ACCIDENT PREVENTION ANALYSIS

IMPLEMENTATION GUIDE

U. S. FOREST SERVICE

RISK MANAGEMENT AND HUMAN PERFORMANCE

Revised April 2011

". . . human error is a consequence not a cause. Errors are shaped and provoked by upstream workplace and organizational factors. Identifying an error is merely the beginning of the search for causes, not the end. The error, just as much as the disaster that may follow it, is something that requires an explanation. Only by understanding the context that provoked the error can we hope to limit its recurrence."

James Reason, Author
Managing the Risks of Organizational Accidents

The Fire Operations Risk Management Council

The U.S. Forest Service's **Fire Operations Risk Management Council** is a key sponsor of this guide.

The Council's Mission:

To promote a comprehensive, proactive, and recognizable program that significantly advances the safety and effectiveness of Forest Service employees.

The Council's Vision:

Regardless of the mission, the challenge, or the environment, U.S. Forest Service employees engaged in fire management and all-hazard incident response activities are safe, effective, and error resilient.

The Council's Goal:

To improve employee performance through information transfer and education with an emphasis on Strong Leadership, a Comprehensive Operational Approach, and Focused Action.

While this Accident Prevention Analysis guide is intended for the U.S. Forest Service this document can be easily adopted by other governmental agencies to encourage individual and organizational learning.

USDA Forest Service Photo
by Becky Blankenship

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"Is the Agency Administrator more interested in learning or punishing? If they feel a need to punish people for rule violation, they should forget about using an Accident Prevention Analysis (APA). An APA is designed to promote learning. Therefore, if learning is the more important goal, an APA is the appropriate vehicle. The learning that will result from this process will far outweigh any perceived benefit that might be derived from punishing individuals for making mistakes or violating rules."

Larry Sutton, Chair
Fire Operations Risk Management Council
U.S. Forest Service

I. Why Should an Agency Administrator Authorize An Accident Prevention Analysis?

Accidents or unintended outcomes can serve as vital warnings to managers that we do not correctly understand or mitigate the risks associated with our work.

There is no question that an accident can be interpreted as an invaluable opportunity to learn *why* an unexpected and unsafe outcome occurred. Because all accidents and serious near misses have inherent learning value to the entire organization, the Accident Prevention Analysis learning tool should be made aware and available to all Agency Administrators. In many cases, this process would be a more beneficial learning vehicle than the traditional "Serious Accident Investigation". (For help in choosing a learning review or investigation process, see Appendix A and the "Decision Aid" graphic on page 37.)

APA Process Meets 'Accident Investigation' Requirements

The Accident Prevention Analysis process meets the accident investigation procedural and documentation requirements of the Occupational Safety and Health Administration's (OSHA) Executive Order 12196, as well as the accident investigation regulations (29 CFR 1960.29) and internal policies of the U.S. Forest Service (FSM 6731 and FSH 6709.12).

What is an Accident Prevention Analysis?

An Accident Prevention Analysis (APA) is a formal process appropriate for an analysis of an unintended outcome that so surprised (or frightened) administrators that they are compelled to treat the incident very seriously and invest considerable resources to understanding how the event happened and exploiting the event as a unique, if not a precious, learning opportunity.

What about "Serious" Accidents?

The definitions of *accident, serious accident* and *non-serious accident* vary. These categories of accidents are not defined by the Occupational Safety and Health Administration or within the U.S. Forest Service directive system. The philosophy behind the APA asserts that *it is antithetical to the objectives of risk management to rank accidents as "serious" or "non-serious" based on the degree of bodily injury or amount of lost property.* Almost all timber falling accidents illustrate this very well; a *close call* or a *fatal injury* is a matter of chance and centimeters – which one is non-serious? Sound Risk Management demands we treat both very seriously with our focus and energy on managing risks - not outcomes.

Certain accidents, such as those involving fatalities or anytime employees will likely face civil charges are not appropriate for APAs. These accidents should be left to the SAI process or other investigative process that may offer employees greater liability protections. See Appendix A. for more information.

A. The Learning Benefits of APAs

The foundational philosophy of the Accident Prevention Analysis process views an active failure as almost never actually being the primary cause of an accident. Rather, as revealed through the Accident Prevention Analysis learning process, these failures are triggers that—when examined through this analysis—expose specific systemic and latent weaknesses in the overall system.

The impetus behind the Accident Prevention Analysis is the dissatisfaction

with our current accident, injury and fatality rates. These rates are unacceptable; we must do better; we must organize for higher reliability. The essential step in organizing for high reliability is developing and nurturing a learning culture.

While the companion post accident review process, the *Facilitated Learning Analysis* (FLA) has proven to be a very effective tool that also focuses on learning rather than blaming, the Accident Prevention Analysis tool takes this key learning process one step farther, seeking to explain the nature of the accident rather than finding simple (human-error biased) causes.

B. Critical Considerations for the Agency Administrator

The Accident Prevention Analysis learning tool process:

- Is designed to illuminate organizational failures and workplace cultural conditions that impede, or undermine our employees' ability to understand and manage risks.
- Hones the agency's ability for designing safe systems and managing human reliability.
- Has the potential to be more effective than traditional accident reviews in preventing future accidents.

The Agency Administrator should understand, up front, that the full disclosure of an APA may reveal conditions that—in the spirit of lessons learned—need to be demonstrated and shared with the broader agency. However, these revelations might not be flattering to those involved. Therefore, Agency Administrators should be cautioned about the full disclosure rights of this analysis process.

C. Reporting Requirements

Implementing an APA does not change the accident reporting requirements (Reference FSM 6732 and local policies - if applicable).

If the accident is interagency in nature (involving personnel from more than one agency or jurisdiction), there may be investigative requirements stipulated in the authorizing Memorandum of Understanding between the agencies.

Nothing in the *Interagency Standards for Fire and Aviation Operations* (the "Red Book") precludes any agency from utilizing the APA process.

The emphasis of the Accident Prevention Analysis does not focus on where employees made mistakes nor does it attempt to identify what *should* have been done. Rather, the APA process is designed to analyze and illuminate the nature of the accident and how employees' actions and expectations could have seemed reasonable at the time, within the context of the situation.

In this way, the Accident Prevention Analysis strives to foster the learning needed to build or enhance our understanding of risk and human performance.

II. Background – Learning from Unexpected Outcomes is Crucial

Most employees involved in a serious accident or "near miss" genuinely want to share what they believe *really* happened. They realize that everyone knows the final outcome. But, at the same time, they know that very few people will understand why their expectations and actions leading up to the accident *made sense (or at least did not seem unreasonable)at the time*.

Unfortunately, we have provided our employees with powerful incentives to *not* openly share their understanding of the events that surround their accidents. Regrettably, our past organizational history tended to justify the belief that if our employees disclose their decisions and actions—their "mistakes"—they will be disciplined, or embarrassed, or otherwise *blamed* for the accident.

We have always known that learning from *successful* outcomes is important. More importantly, today, we have realized that learning from *unintended* outcomes is crucial.

A. Two Key Goals

The Accident Prevention Analysis report has two key goals:

1. Describe—factually—*what* happened. In doing so, the Accident Prevention Analysis Team's responsibility is to illuminate any signals of "predictability" that were present *before* the accident occurred. If the Accident Prevention Analysis can shine a bright light on the accident's impending signals, employees who find themselves in similar situations in the future may now recognize these signals—and treat them as a warning of elevated, or underestimated, risk.
2. Uncover the social, cultural, and organizational conditions that shaped the human performance involved in the accident. The Accident Prevention Analysis is devoted to understanding why the decisions and actions of the people involved in the accident made sense to them. Appreciating and understanding how the people involved in the accident made sense of their environment and then chose the actions that they did is the key to this analysis process.

B. Why and How We Got Here

In May 2006, the U.S. Forest Service's national Fire and Aviation Management office issued the briefing paper "*Peer Review – Purpose and Process*" that charted the course for a post-accident learning process to improve workforce decision-making and organizational learning.

This paper outlined how "peer reviews" can provide a more effective tool for learning from a variety of situations, including close calls. The overriding objective: to create a culture that expects and values peer reviews as an essential means for discovering subtle indicators of undervalued risks. In this way, the newly introduced "peer review" process was designed to become a catalyst for positive change.

Two months later, ten people were involved in a fire entrapment and shelter deployment on the Little Venus Fire on the Shoshone National Forest. To learn from this event—across the agency—the Rocky Mountain Region's Regional Office initiated a review of the circumstances surrounding this deployment incident. The subsequent review team utilized the new "peer review" process consistent with the previous national Fire and Aviation Management May 1, 2006 briefing paper.

C. What's the Difference Between a "Facilitated Learning Analysis" (FLA) and an "Accident Prevention Analysis" (APA)?

Based on the experience of Little Venus Fire shelter deployment review and other local efforts to implement a peer review process, the Forest Service's Fire Operations Risk Management Council formalized two accident response guides designed to enhance organizational learning.

In 2007, the Risk Management Council produced the first iteration of the *Facilitated Learning Analysis Implementation Guide* and the *Accident Prevention Analysis Implementation Guide.* Both the "Facilitated Learning Analysis" (FLA) and the "Accident Prevention Analysis" (APA) process strive to capture and share *learning* from accidents, including close calls and near misses.

The Facilitated Learning Analysis process is intended to be a more basic and economical tool focused on local-level learning. The Accident Prevention Analysis is much more complex and expensive tool best reserved for events that appear to have a high value if exploited for organizational learning. The Facilitated Learning Analysis has proven to be an effective tool for focusing on learning rather than on blaming. The Accident Prevention Analysis tool takes this learning process/philosophy one step farther to concentrate the focus on organizational learning.

Each year, the Forest Service's Risk Management Council revises and updates both of these guides—based upon hands-on implementation experiences.

