# 4.0 Conclusions and Judgments of Need

The conclusions reached by the Board through the topical analyses presented in Section 3 were used as causal factors feeding a root cause analysis. This final effort looked for common themes and overarching principles within the larger set of concerns that could provide the best long-term resolution for both the Hanford Site and the entire DOE complex. Conclusions reached by the Board included positive points represented as Noteworthy Practices.

The Board identified seven root causes that represent areas for management attention. The seven issues (and the underlying contributing causes) were then subjected to a tier analysis process designed to target the areas of responsibility most likely to provide resolution. The results of the tier analysis identify four areas of differing responsibility. These ideas represent the final set of four judgments of need presented.

## 4.1 Overall Conclusions

The Board concluded that the HFD's response to the initial event was proactive and timely. The fire was an immediate and spontaneous result of the vehicle accident. However, the lack of maintenance of defensible firebreaks along state highways running through the Hanford Site allowed the fire to spread quickly onto the ALE Reserve. The HFD leadership recognized the severity of the fire and marshaled all available resources at the disposal of the local command. Within the first hour of the event, all available HFD wildland resources were deployed. In addition, air tanker support and FWS firefighting resources were requested at a very early stage. The decisions to escalate the fire response from local command through mutual aid and to a Type 3 IMT structure were made within hours of the initial notification and were influenced appropriately by the characteristics of the fire and the unique terrain involved.

The Board also viewed the emergency response of other Site personnel as proactive. The early release of nonessential staff from Hanford was preventive, diminishing overall health effects to workers, allowing for an orderly withdrawal in front of the fire and providing less encumbered access to emergency responders.

Sound preventive fire planning and execution, including fire-safe designs and enforcement of vegetation control and fire setbacks around facilities, contributed to the successful defense of Hanford structures and infrastructure. Vegetation management on waste sites and controlled areas contributed positively to minimizing the release of airborne radioactivity during the fire. Only very minor vegetation damage occurred on the waste sites and

controlled areas. The Board concluded that the combination of sound preventive techniques and effective event management accounted for the light loss of property on the Hanford Site and minor injuries to Hanford staff observed.

The Board determined that the Hanford Site successfully activated its emergency response organization to combat the 24 Command Wildland Fire. No substantial gaps in management systems or infrastructure were identified. Consequently, the judgments of need reached by the Board represent areas for improvement and lessons learned.

## 4.2 Judgments of Need

Judgments of need are managerial controls and safety measures believed necessary to prevent or minimize the probability of a recurrence. Specific needs identified by the Board have been targeted to provide for the most efficient and effective focus of management's energy. As previously described, the Board developed four primary judgments of need based on root and contributing causes. The primary judgments of need are as follows:

- RL/ORP should evaluate existing emergency response processes related to Hanford events affecting state and national systems, as well as state and national events affecting Hanford systems. (JON-1)
- RL/ORP should review and revise sitewide and protracted emergency and recovery operations including emergency communications and resource readiness. (JON-2)
- DOE-HQ should assess the Federal Radiological Emergency Response Plan (FRERP) for inclusion of EPA independent radioactivity monitoring during events and for limited deployment of the Federal Radiological Monitoring and Assessment Center (FRMAC) whenever EPA has deployed. In addition, DOE-HQ should determine if AMS assets are at an acceptable level of readiness. (JON-3)
- RL/ORP should improve the corrective action management system to ensure that improvement actions are managed adequately. (JON-4)

Table 4-1 is a summary of the conclusions, noteworthy practices, and judgments of need stemming from the 24 Command Wildland Fire on the Hanford Site. The table's hierarchy demonstrates the relationship between the judgements of need and the seven root causes and also presents the contributing causes related to each root cause. The Board concluded that many contributing causes had sufficient merit to be considered for action, and secondary judgments of need were assigned. These also appear in Table 4-1 and are numerated in relation to the principal judgment of need they support.

