

CAPA/COMPASS

ASPHALT PROJECT

MID-TERM INDUSTRY

REPORT

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By

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Dedication

After many years serving as a local inspector in the air program, Julie Wrend approached me about working for CDPHE's Small Business Assistance Program. I was very touched to see her enthusiasm for the compliance assistance approach to improving the environment. Julie was instrumental in setting up the COMPASS project, establishing trust with the asphalt industry and the credibility of compliance assistance with the Department and the EPA. Her innovative approach to improving the environment has benefited the Department, the people who work for her, the asphalt industry and the State of Colorado. Without her guidance, this project would not be possible.

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I. Introduction

A. Exploring New Ways to Improve the Environment

In 2000, the U.S. Environmental Protection Agency (EPA) undertook an effort to encourage state regulatory agencies to integrate outcome-based performance measures into enforcement and compliance assurance programs to better measure the success of environmental programs and related achievements. Under the Colorado Environmental Performance Partnership Agreement 2001-2002, the Colorado Department of Public Health and Environment (CDPHE) and the EPA entered into a Compliance Assurance Pilot Project, called "Compass." Under the Compass project, the air, water, and waste divisions of the CDPHE implemented several projects to develop and quantify environmental results of all of its enforcement, compliance assurance, pollution prevention, and incentives-based activities. One of the Air Pollution Control Division's (APCD's) Compass projects involves integrating pollution prevention assistance and environmental leadership principles into ongoing compliance assistance efforts as part of a partnership between the APCD and the Colorado Asphalt Pavement Association (CAPA).

The CAPA Compass project takes a different approach for ensuring compliance and improving the environmental performance of the asphalt paving industry. Historically, the APCD relies on the traditional "beans" of inspection and enforcement. This bean counting approach utilizes routine enforcement inspections to assess compliance with CDPHE regulations. It uses enforcement actions such as Compliance Orders, Notice of Violations and Consent Orders to correct non-compliance conditions observed. These efforts typically result in levying fines prior to achieving compliance. In contrast, the Compass project provides compliance assistance to participating industry members in a non-confrontational and consultative way. A primary difference between the two approaches is that enforcement inspectors rely on the threat of legal action to achieve compliance while compliance assistance utilizes the desire of the business to improve their compliance rate. Each approach has its place. The goal of the Compass project is to measure and compare the effectiveness of each approach.

The asphalt paving sector was chosen for five reasons: (a) because of the exponential growth Colorado is experiencing, and along with the Administration's highway construction goals, this is a high profile sector with commensurate growth; (b) the traditional enforcement measures have not appeared to improve the compliance rate in this sector; (c) the growth and attendant highway construction are located throughout the state and have the potential for significant adverse environmental, human health, and welfare impacts; (d) the APCD's work plan for fiscal year 2001 and 2002 currently contains resources allocated for a partnership with this sector; and (e) the industry has shown that it is eager to participate in cooperative compliance assistance activities.

The APCD has been working with this sector in developing compliance assistance tools, a general permit, joint training, and leadership principles. The APCD intends to work in partnership with the CAPA and the Colorado Department of Transportation to develop best management practices (pollution prevention options) that will result in quantifiable outcome-based performance measures. This sector provides an opportunity to develop a full complement of tools for successful environmental problem solving. By understanding the characteristics of

the asphalt pavement sector, the APCD may be able to design better strategies for solving environmental problems and preventing future ones in other sectors. The APCD believes that this voluntary partnership has the potential to provide greater environmental benefit for less cost to the agency.

In the first phase of the project, the APCD conducted a baseline assessment during the 2001 production season using multimedia compliance checklists at forty-four asphalt facilities. During this phase, the facilities will not be inspected by APCD. As a result of the baseline assessments, the operators are provided a detailed, comprehensive report for each facility that addresses all items not in compliance with state and federal rules, as well as identifying pollution prevention opportunities. During the winter months of 2001 through 2002 the facility operators have the opportunity to address the issues raised and improve their compliance rate. Operators may find it necessary to purchase new plants or new control equipment or to modify their operating practices and procedures to improve compliance. With the compliance assistance approach the method used to achieve compliance is left up to the operator. The industry's goal is to get every plant into compliance. Over the term of the Compass project, the APCD works with these facilities to improve compliance in all media, as well as to integrate pollution prevention and leadership principles into the company's operations. Training opportunities, as well as one-on-one conferences, are available to address compliance issues and pollution prevention opportunities raised in the facility reports.

The APCD will conduct a second assessment during the 2002 production season. The follow-up assessment will evaluate the affect of the previous compliance assistance efforts. The baseline and follow-up assessments for each facility will be compared for compliance rate and environmental impact. APCD will evaluate the compliance and environmental outcomes of the project and provide EPA and the industry a report outlining the effectiveness of compliance assistance activities. In addition, each company will be provided with a facility-specific report.

In the second phase of the CAPA Compass project, the objective will be to develop an asphalt sector-based Environmental Management System (EMS) and supplemental modifications to create facility-specific EMSs. CDPHE has applied to the EPA to obtain grant money to fund the development of a template EMS. At the end of the project term, follow-up compliance and environmental assessments will again be conducted to measure the success and environmental results of this phase of the project.

Out of this project, the APCD anticipates obtaining information on creative, non-regulatory techniques for leveraging the effects of limited compliance and enforcement resources, developing a better understanding as to what factors motivate compliance, better-than-compliance, and encourage behavior modifications for continual improvements. As importantly, the APCD will measure the environmental results from the more intensive up-front partnership between the APCD and the highway contractors, anticipating that such an up-front allocation of resources results in fewer resources expended by the sources and the APCD in the long run.

B. Baseline Assessment

The purpose of this report is to provide additional feedback to the industry. The report addresses the results of the baseline assessments for all of the participating facilities combined. The industry sector compliance standing for each media is broken out. The compliance issues observed are discussed and recommendations for compliance improvement are provided when available. During the baseline visits, compliance issues observed were largely relayed to company representatives. These observations concerned operating practices such as opacity. After the baseline assessments occurred, the facility's emission permit and file was reviewed. The operators were then sent a comprehensive report in mid February 2002 addressing all compliance issues for each plant.

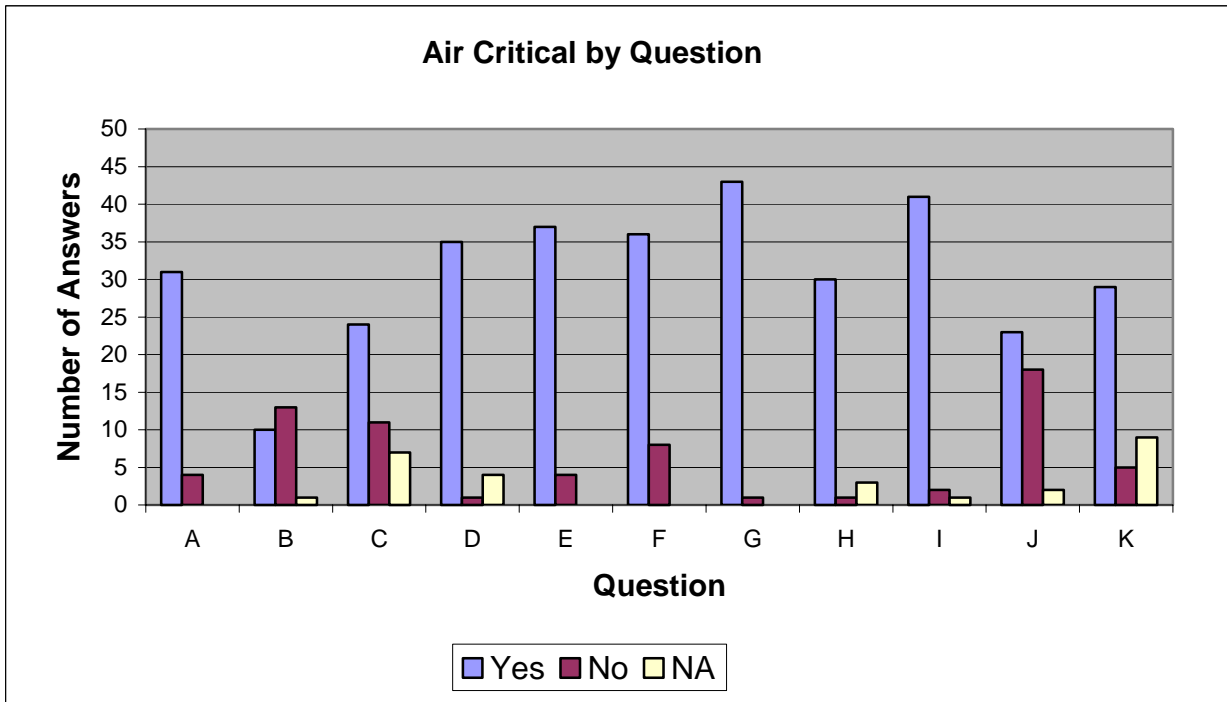
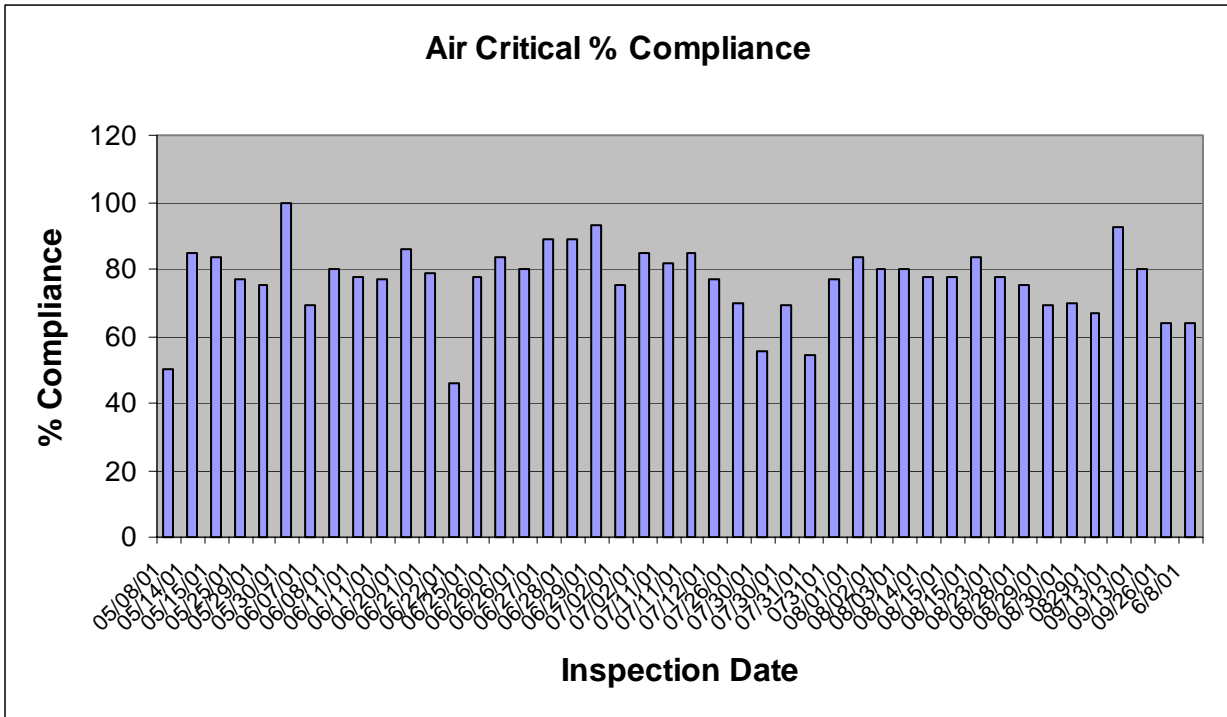
The report includes compliance issues of concern to the Colorado Department of Public Health and Environment Divisions of Air Pollution, Hazardous Waste, Stormwater as well as Pollution Prevention for the industry.

Within each media, compliance issues are broken out into "critical" and "non-critical" items. For each critical item, compliance rates are established and recommendations for improving the compliance rate is provided when available.