While the FLA dissects an event and demonstrates to employees—through their own words—both what they should learn from the event and how they should similarly learn from subsequent events, the APA process identifies the cultural and organizational conditions that increased risk. The APA report will also identify latent factors and conditions that—if not addressed—could contribute to subsequent accidents. Thus, the APA process is designed to improve and promote growth in organizational safety and culture, identifying latent organizational conditions that degrade performance and resilience. Both the FLA and the APA process are used to promote trust between administrators, supervisors and workers and enhance a culture of learning.

[For determining what type of post-event learning analysis option is most appropriate for various accidents, see the "Decision Aid" chart in Appendix A.]

Fidelity to our values demands that we treat accidents and near misses as precious learning opportunities and exploit their lessons across the agency as well as interagency wildland firefighting communities.

III. Introduction – The Accident Prevention Analysis Report as an Effective Learning Tool

A. The Purpose of this Implementation Guide

This guide is intended to be the manual for conducting an Accident Prevention Analysis. This guide walks the reader—step-by-step—through a process to prepare an APA report, from forming an APA Team, to administering the team's work in the field, to preparing and delivering the APA report. This guide also highlights many of the safety and risk management concepts that form the core of the APA process.

B. Two Unique Features of the Accident Prevention Analysis

Two key features make the APA process unique: 1) The understanding and incorporating of "Just Culture" concepts; and 2) The importance of "Story".

1. APAs are conducted under the principles that reinforce the model of "Just Culture".

A "Just Culture" recognizes that individuals must be held accountable for reckless behavior, but also recognizes that management should be held accountable for implementing a reliable operating system, managing human reliability, and for supporting a flexible, reporting and learning culture.

This concept has been presented in various books and discussions by subject matter experts (see Appendix D).

In a Just Culture, an organization learns and improves continuously by openly identifying and examining its own weaknesses.

Organizations with a Just Culture are as willing to expose areas of weakness as they are to display areas of excellence. Of critical importance is that employees feel that they are supported and safe when voicing concerns. Individuals know—and are able to articulate—that they may speak freely on issues regarding their own actions or those actions in the environment around them.

In summary, a Just Culture supports an atmosphere of trust in which people are encouraged (even rewarded) for providing essential safety-related information.

Definition:
'Just Culture'

A workplace where employees at all levels are held *fairly* to account for their participation and commitment to the organization's safety culture. Accountability is fair or "just" because workers are uniquely recognized to be inheritors of the production incentives, tools, trainings, procedures and even the safety -vs.- production *values* of the workplace. Management, in contrast, is expressly held to account for how it manages these artifacts, including the safety -vs.- production *values* of the workplace. In a Just Culture, management purposefully learns from employees how work actually gets done, and then enhances performance-shaping factors—without impeding future learning. Under a Just Culture management is able to balance the inherent but fundamental tension between needing to know what is going on – and not being able to accept what is going on

In a mature Just Culture, information is valued as the lifeblood of safety. Therefore, all employees disclose unsafe conditions, individual mistakes, and they share stories of how they manage the tradeoffs between efficiency and thoroughness (regardless of outcomes) due to the certain, fair and just distribution of rewards for this participation in the safety culture. Just Culture can also refer to the human performance management system designed to achieve the above. (See www.justculture.org.)

An Understanding of "Just Culture" is Essential to the APA Process

An understanding of a "Just Culture" is essential to the dialogue of the APA report's Lessons Learned Analysis section. (For more information on this APA report section, see page 24.)

☑ Before beginning the Lessons Learned Analysis process, the APA Team should therefore consider referring to this page and discussing the following important "Just Culture" concepts:

Understanding Work Under A Just Culture

- Risk is everywhere and in everything.
- Mistakes, errors, lapses, are normal and inevitable human behaviors. .
- Safety is not an "end state". Safety is the active, creative and continuous process of reducing the likelihood or severity of harm—through controls, avoidances, barriers, redundancies, procedures, and mindfulness. The objective of safety is to avoid all unnecessary risks and then manage residual and necessary risks to a level that is acceptable to both the leader and the employee.
- While safety is an essential business practice, our agency does not exist to be safe or to protect our employees. We exist to accomplish a taxpayer-funded mission as efficiently as possible—knowing that many activities we choose to perform are inherently hazardous (for example, firefighting, driving, flying helicopters, horseback riding, tree cutting and even walking through a forest).
- Essentially, every risk mitigation (safety precaution) carries some level of cost to production or compromise to efficiency. One of the most obvious is the cost of training. Employees at all levels (administrators, safety advisors, system designers, and front-line employees) are continuously—and often subconsciously—estimating, balancing, managing, and accepting these subtle and nuanced tradeoffs between safety and production. (See: *The ETTO Principle: Efficiency-Thoroughness Trade-Off , Why Things That Go Right Sometimes Go Wrong*, by Erik Hollnagel, 2009 Ashgate Publishing Limited.)
- Many risks are routine; mitigations or avoidances are straightforward and can be fairly simple. However, many risks are ephemeral and emerge from the complex interactions of random or sporadic events. These irregular and unexampled threats are managed through employee ingenuity with skills that are often systematically connected to the culture and the values of the workplace—especially the resources that the organization devotes to engineering resilience. (See: *Risk + barriers = Safety?* by Erik Hollnagle in *Safety Science*, p. 221-229, vol. 46, 2008.)
- How employees (at any level) perceive, anticipate, interpret and react to risk is systematically connected to *conditions* associated with the design, systems, features, and culture of the workplace. Effectively, all of these conditions are under some degree of control of the organization.
- In dialogue, refer to and think of "*safety*" as the "*reasonableness of risk*". (Additional resources available at: www.justculture.org).

"We like to hear good stories retold. What is more interesting is our need to tell stories, again and again and again. Each telling helps us understand more about the lessons embedded in the story."

Gary Klein, Author
Sources of Power: How People Make Decisions

"Stories are important not just because they coordinate, but also because they register, summarize, and allow reconstruction of scenarios that are too complex for logical linear summaries to preserve."

Karl Weick, Author
Making Sense of the Organization

2. Stories are central to the APA process.

In the APA—to maximize widespread organizational learning, sharing, and teaching— the traditional accident narrative section is modified with the factual story of the accident. That is why it is important for at least one member of the APA Team:

- To have the skills and ability to create the factual story of the accident, and
- To be able to write the accident "story" to take maximum advantage of its learning potential for the greater organization.

The APA report reader shouldn't expect to read a narrative style typically used in accident or incident reviews. A successful APA will contain a factual story that is a re-creation of events *told from the employees' perspective*—thereby more effectively resonating with their peers across the country.

This factual story will likely include subjective judgments, interpretations, and even descriptions of emotions that the APA Team believes to be accurate—but may not be verifiable. It is important to recognize that all interpretations of history are subjective and even the best narrative or factual story is inevitably subjective to reconstructive "sensemaking". (See definition of this term on page 25.)

Many organizational psychologists have written about how stories serve as a primary mechanism for relaying information in organizations.

We learn not only from formal classes, workshops, and various field exercises, but also from the stories that we hear in the field. The intent of the "story" being a primary component of an APA revolves around this central notion.

USDA Forest Service photos by Eric La Prince (left) and Aaron Black-Schmidt (right).

USDA Forest Service Photo by Ben Croft

C. Recommended Reading

This Accident Prevention Analysis Implementation Guide has been written to provide the knowledge necessary to perform an APA and develop the subsequent written APA report.

While this guide makes brief references to authors and subject matter experts regarding human behavior and organizational learning, it is recommended that the Accident Prevention Analysis practitioner explore more of these valuable resources.

For more of this important background information, please see the reference materials listed in Appendix D.

Available Accident Prevention Analysis Reports

The reader of this implementation guide might also want to view completed Accident Prevention Analysis reports. The following—all available on-line at www.wildfirelessons.net or by doing a Google search on the report name—are recommended:

- *Indians Fire APA Report*
- *Cascade Complex APA Report*
- *Chalk Fire – Engine 56 Rollover APA Report*
- *Angora Fire – Entrapment and Fire Shelter Deployment APA Report*
- *The Little Venus Fire Shelter Deployment Peer Review Report*
- *Meadow Creek Fire APA*
- *Crandall Ranger Station Tree Felling Accident APA*

The intent and expectation is that no agency administered administrative punishments should result from information gathered by the Accident Prevention Analysis Team.

IV. Step One – Begin the Learning–Before the APA Team Arrives

A. Agency Administrator Actions

Immediately following any serious accident or near-miss, the Agency Administrator should provide the people involved—directly or indirectly—with the accident with a notepad, pencil, and a quiet room.

Next, the Agency Administrator should request these people to individually and separately take the time to write notes regarding what they perceived were significant events, observations, and decisions.

Obviously, the Administrator should be sensitive to the welfare of these people who may very well have just experienced great trauma. But, for the sake of accuracy, the sooner such personal note taking—and reflection and recounting documentation—occurs, the better. These notes belong solely to the writer. They will not be collected or filed by the APA Team. They are intended to be kept by the individual note writers for their own personal reflection.

Such personal note taking needs to occur as rapidly as possible after the event for two primary reasons:

1. As time passes, human memory quickly begins to obscure details of events. The causes of complex events tend to become more simple and straightforward in hindsight than they actually were.
2. When one person's recollection of the accident sequence is later contrasted with another person's version, both versions tend to become exaggerated and to blend.

Therefore, to the extent possible, individual note taking should occur *before* employees discuss the accident with other employees—or before they undergo critical incident stress management.

B. Personal Note Taking and Photographic Advice

People should be asked to write their notes in a brief and concise "bulleted" form. Their observations should be in chronological order—with both the date and time noted. As previously mentioned, these notes will be used exclusively for and by the individuals who wrote them to help these people recall events during discussion with the APA Team members.

Accident Prevention Analysis Teams do not collect or request written "witness statements".

Any photographs or video taken that could be useful in reconstructing the accident should be collected by the APA Team. With photographic images, the photographer should be asked to inscribe where and when each photograph was taken.

