



The Value Added of the Department of Energy Voluntary Protection Program 2004 Update



U.S. Department of Energy
Office of Environment, Safety and Health
Office of Corporate Performance Assessment

Office of Quality Assurance Programs
Washington, D.C. 20585

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“...Some of us will serve in government for a season; others will spend an entire career here. But all of us should dedicate ourselves to great goals: We are not here to mark time, but to make progress, to achieve results, and to leave a record of excellence.”

— George W. Bush
President of the United States
October 15, 2001
Constitution Hall, Washington, DC

The Value Added of the Department of Energy Voluntary Protection Program (DOE-VPP) – An Update

This document is an update to the previous overview and assessment of the value added by Voluntary Protection Programs (VPP) within the Department of Energy (DOE). This report presents an update on the initial assessment of the value added by the DOE-VPP using methods that are consistent with the analyses used by OSHA and private sector companies to evaluate the value added of VPP.

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Abbreviations and Acronyms

AJHA	Automated Job Hazard Analysis
BBS	Behavior based safety
BLS	Bureau of Labor Statistics
CAIRS	Computerized Accident/Incident Reporting System
CP	Central Plateau
DOE	U.S. Department of Energy
EH	Office of Environment, Safety and Health
ERC	Environmental Restoration Contractor
FFS	Fluor Federal Services
FFTF	Fast Flux Test Facility
HAMMER	Hazardous Materials Management and Emergency Response
HSO	Hanford Site Operations
HU	Human Performance
INEEL	Idaho National Engineering and Environmental Laboratory
INPO	Institute of Nuclear Power Operation
ISMS	Integrated Safety Management System
KCP	Honeywell FM&T Kansas City Plant
LANL	Los Alamos National Laboratory
LBNL	Lawrence Berkeley National Laboratory
LLNL	Lawrence Livermore Laboratory
LWC	Lost Workday Case
NASA	National Aeronautics and Space Administration
NNSA	National Nuclear Security Administration
NSC	National Safety Council
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PFP	Plutonium Finishing Plant
PNNL	Pacific Northwest National Laboratory
PTH	Protection Technology Hanford
SC	Department of Energy Office of Science
SPR	Strategic Petroleum Reserve

TRC	Total Recordable Case
VPP	Voluntary Protection Program
WIPP	Waste Isolation Pilot Plant
WSI	Wackenhut Services, Inc.
WSRC	Westinghouse Savannah River Company
YMP	Yucca Mountain Project

Executive Summary

This report has a two-fold purpose. First, it is intended to provide an assessment of the benefit – the “value added,” – of the Department of Energy’s Voluntary Protection Program (DOE-VPP) using methods and procedures that are consistent with the analyses used by OSHA and by the private sector. Secondly, it provides a collective review of overall program performance as reported by the program’s participants in their annual self evaluations, thereby serving as additional feedback for the continuing program improvement element that is built into the VPP process.

This report additionally serves to update the documentation and data contained in the two previous, annual program assessment reports:

- The Value Added of the Department of Energy Voluntary Protection Program, DOE/EH-0647, issued June 2002, and
- Summary of the Department of Energy Voluntary Protection Program (DOE-VPP) Annual Reports for 2002, DOE/EH-0672, issued July 2003.

The Department of Energy Voluntary Protection Program

In 1992, the Office of Environment, Safety and Health (EH), modified and adapted the Occupational Safety and Health Administration’s (OSHA) Voluntary Protection Program (VPP) for use by the DOE complex of national research laboratories, weapons production facilities, environmental restoration projects, and other facilities. EH adjusted the program features to fit the unique circumstances found within DOE. The DOE-VPP has been fully established within the Department for over twelve (12) years.

Currently, the DOE-VPP has twenty-three (23) recognized site organizations: 21 of these participants have been awarded “STAR” recognition and 2 have been awarded “MERIT” recognition. The figures and graphic displays in this report show the site organizations in the DOE-VPP.

DOE-VPP Performance During 2003

The annual reports of the twenty (20) STAR-level worksites in the DOE-VPP during 2003 indicate that each of these site organizations conducted rigorous and disciplined facility-wide self assessments during 2003. Additionally, it is apparent that the required annual self-assessment process has become increasingly standardized by all DOE-VPP participants.

During 2003, in their annual status reports, each participant in the DOE-VPP identified options for continuous improvements, areas of accomplishment and growth, and reported

progress toward achievement of selected goals and objectives. In addition, the annual reports received from the program participants itemized their systematic efforts to generate outreach, and to mentor other facilities seeking VPP quality performance in safety and health. Collectively, the list of sites, facilities, corporations and agencies receiving mentoring and/or outreach assistance from DOE-VPP participants is most impressive.

Recent onsite VPP reviews for both new applications and re-certifications, (required after three years of performance), have noted a very high quality of VPP operation across DOE. These onsite reviews led by EH suggest that VPP has changed the culture of these sites and added value to manager-worker relationships. Additionally, the reviews and annual reports revealed a VPP added value in the growing partnership of DOE between EH at headquarters and at the DOE field offices. Reports are now being reviewed and endorsed by all field offices. Also significantly, federal employees from these DOE field offices are routinely members of both certification and re-certification onsite teams.

Improvements in Injury and Illness Rates at DOE-VPP Sites

The main source of the data for the injury illness rates at DOE facilities is the Computerized Accident/Incident Reporting System (CAIRS) data base maintained by EH-3/DOE. The record keeping and reporting requirements of DOE are same as OSHA's, and CAIRS uses the same definitions and formulas.

It should be noted that a significant change occurred in CAIRS during 2002-2003. The DOE "Cost Index" in the CAIRS system, which had been used to measure the cost of injuries normalized by the work hours at each site since the 1980's, was eliminated. Prior value added reports utilized this information as a valuable check and balance against other evaluations and statistical models; however, this data is no longer being collected.

Figures and charts within this report show the most recent three year average (2001-2003) of the Total Recordable Case (TRC) Rates for DOE-VPP sites, compared to the corresponding Private industry rates. The TRC rates of the DOE-VPP sites are significantly below private industry rates, and it can be seen that DOE's VPP sites have made significant improvements in reducing the injuries and illnesses.

Methods of Demonstrating the Value Added of VPP

Businesses measure the value added by their VPP by comparing the number and costs of injuries before and after the implementation of VPP. This comparison commonly addresses both financial and non-financial elements.

For financial comparisons in the DOE-VPP, calculations were performed with the aid of DuPont's™ model (widely used by private industries and OSHA to estimate the cost of injuries). The approach adopted by this report is macroeconomic using national averages rather than state level or regional cost of living values. A microeconomic approach would involve collection of the cost data at the firm or company level, including

workman's compensation data. However, in some cases, private industry organizations and DOE contractors keep such microeconomic data confidential and do not publish it. Nevertheless, an appendix to this report does contain some microeconomic data voluntarily submitted by three (3) DOE-VPP site organizations.

Value Added of VPP: Cost Savings

Twelve (12) of the current DOE VPP site organizations were selected for calculating the costs and savings on the basis of the DuPont™ model. Injury data for the period 2001-2003 were compared with data for the three year averages prior to the site obtaining VPP STAR. During the period 2001-2003 the safety performance at many DOE-VPP sites significantly improved (for example, INEEL, WSRC etc.), but at some sites the performance decreased compared to the period 1999-2001.

Large sites such as the Savannah River site obviously derive higher benefits or savings than smaller sites in absolute terms, but smaller sites can be equally or more effective in implementing VPP. For this reason, the cost savings were normalized using the number of employees. The primary objective of this study was to show that VPP can save substantial money for the companies.