## Table 4-1. Conclusions and Judgments of Need

| Conclusions | Judgments of Need |
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| **JON-1** | |
| The existing emergency response processes related to Hanford events affecting state and national systems, as well as state and national events affecting Hanford systems, did not perform as needed or expected in every case. | RL/ORP should evaluate existing emergency response processes related to Hanford events affecting state and national systems, as well as state and national events affecting Hanford systems. (JON-1) |
| MOUs and agreements with offsite agencies and non-DOE tenants did not always exist. Existing agreements/MOUs did not have enough detail, resulting in issues that had to be worked out in the field. | RL should implement or revise agreements with offsite agencies and non-DOE tenants of the site that define roles and responsibilities for emergency response. (1a) |
| The lack of maintenance of defensible fire breaks along state highways running through the Hanford Site allowed the fire to spread quickly onto the Arid Lands Ecology Reserve. | RL/ORP and the Hanford Site contractors need to engage and coordinate with local clean air authorities, state regulators, the DOE-HQ Office of Environment, and the Washington State Department of Transportation to improve firebreaks along state right-of-way shoulders between Highways 24 and 240 and the DOE fence line. (1a1) |
| While interagency fire resources were used on the fire, the MOU between RL and the FWS contained no information relative to the National Wildfire Coordinating Group (NWCG), which could have assisted RL/ORP. The agreement between the HFD and the FWS also did not discuss coordination in accordance with the NWCG system and responsibilities for ordering tanker suppression support and had to be worked out in the field. | RL/ORP need to update and enhance MOUs and agreements between RL/ORP and the FWS, and between the HFD and the FWS, to address NWCG roles and responsibilities and protocols associated with ordering aerial tanker suppression support. (1a2) |
| Previously used helicopter aerial fire suppression support from the Yakima Training Center was not available, and the Yakima Detachment of the Washington State Patrol was not integrated well into the incident management of the fire because no formal agreements are currently in place with these groups. | RL/ORP need to put into place MOUs or agreements with the Yakima Training Center (for aerial helicopter support for wildland fire suppression) and the Washington State Patrol Yakima Detachment (for incident management) to support wildland firefighting operations. (1a3) |

| Conclusions | Judgments of Need |
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| The fire affected non-DOE Hanford tenants, but not all of these entities have explicit agreements in place with RL/ORP delineating Hanford emergency management protocols. | RL/ORP should review and revise, as appropriate, agreements (e.g., MOUs, contracts) with non-DOE tenants at the Hanford Site (e.g. LIGO, U.S. Ecology, Energy Northwest) who implement execution of Site emergency management. (1a4) |
| The process for collection and analysis of radiological data during and post-event was not formalized, resulting in inefficiencies and perturbation of the environmental monitoring program to obtain data for dose assessment to the public.<br><br>Processes need to be developed and implemented for the continued operation of UDAC after a radiological event is terminated, for continuing radiological monitoring after the source of airborne radioactivity has been stopped, and for coordinating and analyzing the radiological monitoring data.<br><br>Formal MOUs between RL/ORP and WDOH and the EPA for coordination of radiological monitoring could be used as an interim measure until the FRERP is modified (see JON-3). | RL/ORP should evaluate establishment of formal MOUs with WDOH and the EPA on protocols for radiological monitoring during the emergency, ingestion, and recovery phases of a radiological event. (Until resolution of this issue is provided at the national level, see Recommendations for Resolution of JON-3). (1a5) |
| There is no institutionalized process to make use of offsite personnel during emergency field operations. | RL/ORP should review and revise existing processes for control and deployment of non-Hanford emergency personnel used during field emergency response. (1b) |
| The Hanford Fire Department needs assessment document did not adequately address necessary wildland resources for very large wildland fires and additional resources needed to be brought to the fire through the National Interagency Fire Center. | The HFD needs assessment document must be updated to include NWCG planning, protocols, involvement and resources necessary to manage future wildland fires of similar size, and results should be fed back into the Emergency Preparedness program. (1c) |

| Conclusions | Judgments of Need |
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| Status of the fire's effect on Hanford Site hazards was not communicated adequately to outside agencies on a real time basis.<br><br>The delays in communication of this information affected resource allocation and deployment of non-Hanford firefighting support. | RL/ORP should evaluate the need for additional liaison and interfaces between the EOC and external agencies to ensure accurate and timely exchange of emergency status and information. (1d) |
| The EOC did not understand the protocols of the Tri-County Mutual Aid Agreement and the National Interagency Fire Center, resulting in incorrect communications and inefficiencies. | RL/ORP should consider inclusion of mutual aid representatives at the EOC during sitewide emergency events. (1d1) |
| Hanford-specific radiological hazards were not adequately communicated to outside agencies prior to the 24 Command Wildland Fire.<br><br>Hanford preplanning information did not adequately provide sufficient data to outside agencies prior to the fire. The radiological and chemical hazards had to be transmitted during the event. Preplanning did not address potential hazards for air support. | RL/ORP should review and revise the process for technical review for accuracy and approval of hazard communications with outside agencies. (1e) |