C. Burnover or Shelter Deployment Accidents

If the accident involved a burnover or a shelter deployment, there are specific considerations that the Agency Administrator and APA Team need to consider to ensure that wildland fire personal protective equipment (PPE) functioned as designed. Subject matter experts from the Missoula Technology Development Center (MTDC) should be consulted. Often times, they must implement a performance analysis of the PPE that was related to an injury—or associated with the prevention of an injury.

V. Step Two – Forming the Accident Prevention Analysis Team

The Agency Administrator should form the Accident Prevention Analysis (APA) Team in consultation with the regional safety officer or fire and aviation risk management specialist. Depending on the complexity of the accident, a team as small as four people—or a much larger team composed of technical specialists and trained accident investigators—could be formed. Team Leader, APA Facilitator, Writer-Editor, and a Union Representative or Peer would, perhaps, be the effective minimum of necessary APA Team membership.

Team Membership for a large, fully-developed APA Team:

Team Leader

The Team Leader is necessary regardless of the complexity of the event. This person is delegated the authority to manage the analysis and to expend funds. The Team Leader is also accountable for the timeliness and accuracy of the APA report. While there are no prerequisite qualifications for a Team Leader, it is recommended that this person be a well-respected senior official from *outside* the Forest Service Region where the accident occurred. Typically the team leader is a line officer of regional director.

APA Facilitator

This position will almost always be needed on higher-complexity reviews. This person should be experienced and competent in evidence collection, reflective listening and interview techniques, accident sequence re-creation, and documentation management. Most importantly, this person should have a solid understanding of Just Culture, human factors analysis, and the APA process. The APA Facilitator should not have any administrative ties or social relationships with anyone involved in the accident—although this may be difficult to avoid.

Writer-Editor

This person would have the necessary writing-editing skills to compile and complete the APA report. It is important that this individual have the ability to create "the story" of the accident, as relayed by the accident participants, and write it—briefly, clearly and compellingly—in such a way as to take maximum advantage of its learning potential for the greater organization.

Peer

The type of employees directly involved in the accident should be represented by an APA Team member with intimate knowledge of the duties and skills necessary to serve in a similar position/job title. For example, if the accident is an engine roll-over, a member of an engine crew should be on the APA Team.

Functional Area Expert

This person has expertise in all aspects of the activity surrounding the accident. For example, if the accident occurred on a prescribed fire, the team should have a member with expert knowledge of prescribed burning operations, planning, coordination, and execution. (In some cases, the Peer and Functional Area Expert may be the same person.)

Safety Manager

This position should be filled if it is anticipated that the APA Team will need to be advised on matters relating to OSHA or to agency-specific occupational safety related issues. The Safety Manager also looks out for the safety of the assigned APA Team members.

Union Representation

Union representation is strongly encouraged on *all* APA Teams. If the accident occurred on a unit represented by a labor union, or if employees involved are represented by a union, a union representative *must* be invited to participate.

Technical Specialists

These positions are filled as needed and dictated by the nature and complexity of the event being reviewed. For example, a "human factors specialist" can be enormously valuable to illuminate human factors, as well as the cultural and social influences extant before and during the accident. A "documentation specialist" is often essential for any analysis lasting more than a few days. It is recommended that the APA Facilitator advise the Team Leader of the need for Technical Specialists necessary for a competent and timely analysis. In particular, the APA Facilitator should anticipate the need for:

- GIS skills to produce quality maps and displays.
- Logistical skills to secure meeting rooms, lodging, printers, faxes, etc.
- Public affairs skills to handle media and "political" concerns.
- Meteorology and Fire Behavior Analyst skills to reconstruct weather, fuel conditions, and fire progression for a wildland fire-related accident.
- Equipment Specialist expertise from the Missoula Technology and Development Center to analyze the performance of personal protective equipment.
- Event relative subject matter experts as needed.

A. Additional Considerations for APA Team Members

- **Detachment from the event.**
  None of the APA Team members should be from the same unit where the accident occurred, nor should any of the members of the team have a social or close working relationship with any of the individuals directly involved in the accident. To the extent possible, the team should meet and set up its base of operations away from the offices of the unit involved in the incident.
- **Outside perspective.**
  Whenever possible, team composition should be interagency in nature to capture an outsider's views of the accident and organization in which it occurred.
- **Strong interpersonal and interview skills.**
  Those APA Team members selected to conduct interviews must have strong skills in both attentive listening qualities and well-honed interview techniques. Interviewers who appear condescending or offer corrective advice will quickly lose the confidence of the person being interviewed—thus, jeopardizing the outcome.
- **An understanding of Just Culture, Human Factors, and Organizational Accidents.**
  Team members should have read and understood the reference materials in Appendix D of this guide.
- **Integrity.**
  All APA Team members should have a reputation for personal and professional integrity and proven experience in dealing with confidential materials. Because breaches of confidentiality may jeopardize an analysis or even the entire APA process—they will not be tolerated.

B. How to Develop Clear Goals and Objectives – In-Briefing Tips

- When arriving at the host unit, the APA Team should in-brief first with the Agency Administrator and then with individuals involved in the accident. This is an opportunity to establish common expectations of what will happen over the next days—or weeks—and to discuss what the outcome will look like. Always be wary of host unit expectations for a "quick wrap-up".

- It is critical that everyone involved in this process have a basic understanding of the purpose and intent of an APA and how it differs from a Serious Accident Investigation, an Administrative Investigation, or an Occupational Safety and Health Administration Investigation. All participants should be briefed on the Just Culture model. They should be assured that no punitive actions will result from information gathered by the APA Team. (This assurance of no agency administrative actions should be clearly stated in the delegation to the APA Team Leader.)

  All participants must understand however, this assurance of *no administrative action* does not protect employees against actions taken by the Department of Justice, Office of Inspector General, or other authorities that are outside the control of the U.S. Forest Service. If the Agency Administrator believes an employee involved with the accident acted with a reckless and willful disregard for human safety or obvious criminal actions, an appropriate type of Administrative Investigation should be requested.

- It should be emphasized during the in-briefing that the focus of the APA is to understand the nature of the accident—which necessarily includes all the workplace conditions (upstream and latent) that had potential influence.

- The in-briefing should also discuss the "storytelling" feature of an APA. The leadership involved should *not* expect the APA report to include a narrative style used in typical serious accident investigations, escaped fire reviews, or legal proceedings. A successful APA will contain a factual story that is a re-creation of events told from the employees' perspective in a manner designed to resonate with their peers across the agency. <u>It will likely include subjective judgments, interpretations and descriptions that the APA Team believes to be accurate—but may not be verifiable</u>.

- Appendix C is a "Tickler List" of items the APA Team Leader should cover at the in-briefing.

Compose a Delegation of Authority

The Agency Administrator should compose a Delegation of Authority to the APA Team Leader. (An example of such a delegation is available in Appendix B.)

It must be clear to the Agency Administrator that while APA Teams operate under the delegated authority of an Agency Administrator, the team will pursue organizational issues that may not reflect positively on the agency or the unit where the accident occurred.

Open Communication Advice

Regularly scheduled conversations should occur between the APA Team Leader and the agency official who authorized the investigation. The purpose of these discussions is two-fold:

- To keep the agency official updated on the APA Team's progress, and
- To ensure that the investigation is meeting the needs of the sponsoring official.

These conversations are not an opportunity for the agency official to "steer" the analysis in a particular direction. Rather, they are opportunities to ensure that the needs of the Administrator are being met and that the APA Team is answering all of the "how" and "why" questions that initially triggered the review.

C. Trust and Confidentiality

Because an APA is a *safety* analysis, not an *administrative* investigation, the team shall not betray the confidentiality of the employees involved. (The only exception to this confidentiality would be through judicial order.) Throughout the APA process, the confidentially of the employee will always be protected.

Cooperation with Other Investigations

APAs are independent from other investigations. Communications with the people involved in the incident, internal team deliberations, and draft reports will be held confidential to the extent possible.

If other investigations are occurring at the same time as an APA, the Agency Administrator must ensure that the APA Team is insulated from interference. For example, if compliance officers from the Occupational Safety and Health Administration (OSHA) or investigators from the Office of Inspector General (OIG) wish to conduct an accident or a safety investigation, they should be supported by the Agency Administrator. (See 29 CFR 1960.29 for OSHA guidance on accident investigations.)

In general, however, other investigators should have no contact with the APA Team, no access to any of the Team's notes, and not be permitted to participate in APA Team interviews or discussions

Material items that are evidentiary in nature such as photographs, transcripts of dispatch logs, law enforcement reports, personal protective equipment, etc., must be shared with the OSHA, OIG or other investigative authorities.

Written documents and photographs should be duplicated whenever possible so that other investigating authorities may retain a separate copy.

The "Chalk Fire Engine 56 Rollover APA Report" discusses the relevant lessons learned and recommendations that resulted from the story of this engine rollover accident.

VI. Step Three – Suggested APA Report Outline

1. **Executive Summary**
   A one to two-page summary of the accident with highlights of Lessons Learned.

2. **Introduction**
   An overview of the accident setting, the process used to investigate the accident, and APA Team membership.

3. **Narrative of the Accident**
   The factual story of the accident using the techniques of storytelling. (See Chapter IX.)

4. **Lessons Learned by the Peers**
   A compilation of the views expressed by those involved in the accident related to what they learned for themselves and what they believe the organization should learn from their experience.

5. **Lessons Learned Analysis**
   A listing of the relevant workplace conditions that help to understand the nature of the accident. The relevance of a given condition (relevance to the accident) is a subjective determination made by the APA team and where feasible originates from the Lessons Learned by the Peers. This is followed by an analysis of these conditions that the APA Team believes were key to this particular accident or could serve as latent conditions for a subsequent accident. (See Chapter VIII.)

6. **Summary**
   A summary of the Lessons Learned Analysis highlighting the conditions examined above and their influence upon the outcome. Performance shaping factors or latent conditions that pose an unnecessary risk to future operations should be discussed in this section and will serve as the basis for the recommendations. . (See Chapter X.)