Conclusions

Even if the only value of DOE-VPP were drawn from the continued reduction of injuries and illnesses, VPP would be a significant benefit to businesses. With less harm, the reduction of medical costs, lost work time, and associated job disruptions would justify the costs and efforts dedicated to VPP operation. In addition, the growing bipartisan popularity of VPP in the U. S. Congress, and its popularity among large corporations, at both the corporate and operations levels across America are evidence of the merit and worth of VPP. And finally, the recent effort by Ireland and Northern Ireland to test pilot VPP knowing that their success may influence the other member-nations of the European Union to adapt VPP in a manor similar to DOE's VPP effort, should be the final "call" for those businesses, government agencies and corporations who consider themselves even moderately "business-smart," progressive and proactive to begin the VPP journey to excellence in safety and health.

And within DOE, from both the annual reports and from the experience of the on site reviews, VPP has significantly and positively altered the safety culture. Even those facilities aspiring to join the DOE-VPP have been influenced because they are seeking advice on implementation from their peers across the DOE complex. For those in the program, the record of enhancements and the growing popularity among managers as well as workers provides demonstrable evidence that VPP adds value, and that DOE-VPP contractors operate more safely.

Specific Case Studies in the Value Added of VPP

The appendix to this report shows data generated and provided by three DOE-VPP STAR site organizations. This data and their accompanying narratives serve to document the value added by their Voluntary Protection Programs. Each has elected a different approach to their assessment. They offer a cross-section within the Department of the varying types of work activities, from scientific enterprises to industrial facilities, with a broad range of employee skills and of work place hazards. These STAR programs include:

- The Oak Ridge Institute for Science and Education (ORISE)
- The Westinghouse Savannah River Company (WSRC)
- The Idaho National Engineering and Environmental Laboratory (INEEL)

Purpose

The purpose of this report is two-fold. First, it is intended to provide an assessment of the benefit – the “value added,” – of the Department of Energy’s Voluntary Protection Program (DOE-VPP) to the overall safety and health conditions at the Department’s workplaces. Secondly, it provides a collective review of overall program performance as reported by the program’s participants in their annual self evaluations, thereby serving as additional feedback for continuing program improvement. This report additionally serves to update the documentation and data contained in the two previous, annual program assessment reports:



- The Value Added of the Department of Energy Voluntary Protection Program, DOE/EH-0647, issued June 2002, and
- Summary of the Department of Energy Voluntary Protection Program (DOE-VPP) Annual Reports for 2002, DOE/EH-0672, issued July 2003.

The Department of Energy Voluntary Protection Program

In 1992, the Office of Environment, Safety and Health (EH), with responsibility for the safety and health of the Department of Energy’s (DOE) roughly 125,000 contract employee workforce, modified and adapted the Occupational Safety and Health Administration’s (OSHA) Voluntary Protection Program (VPP) for use by the DOE complex of national research laboratories, weapons production facilities, environmental restoration projects, and other facilities. EH adjusted the concepts and implementation features to fit the unique operating circumstances and contractual relationships so that during this past twelve years the DOE-VPP has been fully established within the Department.

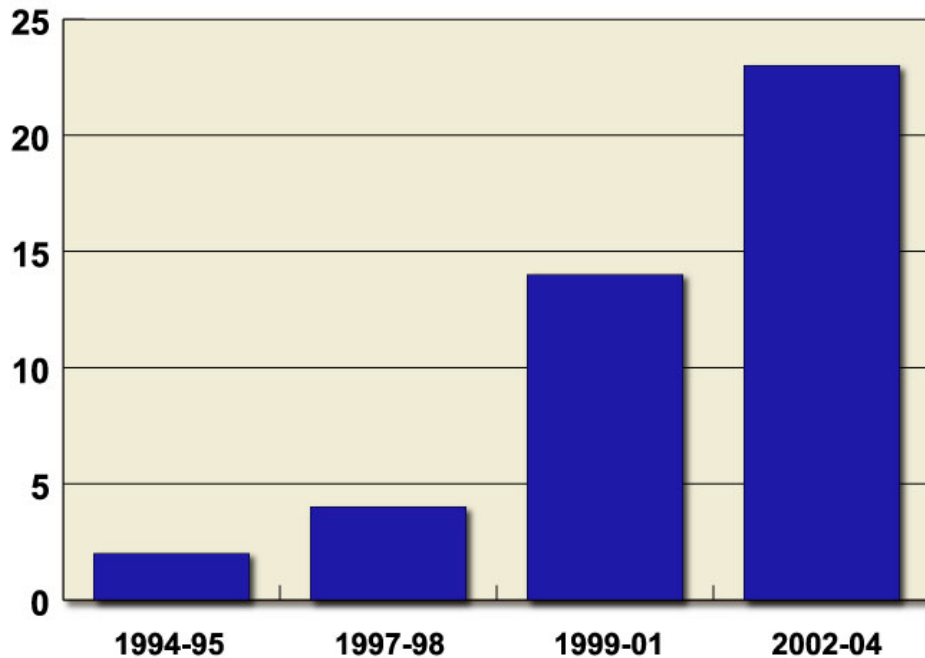


Figure 1. Number of VPP Sites

The DOE-VPP, like the OSHA program, has three (3) levels of recognition; STAR, MERIT and DEMONSTRATION. Contractors whose programs meet the requirements for outstanding safety and health programs receive STAR recognition, the highest achievement level. Contractors with highly effective programs, who commit themselves to attain STAR status within a five-year period, receive MERIT recognition. A site can retain MERIT recognition for a maximum of five years. The DEMONSTRATION program is for achievements in unusual situations about which more information is needed before approval requirements for the STAR program can be determined. Once

approved, STAR sites are re-evaluated every three years, while MERIT and DEMONSTRATION sites are evaluated annually.