II. Multi-media Assessment Results

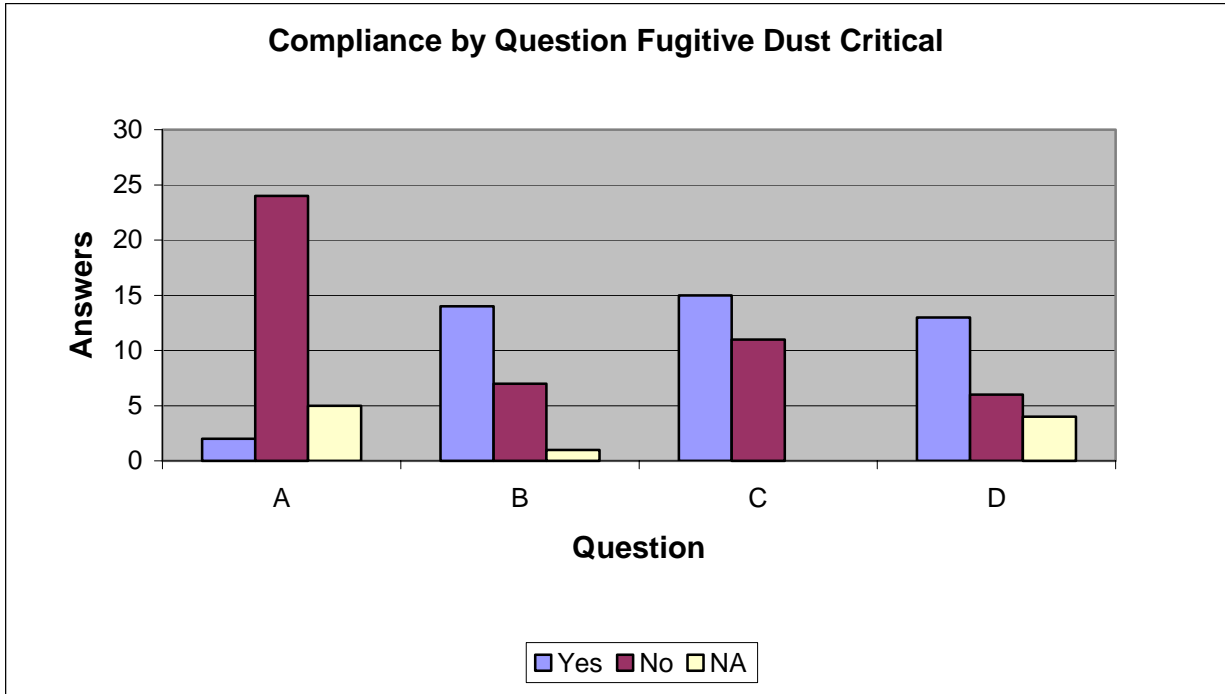
A. Air Emissions Critical Items

The following graph displays the compliance rate for air emissions critical items for each facility. Overall, the group was shown to have significant critical compliance issues. During the baseline assessments, all but one facility had critical items present. If a routine inspection had occurred, rather than a compliance visit, an enforcement action would likely have resulted. One potentially significant difference between an inspection and a compliance visit is that typical enforcement visits are not pre-arranged and conducted without a prior appointment. If an operator knows a compliance assistance visit is scheduled, they may operate the plant differently. On several occasions, plants were started up for the purpose of the baseline assessment. These factors may also influence the compliance rate.



- A Are the burner fuel type(s) used included on the permit/APEN?
- B If lime transfer is not reported previously on an APEN, is the amount of lime transferred less than APEN/Permit levels?
- C Is opacity from pugmill below 20 percent?
- D Is the aggregate amount processed below the permit limits?
- E Is the annual production less than or equal to the annual production limit?
- F Is the baghouse or scrubber stack opacity below permitted limits?
- G Is the control equipment the same as listed on the permit?

- H Is the fuel use less than or equal to the permit limit?
- I Is the hourly operating rate less than or equal to the permitted hourly rate?
- J Is the opacity from the hot asphalt storage bin below 20 percent?
- K Is the opacity reading from the lime silo below 20 percent?



- A If the site does not have a F.D. permit, is F.D. emissions below permit levels?
- B Roads: Is source in compliance with control plan?
- C Roads: Is the control plan adequate?
- D Storage Piles: Is the fugitive control plan submitted being followed?

Each air compliance item compliance frequency is illustrated in the above graphs and discussed by item below.

Items in this section fall into two categories, air emissions and fugitive dust emissions. Both categories are compliance items addressed by the Air Pollution Control Division. Separate checklists for each category were used. Both sets of graphs should be reviewed to determine compliance for air emissions issues.

The Air Emission checklist and the associated Fugitive Dust checklist included a total of fifteen items that were considered to be “critical items”. These items would probably result in some sort of enforcement action if they were observed during an enforcement inspection or investigation of a complaint.

Asphalt plants in the project varied a great deal. Not all items addressed were applicable to each plant. Therefore, the number and type of critical items varied by plant. Each item was evaluated

based on the number of times the item was found to be not in compliance divided by the number of facilities that the issue could be applied to. The results are presented by percent in compliance.

The **most prominent** critical item associated with air emissions is **the submittal of Fugitive Dust Control Plans (FDCPs)**. Of the 44 plants in the project, 24 plants have significant dust emissions but do not have FDCPs incorporated into the plant's air emissions permit. Emission calculations for fugitive dust were conducted based on vehicle traffic across the unpaved roadways in the site. Vehicle traffic included front end loaders associated with the plant's operation, transportation of the hot mix product leaving the site across the unpaved roadway (if applicable) and vehicle traffic associated with providing raw materials to the plant (if applicable). In each case, the emissions resulting from these activities exceeded the threshold for filing an APEN as well as acquiring a permit. If the emission permit for the plant did not include fugitive dust control measures, it is suggested that an Air Pollutant Emission Notice (APEN) addressing fugitive dust for the plant be filed and that the plant's emission permit be modified to include fugitive dust control measures and guidelines.

Three other critical items associated with dust control include: Is the facility in compliance with the control plan? Is the control plan adequate and is the control plan being followed? Compliance with these items were based on the presence of **visible emissions** from the site (or unpaved roadway) and, or the observation of **dust leaving site**. The operator should amend the emission permit to include fugitive dust emissions and comply with the control measures required by the amended permit.

Of the eleven critical items found on the Air Emissions Checklist, one item was found to be the issue with the lowest rate of compliance. Of the 44 plants in the study, 23 plants have lime silos. Within that group, 13 facilities were **above the reporting threshold for reporting lime** on an APEN but had not done so. The compliance rate for this issue was 43%. The operators of each of these facilities should file an APEN to update their file and facility emissions permit. Alternatively, lime silos may be permitted independent from the asphalt plant.

The next two items with the lowest compliance rate concern **opacity issues with the hot mix storage silos and the pugmills located at the plants**. Both of these items had a compliance rate of 56%. Some discussion is necessary for each of these items. Hot mix storage silos were not universally present at all asphalt plants and the presence of visible emissions (opacity) may be partially a result of the presence of higher humidity. As a general rule of thumb, plant operators should be concerned about hot mix silo opacity as it is a potential enforcement issue for their plant unless they have an effective control device in place to address it. It is far more prudent to install a control device or system to address hot mix silo visible emissions even though the opacity standard was not exceeded during the base line assessment if the plant has the potential to exceed the opacity standard. In the future, plants that are found to exceed the opacity standard for the hot mix storage silo will see an enforcement action resulting from an enforcement visit.

For two plants, use of an unusual asphalt oil additive had a great impact on visible emissions from the hot mix silo and the conveyor leading to the silo. **Extremely high visible emissions were observed from the plants using Trinidad Lake Asphalt (TLA)**. This asphalt oil additive was being used with conventional asphalt oil. The plant mix temperatures were in the

neighborhood of 350 degrees F. At that temperature, it appeared that the light end hydrocarbons from the conventional asphalt oil were being driven off. Extremely high visible emissions were observed at both plants, from both the hot mix silo and the conveyor. However, the visible emissions from the control device were negligible. It was very clear that if enforcement had observed these plants running under these conditions, an enforcement action would be initiated and immediate corrective action would be required. The use of a control device, capturing the emissions from the hot mix silo and either filtering it or running it back to the drum would have probably kept the source in compliance while using this material.

Pugmills present a similar issue. Visible emissions from this equipment were observed to exceed the 20% opacity standard at eleven of the 35 plants that had pugmills. Plant operators should take preventative action such as hooding and/or water spray to ensure compliance with the 20 % opacity standard.

The remaining eight critical items had a relatively low frequency of non-compliance. The frequency of compliance ranged from 85% and up. Those issues were:

- Opacity from the control device (baghouse or scrubber)
- Lime silo opacity
- Fuel type not being specified on the permit
- Exceeding the annual production limit established in the permit
- Exceeding the hourly production limit established in the permit
- Exceeding the aggregate consumption limit established in the permit
- Having a different control device than what is listed on the permit

While the frequency of occurrence was not great for these items, they are items that would likely result in action being taken by the enforcement section. For that reason, a discussion of each item is warranted.

Opacity from the control device that exceeds the regulatory limit may indicate that the operating conditions of the plant have deteriorated since the stack test performed as part of permitting the facility. Stack tests (or performance tests) are required of all plants subject to the NSPS. The NSPS requires all plants built or modified since June 11, 1973 to conduct a performance test to demonstrate compliance with the NSPS. Opacity in excess of the 20 % standard is one of the most common reasons for enforcement actions being initiated against air pollution sources. Excess opacity is viewed as an indicator of non-compliance with the NSPS. Opacity is also a frequent cause for complaints from citizens. Maintenance of the control device is thought to be the most common cause of opacity issues. Checking the condition of the bags in the baghouse as well as the operating parameters of the baghouse cleaning system are the first steps in resolving opacity issues from baghouses. Opacity observed rising as a detached plume, particularly when a blue color is associated with the emissions, may not be a factor of the bag or baghouse condition. Rather, this type of visible emissions observation may indicate a problem with plant operation or mix design. Typical mix parameters that may affect opacity from the baghouse include: mix temperature, asphalt type, or the presence of asphalt oil additives such as polymer or rubber.

Opacity from the lime silo is subject to the same opacity limits required of all sources. The practice of loading the silo without a baghouse or filling it at a loading pressure greater than the capacity of the baghouse or pressure relieve valve will result in excessive visible emissions and the characteristic staining on the outside of the silo. Some of the silos were noticeably stained and the assessment was marked as deficient based on the staining, rather than observing the loading of the silo. During the baseline assessment, the process of loading the silo was discussed with many of the plant operators. The operators were asked about how the silo was loaded as well as how overflow was prevented. Many overflow prevention methods were discovered. Some operators had no monitoring method in place other than relying on the truck driver to keep an eye on it. Others had silo leg scales or high-level indicators. These systems seemed to work well, particularly when they were teamed with an alarm or automatic shut off. One operator had installed an automatic choke. This device would first give an audible alarm when it reached the high level indicator then, after 60 seconds, it would choke down the feed line. If the truck operator did not shut down the feed, the lime would back up on him.

Several operators were found to be using a **fuel type** not specified on their emission permit. Emission permits are built based on the information provided by the source on the APEN filed for the permit. For the most part, different fuel types have different emission factors. Most permits specify the type of fuel on the permit. Operating using a different fuel than what is specified on the permit is a violation of the permit and subject to enforcement action. If an operator wants to use a new fuel type, the emission permit needs to be modified before making the change. An APEN must be filed to modify the permit. The exception is that natural gas and propane have the same emission factors and therefore if one of these fuels is included in the permit, the other may be used as well.

The emission permits are constructed around information the Division receives on the APEN filed by the source. Emission limits contained in the permits are derived from the requested levels stated in the APEN or permit application. Determination of source category (Major or Minor) is also based on this information. The **annual production** limits are established in the permit as a permit condition. Exceeding the annual production limit established in the permit is a violation of the permit. The Division would likely take enforcement action if this limit were exceeded. The permit needs to be modified if the operators exceed or is planning to exceed the permit limit for annual production of asphalt. An APEN submittal is necessary to modify the permit. The APEN should include new requested annual production limits.