7. **Appendix**
   An appendix of relevant specialist reports such as a fire shelter performance report, engineer's structural analysis, fire behavior analysis report, weather reports, etc.

8. **Glossary**
   A glossary of terms used in the report that may be unfamiliar to the general public.

9. **Recommendations**
   A listing of reasonable courses of action that modify, enhance or remedy performance shaping factors or latent conditions that pose an unnecessary risk to future operations. The Agency Administrator may choose to refrain from including the recommendations in the final report. (See Chapter X.)

10. **Team Participants**
    A list of the APA Team members responsible for the report.

Interviewers should strive to remember that their objective is to be able to describe how employees developed their understanding of the situation—and then made sense of their choices at the time.

VII. Step Four – How to Conduct Interviews and Develop the Accident Reconstruction

A. Interviews are Crucial to Analysis Process

Conducting interviews appropriately is crucial to the APA.

Interviews should occur as soon after the accident as possible—especially for accident victims who demonstrate a strong emotional response to the event.

The Team Leader should select interviewers based on their experience, skills in empathic listening, interviewing, and interpersonal communications.

Establishing and Ensuring Trust

APA Teams do not use depositions, do not record interviews, and do not request "witness statements". These "traditional" accident investigation tools conflict with establishing trust. If used during the APA process, they could interfere with obtaining frank disclosure of "mistakes" and at-risk behaviors, and various important personal insights.

For "critical" accident participants or observers, the Team Leader or APA Facilitator should consider using a team of two interviewers. Employees who are more tangential to the accident may be interviewed in groups. Please note: because using two interviewers can sometimes be intimidating to the person being interviewed, this approach should be used with the appropriate caution and understanding.

All interviewers will face "hindsight bias." (See Section D. in this chapter.) Interviewers should strive to remember that their objective is to be able to describe how employees developed their understanding of the situation—and then made sense of their choices.

Before interviews begin, the APA Facilitator should update interviewers with the interview process guidance outlined in this chapter. The APA Facilitator should also remind the interviewers to collect quotes and interview information to be displayed in the APA report under the headings:

- "*What the Employees Involved in the Accident Learned for Themselves—and for Their Peers Across the Agency*"
- "*What the Employees Involved Believe Management Should Learn From Their Experience*"

B. Reconstructing the Accident

The exact process of reconstructing the accident (generally by chronology and actions) will vary, depending on the size of the APA Team and the complexity of the accident.

The APA Team should be meeting together frequently (for example: a morning strategy session and an evening debriefing session). Additionally, it is often helpful to post a series of flipchart pages together and construct a chronology or timeline of events. Timestamps from photographs and dispatch logs are also helpful for verifying critical times.

At the conclusion of the accident reconstruction, the APA Team should agree about what happened and when it happened, the mechanics of what happened—and, especially, *how* decisions made sense to people at the time—is a separate APA Team product, the focus of the Team's "Lessons Learned Analysis" (see Chapter VIII.).

C. How to Get the 'Story': Suggested Questions for the APA Interviewer

You control the interview environment.
If it isn't comfortable, private, and friendly—find another location.

1. Ask the interviewee to tell the story from their point of view. Don't correct.

2. Tell the story back to them to ensure that you can make sense of their decisions the same way that they made sense of them at the time.

3. Accept the interviewee's perspective and their story. Remain neutral. Never agree or disagree with statements made—including when critical junctures are discussed in their story. Probe deeper into these junctures with questions such as:

Clues

- What were you seeing?
- What were you focusing on?
- What did you feel was going to happen, what was your level of optimism?
- Did you have any feelings of doubt, or worry about bad outcomes?
- What else were you thinking about (*friends? finances? hurting feet?*)?

Interpretation

- If you had to describe the situation to a peer who has approximately your level of experience, what would you have told them?
- What was your level of attention and focus on the risks that were real, relative to (in hindsight) what you now think it should have been?
- Are there any distractions that come to mind such as fatigue, inter-crew tensions, confidence in the level of control you had over the situation, clarity of mission, feelings of uncertainty, etc.?

Hindsight

- What mistakes in interpretation were likely at this point?
- Knowing the outcome, what do you feel you learned from this event? What do you think the agency needs to learn?

Previous Experience

- Were you reminded of any previous experience?
- Did this situation fit a standard scenario?
- How do you feel you were trained or prepared to deal with this situation?
- What rules and SOPs were helpful in this situation?
- What was your intuition or experience telling you?

Goals

- What goals governed your actions at the time?
- What were the conflicts or trade-offs to make between goals?
- Were there time pressures?

Taking Action

- How did you feel that you could influence the course of events?
- Did you discuss or mentally imagine a number of options? Or, did you know straight away what to do?

Outcome

- Did you feel that the outcome fit your expectation?
- Did you have to update your assessment of the situation?

4. With key accident participants, progressively probe and rebuild how the "world" of the accident/near miss looked from their perspective at each juncture. (If available, show the person pictures, video, maps etc. to help fill any memory gaps.) Discuss with these key accident participants the difference between information that was actually available to them as well as information that was presumed to be known by them. Encourage these people to address—what "hindsight bias" would now describe as—a "loss of situational awareness". A visit to key event locations may be very useful in helping people reconstruct events.

How the APA Views "Human Error"

The APA process is predicated on the following view of human error:

- Human Error and At-Risk Behavior are not viewed as causal factors. Rather, they are viewed as consequences of organizational and cultural influences.
- Human Error and At-Risk Behavior are not random. Rather, they are systematically connected to features of workplace culture, organization, operating environment, and system design.
- Human Error and At-Risk Behavior are not the conclusion of an APA; they are the starting points.

(Paraphrased from *The Field Guide to Understanding Human Error* by Sidney Dekker.)

D. Mitigating 'Hindsight Bias'

While interviewers will never be able to completely overcome "hindsight bias," they can mitigate many of the negative effects using the following threefold approach:

1. To enable and encourage the person being interviewed to openly share information, the interviewer should make every attempt to genuinely gain this person's confidence.
2. As deeply as possible, the interviewer needs to achieve the same limited perspective that was shared by the accident participants leading up to the event.
3. The APA Team must avoid using "counterfactual" expressions or even thinking in terms of "counterfactuals". (Counterfactuals are realities that *did not* happen but—with perfect hindsight—*could have* made a difference.)

The goal of the investigation is to find out how things happened the way they did. What the APA Team members might think *should have happened* will only degrade this goal. Examples of counterfactuals include: *"If only the employee had…" "The crew leader failed to…" "The supervisor should have…"*.

When counterfactuals come to mind, APA Team members should try to overcome their effect by telling themselves that even if the counterfactual had happened, the outcome might still have been the same.

[These three points (1. thru 3. above) are paraphrased from *The Field Guide to Understanding Human Error* by Sidney Dekker.]

Avoiding Hindsight Bias

Hindsight bias is the chief enemy of an interviewer trying to obtain honest and thorough information from a person involved in an accident.

Interviewers must therefore keep in mind that they have virtually unlimited access and time to gather information and facts that the person involved in the accident did not know and often could not have known.

It is natural human behavior for interviewers to inject their reconstructed stories, opinions, and biases into the words (if not the memory) of the accident participant.

Interviewers must be vigilantly aware of how crucially important their foreknowledge of the outcome is during the interview.

Interviewers should appreciate that the accident participants are also afflicted by hindsight bias. To a large extent, human memory will connect images and facts to build a coherent mental story that makes sense in the light of the *now known* outcome. Sensemaking does not stop after the accident. It is normal, and even unavoidable for all of us to rebuild and restructure our memory and mental stories continuously to incorporate additional (new) information. Soon memory of the actual event is replaced by memory of what was previously remembered. Over time, our recollections of events can change dramatically. It is common to interview an employee involved in an accident and their language will be packed with things they wished *they* had done differently – then, in the weeks following their language changes to the certainty of what *other people* should have done. A recommended solution is to interview employees as soon as possible and help keep them focused on telling the story solely from their perspective. That is, how they saw, felt or sensed events happing - and not *why* they believed things were happing.

This step validates the key workplace conditions that influenced how risks were perceived and understood and managed.

VIII. Step Five – Completing the Lessons Learned Analysis

After reconstructing the accident and describing all of its relevant facts, the APA Team will complete the "Lessons Learned Analysis".

This analysis—documented in the APA report—is the heart of the APA process. It identifies what we as individuals and we as an organization should learn from the accident.

This step validates the key workplace conditions that influenced how risks were perceived and understood and managed.

Good Reference Examples

It is recommended that APA Teams read the "Lessons Learned Analysis" section in the following APA reports:

- *Indians Fire APA Report,*
- *Cascade Complex APA Report,*
- *Meadow Creek Fire APA.*

These reports are available at the Lessons Learned website: www.wildfirelessons.net.

[Please note: Reports prior to 2009 labeled cultural and environmental *conditions* as "causal factors." Beginning in 2009, the APA process recommended avoiding or minimizing the terms *cause* or *causal* because their usage tends to overlook the dense complexity of *conditions* that influence context and sensemaking.]

A. The Recommended Procedure for Conducting the Lessons Learned Analysis

1. Gather the APA Team members together in a secure, private, meeting room.

2. Post around the room—most likely on flip chart paper—the quotes and key information gathered from the interviews, highlighting what the employees learned from this accident for themselves, and what they learned from the accident that they now want management to also learn.

3. Summarize all of the key conditions—concerning risk, key issues, decisions, interpretations and behaviors associated with the accident—from notes, interviews, and the chronology and accident reconstruction. These conditions should include the key interpretations—including beliefs, mistakes, lapses, misperceptions, decisions, actions, and behaviors—that directly contributed to the accident.

4. The APA Team should now discuss and come to a consensus on the conditions that preceded the accident—paying close attention to the human performance-shaping factors.

