

**Commission on Behavioral Applications, Behavioral Safety
Cambridge Center for Behavioral Studies**

Site Visit Report

**Acetate Fibers Division
Eastman Chemical Company
Kingsport, Tennessee**

June 6, 2006

To: CCBS Commission on Behavioral Applications, Behavioral Safety

From: Dwight Harshbarger and Timothy Ludwig

Re: Re-accreditation of the Acetate Fibers Division, Eastman Chemical Company

On May 9, 2006 the CCBS Commission on Behavioral Applications representatives visited Acetate Fibers Division operations in Kingsport, TN as part of a review of AFD's application for re-accreditation of the division's behavioral safety programs. Based on data reflecting the continued exemplary safety performance of the division, and supported by observations during our site visit, we recommend to the Cambridge Center's Commission on Behavioral Applications that the Acetate Fibers Division be re-accredited for a period of three years, from May, 2006 through May, 2009.

Observations and Recommendations

1. AFD continues to demonstrate safety performance leadership from senior management through first line employees. This multi-level leadership supports and strengthens performance on both downstream measures of safety, such as OSHA recordable injury rates of less than 0.8, and upstream behavioral safety measures that reduce the likelihood of injuries. The data indicate a continuation and improvement of the exemplary behavioral safety program and safety outcome performance observed in the 2003 site visit.
2. The safety performance data reported in the AFD re-accreditation application are independent, objective and secure.
3. Program managers analyze safety data and "drill down" with root cause analyses to search for patterns of underlying performance problems.
 - Recommendation: Continue this practice.

4. The new employee mentoring process, just beginning, is a positive step to deal with a challenge that will face the division in coming years as employees in the present workforce retire. The mentoring program will need continuing review and support to insure that it does the job it is designed to do.

- Recommendation: Measurement indicators of mentoring program effectiveness should be developed, and periodically monitored to signal the need for changes in the mentoring program.
- Recommendation: Training practices of mentors should be periodically observed to insure quality of behavioral safety training, and avoid “trainer traps” in which trainers / mentors transmit efficient but risky work patterns.
- Recommendation: Create a succession plan for key safety managers and implement an intensive training program for individuals who will be filling these roles in the future.

5. AFD has designed and implemented a safety incident tracking software available on networked computers throughout the plant near all employee workstations. This innovative system allows each work team to list at-risk behaviors and situations and initiate action items for their remediation. These action items can be tracked by higher levels of management to monitor their satisfactory completion. Other information systems designed to support safety programs continue to perform well.

- Recommendation: AFD should continue to monitor data for indicators suggesting actions for behavioral improvement.
- Recommendation: Continuing attention should be given to the analysis of near miss data by coding and examining the data by job, work location, type of work, etc.
- Recommendation: Particular attention should be given to measures of safety behavior, injuries, near misses and other data among higher risk groups such as maintenance employees.
- Recommendation: Maintenance employee performance data should be a data analysis category that is visible and one that receives continuing attention because of the risks faced in that type of work.

6. AFD has begun initiatives to support the use of behavioral safety methods / programs among contractors and contract employees.

- Recommendation: Safety initiatives involving AFD’s contracted workforce be assessed for effectiveness, and additional, stronger, initiatives be considered. This should be done from the premise that AFD bears responsibility for *everyone* who passes through its doors and visits or works on its site.
- Recommendation: Future contracts should be structured to require contractors to implement behavioral safety programs among contract employees; a condition of the contract.

7. The Employee Safety Culture Survey has helped expand information about workplace attitudes and opinions related to safety.

- Recommendation: Confidence in the survey’s results should be strengthened through a statistical analysis, including an item analysis. Area colleges are likely to have advanced students and / or faculty who could help do this.
- Recommendation: Some items in the survey should be selected (or new items added) to highlight actions in strengthening safety for fellow employees, comfort in reporting near misses and at-risk behaviors.

8. We commend AFD for its continued leadership in the development of a strong safety culture; in the development of coaching and safety skills, and meaningful ways of recognizing safe behaviors among employees at all levels of the company.

- Recommendation: AFD should continue its leadership in strengthening behavioral safety programs and practices throughout the Eastman Chemical organization.

