other construction routes. These trips increase the number of vehicles on the road and the number of vehicles already on the road, which could result in work delays and more vehicle-related injuries and property damage.

**Methods**  
The Construction Management, Civil Engineering, and Environment, Safety and Health Branch at Y-12 and the University of Tennessee Construction Industry Research & Policy Center conducted the study. Three alternate traffic management designs were developed:  
• Construction routes were enhanced  
• Safety was not enhanced  
• Net savings were compared between the three alternatives.

**Results**  
Adding construction and safety costs showed that Option C (completing a construction haul road and overpass parallel to the existing road, 0.5 to 1.5 miles) had the lowest total cost of \$15.5M over Option B (no haul road, no overpass) and \$1.5M over Option A (haul road with no overpass). Standard economic measures indicated that the Economic Payback Period and Return on Investment were approximately the same for Options B and C. Table 2. The Net Present Value (NPV) calculation was slightly better for Option B than C.

**Conclusion**  
Building a haul road and overpass for use during the construction of the NEF provides substantial safety and cost benefits that will save the Project an estimated \$16.5M and help Y-12 maintain excellent injury rates over time.

**Figure 1: Cost Comparison of Traffic Management Design Options**

Option	Safety	Construction Costs	Total
Option A	~10	~40	~50
Option B	~10	~20	~30
Option C	~10	~10	~20

**Figure 2: Net Savings Comparison of Traffic Management Design Options**

Option	Net Savings
Option A	~0
Option B	~15
Option C	~19

**Table 1: Cost Comparison of Three Design Options for Managing Traffic at Y-12 during NEF Construction**

Option	Safety	Construction Costs	Total
Option A	~10	~40	~50
Option B	~10	~20	~30
Option C	~10	~10	~20

**Table 2: Comparison of Construction Costs Using Standard Financial Metrics**

Option	Net Present Value	Discounted Payback Period	Return on Investment
Option A	~0	~2 years	~6%
Option B	~15	~2 years	~6%
Option C	~19	~2 years	~6%

**References**  
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• U.S. Department of Transportation, National Highway Traffic Safety Administration. (2002). The Economic Impact of Motor Vehicle Crashes 2000. Report No. DOT-HS-809-004.  
• U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. (2002). Work-Related Musculoskeletal Disorders: Challenges and Opportunities for Prevention. DHHS (NIOSH) Publication No. 2002-118.

A poster outlining the study was presented at the National Institute for Occupational Safety and Health's Prevention through Design conference in August.

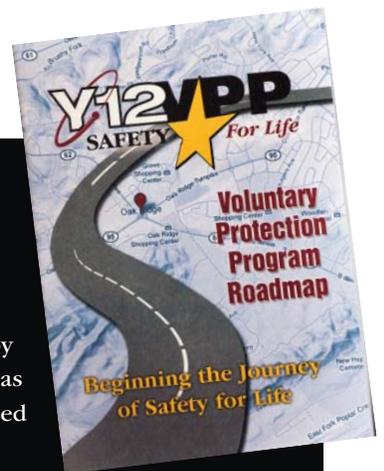
## VPP Roadmap: Steering Us to Safety

Many of you have received a copy of the Voluntary Protection Program (VPP) Roadmap and might be thinking: "Why? What do I do with this?"

The roadmap is designed to contribute to our strong safety culture by engaging employees in safety and health excellence, with the core of VPP being a cooperative effort among all employees. While completing this booklet, you are encouraged to look up information, discuss what you find, and, in the process, get a better understanding of VPP activities and our safety culture at Y-12 and the UPF project. Employees should complete a total of 20 activities listed in the booklet (four are mandatory) and have these verified by

a supervisor, line manager, or VPP Champions Committee member.

Y-12 and the UPF project will undergo VPP status assessment April 9-20 to become a VPP star site. Please support this initiative by completing your roadmap as soon as possible. Questions can be addressed by visiting the VPP website or by a member of the VPP Champions Committee.



On the road to VPP star status.