5. For each key condition, the APA Team should deliberate on the seven questions framed in the "Seven How's". (See shaded box on next page.)

Wikipedia's Definition:
'Sensemaking'

Sensemaking is the ability or attempt to make sense of an ambiguous situation. More exactly, sensemaking is the process of creating situational awareness and understanding in situations of high complexity or uncertainty in order to make decisions. It is a motivated, continuous effort to understand connections (which can be among people, places, and events) in order to anticipate their trajectories and act effectively.

B. Recommendation to the APA Team: Deliberate on the '<u>Seven How's</u>'

In discussing and coming to a consensus on the key conditions that made the accident participants' actions seem reasonable, natural, or expectable in the context of the situation leading up to the accident, APA Team members should keep asking "*why*" or "*how*" until they reach the level of "sensemaking" [see definition below] that was shared by those people directly involved in the accident. (In doing so, to clarify perceptions and resolve conflicting memories and understandings, the team should not hesitate to contact people previously interviewed.)

For each key condition, the APA Team should deliberate on these "Seven How's"

How it made sense at the time of—and leading up to—the accident <u>to</u>:

1. **See things the way that they were seen.**
2. **Expect what was expected.**
3. **Believe the risks were one way, when—*in hindsight*—we know they were another way.**
4. **Forgo an available hazard mitigation.**
5. **Shortcut typical procedure.**
6. **Accept a risk that—*in hindsight*—seems unreasonable to have accepted.**
7. **Ignore a risk that—*in hindsight*—seems so obvious.**

The answers to these "Seven How" questions will lead to identifying the key workplace conditions and performance-shaping factors that contributed to the accident. In addition, information related to simple lapses or mental mistakes are also important to address. They may reveal how—due to an overreliance on flawless human performance—the organization is unacceptably vulnerable to an accident.

C. Lessons Learned Analysis Key Considerations

1. Characterize the Accident by "Condition" Not "Cause"

The APA Team must always remember that the ultimate goal of the APA is increased resilience of the organization through promoting a just culture and a learning culture (*not* the "correction" of the individual). Identifying human error as the "cause" of the accident undermines this goal. As Professor Reason put it, *we cannot change the human condition, but we can change the conditions under which humans work*.

There is a deliberate effort in the APA process to avoid labeling errors as "causal". To do so necessarily degrades our ability to understand the dense and complex nature of accidents. All review or investigation processes have biases.
For example it is often said that 80% of accidents are *caused by human error*. The bias of the APA team however, is that accidents are *not caused* by anomalous or deviant employee behaviors but are more accurately and more fully understood as *unexpected combinations of normal human and system performance variability*. The APA team therefore will focus on a spectrum of workplace and worker conditions that enable us to understand the nature of the accident.

If you *must* to determine <u>CAUSE</u>

If there is a compelling reason to determine cause or identify causal factors in the report, the team should define the word "cause" within the report as:
The Team's judgment of the conditions that describe the nature of the accident including-

- conditions that create tension between production and protection;
- conditions that collectively produce the latent factors that permit the chance conjunctions of local triggers and active failures to breach all the barriers and safeguards.

*Adapted from *The Human Condition* by James Reason

2. Avoid Counterfactual Arguments
APA Teams must also guard against making counterfactual arguments, as in: *"If this person had done X, then the outcome would have been Y—and the accident would not have occurred"*. The APA is only useful when it learns *why people did* what they actually did (why it made sense to them at the time), rather than *why they did not* do something that, in hindsight, others might think they should have.

An APA General Rule

Accident Prevention Analysis reports must avoid using people's names and only refer to gender if it is relevant to the incident or meaningful to the story. Using employee titles may be awkward within the story. One acceptable technique is to use fictitious, gender neural names such as Terry, Tracy, Lynn, Leslie, etc.

3. Discovering Misalignments Between the Administrators' and Employees' Perspectives
Many unsafe behaviors are well tolerated and even valued—until there is an accident. Indeed, one of the values of experience is that it teaches us what rules and procedures are important and which ones can be short-cut to increase efficiency or effectiveness.

Once the APA Team understands how the accident participants made sense of their environment, the team should contrast this understanding with how administrators thought employees would (or should) make sense of the environment.

Exploring the gap between work as imagined by administrators and work as accomplished in actuality can illuminate substantial and critical organizational vulnerabilities.

The extent to which accident-related behaviors seem unacceptable to management is vital to the Lesson Learned Analysis process. A large disconnect between "work as imagined" and "work as actually done" can signal misalignments between the organization's expressed values and the values of the employees regarding tradeoffs between production and safety.

Deficiencies in physical ability, knowledge, skill, or leadership competencies may also be uncovered and considered key conditions or risk factors. Once again in these situations, the focus of the APA Team is not on the *individual* but on the *system* (the organizational conditions) that enabled under-qualified or under-capable employees to be in critical positions.

4. Sensitivity to Admitting Mistakes
The credibility of the APA depends on full disclosure of *all* the events and actions that helped to produce the accident. However, when writing the Lessons Learned Analysis, the APA Team must ensure—to the extent possible—that the employees involved in the accident are not embarrassed (and thus socially punished) for admitting mistakes. This sensitivity should extend to the broader unit and organization who experienced the accident. In some cases, people and organizations will be embarrassed simply for having a bad outcome—no matter how justified their actions may have seemed at the time.

The APA Team members must be firmly grounded in the understanding that if employees were not willfully and recklessly disregarding human safety, their at-risk behaviors and other active failures leading up to the accident must have seemed reasonable (if not justifiable) at the time.

5. Discovering a Serious Crime or Reckless and Willful Disregard for Human Safety
During the course of the APA process—though likely very rare—it could be discovered that an employee acted with a reckless and willful disregard for human safety or committed a serious criminal act. For example, say it was discovered that the accident victim was stealing valuable government equipment at the time of the accident - or, say an employee involved in the accident intentionally tried to hurt another employee. If such a discovery is made, then the event isn't appropriate for a *safety investigation* any longer. It should be handled by a criminal or administrative investigation. If such a discovery is made, the APA Team Leader should write a memo to the delegating official stating that the Accident Prevention Analysis has been terminated and that there may be cause to initiate an administrative or law enforcement

investigation. The APA Team Leader should release all physical evidence (that is, photographs, sketches, PPE or other physical equipment gathered by the APA team) to the Agency Administrator. Notes of interviews and other team products should be given to the APA facilitator for confidential and secure storage. At this point, the APA process has terminated - no further actions should be taken by anyone from the APA team.

Intentional Rule Violation *IS NOT*
Reckless and Willful Disregard for Human Safety

The APA Team must remain very aware that an intentional violation of a rule or procedure *does not* equate to reckless or willful disregard for human safety. Most often a procedural rule violation falls within the category of *normal, if not predictable,* human performance. It is the inevitable byproduct of conditions that pressure employees to increase efficiency or reduce complexity or effort. For instance, talking on a cell phone or two-way radio while driving is a classic example of knowingly violating a rule, however by doing so, there are often *significant* efficiency and productivity gains. It is our best employees that learn how and where to be efficient in ways the rule makers never imagined. Indeed the gap between procedures and practice should be respected as the evolution of expertise. From a safety perspective we must react to knowledge of this gap with careful appreciation. Information such as this is **the lifeblood of safety** and anything that is done to impede the flow of this information will result in less upward reporting.

*Self-reporting of intentional procedural rule violations is one of the most valuable features of an APA - this is the chief reason why we offer the assurance of "**no administrative actions**".*

Disclosure of intentional rule violations can also reveal procedural rules that interfere with *safe* operations. Understanding the *expectation* of the employee is critical to discriminate between a normal procedural rule violation and reckless and willful disregard for human safety. Admissions of procedural rule violation or at risk behavior must be protected, and even cherished, throughout the APA process.

The APA process is a *safety investigation* and that fact has implications with what can be done with information that is not safety related. By choosing the APA process the Agency Administrator and the APA team members have mutual promise to maintain separation between the APA process and any other sort of disciplinary, administrative or law enforcement action *under control of the agency*. While the APA Team Leader and the Agency Administrator must have some degree of discretion and flexibility to handle unique situations, including discussions on confidential matters, there must remain a firm firewall between the APA and any other internal (agency controlled) process that could use information from the APA for non-safety related purposes (see also the in-briefing tickler list in the appendix).

Therefore, if an APA is terminated for the above reasons, team members should not discuss anything they learned during the APA process with anyone. This includes agency officials performing *internal* (agency controlled) administrative or law enforcement actions. To do otherwise would violate the integrity of the safety investigation process and the implicit agreement within the APA process. However, at any time any team member may be required to cooperate with inquires or investigations from *external authorities* (that is, not under agency control) such as, civil police agencies or officials from the US Department of Justice, Office of Inspector General, Office of Safety and Health Administration, etc.

"We like to hear good stories retold. What is more interesting is our need to tell stories, again and again and again. Each telling helps us understand more about the lessons embedded in the story."

Gary Klein , Author
Sources of Power – How People Make Decisions

"All accident report writers have to chop-up continuous and interaction sequences of prior events into discrete words, paragraphs, conclusions and recommendations. If each sequence is viewed as a piece of string, then it is the investigator's job to tie knots in order to mark those points that appear to be critical stages in the development of the accident. Such identifications are necessary for making sense of the causal complexity, but they also distort the nature of the reality. . . . It is important for those who rely on accident reports to recognize that they are—even the best of reports—a highly selective version of the actuality."

James Reason, Author
The Human Contribution – Unsafe Acts, Accidents and Heroic Recoveries

IX. Step Six – Capturing and Sharing the 'Story'

A central feature of the APA report is relaying the "story" of the accident. The APA is distinguished from other reviews and investigations in that it attempts to gather the accident's facts and then transmit these facts and recommendations via a story. The narrative of what occurred—the *story*—is an inherent part of the APA process.

For insights into how to successfully elicit the accident "story" from the accident participants, see *Section C. How to Get the Story* in Chapter VII.

