

**LESSONS LEARNED 2003**

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**SUCCESSSES AND CHALLENGES  
FROM AAR ROLL-UPS**



**For: Wildland Fire Lessons Learned Center  
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## **LESSONS LEARNED RELATED TO THE OPERATIONS FUNCTION**

### **Operations On an All Risk Incident**

**Background:** The Space Shuttle Columbia Recovery Effort brought together a mix of agencies that normally do not work together. Non-traditional agencies working together for a common mission successfully integrated, and the effort was a success both in the field and in camp. Using the versatility of the available teams assured success in this “all-risk” (non-wildfire) assignment. Providing crews and overhead with an orientation proved valuable. Orienting each new crewmember to the incident ensured clearly defined expectations, roles, and direction for the incident.

Some respondents report that to be consistent with the ICS, Divisions should have been identified as Groups, because they were functional units not assigned to a single geographic area. Others pointed out that, since search and rescue comprised the primary effort in the field, assigning one search and rescue instructor/expert to every search division would have enhanced crew effectiveness.

#### **Lessons Learned:**

- ☼ On unusual incidents, orient each and every crewmember to the incident to clearly define expectations, roles and rules.
- ☼ Use ICS principles appropriately on non-wildland fire incidents, including the designation and assignment of groups and divisions.
- ☼ When incident operations include non-wildland fire strategy and tactics, assign tactical instructors and experts to the division or group to enhance effectiveness.

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### **Diversity of Tactics**

**Background:** Several incident management teams (IMTs) reported using a diversity of tactics, including some unconventional ones, to accomplish their assignments.

Several IMTs reported that the need to use a range of tactics presented them with their greatest challenge. For example, one IMT reported that, while managing a large complex with a number of fires, they used of a variety of suppression tactics on many different fires at once; including burnout with and without aerial ignition, minimum impact suppression tactics (MIST), cold trailing, hot-spotting, direct line construction, indirect line construction, wet mop-up, application of retardant, spike camps, and coyote tactics. Another IMT had a fire in extremely rough and steep terrain. Their fire did not completely consume

available fuels within the fire perimeter, and numerous hazards were present including, snags, downfall, tall brush, and no road access. Crews stayed in a spike camp located near the incident, and by using the right mix of aircraft, saw teams, and an elaborate hoselay; they contained the fire without constructing fireline and without receiving a break in the weather or fire behavior. Yet another IMT found that the use of locally contracted excavators to construct direct line in certain areas was very cost effective, safe, efficient, and allowed for expedient mop up.

As resource shortages impacted operations, priority setting became important during the 2003 season, and people accustomed to aggressively attacking all their fires had to accept that they would let fires and parts of fires burn. One IMT was faced with multiple lightning fires of various sizes and very limited resources when they arrived at their assignment. No Type 1 crews were available, so the team worked with the resources available, only staffing one fire at a time. The IMT did not allow itself to get “sucked into” the trap of trying to control all their assigned fires at once with limited resources. This is consistent with the experience of other IMTs, including one forced to keep crews in camp due to lack of overhead.

Another IMT reported that the combination of confinement, containment, and control strategies assigned by the selected WFSA alternative was safe and cost effective. The fire was located in a roadless area, in a heavy fuel model 10 with standing dead Spruce and Lodgepole Pine, steep terrain and safety zones located several miles away with access only by trail or helicopter. According to the IMT, by using a combination of confinement, containment and control, they established firelines around a defined geographic area’s terrain features, fuel changes, and a perimeter road system. Consequently, fewer firefighters were required and all firefighters were able to work in areas with fewer hazards while preparing firelines. The IMT allowed the fire to reduce fuel loadings and create a fuel break between a community and the extreme amount of dead standing spruce in the fire area as well.

On one large fire, the IMT constructed a shaded fuel break in front of homes/cabins in the fire’s path as a suppression tactic. The fuel break was approximately 130 feet wide and was created as part of indirect line preparation using tree harvesters/processors and grapple skidders. The equipment removed ladder fuels and downed fuels, thinned remaining trees, which left the largest trees with adequate air space between their crowns. Conditions never allowed the IMT to burn out from the fuel break as planned. However, the fuel break did alter fire behavior enough to allow structure protection and wildland fire suppression resources to remain in the fire area and protect structures. Local residents who visited the site were pleased with the visual appearance of the large trees that were left, and the park-like setting.

