5.0 ASSESSMENT OF EVENT

This chapter describes the issues that arose during the event and the response to the event and provides judgments of need to ensure a prompt, even more effective response to any future event. The chapter also outlines a new process for improving disposal of Hanford Site refuse.

The Hanford Site (RL and PHMC team) programs and policies were evaluated to determine their effectiveness during this incident. Given that the incident—refuse (i.e., solid waste) being contaminated by a biological vector (fruit flies)—was never before identified within the nationwide DOE complex, the conclusions were positive. The programs and policies were found to have the following effects.

- They promoted vigilance and allowed the team to quickly identify the new vector.
- They effectively protected the health and safety of the Site workers, the public, and the environment.
- They promoted prompt and diligent communications with employees, the public, and the media.
- They were in place to allow the team to promptly contain the contamination, control its spread, and allow the team to identify its source.
- They allowed the team to promptly mobilize and integrate to work with the City of Richland, the State, the EPA, and RL to mitigate this incident.
- They were in place to allow an NOC to be written, reviewed, and approved within 48 hours; WDOH strongly supported this effort.
- They prevented an impact on the surrounding community and allowed for monitoring for offsite effects to show that the incident did not affect the community. In this event, flying-insect traps were set up outside the Site boundaries to verify that no fruit flies carried contamination off Site.

Programs and policies should be addressed to achieve the following:

- Increase monitoring of refuse for potential breakdowns in primary radiological, dangerous, and hazardous material control programs
- Specifically protect against new vectors
- Properly and effectively notify the ONC and others as appropriate
- Provide a closer working relationship between radiological control and biological vector control planning.

5.1 WORKER AND PUBLIC SAFETY

The primary focus for the RL and PHMC management team during this contamination event was to ensure the health and safety of the public and the Hanford Site employees and to protect the environment. Because the primary hazard of this event was the uncontrolled spread of radioactive contamination, the analysis of the response described in Section 5.2 considers the major actions of the PHMC Radiological Control Program during this event. This section considers the actions of the PHMC management team in controlling the spread of contamination outside the normal Radiological Control Program boundaries and mitigating any worker- or public-safety issues related to the event.

Employees on the Hanford Site who were not directly identified by the PHMC Radiological Control organization as affected by the contamination spread wanted to assure themselves and their families that the controls the PHMC team had in place were actually preventing them from being contaminated and unknowingly bringing contamination into their homes. The PHMC Radiological Control organization announced in all-employee communications that all employees desiring to have themselves, their vehicles, or their personal effects surveyed could request this from their management. Several employees requested and received surveys. No contamination was found on these individuals or on their belongings. RCT coverage for these surveys was provided, automatic personnel survey equipment (PCM-1B) was moved to areas conveniently available to these employees, and a list of survey locations on Site was published.

Efficient Actions.

- Workers who received whole-body counts were met at the whole-body counter by health physics professionals who discussed the bioassay results with the workers.

- RCT staff provided personnel contamination surveys and surveys of personal vehicles and belongings of any Site employee requesting surveys.

- B Plant management met routinely with BWHC and FDNW employees in the B Plant area to keep them informed and address potential concerns. The PHMC worker health advocate, FDH Internal Dosimetry, and the Pacific Northwest National Laboratory exposure evaluator met with the craft workers to discuss the bioassay process and answer questions. When worker bioassay results became available, the workers were notified of the bioassay results directly or through their management. At that time the workers were given a telephone number to call if they had questions, concerns, or complaints.