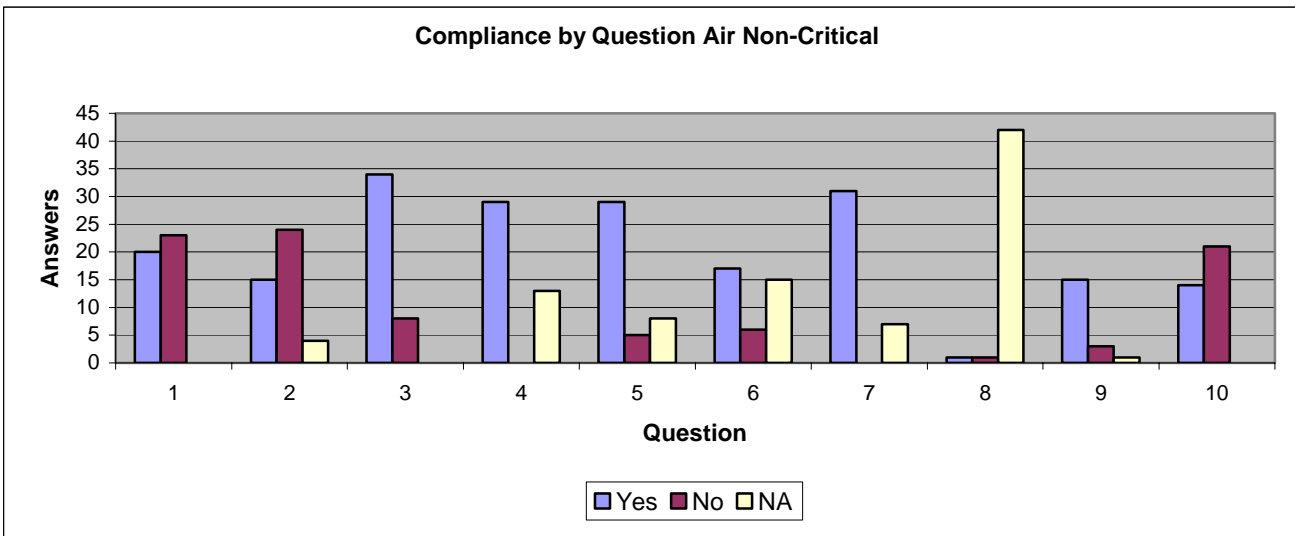
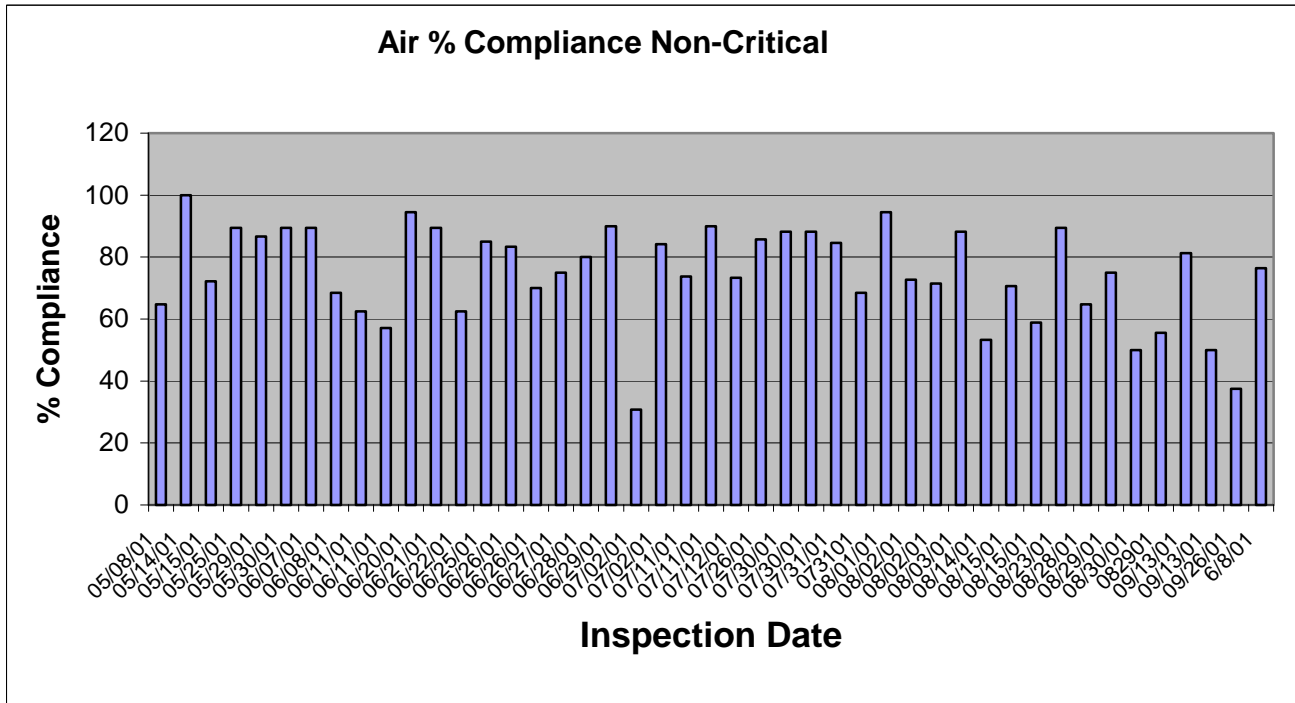
Similarly, exceeding the **hourly production** limit established in the permit is a violation of the emission permit, may also result in damage to the plant, and emissions levels beyond stated in the permit. A stack test showing compliance with the NSPS and a permit modification would need to be processed to bring the source back into compliance.

Exceeding the permit's limit on **annual consumption of aggregate** results in the same issues as exceeding the permit's annual production limit. While few permits have a condition addressing an annual aggregate production limit, the permit would have to be modified in that event.

Lastly, the **control device** for the plant is either a scrubber or baghouse. The emission permit applicant must specify the control device in terms of manufacturer, model and serial number. The

permit specifies this information and is not valid if the control device is not as described on the permit. Control device capacity and control efficiency is pivotal in building the emission permit. A permit modification should be addressed prior to making a change in the control equipment.

B. Air Emissions Non-Critical Items



- 1 Are records available for inspection?
- 2 Are records kept on file for at least the past five years?
- 3 Are the APENs for the plant up to date?
- 4 Are the solenoids in good operating condition?
- 5 Have all upset occurrences been reported?

- 6 If plant is portable, has source filed a relocation notice as required?
- 7 Is the AC oil use amount below the permit limit?
- 8 Is the CEM data logged and records kept?
- 9 Is the fuel usage less than permit levels?
- 10 Is the percent opacity from the truck loadout less than 20 %?

The second tier of items of concern includes some clerical or paper issues and lower level compliance issues. Some of these issues need more attention than others. In any case, these items would not likely result in immediate enforcement action by the Division. However, the Division may still require the operator to take some action to resolve the issue.

Two items addressed **records** being available during an inspection. Records showing what is being done to comply with the emission permit should be readily available to the enforcement inspector. The records should address: occurrence and duration of any startup, shut down or malfunction of the plant or control equipment. This requirement is based on the NSPS for hot mix facilities. In addition, the operator should be prepared to provide to an inspector what has been done to maintain the control equipment and what was done to repair it after a malfunction.

Air Pollutant Emission Notices (APENs) have a five-year term by Colorado State statute. Updating the APEN is necessary to update the annual emission fee sent to each source. It also may trigger a permit modification should the revised APEN show a need such as a new requested production level or equipment. This item was also used in the baseline report to reflect the need to file an APEN for a **change of ownership** of the plant. There were a couple of operators that appeared to have changed hands while the emission permit for the plant had not been modified to reflect the change. The new operators are effectively operating without a permit. Operating without a permit is a fairly serious matter and should be **corrected immediately**.

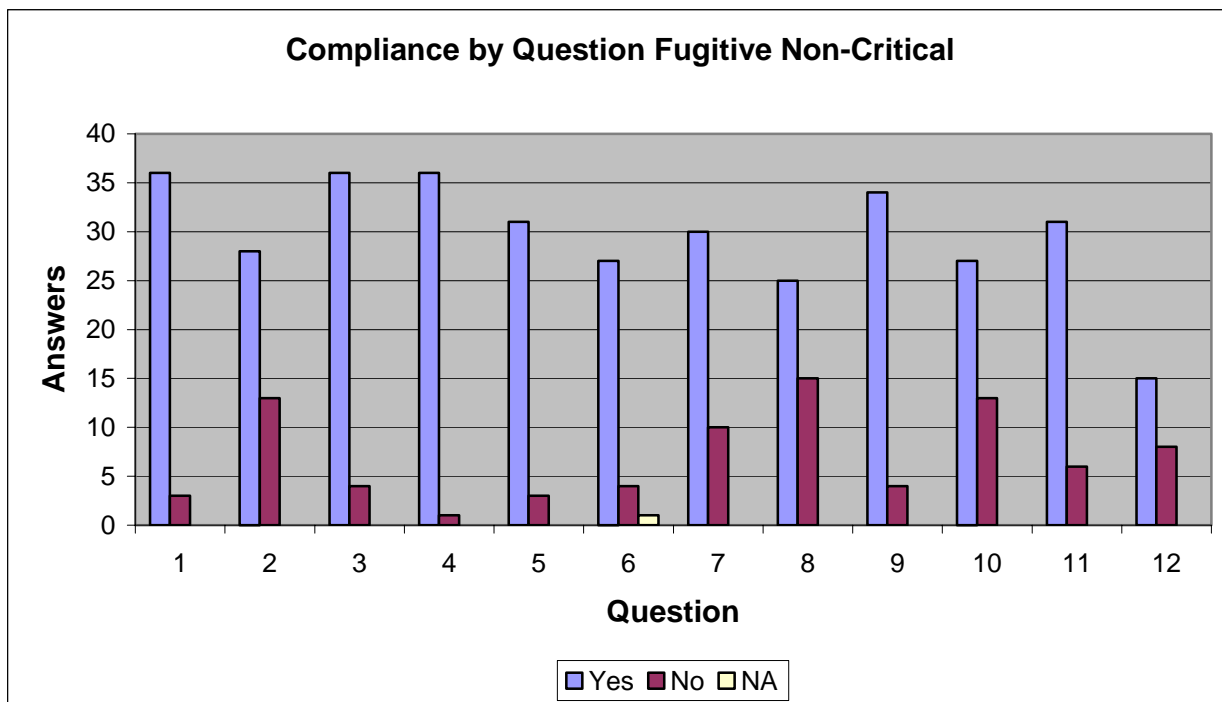
Relocation Notices must be filed when a portable source moves within the state. The notice must be filed **within 30 days** of the move.

The issue of **Upset Reports** was discussed with each plant operator. Upsets are defined as “an unpredictable failure of air pollution control or process equipment which results in the violation of emission control regulations and which is not due to poor maintenance, improper or careless operations, or is otherwise preventable through exercise of reasonable care.” Upsets shall not be deemed to be in violation of the regulations provided that the Division is notified as soon as possible, but no later than two hours after the start of the next working day, followed by written notice to the Division explaining the cause of the occurrence and that proper action has been or is being taken to correct the conditions causing said violation and to prevent such excess emissions in the future. This provision is currently under review, and may change in the near future.

Fuel use exceeding the stated permit limit is a violation of the permit and may result in emissions greater than allowed for in the permit. This item may also be noted in the reports if the fuel listed on the permit is different than the one in use. Different fuels have different emission factors. The permit should reflect the fuel being used and if the permit limit for the amount of fuel used has been exceeded, the permit needs to be modified. An APEN must be filed to accomplish this correction.

From the start of the baseline visits, visible emissions exceeding the opacity limit were observed from the **truck loadout** area of the plant. After much discussion, the Division enforcement section has agreed that these emissions will not be considered an enforcement issue. This approach will remain in effect unless other factors come to light such as the establishment of higher or more significant emission levels from this activity, more reasonable cost factors to control these emissions, or a requirement from a higher authority (i.e. the Federal EPA) that causes the Division to address the issue again.

Fugitive dust, Non-critical items



- 1 Does the control equipment appear to be well maintained?
- 2 Is a water truck available for dust control?
- 3 Are there adequate personnel to operate the water truck?
- 4 Is there an adequate water supply for dust control?
- 5 Is there evidence that the source does and can make repairs to the control equipment?
- 6 Roads: Are speed limit signs complied with?
- 7 Roads: Are speed limits posted?
- 8 Roads: Are visible emissions from unpaved roadways less than 20 % opacity?
- 9 Roads: Is adequate equipment provided and maintained for watering or chemical application of unpaved roadways?
- 10 Roads: Is dust from unpaved roadways being contained within the site?
- 11 Roads: Is mud and/or dirt carryout on to the main paved roadway removed or prevented?
- 12 Storage piles: Is the control plan adequate?

Briefly, questions in this category will not directly result in any enforcement action. These items generally fall into two categories. The first are items that refer to common requirements in

fugitive dust control plans. These items are in the permit to give guidance to the operator in controlling dust. Those items include:

- Are speed limit signs posted?
- Are the speed limit signs complied with?
- Are visible emissions from unpaved roadways less than 20% opacity?
- Is dust from unpaved roadways being contained within the site?
- Are mud and or dirt carryout onto the main paved roadway being removed or prevented?
- Is the control plan for controlling dust adequate?

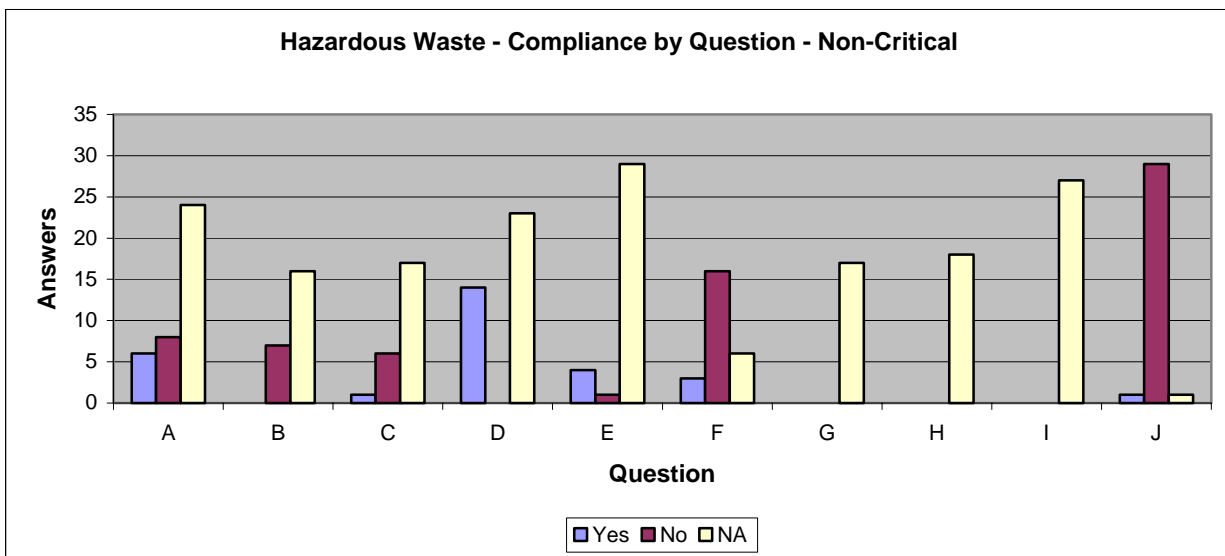
These items should be addressed as measures to control dust at the site. Addressing the remaining items on the Fugitive Dust checklist may facilitate compliance with these items:

- Does the fugitive dust control equipment appear to be well maintained?
- Is there a water truck available for dust control?
- Are there adequate personnel to operate the water truck?
- Is there an adequate water supply for dust control?
- Is there evidence that the source does and can make repairs to the control equipment?