A. APA Storytelling and Story Writing Insights and Tips

- In the context of an APA, stories should not be confused with fiction or an enhancement of facts. In an APA, the narrative is a factual account of what actually occurred as told from the perspective of those most directly affected by the accident.

- Because the APA report is designed to be a learning tool, the narrative is written to utilize and highlight the power of storytelling. People tend to make sense of and remember *"facts"* by creating mental stories that give the facts context and an emotional attachment. Consequently, storytelling is widely recognized by leading educators as the most effective tool for teaching human / environmental interactions to successfully effect organizational and cultural change.

- Effective storytelling includes details gleaned from interviews to enhance the reader's vicarious experience. The story is written in plain language and leads the reader through the sequence of events as they occurred - and as they were felt.

- The participants of the accident did not expect the outcome that eventually occurred. Persons reading the story should be able to feel (or at least understand) the sense of surprise felt by the "victims".

- After a draft of the story is developed, read it aloud to the APA team and a few *guests* (people who have no firsthand knowledge of the event). The setting for this reading should be casual, private and relaxed. After the reading, each team member and guest should be able to relate a sense of what the accident participants were *feeling* at the time. That the characters in the story were hot, thirsty, confused or angry gives readers anchors upon which to attach themselves emotionally to the event and greatly enhances experiential learning. Even more importantly, the

emotions and sensory perceptions of those who *lived the event* establish the context for their decisions and are critical to understanding the sensemaking which occurred at the time. Edit the story as necessary to achieve this result.

- In an APA, the story presents the accident as it was seen, felt and understood by those involved. To the extent possible, the story should not be written from an outsider's perspective. Rather, the story is written from the point-of-view of the people most directly involved in the accident. The story is not written to persuade, but rather to reveal to readers the reality and truth of what actually happened—from the perspectives and within the context of those involved. It should strive to accurately convey what these people understood, believed, felt and experienced.

- Storytelling is a common talent but story-*writing* is unnatural to most people accustomed to writing linear narratives. If the team is struggling on this task, consider bringing in a skilled non-fiction storywriter.

B. Expect Different Perspectives

The story should strive to enable its readers to "walk in the shoes" of the accident's key players. At a minimum, the story should show how the decisions of these employees made sense within their social and cultural context—based on information known to them at the time.

It is inevitable in any complex event that the people involved in the accident will have different perspectives and memories of what happened and how and why. The APA Team's emphasis should be focused on the need to enhance completeness and accuracy to create a coherent and readable story.

Multiple stories are acceptable and this has been used in the other APAs to resolve irreconcilable differences in recollections or to illuminate important differences in perspectives. The APA Team may also consider telling one story from the perspective of the accident victims and a companion story from the perspective of the supervisors involved.

C. A Process for Story Validation

All of the key individuals involved with the accident should have an opportunity to hear the finalized APA report's story *read to them out loud by the APA Team*. They should be requested to correct or clarify important details. Also share with these individuals their *lessons learned* to ensure they are captured correctly. There is high value in employees seeing their thoughts and inputs captured in the report providing they are appropriately in the context in which they were offered.

If significant discrepancies surface, these should be resolved. Further follow-up interviews may be necessary. If important discrepancies cannot be reconciled, consider including an appropriate disclaimer in the report. Alternate recollections could also be posted in an appendix to the report.

It is recommended the validation should occur in two phases: first to those directly involved in the accident (the *victims* per se), and secondly to the other accident participants, supervisors and administrators. If people are shown a hard copy of the report, all copies should be collected afterwards to prevent contradictory copies from being circulated.

In some situations, it may be appropriate to bring all persons involved in the incident together for story validation in a facilitated group setting. Use caution with this approach as strong supervisors will suppress the voices of those that have different perspectives. It is usually preferable to read the story to those directly involved first, then to supervisors and administrators. After corrections are made the story from both readings it can then be read to all, lead by a strong facilitator, in a group setting.

The Indians Fire APA Report relays the story of the circumstances of how this rotating vertical plume entrapped and injured firefighters—and shares lessons learned that this accident's participants want to share with their fellow firefighters across the agency.

X. Step Seven – The 'Summary' and 'Recommendations' Sections

A. The APA Summary

This section of the APA report is a summary of the conditions that supported assumptions, decisions, and actions taken. It should include those conditions that contributed to an inaccurate perception or an inaccurate understanding of the risks that confronted employees.

Create a comprehensive timeline of the accident that illustrates how the main triggers of the accident can be traced back to the conditions and human performance issues that were illuminated in the Lessons Learned Analysis.

B. The APA Recommendations

The final recommendations become a separate and confidential part of the APA report delivered to the Agency Administrator. The Administrator may choose to include some or all of these recommendations into the final published report. If so, this section would follow the "Summary" section of the report.

APA recommendations should focus on workplace conditions or other performance shaping factors that pose an unnecessary risk to *future* operations. Recommendations may also focus on actions believed by the team that would enhance operational reliability and resilience – particularly actions to enhance development of a learning organization. Where reasonable, there should be a linkage between: a lesson learned by a peer; the analysis of that lesson learned and the identification of relevant workplace condition(s); and, the recommendation to mitigate, accommodate or ameliorate the condition(s). ..

The recommendations in this section reinforce that managing human reliability—not just the employee's responsibility—is an inherent responsibility of the organization. Care should be taken to ensure that these recommendations are realistic and achievable—given the limitations of the organization for which they are designed.

C. Example:

How the APA Report Links the Lessons Learned, Lessons Learned Analysis, Summary, and Recommendation Sections

The following illustrates how a basic APA report links the Lessons Learned, the Lessons Learned Analysis, the Summary, and the Recommendation sections.

In this example, The Story section of the accident report describes a serious accident that occurred when an employee was driving a vehicle with an under-inflated tire that became overheated and blew-out, creating a loss of vehicle control. Under the ethical blanket of a "Just Culture," the employee admits that, although he had been told periodically to check the tire pressure, he *never* does so.

- A Lesson Learned by an employee directly involved in the accident:

  "Under inflated tires can be deadly! I will, from now on, regularly check the air pressure in my tires."

- A Lesson Learned for management by an employee directly involved with the accident:

  "Some employees do not know how dangerous it can be to drive with an under-inflated tire. I had to learn the hard way. Management should ensure that we all understand the importance of checking tire pressures."

- A Lessons Learned Analysis provided by the APA Team:

  Conditions Related to Risk:

  - The unit recently began using pooled vehicles rather than assigning vehicles to individuals.
  - Employees interviewed reported that maintenance deficiencies (including over and under-inflated tires, low oil levels, bad shocks, worn wiper blades, etc.) are now common among pooled vehicles.
  - Unit vehicles are considered to be low reliability and employees generally seem to have accepted this as normal.
  - Rules such as requiring all employees to perform all maintenance checks on vehicles are generally known, but not enforced.
  - Most of the employees on the unit believe that routine maintenance on vehicles is everyone's responsibility—but not *any one's* responsibility.

  - The employee involved in the accident rarely, checks the tire pressure or performs any maintenance on fleet vehicles.

example continues on the next page

- There is no record of the tires ever being checked but it is likely the tires were last checked at the last oil change, approximately 11 months and 14,000 miles prior to the accident.
- According to the manufacture, tires such as those on the vehicle involved in the accident can experience bead separation at 290 degrees resulting in catastrophic failure. This temperature threshold can be reached after moderate driving at highway speeds when the cold tire pressure is less than 8 lbs.

Conditions and Factors Shaping Employee Performance:

- Management and employees have become accustomed to—have normalized and accepted—driving vehicles that lack regular or standard maintenance. There is a general and pervasive sense that vehicle maintenance is nobody's responsibility and that the related safety concerns are minimal. While the maintenance policy exists in writing, there is no administrative or social pressure to maintain vehicles.

❖ The Summary section could state:

Through the lens of hindsight, we know that not checking tire pressure regularly is a very risky behavior. In a culture where this behavior is accepted, the risks associated with the behavior become normalized. Once normalized, the risks are no longer managed. Instead, they become routine and ignored—or treated as unavoidable risks.

A key workplace condition that supported the decisions and perceptions of risk involved in this accident is that the unit has no process in place to enforce (or provide the social or administrative incentives to comply with) the existing rules requiring regular and routine maintenance of all vehicles.

❖ A Recommendation provided to the Agency Administrator:

The unit should establish, continually update, and reinforce a process to assure that regular vehicle maintenance and servicing has been performed.

The specific details of interviews and deliberations are not shared with anyone outside of the APA Team—including the Agency Administrator.

XI. Step Eight – The APA Report Review, Presentation, and Approval

The APA Team must have an appropriate level of autonomy to protect the team's analysis. In some cases, these revelations might not reflect favorably on those in charge of the organization. Therefore, the specific details of interviews and deliberations are not shared with anyone outside of the APA Team—including the Agency Administrator.

Agency Administrator Authority

The Agency Administrator retains the authority to request the APA report be vetted by legal counsel, Freedom of Information Act, or Claims and Privacy Act specialists. To neutralize unnecessary legal or political damage to the agency, the APA Team shall comply with these requests.

Upon final completion, the APA report is presented for comments and recommendations to the delegating Agency Administrator and other officials chosen by the Administrator.

The APA Team Leader. the APA Facilitator and the Agency Administrator should work together to resolve any items of dispute pertaining to the report. While it is important to distribute the report as quickly as possible, the integrity of the process is most important.

The original Delegation of Authority should ideally be a consensus of objectives. In addition, throughout the APA process, the APA Team should be communicating its analysis' key points with the Agency Administrator in a spirit of full disclosure—to prevent any "last minute" surprises.

However, in the unlikely event of an irreconcilable dispute between the Agency Administrator and the APA Team Leader, the report should be withheld from publication.

Under no circumstance should the APA report be changed or redacted without the explicit approval of the APA Team Leader.