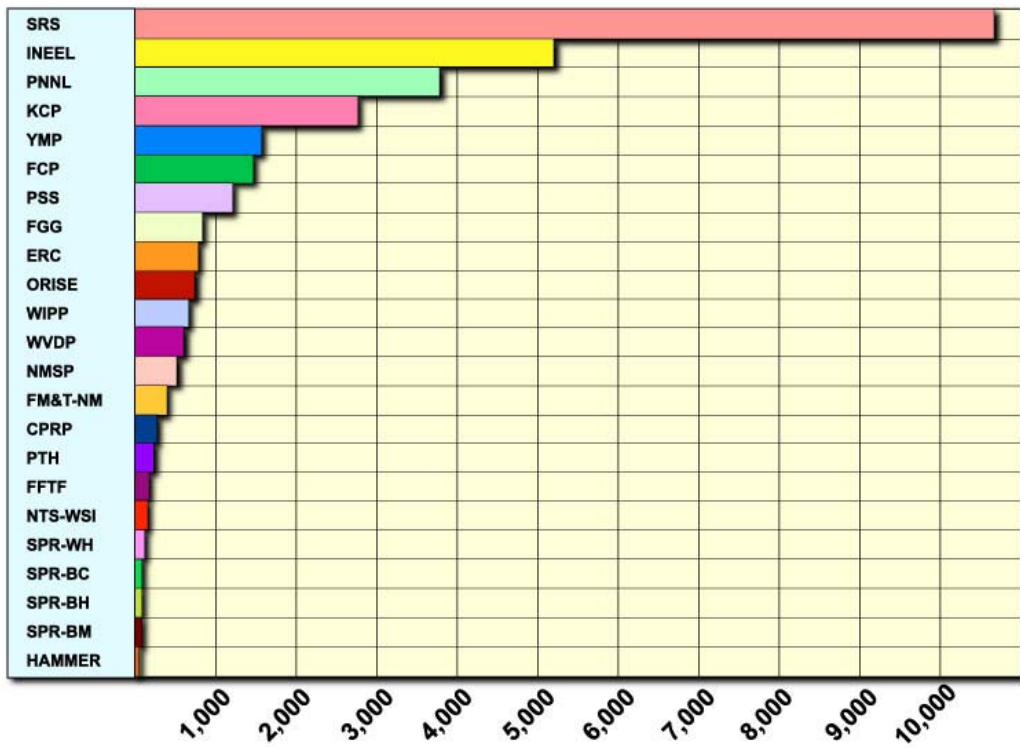


Figure 2. Size Distribution of DOE-VPP Sites

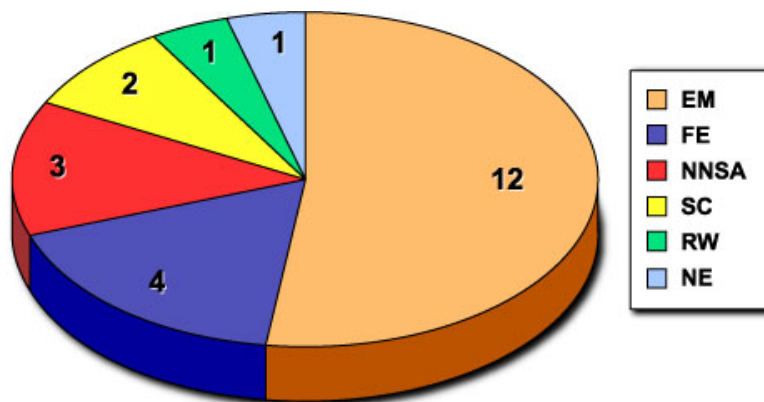


Figure 3. DOE-VPP Sites by Organization

Currently, the DOE-VPP has twenty-three (23) recognized site organizations: 21 have achieved STAR recognition and 2 have been granted MERIT recognition. Figures 1, 2, 3, 4, and 5 are graphic displays of the site organizations in the DOE-VPP. Table 1 lists these facilities. Clearly, the DOE-VPP has matured from its original set of principles, even as the program tenets have been adopted by each DOE facility; new approaches and methods have emerged from actual practice. Additionally, the fact of this evolution is a testimony to the program’s value added at these facilities.

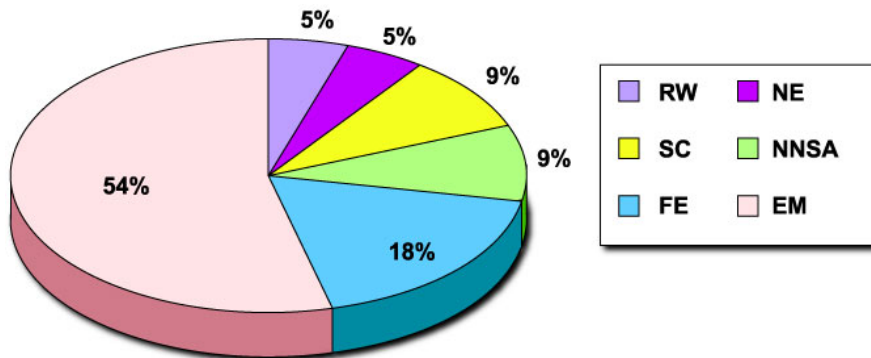


Figure 4. Distribution of VPP Sites by DOE Program Offices – 8/31/04

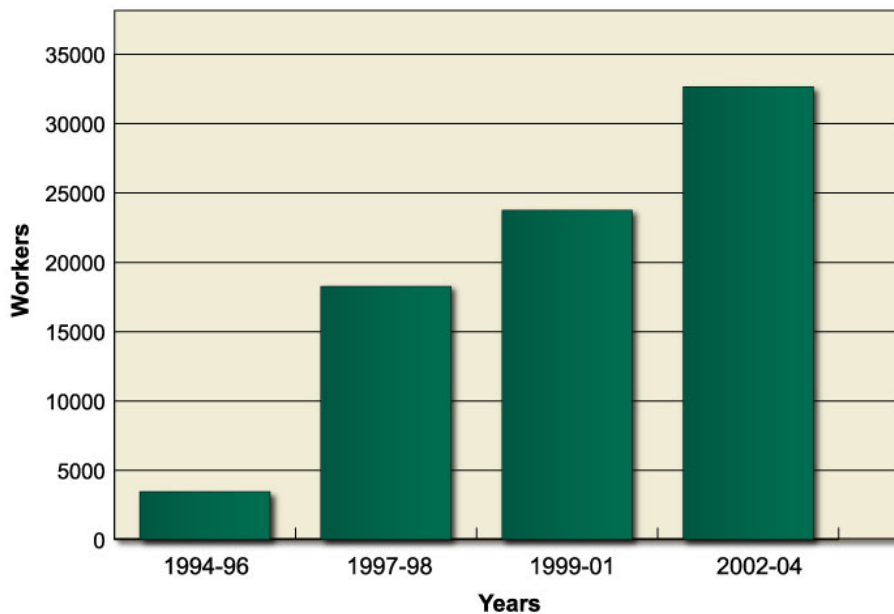


Figure 5. Number of Workers at DOE-VPP Sites

The Department’s utilization and application of established criteria and standards to achieve successful execution at our unique facilities, have been recognized as superior by OSHA, and often adapted into their VPP. Additionally, the EH and OSHA relationship

has grown, and both agencies have routinely provided team members to participate on each other's onsite review teams. Likewise, training and qualification programs for both programs are being coordinated between these federal agencies. The strengthening of this relationship is of itself a value drawn from both VPP executions.

Table 1. Size Distribution of DOE-VPP Site Organizations

Location/Site	Participant/ Contractor	Avg. Employment
Savannah River Site	Westinghouse Savannah River Co.	10,700
Idaho National Engineering and Environmental Laboratory (INEEL)	Bechtel BWXT, Idaho, LLC	5,200
Pacific Northwest National Laboratory (PNNL)	Battelle Memorial Institute, Inc.	3,800
Kansas City Plant, Kansas City, MO	Honeywell Federal Manufacturing & Technologies (FM&T)	2,800
Yucca Mountain Project	Bechtel SAIC Company, LLC	1,650
Fernald Closure Project (FCP)	Fluor Fernald, Inc.	1,500
Hanford Site	Project System and Support (PSS), Fluor Hanford, Inc.	1,280
Hanford Site	Fluor Government Group (FGG), Fluor Hanford, Inc.	750
Hanford Site	Environmental Restoration Contractor (ERC)- Bechtel Hanford, Inc.	746
Oak Ridge	Oak Ridge Institute for Science and Education (ORISE)	700
Waste Isolation Pilot Plant (WIPP)	Washington TRU Solutions	670
West Valley Demonstration Project	West Valley Nuclear Services	620
Hanford Site	Nuclear Materials Stabilization Project (NMSP), Fluor Hanford	550
New Mexico Operations	Honeywell Federal Manufacturing & Technologies (FM&T)/New Mexico	400
Hanford Site	Central Plateau Remediation Project (CPRP) - Fluor Hanford	374
Hanford Site	Day & Zimmerman Protection Technology Hanford (PTH)	300
Hanford Site	Fast Flux Test Facility (FFTF) - Fluor Hanford	250
Nevada Test Site	Wackenhut Services, Inc.	240
Strategic Petroleum Reserve-West Hackberry	DynMcDermott	150
Strategic Petroleum Reserve-Bayou Choctaw	DynMcDermott	100
Strategic Petroleum Reserve-Big Hill	DynMcDermott	100
Strategic Petroleum Reserve-Bryon Mound	DynMcDermott	100
Hanford Site	Hazardous Waste and Emergency Response Training and Education Center (HAMMER)- Fluor Hanford, Inc.	50

DOE-VPP Performance During 2003

The annual reports of the twenty (20) STAR-level worksites in the DOE-VPP during 2003 indicate that each of these site organizations conducted rigorous and disciplined facility-wide self assessments during 2003. Additionally, it is apparent that the self-assessment process has become increasingly standardized at many locations.