C. Hazardous Waste, Non-Critical Items

The CAPA asphalt plants were all Conditionally Exempt Small Quantity Generators (CESQG). No items of critical significance were observed, therefore, enforcement action would not likely had occurred if the Hazardous Waste Division conducted an inspection on these facilities.

Non-critical items should be addressed to improve the compliance rate and prevent waste issues from becoming significant. Most of these items are housekeeping issues and can be easily resolved.



- A Are containers and tanks of used oil marked or labeled with the words "Used Oil"?
- B Are containers of Universal Waste marked with an accumulation start date or is the accumulation date tracked by a log or otherwise?
- C Are containers of Universal Waste properly marked or labeled?
- D Are containers of used oil in good condition?
- E Are releases of used oil being properly cleaned up?
- F Does the facility recycle lead acid batteries outside of the Universal Waste regulations?
If aerosol cans are being punctured, does the facility maintain a procedure for the safe puncturing of the cans?
- G If mercury-containing lamps are being crushed, is a procedure being maintained to ensure that the lamps are crushed safely?
- H If underground storage tanks are used for the management of used oil, are the fill pipes marked or labeled with the words "Used Oil"?
- I
- J Is training provided for Universal Waste?

Are the containers and tanks of used oil marked **or labeled with the words "Used Oil"**? The facility must use the words "Used Oil." Chalk or marker labeling is sufficient.

Are **containers of Universal Waste** marked with an **accumulation start date** or is the accumulation date tracked by a log or otherwise? Universal wastes may only be accumulated on-site for 1 year. The facility must be able to demonstrate how long the waste has been on-site.

Are containers of Universal Waste **properly marked or labeled**? Proper labeling for Universal Waste requires that all containers (including each large battery) must be marked with the words "Universal Waste" followed by words describing the type of waste.

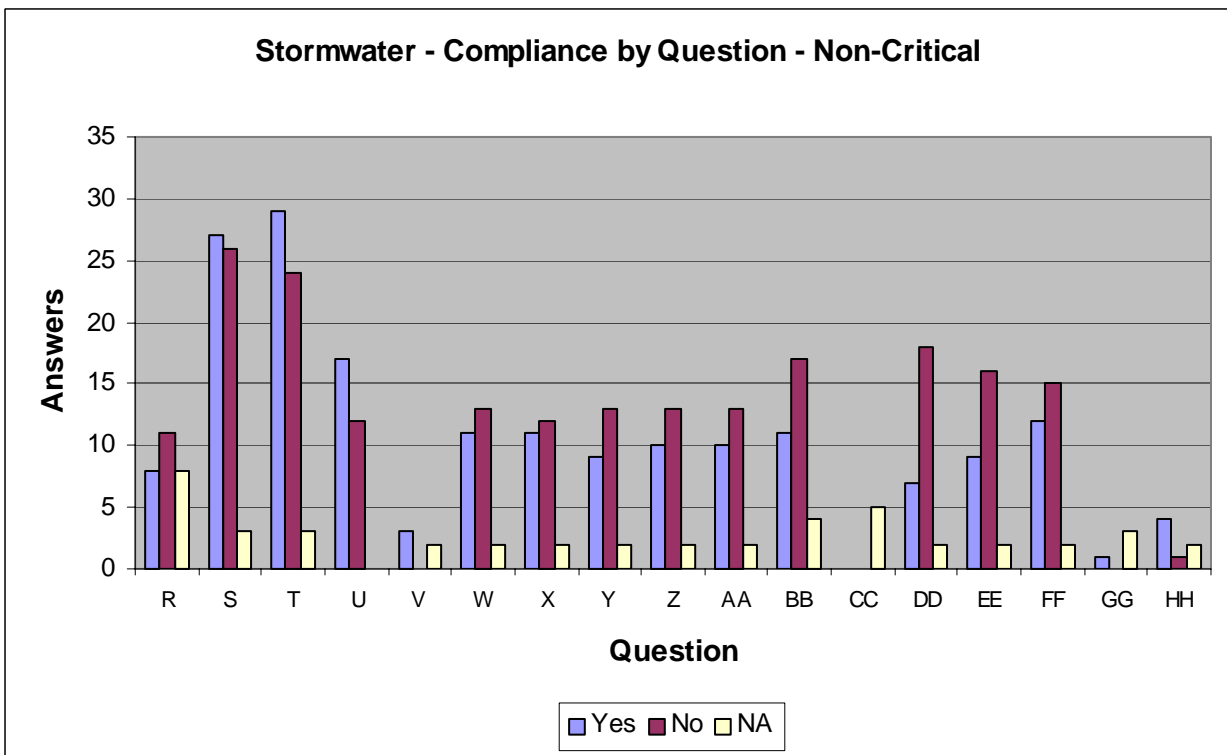
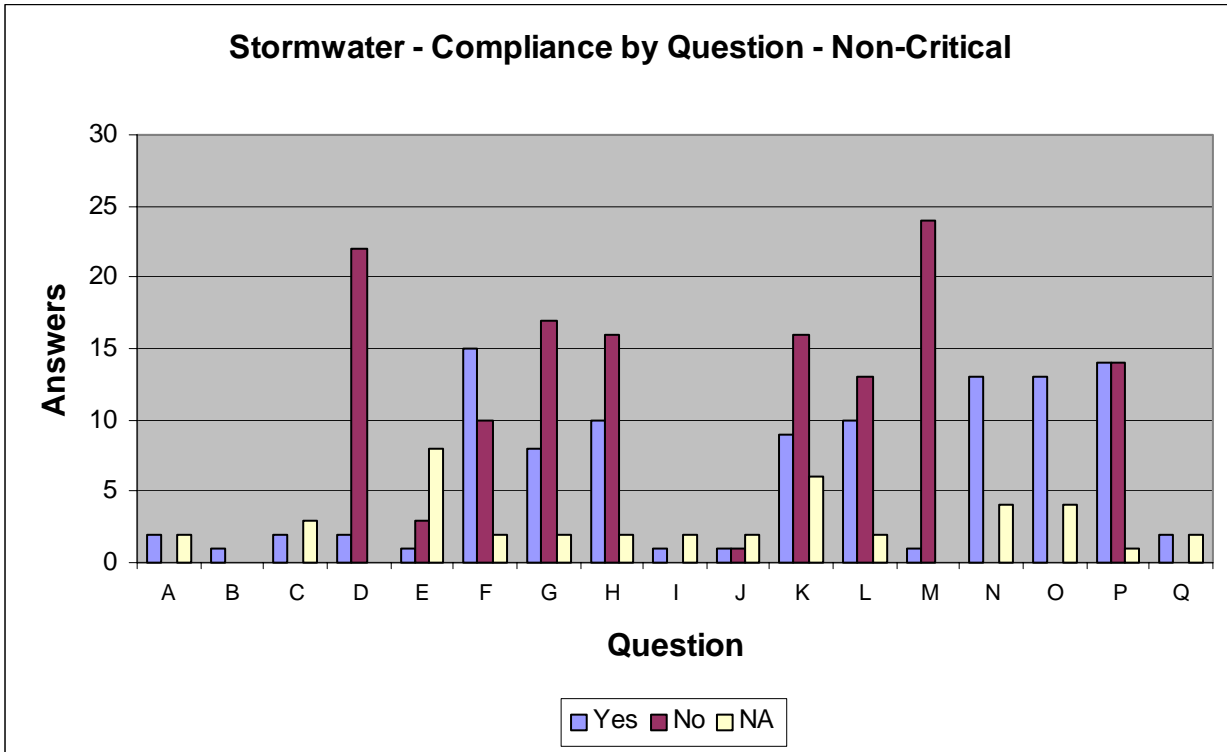
Are containers of used oil in **good condition**? Good condition means that the containers have no rust, no peeling paint, no bulging, no leaks, and no dents. Also the containers must have a tight-fitting lid with bolted ring.

Are **releases** of used oil being **properly cleaned up**? Proper cleanup for these spills requires that at least removing and containerizing the visibly stained soil. Most landfills will accept oil-stained soil.

Does the facility recycle lead acid batteries outside of the Universal Waste regulations? Lead batteries should be recycled promptly after removal from use. Typically, battery suppliers will take them back for recycling.

Is **training** provided for Universal Waste? Training must include informing all employees who manage or handle the universal waste of proper handling and emergency procedures appropriate to the type of waste handled.

D. Stormwater Non-Critical Items



- A All other industrial materials or activities protected from exposure to stormwater?
- B Are requirements of permit being met?
- C Consistent with SWMP?
- D Diversions or practices in place to prevent stormwater contact with industrial materials and activities?
- E Diversions or practices in place to prevent stormwater contact?
- F Inspection procedures and schedule in place?
- G Inspection program adequate?
- H Inspections conducted as scheduled?
- I Is discharge permitted?
- J Management practices in place to prevent contamination (PMs, good housekeeping, etc.)?
- K Management practices in place to prevent contamination (PMs, good housekeeping, etc.)?
- L Material handling procedures specified?
- M Materials storage and industrial process conducted inside?
- N No allowable non-stormwater discharges are present?
- O No other non-stormwater discharges or industrial process waters are present?
- P PM program in place?
- Q Practices in place to determine if stormwater is contaminated and, if necessary remove pollutants?

- R Practices in place to determine if stormwater is contaminated and, if necessary, remove pollutants?
- S Program adequate?
- T Program being followed?
- U Program in place?
- V Shipping and receiving areas (load/unload) protected from exposure to stormwater?
- W Spill areas/drainage points identified?
- X Spill clean-up equipment available?
- Y Spill clean-up procedures identified?
- Z Spill program adequate?
- AA Storage requirements specified?
- BB SWMP available on site?
- CC SWMP deficiencies corrected?
- DD Training conducted as scheduled?
- EE Training program adequate
- FF Training program in place?
- GG Vehicle maintenance, fueling, or washing; storage of fuel protected from exposure to stormwater?
- HH Waste materials/storage protected from exposure to stormwater?

After review of the stormwater issues at asphalt plants. The only potential “critical item” involving stormwater would result if an event involving industrial process water resulted in a fish kill in a public waterway. None of the CAPA participants were observed to have an industrial discharge, therefore, none of the participating facilities had “critical items” for stormwater.

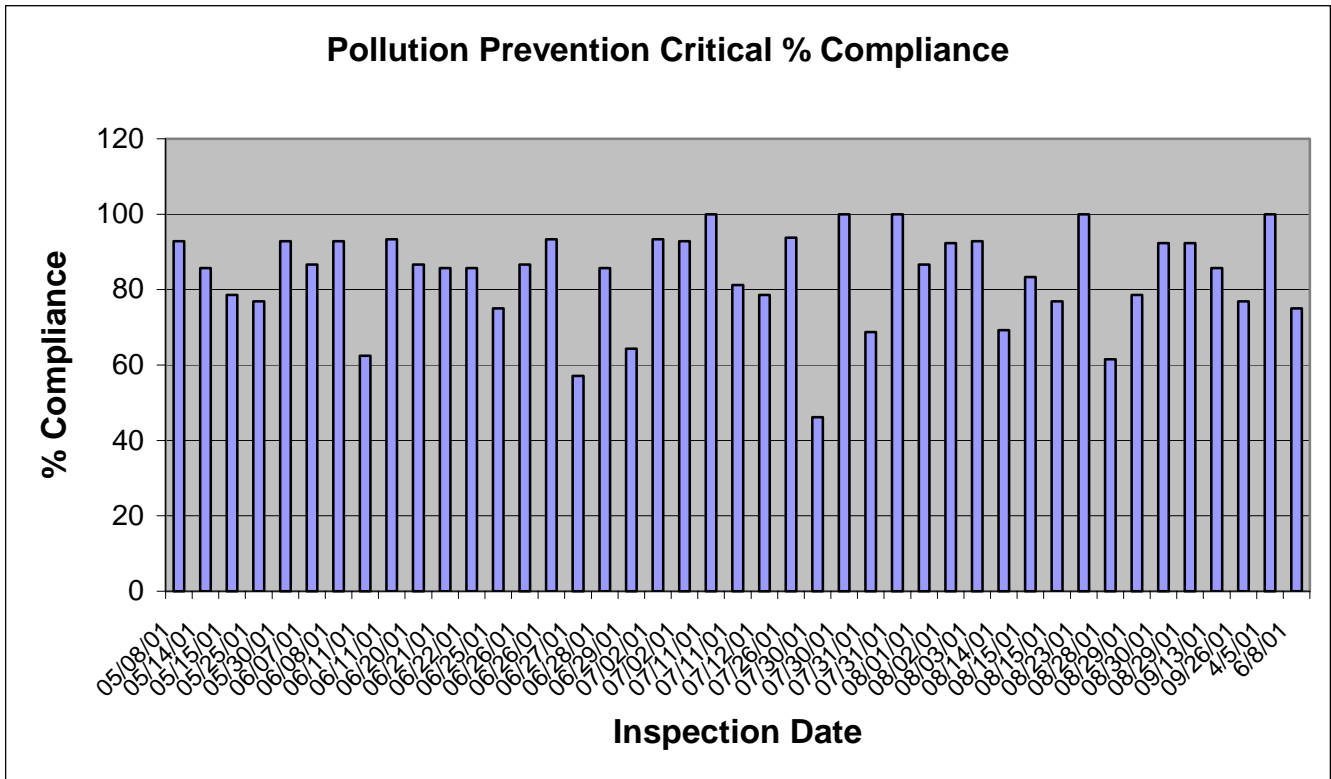
General permitting issues were addressed. If stormwater is not contained during a storm event, a Stormwater Discharge Permit should be obtained. If the facility has an industrial process water discharge, a permit for that discharge would be required. Industrial discharge is any event that involves contact between water and chemicals that may contaminate the water. A common illustration of this event is washing down a parking lot by a business. The parking lot has oil and other waste on it that is transferred to the water. This water leaves the site as it drains off. The event would require an Industrial Process Water Discharge Permit.