If other agencies are involved in the accident (for instance, cooperator personnel were injured or were associated with the event), coordination should occur with those agencies prior to the release of the APA report.

XII. Step Nine – Actions to Take After the APA Report is Accepted and Released

A. Responding to the APA Report's Recommendations

If the recommendations contained in the APA report are relevant only to the local unit or Region, the Agency Administrator should assemble a team to evaluate the recommendations and develop an accident prevention action plan.

This team should strive to complete the accident prevention plan within a few weeks of the APA report's completion.

How To Distribute the APA Report

The APA report should be posted on websites that will maximize exposure, discussions and the potential for organizational learning.

Wildland fire related APA reports should be submitted for posting on the Wildland Fire Lessons Learned website.

For lessons learned *accident prevention* purposes, it is important to disseminate the report as quickly as possible.

B. Local Unit Follow-Up

The clear bias of the APA process is that accidents are organizational and systemic in nature. As a consequence, people on the local unit in which the event occurred may therefore believe that individual performance issues such as failures of leadership or a clear rule violation were ignored, overlooked, or trivialized in the APA report.

Administrators should therefore consider bringing in a trained facilitator to complete a facilitated dialogue session to provide the local unit members with an opportunity to talk through such issues face-to-face.

After participants see the final published APA report they may feel they have concerns or issues that need attention. The APA team should establish at least one contact person for follow-up and feedback.

Collecting and Storing the Analysis Materials

After the APA report is accepted, the APA Team's APA Facilitator shall collect and secure all flash drives, notes of interviews, team deliberations, and draft reports.

Material "evidence" such as photographs, personal protective equipment used, audio files/transcripts of radio communications, law enforcement reports, etc. shall be collected, cataloged, sealed, and given to the Agency Administrator for secure storage.

Agency Administrators should consult with their appropriate legal counsel or records managers on retention of these records.

C. Improving the Analysis Process

Over the course of time and experience, it is expected that this APA guide will be revised and improved. Therefore, approximately one month after an individual APA report is completed, the APA Team should reconvene with relevant Agency Administrators and conduct an after action review. (This interaction can be done "remotely"—for instance, via telephone and electronic conference call. It does not have to occur "in person".)

Results from this review should be forwarded to the Forest Service Risk Management Officer for consideration in future APA Implementation Guide revision efforts.

APA Team members are also encouraged to informally contact the Forest Service Risk Management Officer with observations or recommendations.

XIII. Appendices

Appendix A – How to Determine What Type of Investigation or Review is Appropriate

The Six Questions for the Agency Administrator to Determine if an APA is Appropriate

Determining if an APA is the appropriate investigative tool requires the Agency Administrator to gather sufficient information to answer the following six questions:

1. **Is a Serious Accident Investigation required by policy?**
   Forest Service policy requires a Chief's level-investigation of an accident with one or more fatalities. The Chief's Office may also choose to investigate any other type of accident. Generally, these types of accidents will have such serious political or fiscal consequences that a Serious Accident Investigation process is better suited to the event (Reference FSM 6731.1 and FSH 6709.12 section 34.1). Implementing an APA does not change the accident reporting requirements (Reference FSM 6732 and local policies - if applicable). If the accident is interagency in nature (involving personnel from more than one agency or jurisdiction), there may be investigative requirements stipulated in the authorizing Memorandum of Understanding between the agencies. Nothing in the *Interagency Standards for Fire and Aviation Operations* (the "Red Book") precludes any agency from utilizing the APA process.

2. **Is litigation against an employee or the agency likely as a result of the accident?**
   If the answer to this question is "Yes," the Agency Administrator should consider a confidential administrative investigation or a traditional Serious Accident Investigation. An APA or Facilitated Learning Analysis ("Just Culture") based investigation is inappropriate under the threat of a criminal or civil action.

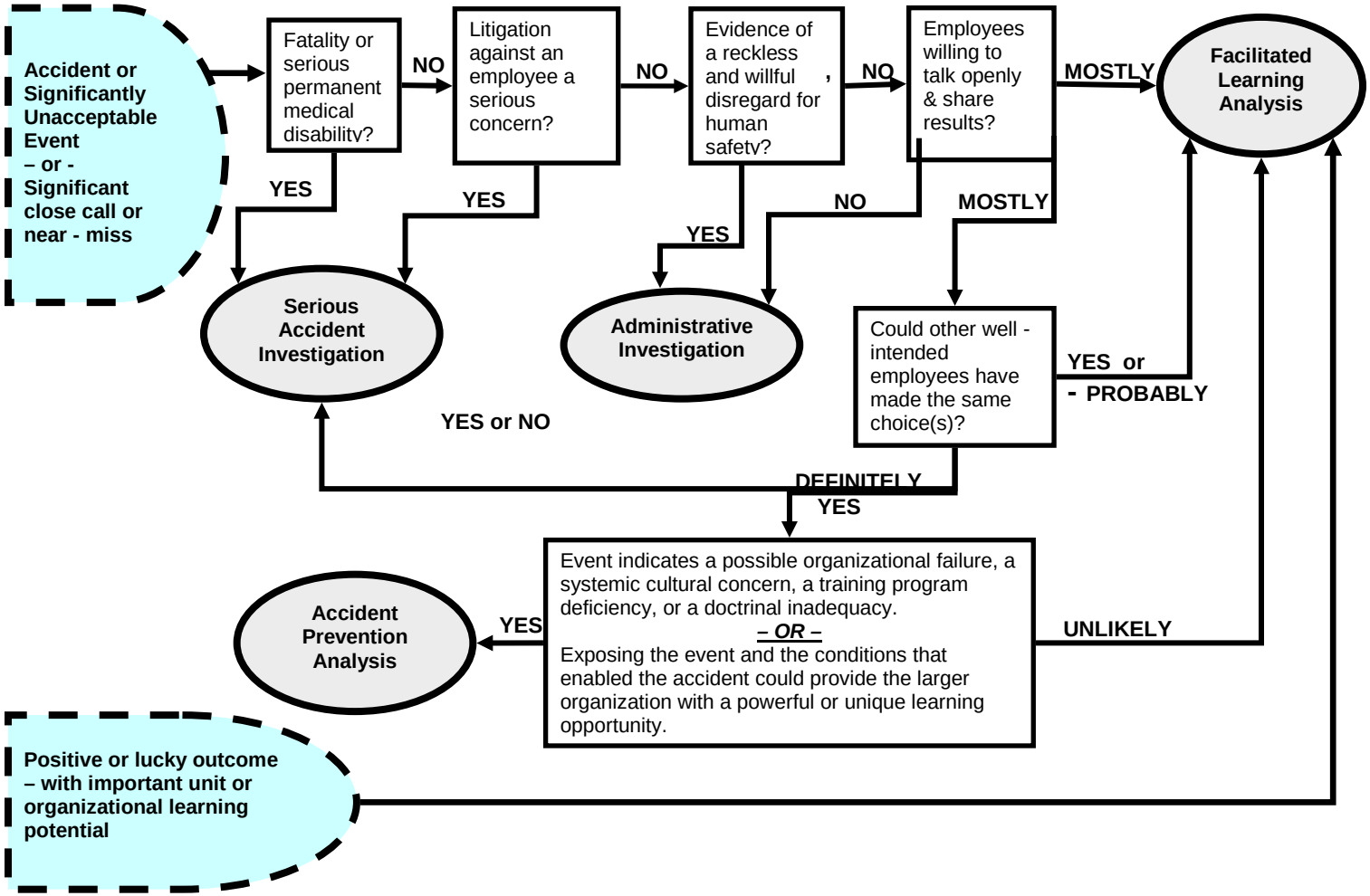
3. **Is there evidence that an act of reckless and willful disregard for human safety directly contributed to the accident?**
   If the answer to this question is "Yes," the Agency Administrator should consider an Administrative Investigation and, if appropriate, a concurrent Serious Accident Investigation. If the APA Team uncovers an act of reckless and willful disregard for human safety, the team may not be able to sustain the trust and confidence of other accident participants—knowing that disciplinary action is likely. (A *reckless and willful disregard for human safety* is conduct that is intentional, unjustifiable and occurred with the foreknowledge that the conduct was *likely* to result in serious harm, death or injury to a human – see shaded box on page 27.) Moreover, the value of an APA is to hold the agency accountable for designing safe systems and managing human reliability. The employee, *not the agency*, is accountable for reckless and willful disregard for human safety. If this behavior is believed to have directly contributed to the accident, an APA is likely a wasted effort.

4. **Is the Agency Administrator committed to disseminating the Lessons Learned?**
   The answer to this question must be "Yes." Because this review process will likely illuminate organizational failures to provide a safe workplace resilient to inevitable employee performance variability, this is a critical consideration for the Agency Administrator. There is also an explicit agreement between the Agency Administrator and the accident victims or observers that no adverse administrative actions will be taken against those who tell the truth after an accident. Some information in the report may be uncomfortable and even embarrassing to management officials. Importantly, to effect positive change, the lessons learned by managers (just as with the employees involved in the accident) must be disseminated so that other managers can learn without having to experience a similar event.

5. **Is the accident an organizational accident?**
   Accidents involving competent, well-motivated employees are those strongly indicative of an "organizational" accident. The more surprised administrators are by the accident, the more the accident tends to be organizational in nature. If the answer to this question is "Yes," because an APA is designed to uncover organizational conditions, this process will be more effective in preventing future accidents.

6. **Is the Agency Administrator more interested in 'learning' rather than 'punishing'?**
   The answer to this question must be "Yes." This "learning" concept is extremely important to the APA philosophy and process. If punishment is intended—in whatever form—the APA process should be dropped. The APA's overriding purpose is always individual and organizational learning. Therefore, if learning is the more important goal, an APA is the appropriate vehicle. The learning that will result from this constructive process will far outweigh any perceived benefit that might be derived from punishing individuals for making mistakes or violating rules.