During 2003, in their annual status reports, each of the STAR worksites in the DOE-VPP identified several options for continuous improvements and modifications to their VPP programs. Each identified area of accomplishment and growth, as well as the status and progress toward achievement of selected goals and objectives. The reports also identified areas where additional improvement was needed, set goals and objectives, and established metrics for measuring progress on those items. For example, common themes identified by the DOE-VPP participants included:

- the need for greater emphasis on communication; and
- the need for continued development of trend analysis.

A distinct feature of the Department's VPP is formal program emphasis placed on mentoring and outreach activity for all participants in the DOE-VPP. Accordingly, the annual reports received from the program participants itemized their systematic efforts to generate outreach, and to mentor other facilities seeking VPP quality performance in safety and health. Collectively, the list of sites, facilities, corporations and agencies receiving mentoring and/or outreach assistance from DOE-VPP participants is most impressive.

The Department of Energy is fortunate in that it has an integrated occupational safety and health management system that serves as the primary requirement for all DOE worksites. The DOE mandated occupational safety and health management system is the Integrated Safety Management System (ISMS), and it remains the baseline requirement by which workplace safety and health is managed within DOE. Although the DOE-VPP is a voluntary program, it serves to compliment the Department's ISMS requirement as a quality measuring and control system. At many sites, Behavior Based Safety (BBS) has become another complimentary effort to address specific work areas and hazards. In these cases, performance has demonstrated that the strengths of these three programs can be effectively synergized.

In understanding the synergy between BBS and VPP, it is most likely that the next phase of maturation for VPP within DOE will be the development and use of the Institute of Nuclear Power Operations' (INPO) Human Performance (HU) program. The HU program as developed by INPO can easily be seen as a logical progression to the one fifth of the VPP process that incorporates employee involvement. Other programs, industries and corporations have long touted their success in this area with the application of

various forms and models of BBS, and the INPO HU program may offer one of the best BBS-based models.

The nine most recent onsite VPP reviews for both new applications and re-certifications, (required after three years of performance), have also noted a very high quality of VPP operation across these sites. These onsite reviews led by EH suggest that VPP has changed the culture of these sites and added value to manager-worker relationships. Specifically, there is now a high degree of communication and cooperation for workplace safety at these reviewed sites.

Management commitment has evolved among managers and supervisors. Training now is more comprehensive for managers and supervisors; financial commitment is more routine and robust; stop work authority more firmly rooted in these cultures; and safety and health leadership more deeply ingrained in individual performance appraisals for managers and supervisors.

With respect to employee participation, most facilities reported a broader worker audience for VPP. More employees are receiving training for outreach, communications have become more diverse and refined, and more employees are participating in more roles as committee members. Safety and health regimens are also appearing in both private and community activities.



DOE-VPP members reported that Worksite Analysis and Hazard Prevention and Control received steady enhancement during 2003. The Automated Job Hazard Analysis (AJHA) program that was initially developed at the Hanford site has quickly spread across the DOE complex, as are other techniques and tools which are being shared, exercised, and refined between members. Significantly, site reports on mentoring and outreach activity show that the AJHA program is being widely shared with other Federal agencies and State governments such as NASA and the Department of Defense (Navy and Army facilities), and with major corporations in the private sector.

Mentoring is a value adding process in the DOE-VPP as noted in the participants' annual reports, and during the execution of the onsite reviews. Current members that perform routine mentoring exhibit the most vibrancy in their programs, adapting best practices that they find at other sites and using the mentoring process to identify lessons learned from other sites. Likewise, the two new members were awarded MERIT primarily because they did not receive adequate mentoring before they submitted their applications. In both cases, the action items assigned to achieve STAR status address employee participation, which could have been achieved through mentoring. In the future, greater attention must be given to mentoring VPP applicants as a part of their initial application.

Reviews and annual reports further revealed a VPP added value in the growing partnership of DOE between EH at headquarters and at the DOE field offices. Reports are now being reviewed and endorsed by all field offices. Also significantly, federal employees from these DOE field offices are routinely members of both certification and re-certification onsite teams. Equally important, the field office managers have assumed sole authority and responsibility for assuring that facility applicants are fully qualified to grow from MERIT to STAR. Likewise, the recent implementation of the DOE-VPP Steering Committee will further strengthen these federal roles and relationships within DOE.

Subcontractor safety and health is another area that is showing statistical improvement, and both annual reports and onsite reviews have noted this improvement. Supervision and training for these workers has improved with greater emphasis on the job planning, control during job execution, and on use of stop work authority by subcontractors. Many facilities now assign dedicated points of contact for subcontracted work, and job task hazards are specifically trained for each worker on each job. VPP has added value to communications and control with subcontractors. It is anticipated that this improvement will continue in the future.

Injury and Illness Performance in DOE-VPP

Additionally, the annual self-assessment reports from DOE-VPP participants record their most recent Bureau of Labor Statistics (BLS) performance statistics. These statistics are fundamental criteria for STAR recognition, and in all cases, the DOE participants have performed at STAR quality for the past three years. The valued added of VPP at each facility is highly visible in these statistical displays.

Improvements in Injury and Illness Rates at DOE-VPP Sites

The main source of the data for the injury illness rates at DOE facilities is the Computerized Accident/Incident Reporting System (CAIRS) data base maintained by EH-3/DOE. The record keeping and reporting requirements of DOE are same as OSHA's, and CAIRS uses the same definitions and formulas.

Two major changes occurred in CAIRS during 2002-2003 are as follows:

1. Effective January 2002, the reporting requirements were changed by OSHA regulations 29 CFR Part 1904. DOE also changed their requirements to be consistent with OSHA reporting requirements. As a result, comparison of 2002 and 2003 data with prior historical data may lead to some inconsistencies. Such inconsistency, if any, would be significant for some measures such as the "Lost Work Days," redefined and renamed as Days Away from Work and Restricted Job Activity and Transfers (DART). For this reason, the graphs shown in the following used Total Recordable Case Rate for comparison purposes.
2. During 1980's, DOE developed a "Cost Index" in CAIRS to measure the cost of injuries normalized by the work hours at each site. This index number was not required by DOE directives or by the OSHA regulations. Private industry does not, and did not construct or collect data on such a measure. The Bureau of Labor Statistics (BLS), or the National Safety Council did not include such an index number in their publications. The weights used by this Cost Index were developed in 1980's, and have never been updated by DOE. The concept of such an index number in theory is innovative and useful. (Similar indices such as Consumer Price Index, and Dow-Jones industrial average, are widely used by financial/economic sectors.) Due to the limitations and assumptions made by the cost index, the Office Corporate Performance Assessment (EH-3) decided to drop the Cost Index from CAIRS data base.

The main message from the attached charts and the CAIRS data related to DOE VPP sites is that the VPP sites have made significant improvements in reducing the injuries and illnesses.

Figure 6 shows the most recent three year average (2001-2003) of the Total Recordable Case (TRC) Rates for all the DOE VPP sites, compared to the corresponding Private industry rates for similar types of operations. Obviously the TRC rates of the DOE VPP sites are significantly below private industry rates for similar operations.