A few facilities had the potential for an industrial discharge though the following issues: Sources should have in place **diversions or practices to prevent stormwater contact** with industrial materials and activities. For example, placing liquids such as diesel fuels, transfer oils in containment so that surface runoff cannot come in to contact with this material will prevent contamination of surface water. Any industrial process not conducted inside or storage of materials inside may create a need for implementing practices to prevent contamination of stormwater. The issues that need to be addressed include: Establishing management practices to prevent contamination, including preventative maintenance plans, good housekeeping measures, inspections by plant personnel and providing adequate training for the plant personnel involved.

E. Pollution Prevention

The Pollution Prevention Checklist used in the COMPASS asphalt inspections was primarily taken from the “Best Management Practices To Minimize Emissions During HMA Construction” published in April, 2000 by the Asphalt Pavement Environmental Council comprised of the National Asphalt Pavement Association (NAPA), the Asphalt Institute (AI), and the State Asphalt Pavement Associations (SAPA). Other asphalt literature and Pollution Prevention (P2) principles were also used. Consistent scoring was somewhat difficult given the wide variety of asphalt plants reviewed and the great difference in age of the plants from brand new to decades old. Slight additional variation came from having two different inspectors filling out the checklists. Two slightly different checklists were used but both had basically the same P2 questions.

If a question was not answered or didn't apply to a plant, it was registered as Not Applicable (NA) or was left blank. This accounts for the differing number of responses for each question.



Critical P2 compliance questions were picked because of their importance for minimizing fuel use or emissions from the asphalt plants. For critical P2 compliance percentages, the scores ranged from five facilities with a high of 100% to a low of 46%. The average was 83.7% and 28 of 43 facilities scored 80% or better. One facility was not scored due to its age and intermittent operation. Scores for individual questions are addressed later in this section.

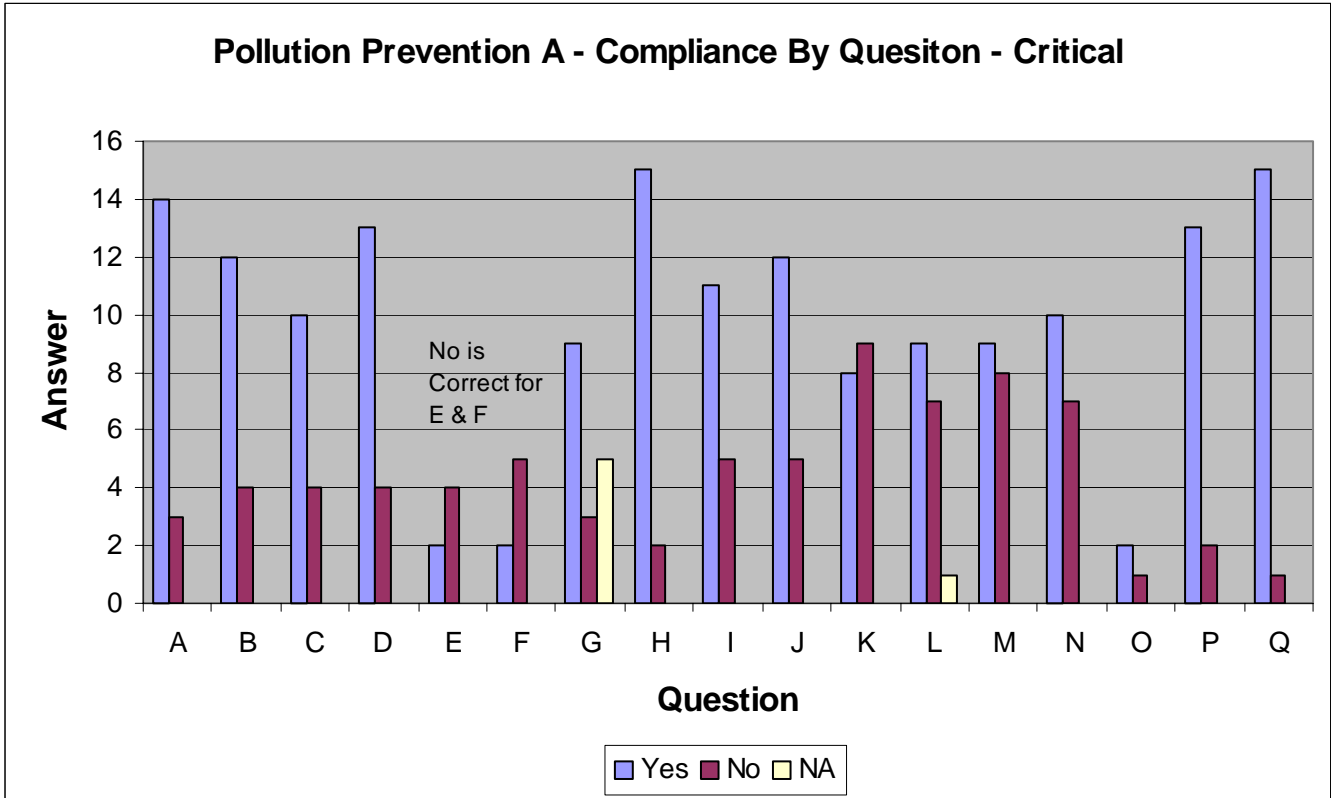
In general, the overall Critical P2 Compliance scores were good, because staff at most facilities seemed to recognize the parameters and activities that are most important to having an efficient facility in compliance with applicable regulations and making a consistent, high quality product. Certainly there is room for improvement for most facilities both to improve fuel efficiency and to address air emission issues quickly before they become a compliance issue.

Critical Checklist Questions

P2 Checklist A

- A Do you adjust the fuel and air combination in your burner to ensure complete and proper combustion of fuel?
- B Do you compare mix temperatures with plant temperatures and look for changes with time?
Do you control the temperature of the asphalt binder and the antistripping additive at the lowest temperature that produces satisfactory results?
- C Do you employ procedures to use the driest portion of the stockpiles?
- D Do you ever overheat RAP (to the point that it becomes brittle or you see smoke)?
- E Do you expose RAP to the burner flame?
- G Do you measure and record the pressure drop in the baghouse and look for changes over time?
- H Do you perform a visual inspection of the air system for obvious combustion problems?
- I Do you regularly calibrate the thermocouples and other sensors?
- J Do you tune up the burner?
- K Do you use counter-flow mixing equipment technology to reduce emissions?

- L Does your burner control system provide proper fuel/air control for efficient combustion?
- M Have you gathered data on aggregate moisture content and fuel use?
- N If the fuel use goes up for the same or less moisture, do you immediately investigate the reason?
- O If yes, do you correct?
- P the dryer configured to optimize retention time and drying efficiency and minimize exposure of RAP and asphalt to the hot air stream?
- Q Select a plant mix temperature starting point based on the information obtained in numbers 17-19

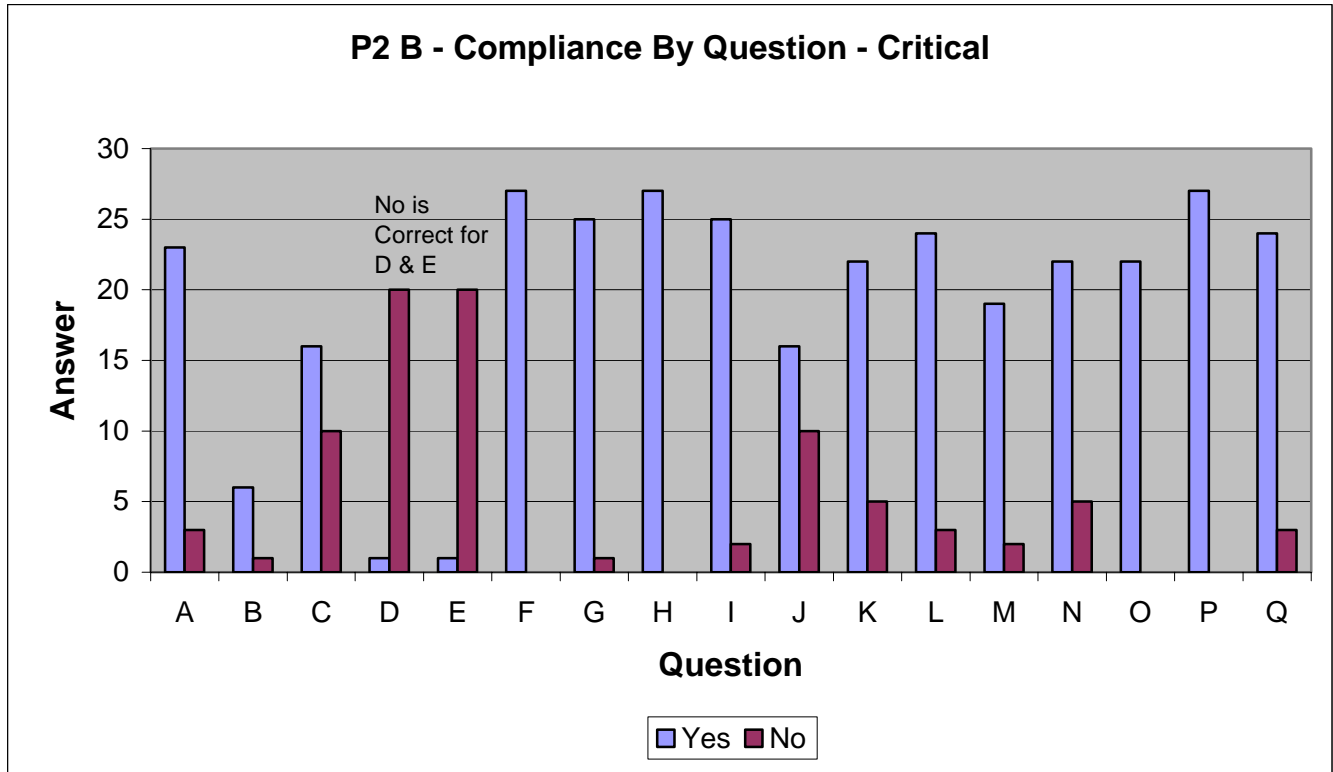


P2 Checklist B

- A Do you compare mix temperatures with plant temperatures and look for changes with time?
- B Do you control the temperature of the asphalt binder and the anti-stripping additive at the lowest temperature that produces satisfactory results?
- C Do you employ procedures to use the driest portion of the stockpiles?
- D Do you ever overheat RAP (to the point that it becomes brittle or you see smoke)?
- E Do you expose RAP to the burner flame?
- F Do you measure and record the pressure drop in the baghouse and look for changes over time?
- G Do you perform a visual inspection of the air system for obvious combustion problems?
- H Do you regularly calibrate the thermocouples and other sensors?
- I Do you tune up the burner?
- J Do you use counter-flow mixing equipment technology to reduce emissions?
- K Does your burner control system provide proper fuel/air ratio control for efficient combustion?
- L Have you gathered data on aggregate moisture content and fuel use?
- M If # 50 is No, Do you adjust the fuel and air combination in your burner to ensure complete and proper

combustion of fuel?

- N If the fuel use goes up for the same or less moisture, do you immediately investigate the reason?
- O If yes, do you correct?
- P Is the flighting in the dryer configured to optimize retention time and drying efficiency and minimize exposure of RAP and asphalt to the hot air stream?
- Q Select a plant mix temperature starting point based on the information obtained in numbers 25-27.



P2 Critical Checklist Questions (checklist-question)

A-A, B-M: Do you adjust the fuel and air combination in your burner to ensure complete and proper combustion of fuel?

Burner fuel and combustion air combination is one of the most important parameters for efficient combustion. Surprisingly, 5 of 38 facilities did not seem to adjust or test this parameter on at least an annual basis. Unless a facility has a long track record of stable, efficient operation, this combination should be checked out on at least an annually.