Section 1: Introduction

The Acetate Fibers Division (AFD) is a manufacturing division of Eastman Chemical Company, Kingsport, TN.*

The division employs 750 people with 650 employees directly involved in the manufacturing and maintenance operations. The division's principal products are fiber grade cellulose acetate, acetate tow, and acetate yarn. AFD began implementing behavioral based safety processes in 1992 when OSHA-R rates were > 8.0. Over the subsequent years, numerous improvements to the original BBS Process have lowered OSHA-R rates, in the last 5 years bringing rates consistently below 0.8. In 2003, AFD applied for CCBS accreditation of its behavioral safety program, and in October a CCBS site visit team recommended accreditation. The division was formally awarded the Cambridge Center's first ever accreditation in May, 2004.

* At the time of the initial application for accreditation, AFD was part of the Voridian Division of Eastman Chemical Company.

Section 2: Changes in Background Factors Since Initial Accreditation

AFD's vision remains that of an injury-free workplace. Significant changes in business conditions in the last 2 years have presented challenges to that vision. The 2 major changes have been 1) increased production volume and 2) integration of new employees into the manufacturing and maintenance operations.

Chart 1 shows the increased production volume from year 2000 through 2006 (forecast) based on indexing the production to year 2000 as 1.0. Also on this chart is the OSHA-R rate for the same time period. Based on the 2000 production rate, production grew by 13% in 2004, 27% in 2005 and is forecast to increase by 30% in 2006. The OSHA-R rate has remained stable at <0.8 following breakthrough improvement in 2001.

Chart 2 shows the increase in the number of new employees entering the workplace from 2000 through the 2006 forecast, along with the OSHA-R rate for this time period. Once again, the OSHA-R rate has remained stable even as significant numbers of new, inexperienced operators and mechanics have entered the workplace. In 2005, employees on the job < 1 year accounted for 35% of all injuries in AFD.

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Chart 1
Acetate Fibers Division Production vs. OSHA-R Rate
 2000 Production Volume = 1.0

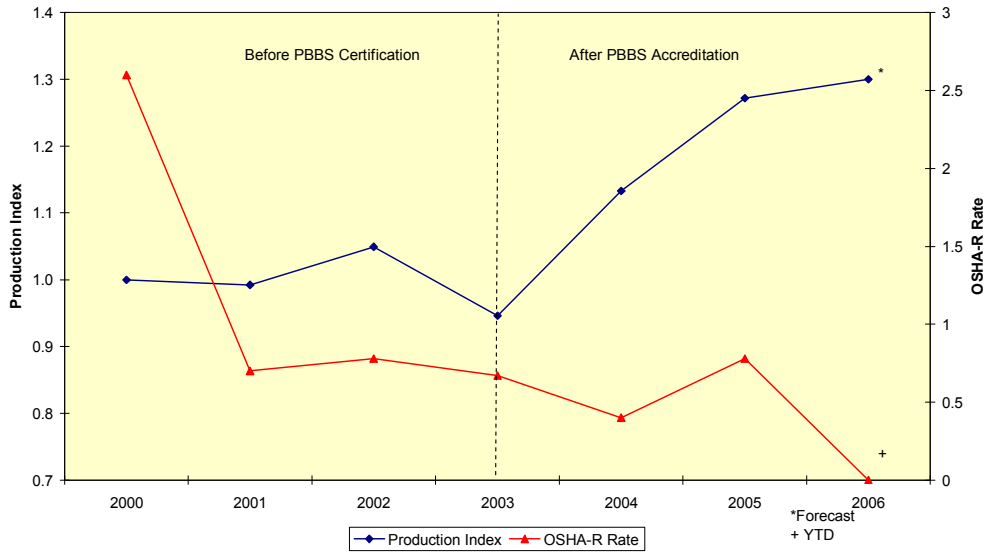
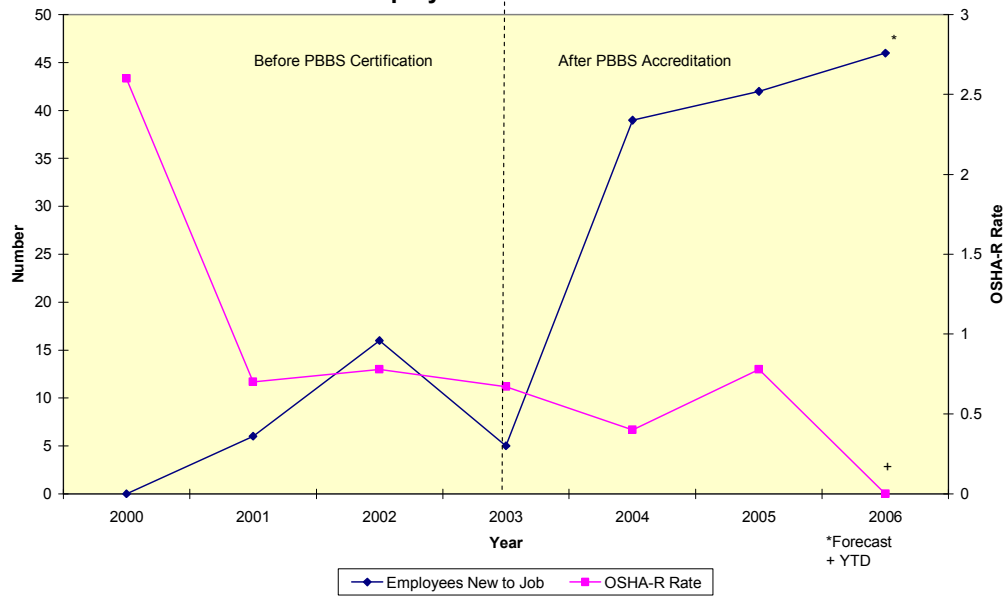