On a Type 4 incident, the agency selected a strategy to let the fire burn itself out after taking into consideration 1) the current and predicted weather, 2) location of the fire, and 3) current and predicted fire behavior of the fire. This fire was located in a remote area of a wildlife refuge, and the fire staff of a nearby national forest made a daily detection flight of the fire. In three days the fire had completely burned itself out, and there were no complaints of any kind.

Numerous IMTs reported being distant from their fire. All types of teams reported using spike camps to overcome very long driving times or difficult backcountry access. However, respondents also reported that spike camps presented challenges. For example, one IMT referred to their incident as a test of air support operations, because they had as many as six spike camps in operation at one time. Another IMT, managing a large complex with a number of fires, found success with movable, low impact spike camps.

**Lessons Learned:**

- ☀ Managing large complexes with a number of fires may require the IMT to simultaneously employ a range of suppression strategies and tactics, including unconventional approaches as well as those that simply require dogged persistence.
  - ☀ In some circumstances, resource availability will dictate what a team is able to do. IMTs should take action on only those fires that they can safely and effectively staff. As one team put it “Only fight what you can safely, and don’t worry about some of the fires continuing to grow. And don’t let political pressure change your tactics. Prioritize fires at the onset of the assignment and again daily.” Sometimes you just need to watch the fire burn itself out.
  - ☀ Spike camps remain a viable alternative for getting firefighters close to the work, overcoming poor access, and mitigating long driving times and the need for extensive crew shuttle by helicopter. However, spike camps also present challenges and the IMT must staff and equip sufficiently to support them.
  - ☀ IMTs can also mitigate travel and access issues by having crews work from point-to-point, shuttling their vehicles between points and using “coyote tactics,” having crews camp where they stop work without supplying a fixed camp.
  - ☀ Locally contracted excavators can provide a very cost effective, safe, and efficient tool for constructing fireline and expediently mopping up.
  - ☀ Shaded fuel breaks constructed around structures in the fire’s path can represent an effective suppression tactic.
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## **Operations and Tactics in Australia**

**Background:** Many lessons were learned about how fires are managed and suppressed in Australia including the following:

Minimal handline is constructed on wildfires in Australia because of the fuels and topography. Fuels burn rapidly and access to many areas is minimal. No fire shelters are used, and firefighters use their vehicle as their escape route. The firefighter must always plan where they will drive to for safety, and be able to get to their vehicle quickly. Consequently, firefighters never get too far away from their vehicle.

Australians prefer burning out from roads and tracks (dirt roads) to line construction, though they do construct line on small, low intensity fires. Burning out, in most cases, goes quickly, and mop-up was occurring within two hours of most burnout operations and involved minimal water. Fuels tended to burn out quickly and heavy fuels (eucalyptus logs and trees) stopped burning when the heat was not concentrated, so just a little scraping and spreading of the heat extinguished the fire.

The Australians use the “Swing Shift” effectively. The operations included normal day and night operational periods with a Swing Shift that typically worked from noon until 0400. Swing Shift personnel mostly did the burning, and held what they burned, and consequently they did not always run through 0400, but would end the shift when they could no longer burn. The day operational period would also start burning when they could, and the Swing Shift would take over burning, allowing the day people to hold and patrol the areas that they had already burned. The added shift provided coverage without worrying about lag times for shift changes, reducing the potential for overlong shifts.

### **Lessons Learned:**

- ☀ U.S. firefighting agencies can learn from support assignments to foreign countries, bringing back novel and innovative approaches to the firefighting job.
  - ☀ In light, fast-burning fuels with low residence time, burning out from roads should be considered as an alternative to line construction.
  - ☀ A “Swing Shift” may provide improved operations and eliminate concerns associated with leaving critical parts of the fireline uncovered during shift changes. It also helps the IMT manage fatigue by reducing shift length.
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## **Quickly Completing Critical Burnout**

**Background:** On a fire, one IMT reported that they were able to quickly complete critical burnout operations by using aggressive tactics. The team used line constructed by volunteer fire departments on initial attack, aggressively continued dozer line construction and implemented burnout operations as soon as possible. Using these aggressive tactics, they were able to complete burnout operations just ahead of sustained 20 mph winds that hit the fire from all directions. Because they had completed the burnout, all their lines held, on that same afternoon, other fires in the area all experienced significant fire activity and growth, including the loss of structures.

**Lesson Learned:** Quick, aggressive action can complete critical tasks and can determine whether a team contains its fire or not. This type of fast, vigorous action may require that the team perform as if they are on initial attack; effectively deploying the resources on-hand and taking advantage of work completed by initial attack forces, rather than taking time to prepare a new plan and waiting for ordered resources to arrive.