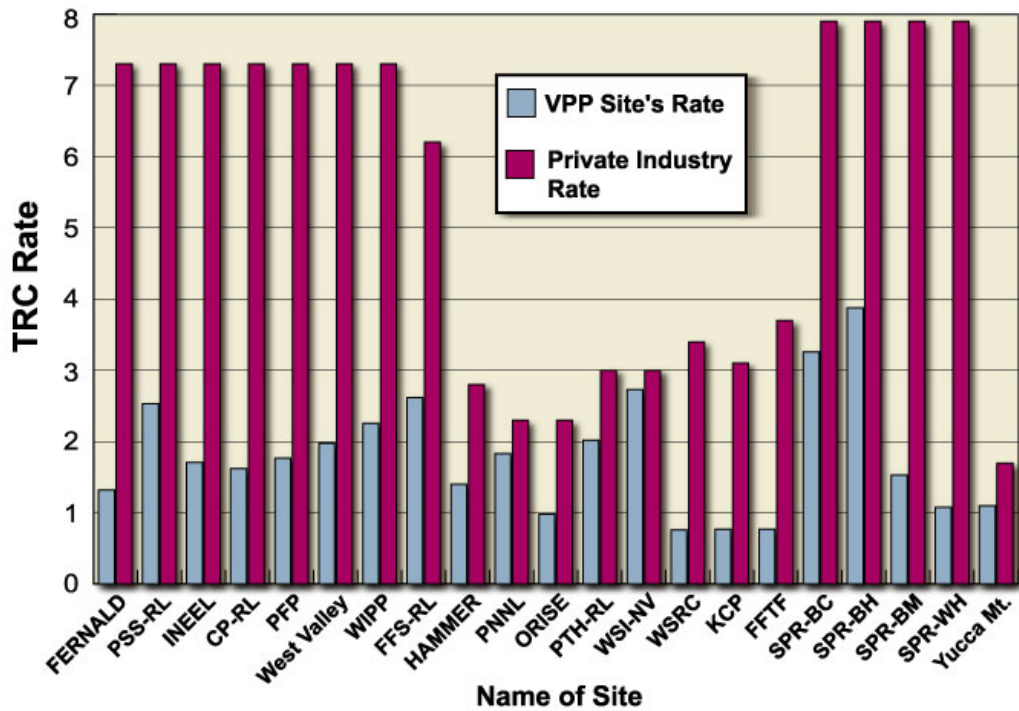


Figure 6. Comparison of DOE-VPP Site Operations with Averages of Similar Operations in Private Industry Sectors, 2001-2003 TRC Rates

Figure 7 presents the TRC and Lost Work Day Case rate data for Idaho National Engineering and Environmental Laboratory (INEEL) for the years 1996 through 2003. The downward trend of both these rates at INEEL is highly significant. The impact of such reduction in injuries can be witnessed in the next section where cost of injuries and the Value Added of VPP are discussed.

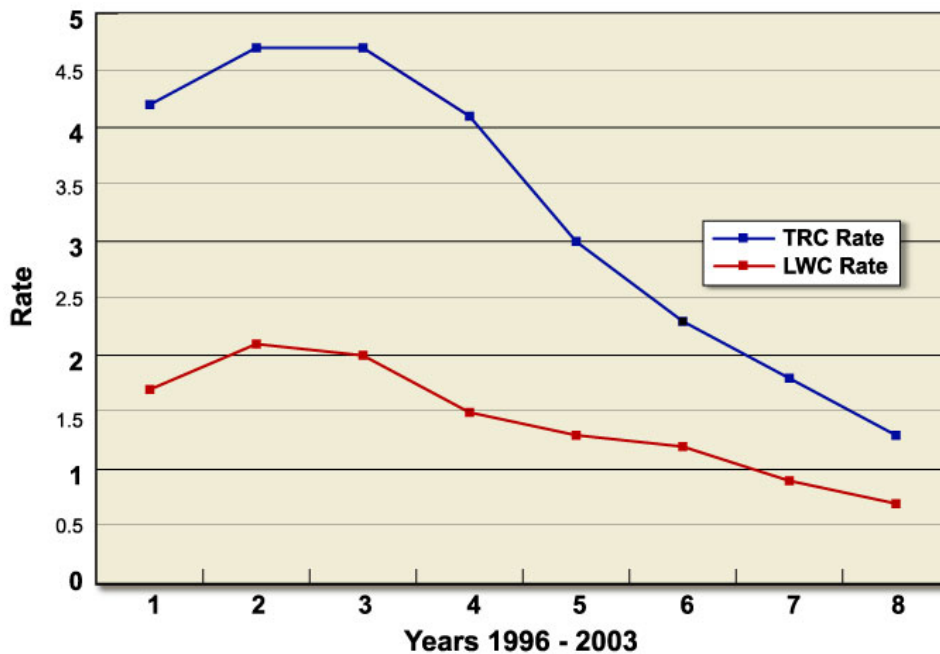


Figure 7. Trend of Injury Illness Rates at INEEL

Figure 8 compares the TRC rate of Honeywell FM&T Kansas City Plant (KCP) with other NNSA facilities such as SANDIA National Lab, Lawrence Livermore National Laboratory (LLNL), Los Alamos (LANL), and Y-12 plant at Oak Ridge. The chart suggests that NNSA facilities may consider the lessons learned from VPP at KCP to achieve better results. The level and complexity of work at other NNSA sites may differ from that at KCP, however, some reduction in TRC rate could be achieved by adoption of VPP. Two other NNSA facilities, WSI-NV and the Kirkland Operations of Honeywell at Albuquerque are examples of the VPP lessons learned that can be utilized by other potential NNSA facilities.

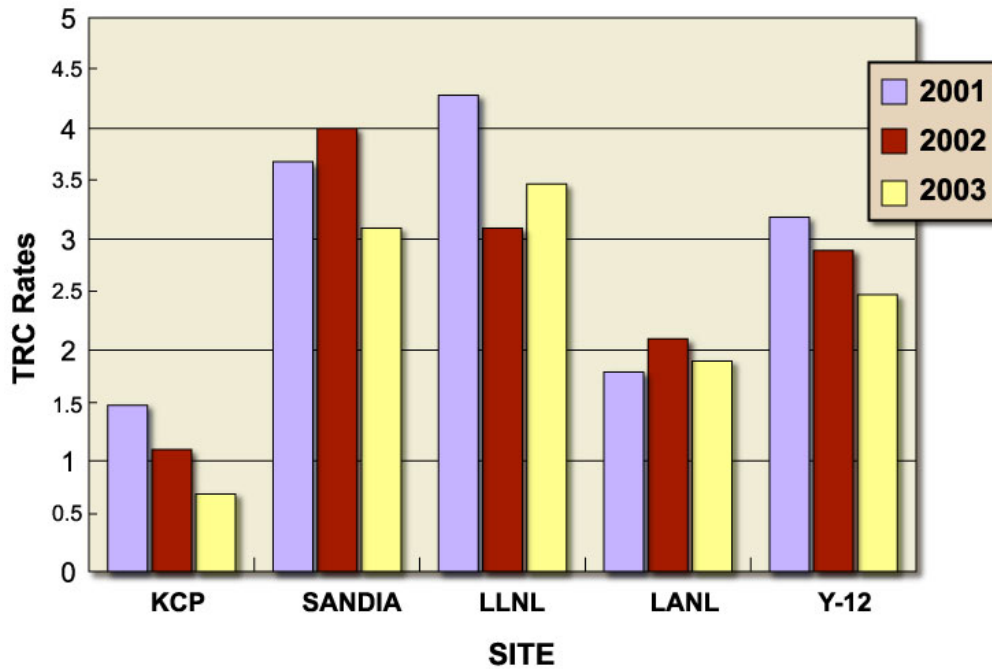


Figure 8. Total Recordable Case Rates of Kansas City Plant (VPP STAR) and Other Non-VPP Sites in NNSA – 2001-2003

Figure 9 compares the TRC rates of ORISE and PNNL (VPP STAR sites) with other DOE Office of Science (SC) Laboratories. With the exception of Thomas Jefferson Laboratory, the TRC rates of all other SC laboratories are higher than the rates of PNNL. Comparison of 1999-2001 averages of SC laboratories with their own rates in 2001-2003 indicates an overall improvement, for example, 1999-2001 average TRC Rate of ORNL, PPPL, and FERMI were 4.3, 4.0 and 3.6 respectively, and have dropped to 3.3, 3.1 and 2.6 during 2001 - 2003. The SC laboratories use the same safety programs including the mandatory ISMS. With the exception of LBNL, none of the SC laboratories adopted BBS. Therefore, we can infer that difference in the injury rates at ORISE and PNNL compared to other SC laboratories can be attributed to VPP.