Chart 2
Acetate Fibers Division Employees New to the Job



Section 3: PBBS Enhancements Since Accreditation

• Observer Coaching Process

In the fall of 2004, the PBBS Steering Team identified a need to improve the quality of the behavioral observations. A formal process was developed for first-line managers to train members of their crew teams on making observations, giving feedback, and recording the observation in the database. Thirty-four, first-level managers provided observer training to 586 operators/mechanics. A coaching check sheet was developed to aid first level managers in delivering the training. (Table 1) The process began in the 2nd quarter of 2005, with the goal of completing the training delivery within 12 months. Progress in completing the training process was measured on a monthly basis and is shown in Chart 3. Through March, 2006, 100% of the operators/mechanics have completed this training.

Table 1

ESP Observer Coaching Sheet

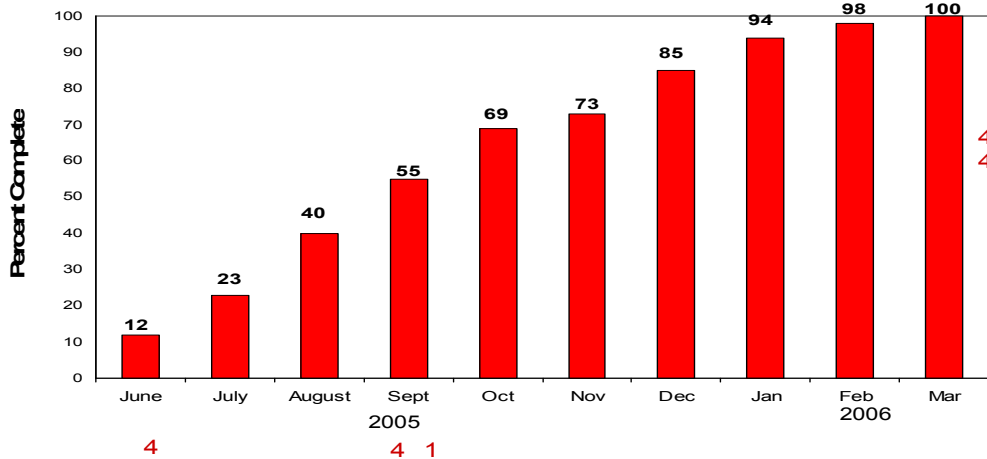
Coach _____ Date _____	Observer _____ Department _____
1. Observation 1.1 Knowledge of Known ARB's for Task Observed 1.2 Quality of the Observation 1.3 New ARB Identified COMMENTS R+ _____ IO _____	
2. Feedback 2.1 Courteous/Pleasant Tone 2.2 Start with an R+ 2.3 Engage Person Being Observed in Discussing Behaviors COMMENTS R+ _____ IO _____	
3. Data Entry 3.1 Knows How to Access ESP Database 3.2 Ability to Navigate Through Database 3.3 Ability to Accurately Enter Observation COMMENTS R+ _____ IO _____	
Follow Up Action Plan _____ _____ _____	Follow Up Date _____ _____ _____