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## **Supporting Initial Attack**

**Background:** Numerous IMTs, in addition to managing an incident, found themselves successfully supporting local Initial Attack (IA) operations during the 2003 fire season. For example, an IMT was tasked with supporting IA, made plans to meet that responsibility, and provided two helicopters and a hand crew to respond to an emerging fire, which was caught at 730 acres with the assistance of the IMT's resources.

Other IMTs found that supporting local initial attack operations provided them with challenges. For example, dispatching procedures and aviation support became the issue for one IMT. The IMT was assigned IA responsibility within their Temporary Flight Restriction (TFR) zone for their incident, but were also asked to support local agencies with IA outside of the TFR when requested. As the incident evolved, the IMT was asked for IA assistance several times, and normally sent a helicopter to assist with bucket work, or other tasks. However, the incident's aviation resources were responding as far as 30 miles away from their designated TFR, and flight following from the helibase became difficult. Consequently, the IMT's Aviation Branch Director raised safety concerns about flight following, communication, and general safety practices.

The IMT solved this potential problem by establishing a procedure for flight following and communications with the local interagency dispatch center. Under this process, once the incident's helicopters left the established TFR, the local dispatch would take over responsibilities for flight following, radio frequency control, and protocols for ground forces. Once this process was in place, IA assistance flowed smoothly, with fewer safety concerns.

**Lessons Learned:** IMTs can effectively support local initial attack forces. Discuss expectations with the host agency in advance and make formal plans. Collaborate as necessary with local resources, including dispatch centers.

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### **Changing Strategy with Changing Conditions**

**Background:** One IMT reported that the selected WFSA alternative called for indirect attack that would encompass approximately 30,000 acres when completed. The IMT felt that this strategy was very appropriate given the fuel type, fuel moisture conditions, fire weather, and observed fire behavior. The IMT began implementing this alternative by burning out at the heel of the fire on the west flank to provide an anchor point and protect a subdivision. However the fire received approximately 0.60" of precipitation over a two-day period. The IMT, with concurrence of the line officer's representative, changed strategy given the changed conditions. The new strategy secured the north and south flanks, tying into an escarpment on the east flank of the fire. The final fire size was approximately 3,500 acres. The IMT implemented the changed strategy by employing five Type 2 handcrews with helicopter support, which the IMT considers an incredible feat.

**Lesson Learned:** IMTs need to remain flexible and prepared to change strategy quickly as conditions change and opportunities present themselves.

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### **Type 3 Teams and Their Use in Extended Attack**

**Background:** Type 3 IMTs often assume fires from Type 2 and Type 1 IMTs. However, two agency units reported on their experience assigning Type 3 teams to manage extended attack fires prior to transition to a Type 2 or 1 team. In both cases, this approach increased leadership, provided safer and more aggressive suppression activities, and provided for a smoother transition to a higher-level IMT.

**Lesson Learned:** Type 3 IMTs provide an effective level of management on emerging fires, and offer effective management between initial attack and assumption of command by a Type 1 or 2 team. Type 3 teams can provide effective leadership, implement safer and more aggressive suppression actions and facilitate a smoother transition to a higher-level team.

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### **Role of Volunteer Fire Departments**

**Background:** An IMT worked with rural departments that had taken the initiative to train to NWCG 310-1 standards on two different fires. In both cases, the IMT was able to seamlessly incorporate these valuable resources into the Incident Action Plan (IAP), and the local forces were used both for structure protection and wildland fire suppression. In addition, the IMT relied on the local forces for area knowledge, flexibility and leadership. The volunteers' knowledge of the local

area allowed the team to incorporate safe, aggressive tactics in their suppression efforts. In turn, incorporating local forces into the suppression effort gave the local forces ownership in the suppression effort, increased community support, and helped to strengthen interagency relations.

Conversely, the IMT also encountered other local fire departments that had not signed up through local dispatch, forcing the team to go outside the local area to obtain needed support and equipment.

**Lessons Learned:**

- ☀ When IMTs encounter volunteer fire departments that have trained to NWCG 310-1 standards, the team can easily incorporate their resources into the IAP and rely on them for local knowledge and leadership .
- ☀ Incorporating local volunteers into the IMTs effort improves local relations and interagency cooperation.
- ☀ IMTs will encounter both well-trained, well-organized volunteer fire departments and those that essentially remain outside the system.