Agency Administrator Decision Aid
for Choosing the Appropriate Post-Event Investigative-Analysis Process



Note: an internal Law Enforcement Investigation may be initiated independent of the above after any accident.

Appendix B – Delegation of Authority Example

File code: 6730 Date:
Route to:

Subject: Delegation of Authority

To: (Accident Prevention Analysis Team Leader)

This memorandum formalizes your appointment as Team Leader of the Accident Prevention Analysis Team formed to investigate, analyze and report on the (accident name, location). As Team Leader, you have the full authority of my office to execute and complete a thorough Accident Prevention Analysis. To the extent reasonable, follow the procedures displayed in the Accident Prevention Analysis Guide. You are scheduled to in-brief with my staff and me on ___(date and location) _____. _____ will be your logistical coordinator and my liaison to you. Please contact him/her at phone number _____ to discuss your logistical support needs.

You are expected to produce the 72-hour (or preliminary accident briefing) report and the final report as soon as practicable.

I expect you to terminate this investigation if you uncover information that leads you to believe this accident resulted from a reckless and willful disregard for human safety. I respect that the information you collect from interviews will remain confidential even in this instance. I also agree that no punitive actions will be taken by the Forest Service against any employee as a result of information provided to any member of your team. I will contact you periodically for an update on your progress.

Your authority includes, but is not limited to:

- Controlling, organizing, managing, and directing the analysis.
- Controlling, and managing the confidentiality of the process.
- Protecting and managing the integrity of evidence collected.
- Authorizing and requesting additional personnel, including technical specialists, to support the APA Team, and releasing them upon completion of assigned duties.
- Authorizing and coordinating the expenditure funds.
- Coordinating all media releases about the investigation.

- Issuance of Safety Alerts, if warranted, in coordination with _____ the Regional Safety Manager, cell number: _____.

All travel; equipment and salary costs related to this investigation should be charged to ___ (job code) ___ with an override code of _____.

For additional information, please contact me at: _____.

/s/_____
Agency Administrator

Appendix C:
Agency Administrator ~ APA Team Tickler List of In-briefing Discussion Items:

If the unit is represented by the union, ensure union representation is present at the in-briefing!

1. **Why an APA?**
    a. This event was unexpected. Unexpected outcomes are disturbing to our organizational and personal security. The suffering caused to our employees and their families from accidents are unacceptable to us. If there is something we can change so that it never happens again, we are ethically and morally compelled to do so.
    b. We've learned the hard way that how we react to any accident will either vector us towards, or away from, a learning culture. The APA process, as demonstrated and refined by years of implementation experience <u>will move us towards a learning culture</u>.
    c. We knew there is always a chance of this type of accident happening. It may have been a surprise but it also probably wasn't totally outside of the range of what we felt could happen. The APA report will show how our employees made sense of their situations and reveal the workplace systems and conditions that made such sensemaking reasonable; and perhaps even inevitable. With this information, management can make system adjustments that should enhance performance and reliability in the future.
    d. The APA report will tell the story of the event in such a way as to give others across the country a vicarious experience of the accident. It is hoped this experience will be a *portal* experience leading to a greater awareness of risks and their own safety *(Leader: consider discussing the meaning and value of portals)*.
    e. All accidents are required by OSHA and by FS policy to be "investigated" and all escaped Rx burns are to be reviewed as per FS policy. This APA shall constitute an investigation/review and fulfill that requirement.

2. **The process the APA will follow:**
    a. The APA team will gather background information on timelines, maps, dispatch records, photographs, etc., and information from conversations from those involved to be able to piece together all the "facts" and create a timeline of the accident story and an outline of key events. Concurrently team members will be working closely with those most directly involved with the accident to understand what they believed happened and how the decisions and actions leading up to the event made sense at the time.
    b. Using the APA's Lessons Learned Analysis process the team will examine and interpret the workplace conditions and upstream factors that lead to the

sensemaking that occurred before and during the accident. Lessons learned by those directly involved will be featured in this analysis.

c. A draft story of the accident will be completed. This story will then be read in a confidential setting to the key characters within the story. A vetting process will occur between the team and the key characters until there is substantial agreement on the factuality of the story.
d. A draft of the report will be completed and submitted to the Agency Administrator. If requested, this draft will include recommendations from the APA team to the Administrator that the team believes will enhance risk management in the future. Any changes to the draft document will be negotiated between the Agency Administrator, the APA Facilitator and the APA Team Leader.
e. As soon as the report is accepted, the report will be posted on appropriate websites for widespread distribution and learning.
f. Other steps or items *this particular* APA may include:
_____ ...

3. What the APA team needs from the Agency Administrator:

a. Assurance of no administrative actions against any employee involved in this APA *(Leader: consider discussing what administrative actions means <u>from the employee's perspective</u>).*
b. A commitment to comment upon and approve the report promptly.
c. Support for the team with regard to facilities, logistics, making employees available, etc. Immediate logistical needs include:
_____ …

4. Expectations:

a. APA Team members will be absolutely confidential in all deliberations and conversations.
b. If the APA Team discovers a willful and reckless disregard for human safety, for example, "the crew was smoking dope", the APA will be terminated and the team will leave. The background and details of the discovery will remain confidential *(Leader: consider discussing the meaning of a "willful and reckless disregard for human safety" or reading the box on page 27 of the APA guide).*
c. The APA process is profoundly different than a traditional investigation. Most accident investigations use process adopted from the science of criminology focused on finding "cause" (as crimes are committed ~ accidents are caused). Whereas the process of the APA is adopted from the science of human factors and the understanding that accidents result from unexpected combinations of *normal* performance variability. The former seeks evidence and findings to construct a cause(s); the latter seeks to explain how employees

understood risks and then made sense of the safety and production tradeoffs within their social, cultural and environmental context. Secondly APA process operates within the framework of a Just Culture which protects employees from retributive accountability (singling out operators for fault) and instead distributes accountability fairly to the sources within the system that influenced how risks were understood and managed. *(Leader: consider reading the definition of Just Culture found on page 10 of the guide and "Understanding Work Under a Just Culture" page 11).* This can be expected to be an uncomfortable challenge to supervisors and other leaders that see employee error as the root cause of the accident.

d. After a while, some employees may feel that other employees 'got off' when they should have been punished for violating a rule or "causing" the accident. Other employees may be resentful because they feel others weren't as forthcoming as they should have been. Administrators should be sensitive to this and may need to follow-up with additional facilitated dialogues or workshops on Just Culture.
e. The draft report should be completed by about __/__/___.

5. The end state.

a. The employees and their colleagues better understand not only what happened but why the choices made leading up to the accident made sense at the time, in the context of the event.
b. Employees see that their supervisors can be trusted (at least in this incidence) to react to an accident in a way intended to build trust and a learning culture.
c. Administrators and employees have a document that will be helpful for use in future operational training, safety training or risk management. This document may also be useful to other units for these purposes across the country.
d. The accident investigation policy requirement is completed with the acceptance of the APA report. The Agency Administrator may choose to implement the recommendations; or not.

Summary:

Risk Management and even *Safety* can be somewhat obscure and indefinite goals. A tangible goal however is simply to be better than we were before and specifically to be closer to a Highly Reliable Organization. One the traits of HROs are - *a preoccupation with failure*. This isn't negative thinking, it is intelligent wariness. As Karl Weick wrote: *"If eternal vigilance is the price of liberty – then, chronic unease is the price of safety."* We know that we cannot make our work place free from all potential or even recognized hazards. But we can exploit the value of accidents and close calls by focusing on learning from our mistakes and continuously improving how we discern, interpret and manage risks. To actualize a HRO requires a commitment to a culture of learning.

Appendix D – Reference Materials for Accident Prevention Analysis Teams

APA coaches are available! Call the Risk Management & Human Performance Specialist at: 208.387.5970

1. Anticipating Accidents and Human Factors

Dekker, S. 2006. *The Field Guide to Understanding Human Error*. Ashgate Publishing Company.

Hollnagel, E. 2009. *The ETTO Principle: Efficiency-Thoroughness Trade-Off, Why Things That Go Right Sometimes Go Wrong.* Ashgate Publishing Limited.

Reason, J. 2008. *The Human Contribution – Unsafe Acts, Accidents and Heroic Recoveries*. Ashgate Publishing Company.

Reason, J. 1997. *Managing the Risks of Organizational Accidents*. Ashgate Publishing Limited.

Tavris, C. and Arnonson, E. 2007. *Mistakes Were Made (But Not By Me).* Harcourt Inc., Harcourt Books.

Weick, E. and Sutcliffe, K. 2007. *Managing the Unexpected: Resilient Performance in an Age of Uncertainty*. John Wiley and Sons Inc.

2. Stories and Organizational Learning

Bruner, J. 2002. *The Uses of Story*. First Harvard University Press.

Crandall, B. and Klein, G. 2006. *Working Minds: A Practitioner's Guide to Cognitive Task Analysis*. Beth Bradford Books.

Klein, G. 1998. *Sources of Power*. Massachusetts Institute of Technology.

3. Just Culture

Marx, D. 2001. *Patient Safety and the "Just Culture" – A Primer for Health Care Executives.* Trustees of Columbia University in the City of New York. Available on line at: http://www.mers-tm.net/.

Global Aviation Information Network, Working Group E, Flight Operations/Air Traffic Control Operations Safety Information Sharing, 2004. *Roadmap to a Just Culture: Enhancing the Safety Environment.* Available on line at: http://204.108.6.79/.

On-line training modules on application of Just Culture, produced by Outcome Engineering Inc. Available at: www.JustCulture.org.

4. Overview

Larson, G.; Wright, V.; Spaulding, C.; Rossetto, K.; Rausch, G.; Richards, A.; Durnford, S. 2007. Using social science to understand and improve wildland fire organizations: an annotated reading list. Gen. Tech. Rep. RMRS-GTR-201. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 82 p.

Snook, S. 2000. *Friendly Fire.* Princeton University Press.

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