Table 1A

Definitions

- 1.1 Knowledge of known ARB's for task being observed:**
Comprehension of Job/Task specific At-Risk Behaviors identified from Job Hazard Analysis that appears in ESP Database.
- 1.2 Quality of observation**
Observing comprehensive listing of Job/Task specific ARB's in ESP Database identifying behavior to be Safe or At-Risk.
- 1.3 New ARB Identified**
Identified ARB that does not exist in ESP Database
- 2.1 Courteous/Pleasant Tone**
Giving considerate agreeable feedback to person being observed
- 2.2 Start with an R+**
Give positive reinforcement in opening statement to person being observed.
- 2.3 Engage person being observed in discussing behaviors**
Involve person being observed in discussing behaviors
- 3.1 Know how to access ESP Database**
Personal ability to access ESP Database from local desktop
- 3.2 Ability to navigate through Database**
Personal skill to effectively make their way through the ESP Database
- 3.3 Ability to accurately enter observation**
Personal skill to correctly enter observation in ESP Database.

Chart 3
Acetate Fibers Division
Observer Coaching Percent Complete
(578 out of 586)



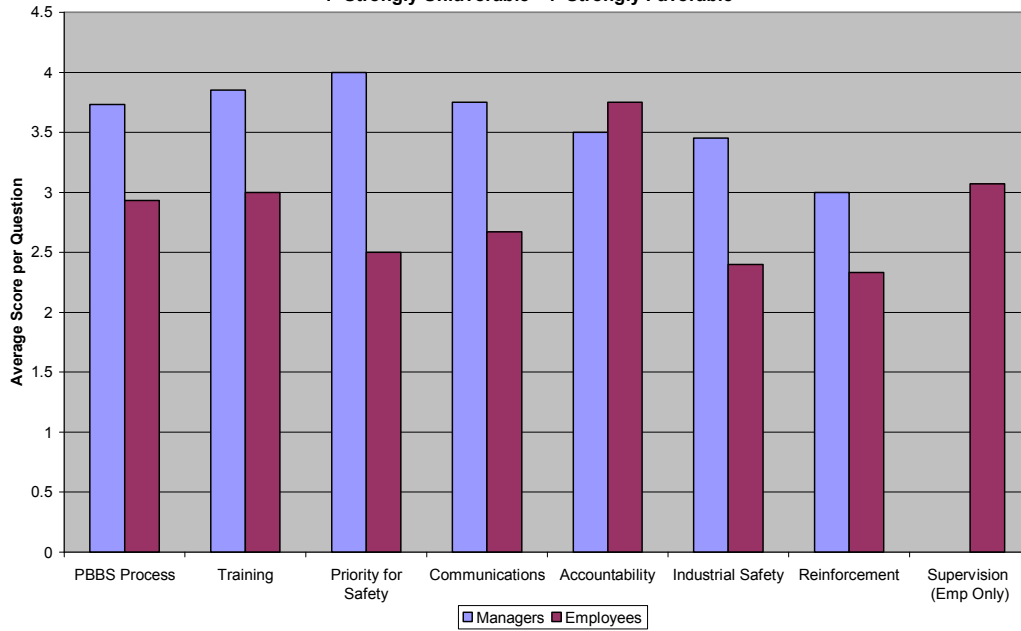
- Employee Safety Culture Survey

In 2004, AFD partnered with the Kingsport site Plant Protection group to pilot a safety culture assessment tool. A list of statements covering a wide range of safety issues was developed for both managers and operators/mechanics. Respondents marked each statement on a 4-point scale. This provided a basis for assessing managers' beliefs and values on safety as compared to operator/mechanics' beliefs and values as shown in Chart 4. Where there were important differences between the groups, action items were identified and implemented. In addition, the assessment tool is being used to evaluate the safety culture on individual crews as compared to the division culture to identify improvement opportunities.

Sixty-five (65) managers and 483 operators/mechanics completed the assessment questionnaire during their monthly safety meeting during November of 2004. This represented about 75% participation rate for both groups.

During the site visit the CCBS team suggested statistical tools and methods that might be used to improve the safety culture assessment tool; see recommendations.