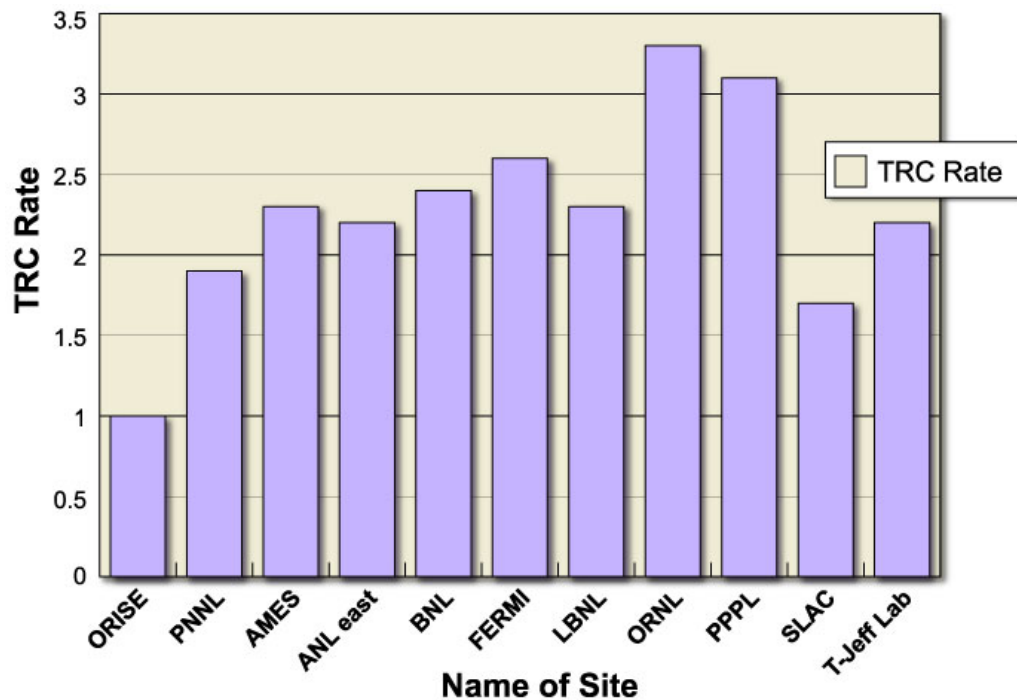


Figure 9. Comparison of VPP STAR Site Organizations with Other Science Laboratories: 2001-2003 Average TRC Rate

It is possible for one of the SC laboratories such as Thomas Jefferson Laboratory or any of the other DOE facilities with low injury rates to be eligible to apply for VPP recognition by DOE. However, it should be noted that injury rates, or statistics, are not the sole basis for recognition by DOE VPP. For example, recently two DOE contractors/applicants were unable to receive STAR status even though they satisfied the statistics criteria. VPP requires that the DOE contractors go beyond compliance with regulations and other DOE programs such as ISMS, and seek excellence showing strong management commitment, employee participation, etc. (the five tenets of VPP).

Value Added of VPP: Cost Savings

From the list of 21 DOE VPP sites, 12 sites were selected for calculating the costs and savings on the basis of the DuPont™ model. Of these 12 sites, four represent the Strategic Petroleum Reserves sites, and the injury illness data for these sites are reported by CAIRS under one organization code, i.e., the data are combined. The selection of the DOE sites in Table 1 is based on the following criteria. ERC, ORISE, and PFP are brand new VPP sites, HAMMER is a very small training facility, data for PSS (HSO), CP, FFTF, and FFS are not directly available in CAIRS, since specific organization codes were not assigned to them, and Fluor reorganized some of these companies, for example HSO to PSS etc., Fluor reported the data to CAIRS for the whole company. The individual unit injury records may be available at the Fluor corporate office in Richland, and some data may also be available in their original VPP applications and Annual reports.

Injury data for the period 2001-2003 were compared with data for the three year averages prior to the site obtaining VPP STAR. Such data are available for all the sites selected by Table 2. The Yucca Mountain Project (YMP) was selected because excellent and reliable data are available in CAIRS, even though it is a new site (received STAR in August 2003). The cost savings were estimated by comparing its injury record in 2003 with prior years, and by assuming that YMP's safety performance will continue to be at the same levels. The DuPont™ model requires three years of data to perform such calculations. During the period 2001-2003, the safety performance at many DOE VPP sites significantly improved (for example, INEEL, WSRC etc.), but at some sites the performance decreased compared to the period 1999-2001. This is the major reason for the differences in the cost savings provided by the previous Value Added report published in 2002 and this report.

Table 2 shows the cost savings due to VPP at DOE 12 sites calculated on the basis of the DuPont™ model. The data for the four Strategic Petroleum Reserves (SPR) sites were combined since they are small in size and operated by the same company. In the case of two facilities, WIPP and PTH, the cost savings were found to be negligible and therefore not presented. It is essential for both DOE and the operating contractors, that such sites review and validate the data submitted by them to CAIRS, since outliers in the data were discovered. The DuPont™ model takes "lost work days" as one of the inputs for calculating the costs of injuries, and it is sensitive to this parameter value. The TRC rates and LWC rates may be low at a site and yet the lost work days can be extremely large due one single injury case. Such distortions would significantly impact the final results of the model. The DOE-VPP onsite reviews and the Recertification visits emphasize TRC and LWC under the assumption such cases are very unusual.

Large sites such as the Savannah River site obviously derives higher benefits or savings than smaller sites in absolute terms, but smaller sites can be equally or more effective in

implementing VPP. For this reason, the cost savings were normalized using the number of employees, as shown in the last column of Table 2. This suggests that SPR- Dyn McDermott Petroleum Company was able to gain the most benefits from VPP among the DOE sites. Other sites, such as INEEL and KCP should be mentioned for their success in implementing the VPP. In the case of SPR, all four sites implemented BBS, and it is possible that VPP along with BBS produces better results. INEEL and KCP do not have the BBS program at their sites, and yet could achieve excellent results.

The primary objective of this study was to show that VPP can save substantial money for the companies and not necessarily to provide the exact amounts of the savings. Additionally, the DuPont™ model was originally developed for use by private industry, and the assumptions involved in it may not be completely applicable to DOE contractors. The National Safety Council statistics used as inputs to the DuPont™ model may also need adjustment for cost of inflation and further updating. In view of these limitations, the cost savings presented in Table 2 should be considered in relative terms.

Table 2. Cost Savings due to VPP

Name of the VPP site	Number of Employees *	Savings in \$1000's /year	Per Capita savings \$
Fernald	2400	193	80
INEEL (Idaho)	5400	1135	210
Kansas City Plant (KCP)	3000	454	151
PNNL	3300	59	19
SPR- Dyn McDermott (4 sites)	800	233	291
West Valley	700	78	111
WSI-NV	300	37	123
WSRC Savannah River	14000	1414	101
Yucca Mountain	1800	99	55

* Number of employees is the approximate number based on work hours

Recommendations

Based on the information found in this report as well as the two previous annual program assessment reports:

The Value Added of the Department of Energy Voluntary Protection Program, DOE/EH-0647, issued June 2002, and

Summary of the Department of Energy Voluntary Protection Program (DOE-VPP) Annual Reports for 2002, DOE/EH-0672, issued July 2003;

the following proposed recommendations are made concerning the continued operation of the DOE-VPP:

- Continue to develop and enhance the electronic-Voluntary Protection Program (e-VPP) in support of the President's Management Agenda and the electronic government (E-Gov) portion of that agenda. This undertaking reduces resource time for all such VPP activities, directly saving the Federal government millions of dollars in personal time and commitment.
- Continue development of a “generic” version of e-VPP and make it available to all occupational safety and health state plan states, and assist them in using it to manage their State VPP efforts.
- Encourage more DOE contractors to participate in the program, especially areas of the DOE complex that are under-represented such as National Laboratories and other science research facilities.
- Continue to annually evaluate and report on the value added benefits of the Voluntary Protection Program for the DOE complex.
- Continue to actively promote the mentoring and outreach aspects of the DOE-VPP.
- Encourage growth and enhancement of DOE-VPP through the use of synergistic programs such as the Institute of Power Operations (INPO) Human Performance (HU) program.