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**The Effects of Fuels Reduction on Suppression Efforts**

**Background:** Several respondents reported on the effects of recent fuel treatments on their suppression efforts.

One IMT was able to observe, first hand, the effectiveness of fuels reduction efforts on both Federal and private lands on two different incidents. On these incidents, previous prescribed burns decreased fire behavior, which allowed the IMT to use less intrusive tactics, including handline in place of dozer line to accomplish fire suppression objectives.

On a Type 4 incident, the IC reported that in the fire area, most of the local private property owners had worked the previous fall to clean up their property. One individual lost a cabin, trailer, two sheds, and a garage because brush, long grass and leaves were allowed to remain rather than being removed.

**Lessons Learned:** Previous prescribed burns and defensible space cleanup by property owners can decrease fire behavior and allow the IMT to modify their tactics.

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**Incident Within an Incident: Responding to a Downed Aircraft**

**Background:** An IMT reported on their reaction to a downed aircraft (helicopter that had been performing bucket work) that caused an incident within their incident as a notable success. This IMT includes procedures for an incident within an incident in their IAP, and addresses those procedures in its briefings.

In this case, notification of a downed aircraft by the Air Operations Branch Director triggered the IMT sub-plan. The IMT immediately established priorities that were announced over the command channel for search and rescue, firefighter safety, incident stabilization, and site security for investigation.

Having three Operations Section Chiefs assigned to the team allowed one field Operations Chief to take command of the scene with support from the Safety Officer. One Division Supervisor and his resources had already been pre-assigned to initial attack duties, and this division was immediately assigned to assist, since there was a fire associated with the crash. This arrangement saved time, since individual resources did not have to be called and assigned. The Communications Unit assigned additional recorders to monitor and record critical radio traffic, and the communication room was secured to keep unnecessary interruption away and to ensure privacy. As a result of these actions, the IMT had the first responders at the scene within ten minutes.

Another IMT reported that determining what duties and responsibilities the IMT had associated with an aircraft accident fatality proved problematic for them. This IMT overcame this challenge after the incident had been stabilized and the Command and General Staff conducted a strategy meeting with the agency administrator and Fire Management Officer (FMO). During this meeting, they identified the responsibility and roles of the IMT, those of the hosting agency and developed a plan.

The crash site became a branch of the incident and the IMT filled the information function. The agency took the lead with the investigation, though the IMT did order and receive the State Patrol's Accident Re-creation Team to assist with mapping and recording the crash site (the National Transportation Safety Board investigators appreciated their support.) The local Coroner did not have experience with this type of accident and was not well prepared, so the IMT's Safety Officer and IC, along with the host unit's FMO provided assistance with the recovery of the pilot. In the future the Medical Unit Leader will contact the local coroner to evaluate their capabilities when the IMT develops its plan.

**Lessons Learned:**

- ☀ IMTs should prepare internal team procedures for emergency response to “incidents within the incident” such as aircraft accidents and medical emergencies to ensure that all team members are familiar with procedures and train for them.
  
- ☀ IMTs should include procedures for emergency response to aircraft incidents, medical emergencies and other “incidents within the incident” in the Incident Action Plan (IAP) and address them in briefings.

- ☀ IMTs need to know their own capabilities before they are needed and know what local resources are available to them for emergency response, accident and fatality investigation, etc.

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### **Dealing with Host Specific Qualifications Systems**

**Background:** Several IMTs encountered a geographic area coordination center's (GACC) qualification system that differed from the NWCG 310-1. One team mistakenly believed this to be the policy of a single, state forestry agency. However, in actuality, the GACC adopted a staged qualification system, which allows, for a specified period of time, non-qualified contractor personnel to occupy line positions. During the time period when an individual who is not qualified is occupying a position, the GACC expects IMTs to use the resource and "pair them up" with a qualified resource. For example, the IMT would pair a contract engine with an engine staffed by a qualified Engine Boss. Next year, these same engines will be required to meet 310-1 standards, but during the time the IMTs were using them, they did not meet 310-1 qualification standards.

One IMT found that their Safety Officer and Operations staff could not, in good conscience, put these individuals on the line without proper supervision and didn't feel comfortable with making them a task force by combining them with an engine with a fully qualified Engine Boss. Many Engine Bosses are not qualified as Task Force Leaders, and need to focus their leadership on his or her own module.

This IMT's solution was to stage the contract engines lacking qualified leadership until the IMT could order and fill Strike Team Leader and Engine Boss resource orders. This process took less than one operational period, and the contract engines were put back to work. The IMT documented their decisions and actions and gave them to Area Command. The Area Command and other IMTs found difficulty with this issue, which is reported elsewhere in this report.