Chart 4
Acetate Fibers Division Safety Culture Assessment
 1=Strongly Unfavorable 4=Strongly Favorable



- Annual PBBS Process Audit

AFD Health, Safety Leadership Team developed and implemented a comprehensive PBBS Process Audit in 2005. The PBBS Process Audit evaluated sixteen functional areas for each crew team throughout AFD to determine their effectiveness and needs for improvement. Based on this audit, each department’s Health, Safety and Environmental Coordinator in conjunction with the department’s Leadership Team developed and implemented improvement plans for each crew team. For example, one department discovered they had not been performing formal Task Safety Audits and implemented them. The matrix used to conduct the audit is shown below:

Acetate Fibers Division Safety Processes Audit

PROCESS	APD		AYD		ATD		ASD		AMD		AFD	
	Y/N	EFF	Y/N	EFF	Y/N	EFF	Y/N	EFF	Y/N	EFF	Y/N	EFF
Observations - ID New ARBs	Y	S	Y	E	Y	E	Y	E	Y	E	Y	E
Problem Solving New ARBs	Y	E	Y	S	Y	S	Y	E	Y	E	Y	S
Reporting Near Misses	Y	E	Y	S	Y	E	Y	E	Y	E	Y	E
Pre-planning Agenda Crew Team Meetings	Y	E	Y	S	Y	E	Y/N	NI	Y	E	Y	S
Crew Team Meetings (Models, Games, Discussion of ARBs)	Y	E	Y	S	Y	S	Y	S	Y	S	Y	S
Safety Minute at Start of Shift	N	NI	Y	E	Y	S	N		Y	S	Y/N	S
Formal Task Safety Audits	Y/N	S	Y	E	Y	S	Y	E	N		Y/N	S
Department Leadership Team Meetings/ Upward Reporting	Y	S	Y	E	Y	S	Y	S	N		Y	S
Using Accountability Worksheets	Y	S	Y	S	Y	NI	Y	E	Y	NI	Y	NI
Coaching Employees w/ Multiple Incidents	Y	E	Y	E	Y	S	Y/N	NI	Y	E	Y	S
Use of Safety Improvement Plans	Y	E	Y	E	Y	S	Y	E	Y	E	Y	E
New Employee Training and Follow Up	Y	E	Y	E	Y	E	Y	S	Y	E	Y	E
Communication of Incidents to all Depts.	Y	S	Y	E	Y	E	Y	E	Y	E	Y	E
Lead by Example / Safety Balanced with Production	Y	E	Y	E	Y	E	Y	E	Y	E	Y	E
Daily Coaching on the Floor	Y	E	Y	E	Y	E	Y	E	Y	E	Y	E
Team Manager Network Being Utilized	Y	S	N		Y	S	N		Y	E	Y/N	S
Quarterly AFDLT Safety Meetings											Y	E
One Hour / Month Safety Topic for AFDLT											Y	E
AFD/PP/Medical Partnership Meeting											Y	E

E = Effective

S = Somewhat Effective

NI = Needs Improvement

Indicates Division Level F

Possible Action Items

1. Periodic Refresher Training for TM and employees
2. Improve Quality Reporting System
3. Quarterly or Semi-annual Audit of ESP
4. In-house Yearly ESP Conference sharing best practices and identifying weak areas
5. Response from all Departments on an Incident

- 2005 Injury Data Analysis

AFD performed an analysis of the OSHA-R and minor injuries for 2005 to determine if there were common factors among the injuries. The factors investigated were 1) operator experience on the task being performed, 2) operator response to an upset condition, 3) impact of working overtime, 4) day of the week the injury occurred, and 5) frequency the task is performed per month.

The analysis revealed that the major factors impacting these injuries were employees responding to upset conditions and the employee being in the assignment for <1 year. As a result, AFD has developed plans for a safety mentoring process for new employees and ways to evaluate the way employees respond to upset conditions. Improving methods for the integration of new employees safely into the workplace will be especially important as increased numbers of new employees replace “baby boomer” employees who will retire in the next 5 years.

- Observation Interaction Models

The behavioral safety program in AFD is based on the principles of behavior based safety (PBBS). The application of these principles gives operator crew teams choices about how to deal with new at-risk behaviors, and how to engage employees in the observation interaction process. When the PBBS process in AFD was accredited there were eighteen training / problem solving "models" in the observation interaction process. Since that time, seven models have been added. These models were developed by crew teams and then shared with all the other crews within AFD. The additional models were discussed during the site visit.

- AFD New Employee Safety Cultural Assessment Survey

As noted above, the data demonstrate that employees on a new assignment for less than 1 year were more likely to suffer an injury than experienced employees. 35% of AFD's 2005 injuries occurred among new employees even though new employees only represented 7.2% of the workforce.