Conclusions

Even if the only value of DOE-VPP were drawn from the continued reduction of injuries and illnesses, VPP would be a significant benefit to DOE contractors and subcontractors. The costs and efforts dedicated to VPP operation can be easily justified when considering the reduction of medical costs, lost work time, and associated job disruptions that are avoided by implementing VPP. The DOE-VPP has grown to a point where it now covers over 32,000 DOE contractor/subcontractor employees. In addition, the growing bipartisan popularity of VPP in the U. S. Congress, and its popularity among large corporations, at both the corporate and operations levels across America are evidence of the merit and worth of VPP. And finally, the recent effort by Ireland and Northern Ireland to test pilot VPP knowing that their success may influence the other member-nations of the European Union to adapt VPP in a manor similar to DOE's VPP effort, should be the final "call" for those businesses, government agencies and corporations who consider themselves even moderately "business-smart," progressive and proactive to begin the VPP journey to excellence in safety and health.



EH observes that within DOE, from both the annual reports and from the experience of the on site reviews, VPP has significantly and positively altered the safety culture in DOE. Even those facilities aspiring to join the DOE-VPP have been influenced because they are seeking advice on implementation from their peers across the DOE complex. For those in the program, the record of enhancements and the growing popularity among managers as well as workers remain demonstrable evidence that VPP adds value, and that DOE contractors operate more safely.

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Appendix I: Case Studies in the Value Added of VPP¹

Three DOE-VPP STAR sites have generated and provided performance information to document the value added by their Voluntary Protection Programs (VPP). Each has elected a different approach to their assessment. They offer a cross section within the Department of the varying types of work activities from scientific enterprises to industrial facilities with a broad range of employee skills and of work place hazards. These STAR programs include:

- The Oak Ridge Institute for Science and Education (ORISE)
- The Westinghouse Savannah River Company (WSRC)
- The Idaho National Engineering and Environmental Laboratory (INEEL)

1. Oak Ridge Institute for Science and Education (ORISE)

Workers' Compensation Insurance Premium Reduction

The service provider for the ORISE Workers' Compensation self-insurance program completed a rating review and a subsequent reserve account adjustment for our loss experience for the period FY1999-FY2002. The adjustment resulted in a premium return of \$179,525 from our reserve accounts for claims coverage based on ORAU's good claims experience, a direct result of working more safely. During this time, we were benchmarking the DOE Voluntary Protection Program (VPP) as the standard of excellence for enhanced performance, and we had initiated a "zero (accidents) is achievable" philosophy in our operations in hope of qualifying for VPP recognition.

Computerized Accident/Incident Reporting System (CAIRS) Occupational Safety & Health Index

ORISE accident and injury rates continued to show good results during CY2003. During the first three quarters of CY2003 (the most recent comparative CAIRS data available under the new OSHA definitions), ORISE recorded a rate of \$1.31 per 100 hrs. worked, using the DOE Occupational Safety and Health Index. This compares to the "all DOE and contractor" index rate of \$8.82, the "research contractor" grouping of \$7.55, and the "service contractors" grouping of \$11.26.

These three cohorts are somewhat similar to the ORISE scope of work, and can provide a degree of comparison. Using the research group's value, the lowest value of the three

¹ Acknowledgements: We thank Bob Kapolka (ORISE), Yvonne Gentry (SR), and Bowen Huntsman (Idaho) for providing information in this Appendix.

and the current DOE designated grouping for ORISE, a comparison for estimated savings can be drawn. Had ORISE performed at the DOE research grouping rate of \$7.55 rather than at the \$1.31 rate (a difference of \$6.24 / 100 hrs worked), our costs would have been \$82,488 higher (1,321,919 hrs worked in CY2003 / 100 hrs x \$6.24) for FY2003.

This is a conservative estimate based on ORISE and DOE CY2003 rates for the first three quarters extrapolated for the entire CY. ORISE had no “OSHA recordables” in the fourth quarter of CY03, which would have reduced our rate further.

ORISE has seen a long term marked improvement in its Occupational Safety and Health Index as seen in the following chart extracted from the CAIRS rate tables:

Calendar Year	1999	2000	2001	2002	2003
ORISE OSHX	4.80	3.71	3.17	0.32	1.31*

* First three quarters of CY2003

The reduction in the ORISE Occupational Safety and Health Index from 1999 to 2003 is calculated to be 73%, or an annualized 18% reduction. Translated to an average cost savings, this reduction in rates has resulted in an **\$11,206** annual average during this period.

2. Westinghouse Savannah River Corporation (WSRC)

WSRC reviewed their workers’ compensation claims experience and associated costs before they began their VPP initiative and compared it to their claims experience and associated costs after achieving VPP Star Status.

Prior to beginning their VPP initiative, WSRC found that during an eight (8) year span of time (4/1/89 to 3/31/1997) the average cost of workers’ compensation was \$2.2M annually or \$0.26 cents per \$100 of pay roll.

The VPP effort at WSRC was accelerated beginning in 1997, with management and employee emphasis on VPP Program Elements and the five tenets of DOE-VPP. Subsequently, WSRC achieved DOE-VPP recognition in 1999. Throughout the period from 1997 until 2000, an increased effort by employees to achieve VPP status at the site resulted in a significant decrease in injury and illness rates and a decrease in the severity of injuries.

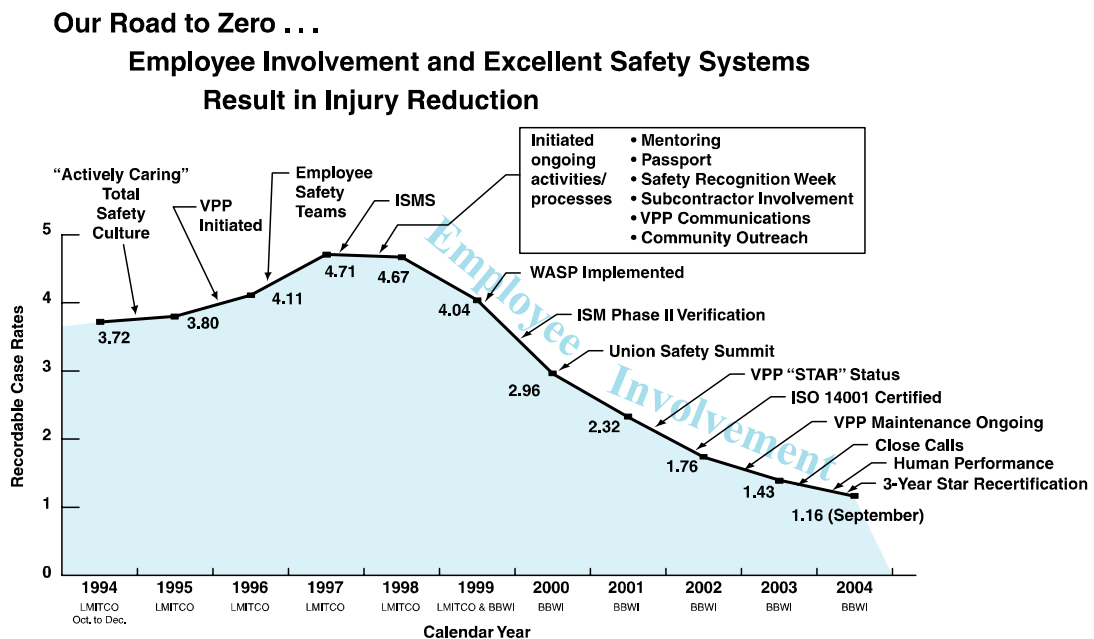
A review of WSRC workers’ compensation claims experience from 4/1/1997 through 3/31/2004 found the average cost of workers’ compensation claims decreased significantly to \$0.14 cents per \$100 of payroll as compared to the earlier rate of \$0.26 cents per \$100 of pay roll. Applied over a seven (7) year period this savings experienced and documented by WSRC equates to \$11M in total savings or a saving of \$1,571,428.57 per year.