5.1.1 Safety of Workers and Public at the City of Richland Landfill

Issue: **Contamination in the City landfill is a hazard to landfill workers and members of the public who deliver their refuse to the landfill.**	
Discussion: The hazard of radioactive contamination in a public landfill comes not only from the radioactive material itself, but also from the actions needed in the landfill to control any found or suspected contamination. Physical (e.g., sharps [needles, broken glass, splintered wood]), chemical (e.g., residential containers with residue pesticides, cleaners, solvents) and biological (e.g., hospital refuse, molds, fungi, bacteria) hazards are always present in a municipal landfill. The close contact with these items that hand surveying refuse for radioactive material requires exposes workers to more potential hazards than low levels of radioactive contamination.	*Judgment of Need: Routine monitoring of landfill shipments from the Hanford Site should be conducted in the most effective and remote method to separate workers from routine shipments of refuse. In addition, workers in the landfill and the public should be separated from any inadvertent contamination that might reach the landfill.*

5.2 RADIOLOGICAL CONTROL PRACTICES

This event was discovered through the operation of the daily routine radiological surveillance program, which is a fundamental radiological control practice.

5.2.1 Recovery Actions

Progressive actions were implemented to identify the extent of the contamination, the transport vectors, and potential sources. However, because of the nonroutine early pick-up of the dumpster refuse, identifying contamination in the refuse stream did not preclude the transfer of radioactive contamination to the City landfill.

Efficient Actions.

- Field data during the event were handled well. Field radiological operations response to this event generated significant quantities of field radiological data.

- Management and control of the onsite (Hanford) response and the organization and operations in the Situation Room were effective. The focus was on the health and safety of the workers and the public and proper management of, and response to, the incident.

- The RCT, labor supervision, and City landfill supervisor worked together well to locate the contaminated refuse at the City landfill.

- Good Hanford Site teaming took place among the major contractors: the teams received exceptional cooperation from BHI in supplying containers and trucks for moving the contaminated refuse from the City landfill back to the Hanford Site; Pacific Northwest National Laboratory Site Surveillance set up and monitored flying-insect traps off Site.

- RL and the PHMC contractors and subcontractors worked together to resolve all the issues and mitigate the consequences of the offsite contamination event. This included Waste Management Federal Services of Hanford, Inc. (WMH), LMHC, DYN, WMNW, and FDH.

- The incident brought together onsite and offsite entities and provided experience in working as a team. However, in the interest of teamwork and accomplishment, improved protocol bridges need to be established.

- The Hanford Site contractors employed an appropriate mix of personnel on the response team. The team included members with field and technical expertise in diverse radiological operations.

- The Spent Nuclear Fuels Counting Facility (laboratory) in the 100 Areas was used extensively and provided great support in rapidly turning around samples, as did Pacific Northwest National Laboratory's 325 Radiochemical Processing Laboratory.

- The 222-S Analytical Services of Waste Management Laboratories analyses provided the final "fingerprint" data to isolate a previously unknown source.

5.2.2 Sample Management

Issue: Creation of current and concise radiological source term technical data packages facilitates timely correlation of sample unknowns to candidate sources. This supports accurate and timely mitigation response.	
Discussion: Sample management is essential in timely and accurate evaluation and identification whether single or multiple sources were involved. Availability of current and concise radiological source-term data is important in event diagnosis and mitigation response planning. It is important to coordinate radiological sample management (determining which samples are to be analyzed, the priority of sample analysis, and where samples are sent for analysis).	*Judgment of Need: PHMC procedures addressing contamination spreads across facility or subcontractor boundaries should identify the person in charge to coordinate and prioritize event radiological-sample analysis and should use the available laboratory resources. The procedures should direct the person in charge to determine the source terms of the affected facilities through communication with the facility radiological organization. In the development of the procedures, the Site laboratories should determine the standard sample geometries, sample identifications, and data report formats that are available or that need resources for development.*

5.3 BIOLOGICAL VECTOR CONTROL

Detection of biological vectors involved in transport of radioactive contamination has included surveillance and monitoring of vegetation (e.g., tumbleweeds), insects (e.g., termites, ants), amphibians (e.g., toads), reptiles (e.g., lizards, snakes), birds (e.g., pigeons, swallows), and mammals (e.g., bats, rabbits, mice). For example, in calendar year 1997, 74 incidents of contaminated biota occurred, involving four vegetation species (cheat grass, tumbleweed, rabbitbrush, and big sagebrush) and eight animal species (darkling beetle, sagebrush lizard, house mouse, deer mouse, Great Basin pocket mouse, Nuttall's cottontail, and coyote) near operation facilities (Perkins et al. 1998).