AFD Health, Safety Leadership Team developed and implemented a 29 item survey to assess a new employee's beliefs and perceptions concerning safety. The survey is administered during the first week of the new employees' orientation. Results of each new employee survey are then communicated to the supervisor as a tool for coaching and development discussions during their first year of employment.

- New Employee Mentoring Process

In 2005, AFD added 45 new operators/mechanics to the workforce. A detailed data analysis of the injuries during this time period revealed that these new employees accounted for 35% of the total injuries even though they only represented 7.2% of the workforce. In response to this finding, AFD developed a Safety Mentoring Process for all new employees. A mentor will be assigned to each new employee following the initial training period to mentor that employee re recognition of at-risk behaviors, hazards of the job, and steps to reduce hazard exposure. The mentor will also provide reinforcement for safe behaviors performed by the new employee. The safety mentor will be a co-worker in the same work area as the new employee. The plan is for each mentor to work with an assigned new employee for 1 year. A phased implementation of this process began in the 2nd quarter of 2006.

Section 4: AFD has taken the following actions to address recommendations from the October, 2004 site visit report

A. WORK TOWARD THE OBJECTIVE OF ACHIEVING A ZERO RATE OF OSHA RECORDABLE INJURIES.

- The vision of AFD remains to have an injury-free workplace. The enhancements outlined in the preceding sections of this application support AFD's commitment to achieve this vision.

B. DISSEMINATE THE AFD PBBS PROGRAMS TO OTHER PARTS OF THE COMPANY IN WHICH SAFETY CAN BE IMPROVED.

AFD has been very active in responding to this recommendation. Some examples include:

Within Eastman Chemical Company

- After several meetings by AFD with the management of the Polyethylene Division at the Texas Eastman site, they implemented a BBS Process using the AFD's PBBS Process. TEX PE Division achieved a best ever OSHA-R rate of < 1.0 in 2005.
- Numerous meetings have been held with the management of the Columbia, SC site to review AFD's PBBS Process including presentations by Division Superintendent Lee McConnell to the site senior management and B.H. Collins working with their BBS Steering Team. As a result, the Columbia site will begin using the principles of AFD's PBBS Process to improve their current BBS Process during 2006.

- Mike Ballard has made numerous presentations on various components of AFD's PBBS Process to the Eastman Corporate BBS Networking Team which includes representatives from all world-wide sites. Mike also serves as a member of the team.
- At the 2006 Eastman BBS Conference, Lee McConnell, Mike Ballard, and B.H. Collins each made presentations on the elements of AFD's PBBS Process to the 200 attendees from all Eastman Chemical Company domestic and selected global sites. AFD's PBBS Steering Team provided logistic support for the conference.
- Mike Ballard and B.H. Collins have worked closely with 2 other divisions at the Kingsport site making presentations to management groups and working one on one to share AFD's PBBS Process.

External to Eastman Chemical Company

- Lee McConnell, Mike Ballard, B.H. Collins, and Chuck Pennington presented the AFD PBBS Process at the 2004 BSN Conference.
- Mike Ballard, B.H. Collins, and Chuck Pennington presented enhancements to the AFD PBBS Process at the 2005 BSN Conference.
- Lee McConnell will present a keynote address at the 2006 BSN Conference.
- Mike Ballard and B.H. Collins have presented elements of the AFD PBBS Process at the annual Kingsport Area Safety Council Safety Seminar each year since 2004.
- B.H. Collins is working closely with AFD's site contractor for operations support to implement a PBBS Process in their company.

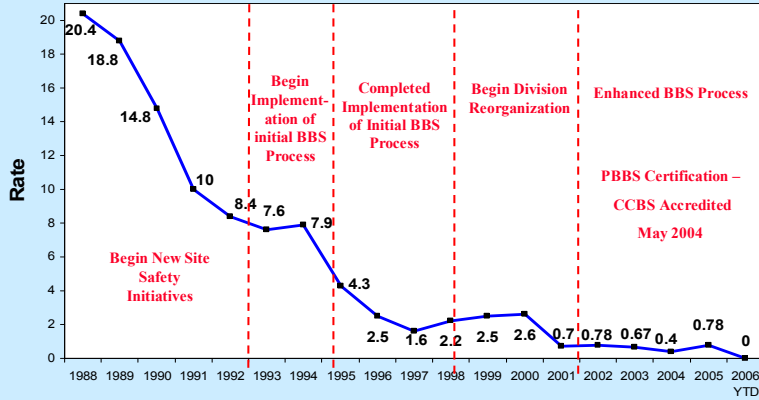
Section 5: Safety Performance Data

As a result of the enhancements outlined in Section 3 above, plus the continued application of AFD's PBBS Process, high quality safety performance has continued since the initial accreditation.