A-B, B-A: Do you compare mix temperatures with plant temperatures and look for changes with time? 35 of 42 facilities were regularly checking mix temperature to ensure it was tracking plant temperature readouts. This seems essential given the crucial importance of mix temperature and the high possibility of fouling plant thermocouples. Most plants were checking this at least daily and many several times per day. Other temperatures such as baghouse entry temperature

should also be checked regularly.

A-C, B-B: Do you control the temperature of the asphalt binder and the anti-stripping additive at the lowest temperature that produces satisfactory results? 5 of the 21 facilities running anti-strip in their asphalt formulations were not doing this. Typically, the operators of these facilities had an operating temperature that they preferred and pretty much ran at that temperature virtually all the time. By doing so, they miss an opportunity to run at a lower temperature that would still produce satisfactory results and also lower fuel usage, emissions, and, potentially, anti-strip odors.

A-D, B-C: Do you employ procedures to use the driest portion of the stockpiles? 14 of the 43 facilities did not try to use the driest portion of stockpiles. Usually, their loader operator was mainly trying to deliver aggregate of consistent moisture rather than the driest. Many facilities felt that by working into the middle of a pile and staying off the bottom of the pile, a good loader operator could consistently deliver dry aggregate in all but the wettest conditions. Obviously, the drier the aggregate is, (assuming compliance with dust control requirements) the lower the fuel usage necessary to meet asphalt moisture and temperature requirements.

A-E, B-D: Do you ever overheat RAP (to the point that it becomes brittle or you see smoke)? Only three of 27 facilities running RAP had or admitted to this problem. Some plants were configured to prevent this problem by mixing in a separate drum. So, unless the plant was operated at a very high temperature, overheating was not a problem.

A-F, B-E: Do you expose RAP to the burner flame? Only three of 28 facilities had or admitted to this problem. These were typically older facilities retrofitted for RAP use. In most of the newer facilities, exposing RAP to the burner flame was a physical impossibility due to the location of the RAP introduction. In older parallel flow facilities, care must be taken to maintain flighting to ensure a proper aggregate veil to prevent flame exposure to the RAP.

A-G, B-F: Do you measure and record the pressure drop in the baghouse and look for changes over time? Only three facilities of the 39 with baghouses were not tracking their baghouse pressure drop. This is an important parameter because measured changes may indicate a problem before the stack does visually. If the bags are not being cleaned adequately and need more frequent or intense pulsing, this problem will not show up in the stack immediately and may not at all until there is a baghouse failure. Bag leaks or by-passing may also show in the pressure drop before it is apparent visually. So baghouse pressure drop should be tracked and recorded and any changes should be for known reasons or the baghouse should be checked out. For facilities with scrubbers, operating parameters such as water flow, water pressure, or pressure drop should be monitored as well to ensure the scrubber is operating as desired. With the plume of steam off a scrubber, watching operating parameters often will help detect problems more quickly than just watching the scrubber plume.

A-H, B-G: Do you perform a visual inspection of the air system for obvious combustion problems? 40 of 43 plants regularly checked their stack. The facilities that were not typically had a stack that was not easily seen from the control room. Other facilities had a scrubber with a steam plume making visual inspection more difficult for untrained personnel. Obviously, besides monitoring the control device (baghouse or scrubber), visual inspections are a quick way to catch a problem and get it fixed before a complaint is registered or an inspector drives by. Some facilities even had their personnel trained at “smoke school” so they would know better when a compliance problem was occurring. Other facilities contract with consultants to make regular visual readings of their stack to help ensure compliance.

A-I, B-H: Do you regularly calibrate the thermocouples and other sensors? Most facilities

(38 out of 43) were calibrating or checking their thermocouples in one way or another to ensure key plant temperatures were accurate. While virtually all facilities checked their thermocouples during winter maintenance, many checked them for wear or rotated them periodically in the summer as well.

A-J, B-I: Do you tune up the burner? Burner operation is the heart of the asphalt plant and inefficient burner operation raises operating costs and emissions and safety concerns as well. Most (37 of 44) facilities were doing at least an annual burner tune-up. Additional tune-ups were scheduled if any problems were noticed. Some facilities were also doing a few checks throughout the summer to ensure optimal burner operation. A few facilities were acquiring their own combustion gas analyzer, so they could check their burner even more frequently. One facility reported almost a 20% gain in fuel efficiency since acquiring their combustion gas analyzer.

A-K, B-J: Do you use counter-flow mixing equipment technology to reduce emissions? Slightly more than half (24 out of 43) plants were equipped with counter-flow drums. This indicates many older asphalt plants in Colorado. Counter-flow drums are more efficient at drying because the flame and hottest gases are closest to the aggregate at its exit ensuring its dryness. They provide better control for the same reason. Newer counter-flow plants are also less likely to have problems with flame contact with AC oil or RAP due to improved designs.

A-L, B-K: Does your burner control system provide proper fuel/air ratio control for efficient combustion? 31 of 43 facilities had a control system to provide proper fuel /air control for efficient combustion. For the other facilities, the control systems typically were not effective and manual operation was necessary to maintain consistent operation temperatures. Once again these were typically older facilities and again were less likely to be operating efficiently.

A-M, B-L: Have you gathered data on aggregate moisture content and fuel use? Most (33 of 43) facilities were doing tracking this important parameter. Fuel use per ton of asphalt is a key operating parameter. However if moisture is not tracked as well, an operator may be looking for plant problems causing lower fuel efficiency that are really due to increased moisture.

A-N, B-N: If the fuel use goes up for the same or less moisture, do you immediately investigate the reason? As discussed in the previous question, if aggregate moisture is remaining the same and fuel usage is going up, plant problems are indicated. 12 of 44 plants did not recognize this as a potentially serious plant operation issue that calls for immediate investigation.

A-O, B-O: If yes, do you correct? Only one plant out of 25, probably not understanding the question, said they would not immediately correct if they investigated a fuel use increase situation not related to moisture and found a problem.

A-P, B-P: Is the flighting in the dryer configured to optimize retention time and drying efficiency and minimize exposure of RAP and asphalt to the hot air stream? Only two of 42 plants felt their flighting was not in optimal condition. Most plants were replacing flighting every three to five years and doing a major check-out and repair each winter. Many facilities also checked their flighting between once per week and once per month to ensure it was in good repair. Flighting certainly deserves regular attention to ensure a veil is maintained and optimal drying efficiency is occurring.

A-Q, B-Q: Select a plant mix temperature starting point based on the information obtained in numbers 25-27. 39 out of 43 facilities were taking into account asphalt mix being produced (including binder), weather, temperature, lift thickness, and haul distance in choosing their plant mix temperature. The other facilities typically just ran at a constant temperature often with a constant product mix regardless of the other variables. This small minority may be missing out

on a chance to run at lower temperature when mix and other variables are right, and in doing so, save fuel and reduce emissions.

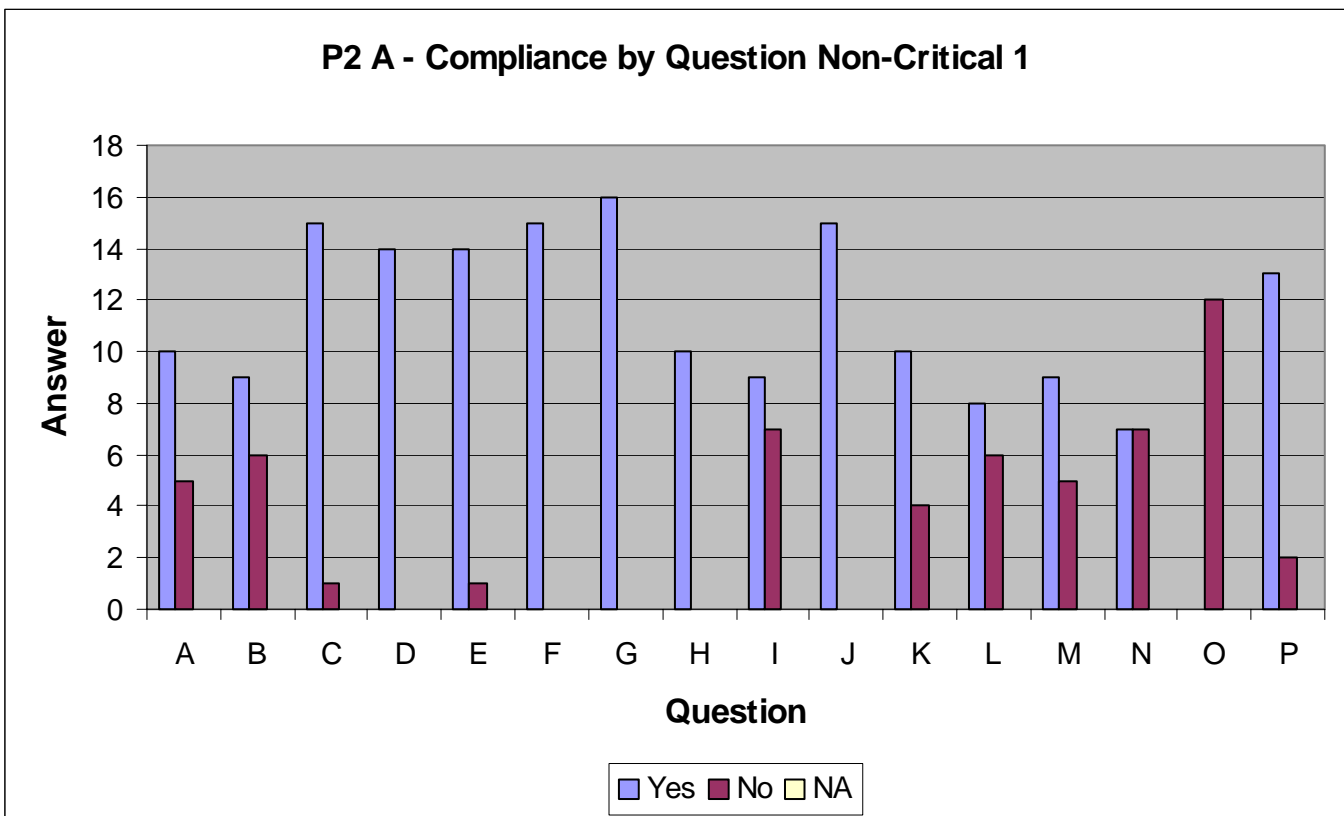
Pollution Prevention Non-Critical Questions

P2 Non-Critical questions were factors or activities either not as important for efficient operation or reducing emissions or were not expected to be done in a typical facility. Compliance with Non-Critical questions averaged 66.9% or about 17% less than the Critical P2 average score. Scores ranged from 47.5% to 86.5%. In contrast to the Critical P2 scores, there were no 100%'s and not even any scores above 90%.

Lower scores for Non-Critical questions are to be expected. Since these items are by definition either less important or less likely to occur, other factors at an asphalt plant may be more significant and therefore a higher priority to implement. Still many of the Non-Critical items should be considered for the optimal operation of an asphalt facility from a P2 perspective.

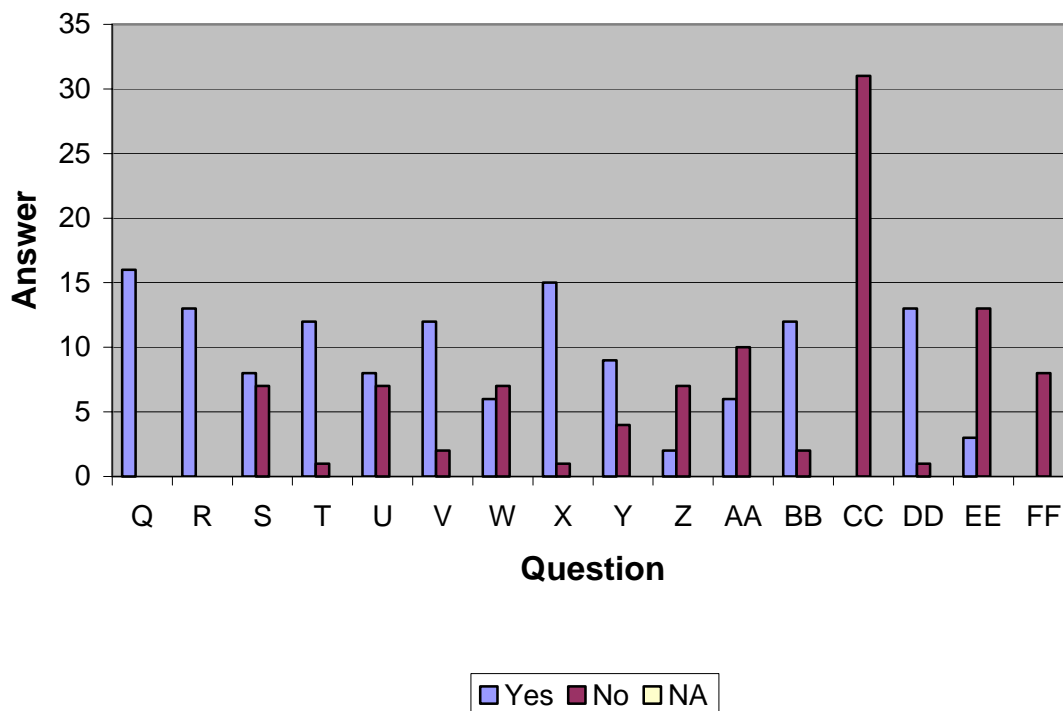
One item of note is that a few facilities were successful in partially sealing their silo tops and slag conveyors and pulling air back from these places into the drum as combustion air. This feature is a design option on new facilities as well. This seemed to greatly reduce emissions, and probably odors and potential compliance issues as well, from these facilities. While these emissions presumably are combustible and would add have a slight fuel value in the drum, the major value of this feature would be to minimize emissions from the silo tops and conveyor.