**JON-2**

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| The existing sitewide and protracted emergency and recovery operations processes, including emergency communications and resource readiness, did not perform as needed or expected in every case. | RL/ORP should review and revise sitewide and protracted emergency and recovery operations, including emergency communications and resource readiness. (JON-2) |

## Execution of Sitewide Events:

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| Emergency response procedures address evacuation of a building or facility for an emergency situation but do not cover abandonment of a facility. | RL/ORP should examine the emergency management process to ensure that facility/site abandonment is addressed in the evacuation process. (2a) |

| Conclusions | Judgments of Need |
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| The existing emergency response procedures fail to identify how duties normally performed by facility staff at the Incident Command Post are to be accomplished when the emergency is not facility-specific.<br><br>The emergency response procedures do not allow the SED to take the Site to an Alert level emergency based on a predictive/preventive analysis of the situation confronting the Site.<br><br>Differences between "early release" and "evacuation" are not well known onsite. | RL/ORP should review and revise existing emergency response procedures to address non-facility-specific and multiple-facility emergencies, including Incident Command Post structure and staffing. (2b) |
| When adverse fire conditions exist and there is a fire in Snively Canyon, significant portions of the Hanford Site will be burned.<br><br>A new Protective Action Recommendation should be developed for an anticipated fire in Snively Canyon. | RL/ORP should add a new Emergency Action Level based on an anticipated fire in the Snively Canyon area of the Arid Lands Ecology Reserve. (2b1) |
| The existing process for communicating essential personnel information did not work during this event. | RL/ORP should review and revise the requirements for identification of essential personnel during emergencies and for the provision of avenues of safe access. (2c) |
| Cellular telephones should not be considered a reliable system for communication during emergencies.<br><br>The HFD had difficulty communicating with personnel from organizations who are not part of the Tri-County Mutual Aid Agreement.<br><br>The LIGO crash phone system did not provide emergency information in a timely manner, and, as a result, the emergency evacuation was not timely. | RL/ORP should review, revise, and demonstrate effectiveness of emergency response communication capabilities to enable participation of pertinent Site and external entities in emergencies that affect the Hanford Site (cell phones, radio frequencies, information dissemination). (2d) |

| Conclusions | Judgments of Need |
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| **Extended Emergency Operations:** | |
| The staffing and scheduling of the emergency response personnel does not support multiple-shift events. | RL/ORP should review, revise, and demonstrate effectiveness of emergency response staffing levels to ensure shift turnovers can be supported for protracted operations. (2e) |
| The EOC did not get all the SMEs needed for efficient operations, and a process to obtain people with specialized skills from outside sources and internal volunteers does not exist.<br><br>RL emergency procedures did not address utilizing SMEs (e.g., air operations and fire protection operations). The emergency management system does not provide for a process to characterize the event for associated hazards, access technical support needed, procure needed resources, or reassess issues as the event changes. | RL/ORP should review and revise process for identification of Site staff expertise in advisory and support capacities to enhance emergency management teams. (2f) |
| The process for collection and analysis of radiological data during and post-event was not formalized, resulting in inefficiencies and in the perturbation of the environmental monitoring program to obtain data for dose assessment to the public. | RL/ORP should review and revise the process for collection and analysis of radiological data during and post-event. (2g) |
| Processes need to be developed and implemented for the continued operation of the UDAC after a radiological event is terminated, for continuing radiological monitoring after the source of airborne radioactivity has been stopped, and for coordination and analysis of the radiological monitoring data. | RL/ORP should review and revise the process for recovery from emergency events to include scope beyond facility reentry. (2h) |

| Conclusions | Judgments of Need |
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| The process for bringing equipment in from offsite for emergency response is not institutionalized.<br><br>The HFD's refusal to use the offered equipment was correct, based upon the safety issues and fire conditions. | RL should review and revise the need to disseminate requirements for use of non-DOE equipment. (2i) |