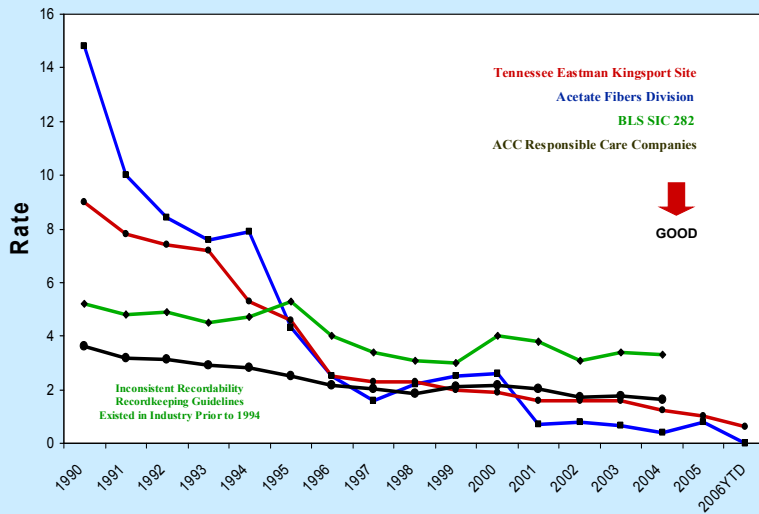
The safety performance charts shown below have been updated since the accreditation was awarded.

- Historical OSHA-R Rate
- OSHA-R Rate with Benchmark Data
- Day Away from Work Cases
- Minor Injury Rate
- Total Injury Rate
- New At-Risk Behaviors Identified
- Reported Near Misses

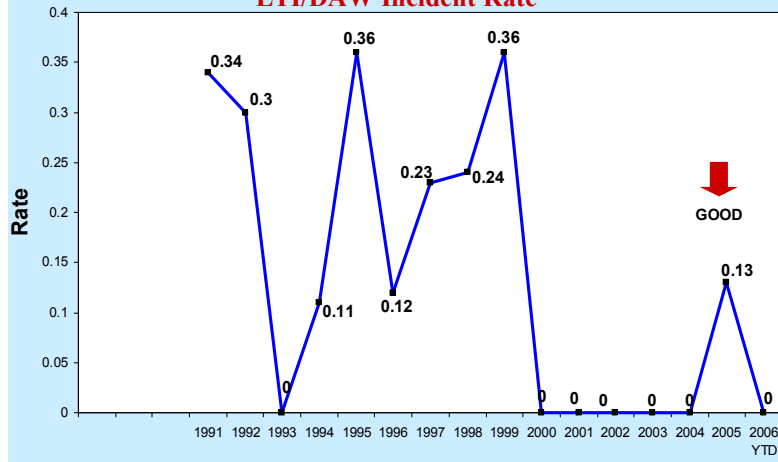
Acetate Fibers Division OSHA Recordable Rate