**Lesson Learned:** IMTs will encounter hosting units who have modified their qualification and certification systems to allow personnel on the fireline that do not meet NWCG 310-1 standards. IMTs must be prepared to address this situation in their policies, procedures and planning.

**Note:** This issue is also discussed in the Safety Function section of this report under the heading Contract Engines/Engine Boss Qualifications (Page 85.)

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### **Delayed Release of Resources**

**Background:** One IMT reported that when release of operational resources required delays of up to 24 hours, they had good success with assigning those resources that had been released but had not departed to initial attack, permitting

remaining resources to focus on the immediate, daily operational needs of the incident rather than on initial attack readiness.

**Lesson Learned:** IMTs can strike a balance between providing local initial attack capability, staying focused on meeting incident objectives, and managing delayed demobilization by assigning delayed, demobilizing resources to initial attack.

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### **Coordinating Local and Incident Air Operations Plans**

**Background:** On one incident, the IMT recognized that the local aviation staff was already participating in a pre-planned event, a Presidential visit.

On another incident, a problem surfaced when fire activity picked up and conflicts arose between the incident's helibase and the hosting agency's initial attack (IA) helibase located within a few miles of each other. The problem stemmed from a lack of communication between the two helibases while running simultaneous operations.

**Lessons Learned:** In the first situation, the IMT Air Operations Branch Director worked with the local plan until the event was over. In the second case, The IMT Air Operations Branch Director ordered a complete shut down of Air Operations, facilitating a meeting between the supervisors of each operation. Once the communication problem was solved operations resumed safely and efficiently.

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### **Incident Aviation Operations Facilities**

**Background:** An IMT managing a fire, initially set up their Aircraft Base Radio Operations (ABRO) in a private hanger at the local airport, using hand held radios and an external antenna. This arrangement did not work well, so a helibase operations trailer was ordered and used to isolate the ABRO, and provide higher power radios for positive communication.

Another IMT found that, although the county airport where they were set up was a low use, general aviation facility, the addition of 11 fire aircraft to the general aviation traffic necessitated a temporary control tower to prevent conflicts. The IMT used an FAA Temporary Tower to control and manage take-off and landing communications for the airport.

**Lessons Learned:**

- ☀ Purpose-built helibase operations trailers allow the IMT to isolate the Aviation Base Radio Operator from distraction and provide high power radios for positive communication.

- ☀ When operating incident aviation operations from public airports, a temporary tower may be necessary to mitigate the impact of incident operations on normal airport operations and to prevent air traffic conflicts.

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### **Checking All Structures on Interface Fires**

**Background:** A Type 4 Incident Commander (IC) reported that any loss of private structures is unpleasant enough without losing properties unnecessarily. When the IC's fire was detected, an aircraft reported four structures involved and several being threatened on a fire in hardwood litter. The fire started late in the day so the responders knew it would not go far. On the other hand, with the threat to structures and 45 minutes travel time to the incident, the initial attack IC ordered heavily. As it turned out, the agency dispatched more equipment than was needed to control the fire, and most units were cancelled shortly after the IC arrived and sized-up the fire. However, the responding resources nearly lost a structure that they had not immediately recognized as threatened. They found this structure after all easily visible structures had been checked and most resources were attending to the wildland fire

**Lesson Learned:** It is very important to perform a thorough check of all buildings in the fire area. Keep adequate structure protection resources on the fire scene until this check has been completed.

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### **Monitoring Matrix for Rehabilitation Work**

**Background/Lesson Learned:** An IMT managing a fire found that the incident suppression rehabilitation needs created by five IMTs presented a significant challenge that tested both the resource advisors and the team. The task gave the team and resource advisors an opportunity to try a rehab "monitoring matrix", on which the Operations Section and resource advisors signed-off identified tasks at the end of each day.

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### **Lessons Learned: Type 2 Crew Bosses**

**Background:** During 2003, the Lessons Learned Center interviewed Type 2 Crew Bosses, many of whom take out eastern crews and crews from the Lake States. The respondents take the Crew Boss job very seriously, and several have been taking crews out for 10 years or more. Some have experienced the evolution of Type 2 crews from agency "regulars" with abundant experience, to "pick-up" crews with a mix of multi-agency personnel and casuals. The respondents discussed their many experiences, including lessons learned related to four key areas:

#### Crew Boss is a People Job

Overwhelmingly, these Crew Bosses believed that their greatest success lay in their ability to bring a crew together, achieve crew cohesion, and get the crew