One facility was using a product called Teclon 50 as a release agent on the slat conveyor. The mix was a 7:1 water/agent mix and about 3 drums per season were projected for use that season. The mix was being applied at shutdown to coat the conveyor and rollers. The operators noticed a 10% drop in amperage required for the 75 horsepower slat conveyor motor since this practice was started.



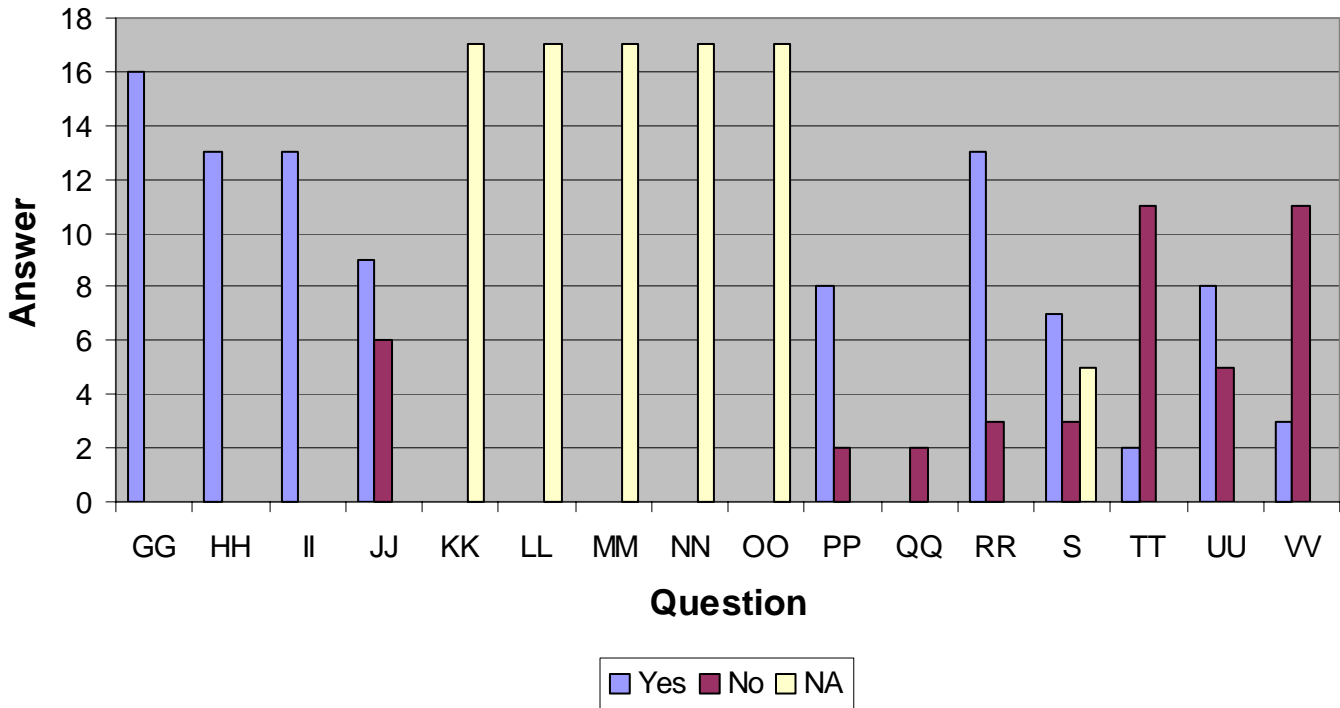
- A Did you contact your asphalt supplier for help to determine the plant mixing temperature?
- B Did you use the laboratory mixing temperature as the plant mixing temperature? (No is the right answer.)
- C Do you adjust this temperature as necessary during normal production?
- D Do you assure complete combustion?
- E Do you check all thermocouples, including cables and wells, for proper placement, proper calibration, and wear?
- F Do you consider previous field experience with asphalt binder grade from this asphalt supplier and current project conditions (including weather and seasonal conditions, lift thickness, haul distance, and mix considerations) and adjust as necessary?
- G Do you consider typical asphalt binder temperature based on PG binder grade?
- H Do you construct a test strip and monitor both densities and temperatures in accordance with an approved quality control plan?
- I Do you contact the asphalt supplier, describe the mix type, and request the plant mixing temperature recommendations?
- J Do you determine the lay down temperature at which a specification density can be achieved?
- K Do you dry run the controls on the burner to verify proper operation and wear?
- L Do you ensure proper lift thickness of four times the maximum nominal aggregate size?
- M Do you ever shut down the burner to make adjustments to check low fire performance?
- N Do you have the stack gases tested to see if they are within limits?
- O Do you increase the mat lift thickness before calling for a higher plant temperature?
- P Do you inspect the components of the fuel train (pressure regulator, fuel strainers and traps, fuel preheats, piping, valves, gauges, thermometers, etc.)?

P2 A -Compliance by Question Non-Critical 2



- Q Do you keep a record of fuel use over time?
- R Do you look for flame stability problems?
- S Do you maintain engineering controls (e.g. recovery systems) on paving equipment?
- T Do you mark linkage settings before a tune up?
- U Do you periodically check or have the air/fuel ratio checked for efficient combustion?
- V Do you reduce excess air at burners?
- W Do you share tracked fuel use information with co-workers and the burner manufacturer?
- X Do you use aggregate with relatively low water absorption levels?
- Y Do you use analyzers to detect unburned fuel?
- Z Do you use anti-stripping additives only when test results indicate the need for them?
- AA Do you use available software or graphs to estimate the heat loss during mix transport and letdown, taking into consideration haul distance, ambient temperature, wind conditions, and mat thickness?
- BB Do you use combustion analyzers to accurately set the burner for good combustion through a full range of operation?
- CC Do you use diesel fuel and kerosene as release agents? (No is the right answer.)
- DD Do you use dry RAP and aggregates?
- EE Do you use paved stockpile areas graded to enhance drainage?
- FF Do you use RAP that contains tar?

P2 A Compliance By Question Non-Critical 3



GG Do you use stockpiling techniques (place material in a small are and stacking as high as possible without risking contamination) to allow materials to shed rain?

HH Do you verify motor rotations?

II Do you verify proper valve operations?

JJ Have you contacted the burner manufacturer to find out the limits on CO and O2?

KK Have you minimized potential for fumes form plastic collars on glass containers crushed as aggregate?

LL Have you taken steps to minimize fumes in other products from construction and demolition waste?

MM Have you taken steps to minimize fumes in the crumb rubber mixtures?

NN Have you taken steps to minimize fumes in the shingles?

OO Have you taken steps to minimize fumes in the slag aggregate?

PP If the stack gases are out of limits, do you contact the burner manufacturer to make the necessary adjustments?

QQ If you are in an area of high annual rainfall, do you cover stockpiles?

RR Is the starting point close to the middle of the range of temperatures for the PG binder grade being used?

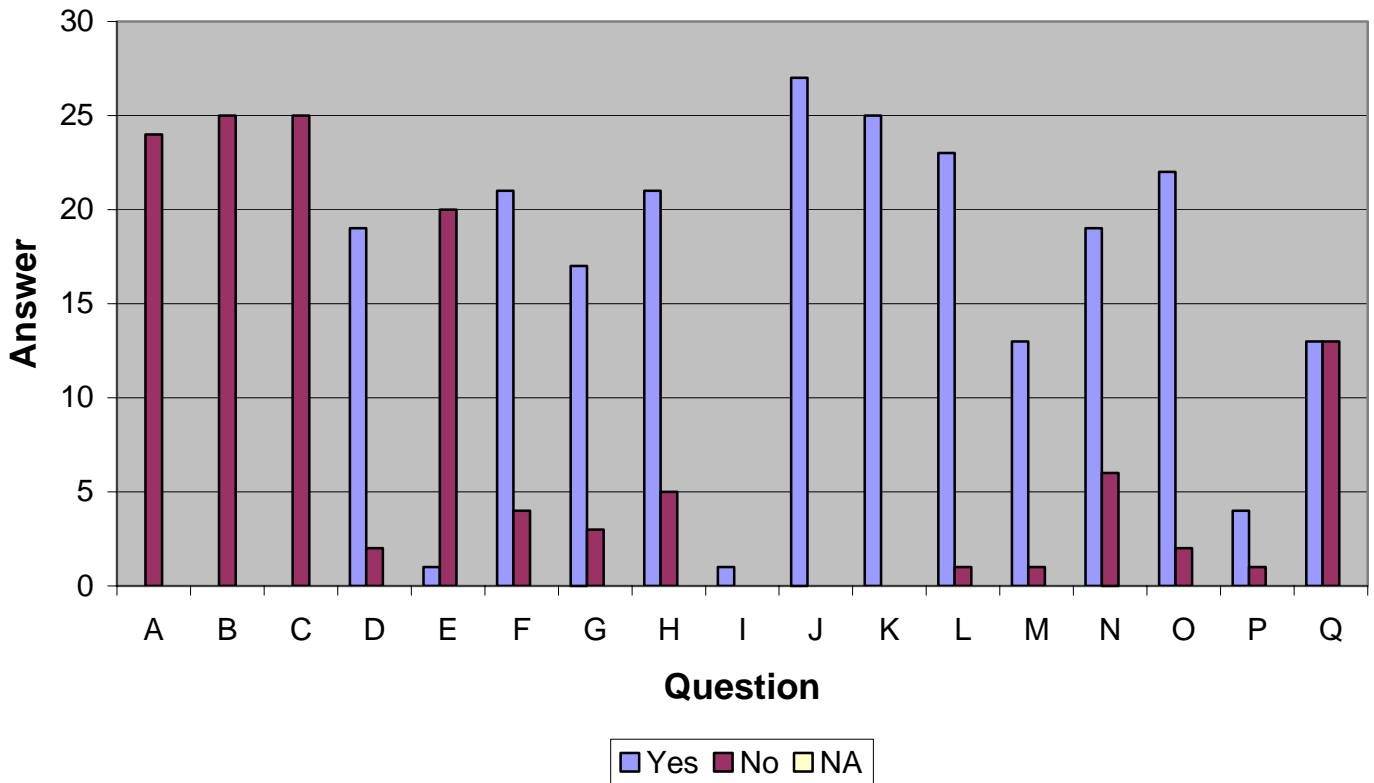
SS Is your low fire stable without overheating the baghouse?

TT Is your output at 100% burner close to faceplate rating?

UU When the stack is tested, do you compare the plant's thermocouple reading to the tester's thermocouple?

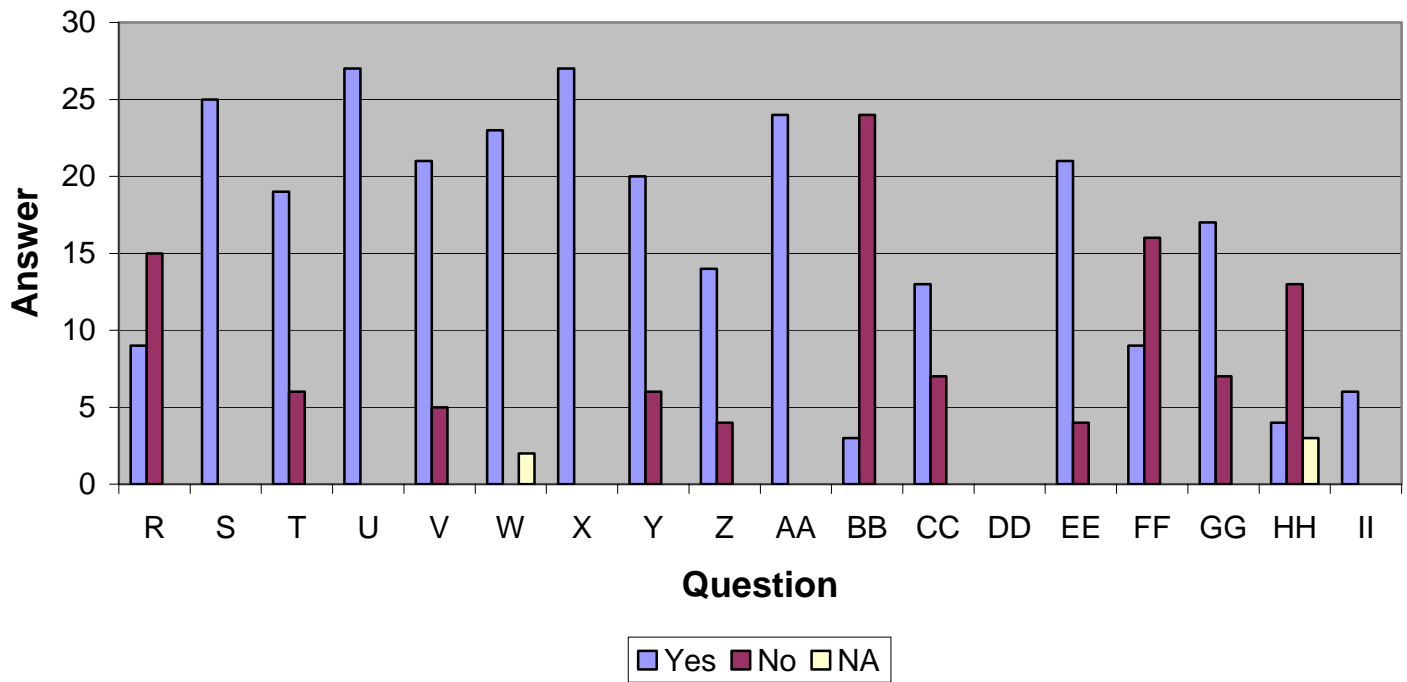
VV Will your controller maintain stable temperatures in the automatic mode?