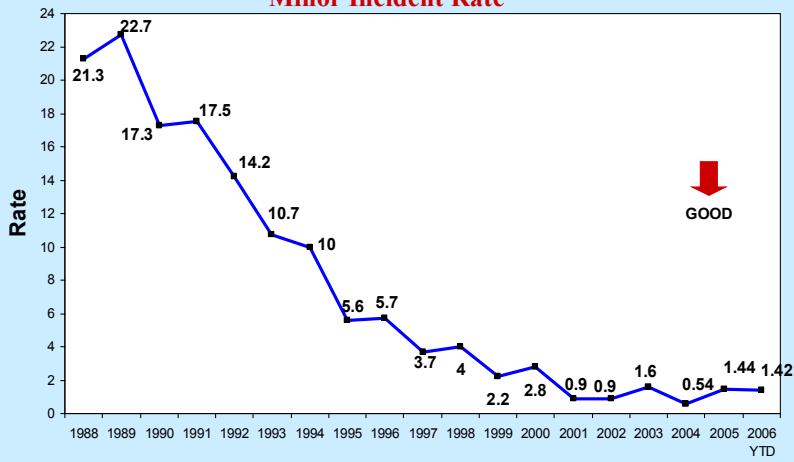
OSHA Recordable Rate Comparison



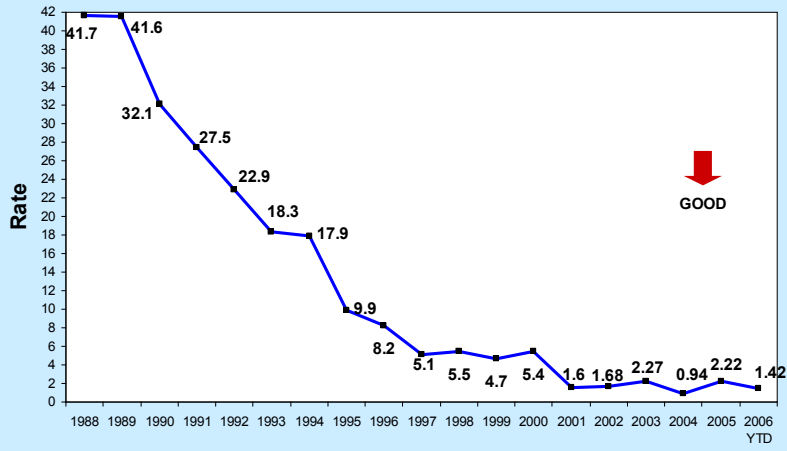
**Acetate Fibers Division
LTI/DAW Incident Rate**



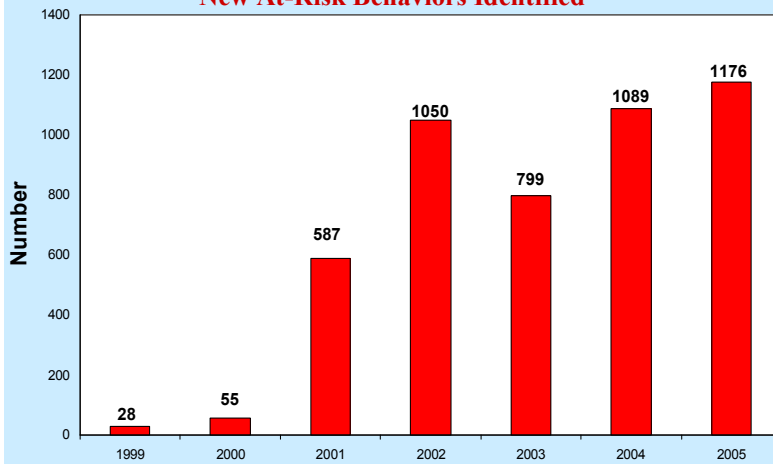
**Acetate Fibers Division
Minor Incident Rate**

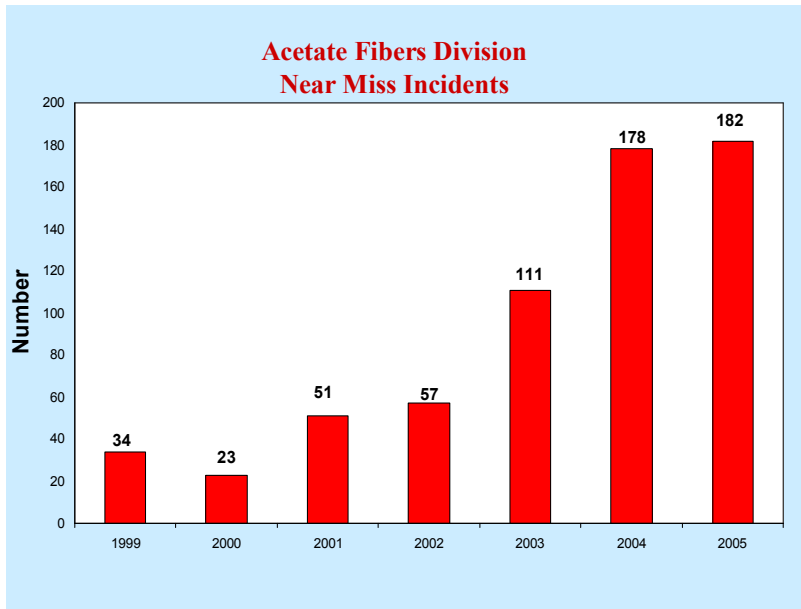


**Acetate Fibers Division
Total Incident Rate**



**Acetate Fibers Division
New At-Risk Behaviors Identified**





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