These facts reported by WSRC show that VPP had a significant impact on reduction of overall workers' compensation costs. In reporting this information, WSRC acknowledges that the realized cost savings related to VPP has been complimented by other initiatives that have been started during the last five years; however, the fact that such savings can be traced to earlier years when VPP was the only primary initiative shows the lone value and business importance of VPP implementation. The initiatives implemented after VPP such as ISM and the sites' Behavior Based Safety initiative contribute and compliment VPP, but the initial impetuous and the foundation of this business case for value added was provided by VPP.

3. Idaho National Engineering & Environmental Laboratory (INEEL)

At the INEEL, safety is integrated into the work control process and the other operating systems on a daily basis. Employee involvement has become the medium in which safety as a value is incorporated into these safety systems. Both managers and employees take a proactive approach to working safely and they demonstrate that they truly care about their co-workers. As the INEEL continues to inch toward zero recordable injuries over the long term, it will make every effort worthwhile in both financial and human terms. Our focus continues to be on the people since safety is a people business. As illustrated in Chart 1 below, the integration of safety into work processes, the utilization of employee involvement/awareness activities, and thorough case management and incident investigations is resulting in a continuous downward trend in the recordable case rate which equates to healthier employees and reduced costs.

Chart 1.



Note: Includes construction subcontractor performance.

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In the early 1990's worker compensation costs experienced a significant reduction and since 1995 to the present time, worker compensation costs at the INEEL have essentially remained flat lined. This has occurred in an environment where inflation has resulted in yearly increases in medical costs while experiencing periodic reductions in our work force. Maintaining these costs at a fairly constant rate has been exceptional.

Additional Value Added of the DOE-VPP - Uncosted

- Employee involvement has been **pivotal** in the successful implementation of Integrated Safety Management and ISO 14001.
- Employees are directly involved in the planning and conducting of workplace inspections, and in the investigation of injuries and illnesses.
- Workers participate in pre-job walk-downs and pre/post-job briefings on a daily basis as a part of the work control process. This was infrequent in the pre-VPP years.
- There is a team of 140 employees who participate monthly in the area Employee Safety Teams, identifying and resolving safety and health issues [employee ownership of safety].
- Employees organize and conduct community safety outreach activities that have impacted > 15,000 children, youth and adults.
- Employees have participated in >14,000 peer behavioral observations during the past 3 years.
- Employees develop and deliver safety meetings for their work group.
- Every non-represented INEEL employee has a Safety and Health Personal Action Plan, determining what "I" can do to reduce injuries and illness to zero.
- Union representatives have routinely scheduled "Union Safety Summits" where union officers, contractor senior management and DOE senior management discuss and resolve safety concerns. Safety is a non-negotiable item for workers. Union relationships are positive.
- Employees share safety [home and work-related] lessons learned in bimonthly issues of the Daily Constitutional [25-35 issues/year]. A network of 130 employees, distribute and post this publication.
- Staff meetings, as well as other business meetings, begin with a safety share, where an employee can discuss a "close call", hopefully preventing a future injury.

- Employees are provided an opportunity to lead and promote stretching exercises in their location work areas. There are >100 stretch leaders at the various work locations.
- Personal testimonies have verified that the safety culture is “at home” as well as on-the-job, i.e., employee wearing safety glasses with side-shields and safety shoes when mowing the lawn, co-workers conducting a “pre-job briefing” before floating the river, and employees using fall protection when repairing their roofs.
- Employees conduct the Annual Safety & Health Evaluation required of the VPP criteria. This has traditionally involved at least 24 employees.

APPENDIX II: Methods of Demonstrating the Value Added of VPP

Businesses measure the value added through their VPP by comparing the costs of injuries before and after the implementation of VPP. This comparison commonly addresses both financial and non-financial elements. Businesses have developed criteria and models that can quantify value added from a business point of view.

For financial comparisons in the DOE-VPP, calculations were performed with the aid of DuPont's™ model (widely used by private industries to estimate the cost of injuries). A description of this model is given below and also available in DOE VPP web page. The approach adopted by this report is macroeconomic using national averages rather than state level or regional cost of living values. A microeconomic approach would involve collection of the cost data at the firm or company level, including workman's compensation data. The microeconomic approach, using company level data, can provide more accurate estimates than the approach adopted by this report. However, private industry/DOE contractors may keep such data confidential and proprietary and may not publish it. In the Appendix of this report, some microeconomic data obtained from the DOE sites are presented.

Additionally, organizations may elect to review potential savings or cost avoidance using other methods, by costing out each cost-generating element separately. For example, several of the following areas could be selected for a pre- and post-VPP comparison.

- Employee turnover rates – as measured by cost of hiring and training new personnel
- Absenteeism – as measured by a company's cost estimates for lost work time
- Worker compensation costs
- Waste, poor quality, rework costs
- Output, productivity, completed work on schedule – as measured by a company's cost estimates versus actual costs

Comparing other cost generating areas that are easily identifiable can also develop another picture of the value added. For example, comparisons can be made of pre- and post-VPP costs by examining:

- Numbers and amounts of fines and penalties assessed
- Results of external inspections (number/types of hazards identified)
- Cost of thievery, pilfering, property damage and affect or cost on insurance premiums

In undertaking such reviews and comparisons, it is important to be aware of certain fundamental issues that must be addressed in selecting functions or operations. In general, the selection of functions or operations for comparison should include consideration of the following:

- Which parameters are meaningful measures given the particular business or operation?
- Can data be easily collected for the selected parameters?
- Is data available for these parameters both before and after VPP implementation?
- What is the cost associated with collection and comparison of this data?
- Is it feasible to routinely collect and compare this information?

The background information on the calculations and programs used in this report is given below. Additional details are contained in the DuPont™ Safety Yardstick program <http://safety.dupont.com/forms/yardstick.html>.

The National Safety Council (NSC) is the source of injury information used for cost estimates in the DuPont™ Safety Yardstick program. Each year, based on the data supplied by those organizations that report such information to the NSC, the NSC issues a report called Injury Facts® which are the Council's annual compilation of that data on fatal and nonfatal injuries that occur in the workplace.

The basic data supplied in Injury Facts® is used to compute an estimated average injury cost figure. This, of course, is merely an estimate – other specific factors around the state in which the injury occurred, the degree at which the organization helps the employee get back to work, and other factors can and do affect this number.

Using the NSC Data in, say, 1999, the NSC estimated that, within their reporting organizations, there were 3.8 million injuries requiring days away from work (disabling injuries). The total injury costs were estimated at \$122.6 billion. Therefore, the Lost Workday Case “cost index” is \$122.6 billion/3.8 million, or \$32,263 per lost workday case. Per this index, one could take their number of lost workday cases, multiply by \$32,263, and get an estimate of their total injury cost.

The “cost index” is then calculated for all recordable injuries by taking the \$32,263 times 2.0 (the average LWC rate) divided by 8.0 (the average recordable injury rate – all per NSC) to get a figure of \$8066 per recordable injury. Per this index, one could take their number of recordable injuries, multiply by \$8066, and get another estimate of their total injury cost.

For the final “cost index” based on the total time lost, the total injury costs (\$122.6 billion) is divided by the number of lost days (80 million) to get \$1532. Per this index, one could take their total number of lost days, multiply by \$1532, and get a third estimate of their total injury cost. Finally an average of these three methods is taken to provide a single, annual average cost estimate.