Before the current incident, 70 biota species (45 animal and 30 vegetation) had been identified in the Hanford Site's 200 Areas environs as being involved in uptake or transport of radioactivity (Johnson et al. 1994). Some flying insects, such as bees and wasps, previously had been found to be contaminated but were quickly eradicated in those few instances. Smaller flying insects such as fruit flies and gnats often had been the targets of Hanford Site pest control operations (i.e., insecticide spraying and fogging to protect employee safety and health), but had not before been observed to be contaminated with radioactivity. Based on these past observations, these flying insects were not routinely monitored to detect radioactivity.

5.3.1 Environmental Surveillance and Monitoring of Biological Species

Issue: Routine and special environmental surveillance and monitoring of biological species potentially coming in contact with radioactive materials identifies where administrative or physical barriers are necessary to protect employees, the public, and the environment.	
Discussion: Routine and special environmental surveillance and monitoring at the Hanford Site historically have targeted biological species at waste sites where the potential exists for contamination spread. Previous environmental monitoring near the 241-ER-152 Diversion Pit had identified contaminated vegetation, terrestrial insects, and rodents, but not flying insects.	*Judgment of Need: Small flying insects should be added to the list of biotic species routinely monitored for radioactive contamination. Flying-insect traps should be seasonally located at contaminated facilities or transfer stations that have the potential to attract these insects. Sanitary practices should be evaluated to eliminate fruit fly attraction (e.g., determine safe distances between contamination sources and food sources, refuse containment, etc.).*

Because biota-related spread of radioactive contamination has a history of recurrence in the approximately 2.5 hectare (6.2-acre) area southwest of B Plant in the 200 East Area, this area typically has been the focus of intense pest control and monitoring and surveillance. Activities and facilities in the area are under the direction of four different contractors (BWHC, LMHC/TWRS, DYN, and WMH), requiring additional integration and communication to keep biota from encroaching on neighboring facilities when control is initiated at a particular site.

Pest-control operations to control biota-caused transport of contamination were under way at several facilities in this area before the discovery of contaminated fruit flies. Contaminated deer mice have been found at the K-3 Filter Pit Encapsulation Facility (225-BB) near B Plant. Contaminated deer mice and ant hills were found between the 241-ER-151 Diversion Pit and the 216-B-64 Basin for more than a month before the September 28 contamination incident. Integrated (LMHC/TWRS, DYN, WMNW) surveillance, posting, and control efforts were extensive in this area.

Identification and control measures for this incident included placing flying-insect traps on and near the Hanford Site and applying chemical insecticides (i.e., spraying and fogging). Structures and areas treated included refuse-handling facilities (e.g., refuse cans, dumpsters, garbage trucks, buildings), suspected contamination sources (e.g., the 241-ER-152 Diversion Pit), and the primary affected area (i.e., the RBA).

In support of controlling the fruit fly problem, the FDH Office of Biological Control conducted the following types of insecticide applications:

- General and spot spray applications with wettable powder (Dursban 50W) and flowable microencapsulated (OPTEM™) insecticides

- Fogging with an emulsifable concentrate (malathion 57EC) insecticide. When fogging, the concentrated insecticide is metered to the discharge head, where it is sheared by a vortex air-blast blower (controlled air turbulence) into optimum size droplets by the nozzle apparatus and dispersed into the atmosphere. After dispersal, the droplets stay suspended in the air and drift with prevailing winds to insect-infested areas

- Space spray with aerosol pyrethrin (PT-565) and total-release pyrethrin with pyrethroid (Pro-Control Plus) insecticides.