P2 B Compliance by Question Non-Critical 1



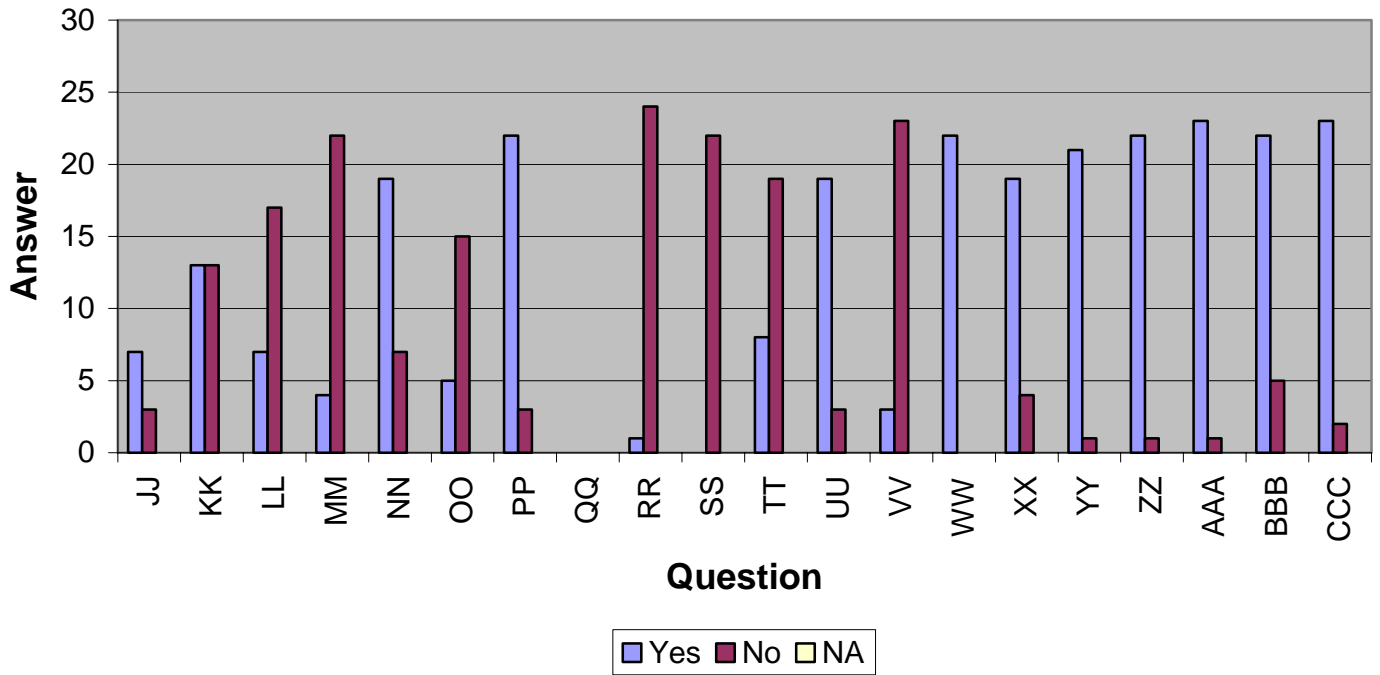
- A Are crumb rubber mixtures used?
- B Are plastic collars on glass containers crushed as aggregate?
- C Are shingles used?
- D Did you contact your asphalt supplier for help to determine the plant mixing temperature?
- E Did you use the laboratory mixing temperature as the plant mixing temperature? (No is the right answer.)
- F Do you adjust this temperature as necessary during normal production?
- G Do you ask technicians to explain exactly what adjustments are being made and why?
- H Do you check all thermocouples, including cables and wells, for proper placement, proper calibration, and wear?
- I Do you check and maintain all automatic and manual fuel valves to ensure proper operations?
- J Do you check the operation of the mechanical components of the burner (drive motor, valves, linkages, nozzle, spinner, etc.)?
- K Do you consider previous field experience with asphalt binder grade from this asphalt supplier and current project conditions (including weather and seasonal conditions, lift thickness, haul distance, and mix considerations) and adjust as necessary?
- L Do you consider typical asphalt binder temperature based on PG binder grade?
- M Do you construct a test strip and monitor both densities and temperatures in accordance with an approved quality control plan?
- N Do you contact the asphalt supplier, describe the mix type, and request the plant mixing temperature recommendations?
- O Do you determine the lay down temperature at which a specification density can be achieved?
- P Do you determine the optimal percentage of anti-stripping additives based on percent weight of the asphalt, not the weight of the mixture?
- Q Do you dry run the controls on the burner to verify proper operation and wear?

P2 B Compliance by Question Non-Critical 2



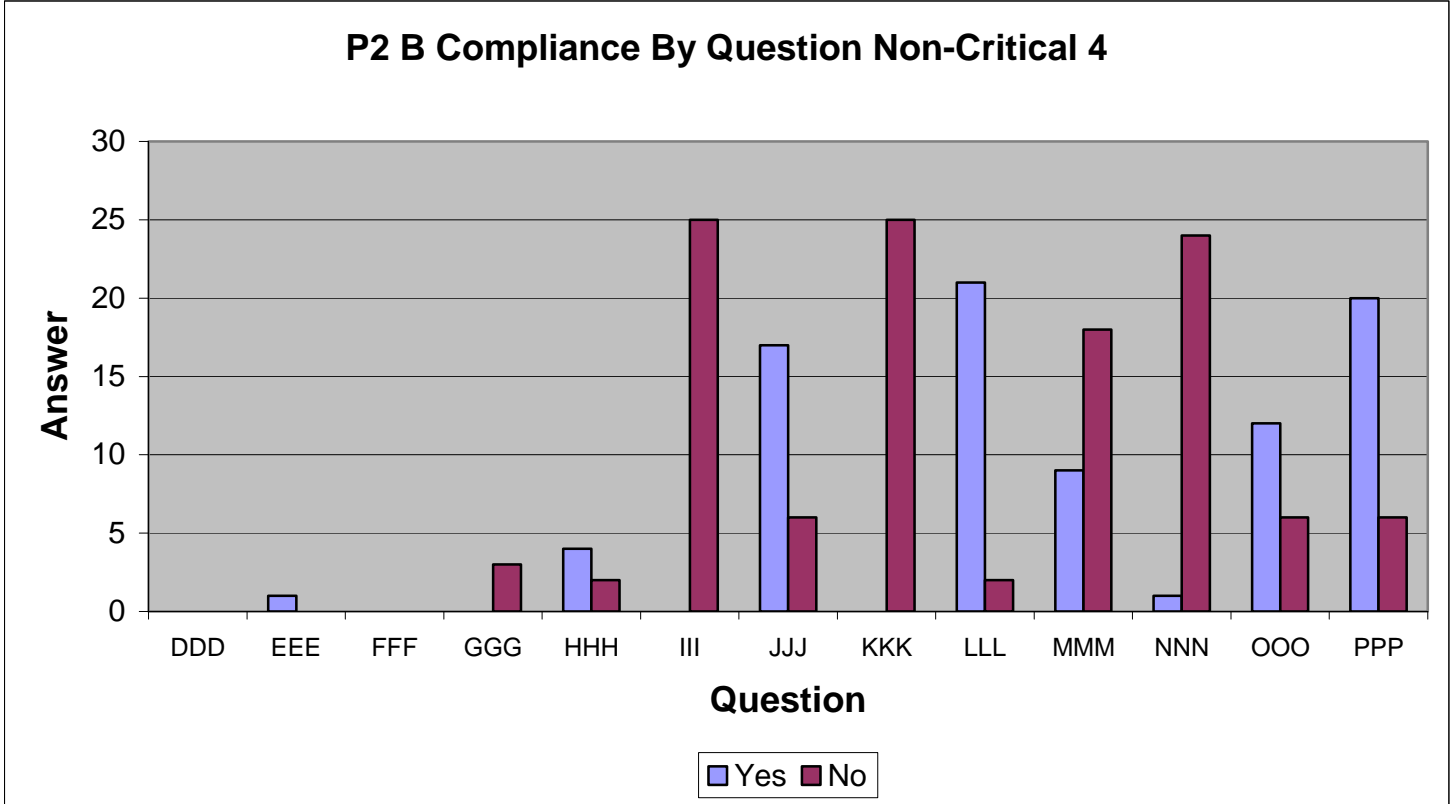
- R Do you ever shut down the burner to make adjustments to check low fire performance?
- S Do you have a burner control system?
- T Do you have the stack gases tested to see if they are within limits?
- U Do you inspect the components of the fuel train (pressure regulator, fuel strainers and traps, fuel preheats, piping, valves, gauges, thermometers, etc.)?
- V Do you keep all mechanical and electrical safety interlocks in the system and check periodically for operation?
- W Do you keep your exhaust fans running efficiently?
- X Do you look for flame stability problems?
- Y Do you mark linkage settings after a tune-up?
- Z Do you mark linkage settings before a tune up?
- AA Do you operate and maintain your burner controls in accordance with the manufactures specifications and instructions?
- BB Do you operate with electrical jumpers on the control? (No is right answer)
- CC Do you pave during the day (as opposed to at night)?
- DD Do you periodically check or have the air/fuel ratio checked for efficient combustion?
- EE Do you reduce excess air at burners?
- FF Do you seal silo tops and load-out areas to reduce fugitive emissions?
- GG Do you share tracked fuel use information with co-workers and the burner manufacturer?
- HH Do you try to pave when ambient weather conditions are conducive to low emissions (high wind velocity, low relative humidity, low dew point)?
- II Do you uniformly blend the anti-stripping additive into the asphalt?

P2 B Compliance By Question Non-Critical 3



- JJ Do you use aggregate with relatively low water absorption levels?
- KK Do you use analyzers to detect unburned fuel?
- LL Do you use anti-stripping additives only when test results indicate the need for them?
- MM Do you use available software or graphs to estimate the heat loss during mix transport and letdown, taking into consideration haul distance, ambient temperature, wind conditions, and mat thickness?
- NN Do you use combustion analyzers to accurately set the burner for good combustion through a full range of operation?
- OO Do you use diesel fuel and kerosene as release agents? (No is the right answer.)
- PP Do you use dry RAP and aggregates?
- QQ Do you use low-odor formulations of anti-stripping additives?
- RR Do you use paved stockpile areas graded to enhance drainage?
- SS Do you use RAP that contains tar?
- TT Do you use stockpiling techniques (place material in a small are and stacking as high as possible without risking contamination) to allow materials to shed rain?
- UU Do you verify motor rotations?
- VV Does your asphalt storage tank capture fugitive emissions?
- WW Does your burner control system coordinate important components?
- XX Does your burner control system ensure proper process temperatures for a quality mix?
- YY Does your burner control system ensure safe burner operations?
- ZZ Does your burner control system perform critical combustion operations?
- AAA Does your burner control system protect other plant components from excessive heat or pressure?
- BBB Have you contacted the burner manufacturer to find out the limits on CO and CO2?
- CCC Have you minimized potential for fumes form plastic collars on glass containers crushed as aggregate?

P2 B Compliance By Question Non-Critical 4



- DDD Have you taken steps to minimize fumes in other products from construction and demolition waste?
- EEE Have you taken steps to minimize fumes in the crumb rubber mixtures?
- FFF Have you taken steps to minimize fumes in the shingles?
- GGG Have you taken steps to minimize fumes in the slag aggregate?
- HHH If the stack gases are out of limits, do you contact the burner manufacturer to make the necessary adjustments?
- III If you are in an area of high annual rainfall, do you cover stockpiles?
- JJJ Is the starting point close to the middle of the range of temperatures for the PG binder grade being used?
- KKK Is there construction or demolition waste?
- LLL Is your low fire stable without overheating the baghouse?
- MMM Is your output at 100% burner close to faceplate rating?
- NNN Were any Slag aggregates used?
- OOO When the stack is tested, do you compare the plants thermocouple reading to the tester's thermocouple?
- PPP Will your controller maintain stable temperatures in the automatic mode?