## Welcome Brant Morowski

If Brant Morowski had to pick a new occupation after more than four decades of successful large domestic and international Engineering, Procurement and Construction (EPC) projects he might go in a completely different direction — golf course greenskeeper and wine taster are on his list. Luckily, he is with us instead as the new engineering manager for UPF. Morowski has joined our team after completing his last assignment with the Waste Treatment Plant (WTP) in Hanford, Washington, as the deputy manager of engineering.

Morowski already enjoys working with our group of talented, creative people and looks forward to the challenges a robust project like UPF will bring. He feels our top priority is “working together to deliver a safe and quality product that meets customer expectations.” Commitment to nuclear safety and quality, meeting commitments, managing change, and remaining adaptable are key for us going forward, he said.

Morowski defines near term success as working safely and achieving our FY 2012 goals — reaching 90% design maturity, baselining total project cost, and being ready to take the project to the field. “As we move beyond FY 2012 and complete final design, engineering will refocus to support the goals of procurement, construction, and ultimately commissioning. The success of the completed project is our ultimate goal,” said Morowski.

In the people he works with, Morowski values integrity, professionalism, commitment, and teamwork. “With the wide



Welcome UPF's new Engineering Manager Brant Morowski.

range of skill and diversity of the workforce here at UPF, I believe our goals are achievable by looking out for each other and focusing on the things that matter,” said Morowski. If you haven't already, please be sure to welcome him to the UPF team.



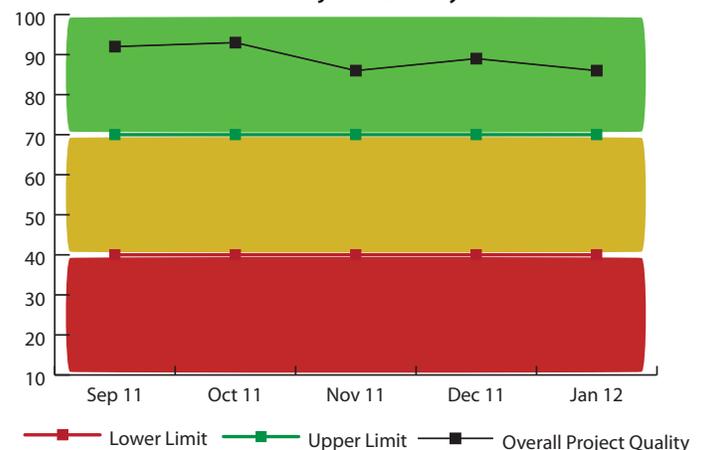
### Quality Corner

The “UPF Project Quality Dashboard” was officially rolled out on the UPF project in February 2012. The UPF Management Team has taken a team approach to develop a product that we can all take pride in. The dashboard provides a graphic representation of how selected functions are tracking and monitoring the quality of their performance. It includes both a numeric and color-coded grading system to display individual functional performance as well as the overall project performance from a quality perspective.

The initial rollout of the dashboard will focus on Engineering, Procurement and Construction (EPC), along with Quality, Contractor Assurance and Project Controls. The dashboard is based on a six sigma model that assigns both weights and scores to individual metrics developed for each functional organization. The intent is to focus on monitoring and eliminate rework whenever possible.

Although individual functions will have multiple metrics to facilitate tracking, monitoring, and implementing actions to improve performance, the dashboard is intended to display a small subset of those metrics that are considered both relevant

FY 2011 Project Quality Trend



and important to the quality of work being performed by each function as the project continues to evolve through the various EPC stages. As such, the UPF Project Quality Dashboard will continue to evolve as the UPF project itself evolves.

## Your Coworkers

Join your coworkers at Commerce Park on March 26 and at Hardin Valley on April 3 to donate blood during the upcoming Medic Blood Drives. Watch YSource and your email for more dates to donate at Y-12.



### Contact Us

We want your feedback! Please forward any ideas, topics, or suggestions to Marla Vinson (MVZ). We hope this newsletter will provide useful and exciting information about our UPF Project and the employees in it. Thanks for reading!

Marla Vinson, Editor, Publishing Communications  
Denise Novak, Layout, Publishing Communications

## WORKSAFE SAFETY STATISTICS

- UPF personnel worked 101,582 hours in February without an injury
- 3,129,277 hours have been worked over the life of the project without a lost work day injury
- UPF personnel have worked 268,132 hours since the last recordable injury