## Emergency Response Communications:

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| There is no formal documentation of the review and approval process for news releases during emergencies. The EOC procedures contain no checklists to ensure that appropriate technical personnel approve the accuracy of the news release. | RL/ORP should review and revise the process for the technical review for accuracy and approval of press releases. (2j) |

## Emergency Resource Readiness:

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| The lack of tools for visual display of radiological information within the EOC contributed to ineffective communication of radiological data.<br><br>Available mapping resources for emergency response did not provide information that could be used to effectively fight the fire, provide Patrol response, or give understandable information to the public.<br><br>A Hanford Patrol officer was sent into the path of the fire because the POC was not aware of the fire location.<br><br>Traffic control processes (both onsite and offsite) were not well coordinated.<br><br>Crowd control was not well coordinated.<br><br>The use of the Internet for publishing radiological and other data from the 24 Command Wildland Fire was not formalized, resulting in a period of ineffective communication of data. | RL/ORP should upgrade the tools available to emergency response to enhance the collection, display, and dissemination of emergency data. (2k) |

| Conclusions | Judgments of Need |
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| HFD procedures did not address temporary flight restrictions.<br><br>Procedures for closure of airspace did not contain flexibility to establish or move temporary flight restrictions where needed.<br><br>Hanford personnel rode on chartered aircraft outside established procedures. | RL/ORP should review and revise the process for controlling airspace and authorizing DOE-funded personnel on chartered aircraft. (2l) |
| The Hanford EOC was not designed as an EOC and has vulnerabilities because of environmental and security reasons. | RL and the General Services Administration should assess the design of the Federal Building to support EOC operations. (2m) |
| The deployment of radiological monitoring field teams was delayed due to failure to stage vehicles for plume tracking at the Federal Building and due to radiological equipment not being maintained in a condition for ready access.<br><br>The ARAC system at Hanford was not adequately maintained ready for use. | RL/ORP should review and revise the staging, maintenance, and storage of equipment used in emergency response. (2n) |
| **JON-3** | |
| The Secretary of Energy, White House, and RL Manager made a good decision in requesting EPA radiological monitoring during the 24 Command Wildland Fire. However, EPA was unable to perform radiological monitoring during the emergency phase because this new scope of work had not been adequately preplanned by all agencies involved.<br><br>DOE did not comply with its responsibility to coordinate EPA radiological monitoring (through FRMAC) in accordance with the requirements of the FRERP. The poor coordination between DOE and EPA contributed to EPA's inability to perform radiological monitoring during the emergency phase.<br><br>For the 24 Command Wildland Fire, AMS assets were not available for immediate deployment. | DOE-HQ Office of Emergency Response (SO-42) should assess the FRERP for inclusion of EPA independent radioactivity monitoring during events and for limited deployment of FRMAC whenever EPA has deployed. In addition, DOE-HQ Office of Emergency Response (SO-42) should determine if AMS assets are at an acceptable level of readiness. (JON-3) |

| Conclusions | Judgments of Need |
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| | **JON-4** |
| Corrective actions resulting from critique of the 1984 Hanford fire proved ineffective or were not implemented in five areas, as supported by observations of the 24 Command Wildland Fire:<br>• Communication issues<br>• Definition of essential personnel<br>• Control of spectators/onlookers<br>• Firebreaks on state routes<br>• Maps and mapping capabilities in the EOC for sitewide events. | RL/ORP should improve the corrective action management system to ensure that improvement actions are managed adequately. (JON-4) |

## Noteworthy Practices

The Hanford Fire Department response to the initial event was proactive and timely.

The decisions to escalate the fire response from local command through mutual aid and to a Type 3 IMT structure were made proactively and were influenced appropriately by the characteristics of the fire and the unique terrain involved.

The emergency response to the event was proactive.

The early release of personnel from Hanford was preventive, diminishing overall health effects to workers, allowing for a more orderly withdrawal in front of the fire and providing less encumbered access to emergency responders.

Sound preventive fire planning and execution, including fire-safe designs and enforcement of vegetation control and fire setbacks around facilities, contributed to the successful defense of Hanford structures and infrastructure.

Vegetation management on waste sites and controlled areas contributed positively to the control of radioactive materials onsite. The combination of sound preventive techniques and effective management of the event account for the light loss of property and minor injuries observed.

The decision to obtain relief from the incident management team and redeploy Hanford fire suppression resources to protect Site structures was appropriate and necessary.