5.3.2 Flying-Insect Trap Monitoring

Ninety-five flying-insect traps were placed at strategic locations on and off Site to monitor possible insect contamination. This total included 4 traps placed at the City landfill by WMNW, 10 placed at Hanford Site locations outside the 200 Areas and off Site by the Pacific Northwest National Laboratory, and 3 placed near the U.S. Ecology site near the 200 East Area by WDOH. Six traps were placed at the refuse transfer station in the 4843 Storage Building in the 400 Area. Trap locations and durations in operation are described in Appendix E and the locations are shown on the maps in Exhibits B, C, and D. Trapping was initiated on September 30 in the 241-ER-152 Diversion Pit and the MO-967 Mobile Office. As of December 4, all traps had been closed except six at the 4843 Storage Building refuse transfer site in the 400 Area.

No contaminated flies were captured at the remote locations (e.g., City landfill, Pacific Northwest National Laboratory's offsite locations, Vernita Bridge, along the Columbia River). One contaminated fruit fly was captured at U.S. Ecology, a leased site located approximately at the geographic center of the Hanford Site, about 2 kilometers (1.2 miles) south-southwest of the 241-ER-152 Diversion Pit; all others were captured within the RBA south of B Plant. Traps were monitored every day for the first 2 weeks, then every other day, but no contaminated fly has been captured since the October 30 capture at U.S. Ecology. A review of the wind patterns that occurred before the contaminated fly was captured at U.S. Ecology showed winds out of the north-northeast for durations of up to 8 hours and speeds from 10 to 24 kilometers per hour (6 to 15 miles per hour). The wind's north-northeast direction, duration, and speeds are consistent with expectations that the fly originated from the RBA south of B Plant.

5.3.3 Chemical Insecticide Control

Both spot- and general-area treatments were used to control the fruit flies. Spot treatment locations included the City landfill, storage and maintenance facilities, garbage trucks, refuse

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cans, dumpsters, and the 216-W-3-AE Burial Ground Trench 13. The products for spot treatments included Dursban 50W, PT 565, OPTEM, PRO-Control Plus, and ULD BP-300™. Product selection was based on target-facility conditions, customer concerns about compatibility with facility surfaces, and label instructions.

The 241-ER-152 Diversion Pit was initially surrounded by a tent structure open at the top to accommodate crane operations. This pit was later sealed, leaving access only through a gloveport. The enclosure received a general-area treatment with PT 565, first on October 27 and again on November 4, with PRO-Control Plus. Trapping inside the pit indicated that the first treatment was not completely effective; however, no flies were captured following the second treatment. Spot treatments were initiated October 3 and terminated November 5.

The City landfill received precautionary spot treatments of Dursban 50W during the excavation and retrieval of Hanford Site refuse. Treatments occurred from October 8 to 12.

The product used for area treatments (i.e., fogging) was malathion 57EC, dispersed via a truck-mounted fogger in accordance with label instructions. The RBA was fogged on October 10 to 12 (excessive wind speeds precluded spraying on the 13th and 14th), 15 to 19, and 25 to 31 and November 2 to 9. Low temperatures and/or high winds limited insect activity and chemical treatment. Malathion is a common insecticide for flying insects (e.g., mosquitoes). Area fogging began on October 10 following an emergency purchase of a truck-mounted fogger, was conducted as needed at the RBA, and was terminated November 5.

5.4 SOLID WASTE DISPOSAL PRACTICES

5.4.1 Landfill Practices

This event was unusual in that radiological contamination was spread off Site through refuse collection and disposal. The only “readiness response” to this type of situation is to dispatch RCTs to the landfill to try to detect contamination. This was done immediately after the potential for contamination was identified. However, the initial visit to the City landfill on September 30 by an RCT was not properly coordinated. No formal criteria were in place to suspend shipping all types of refuse when contamination is found or suspected.

As concerns escalated and a decision was made to excavate recently deposited refuse at the landfill, plans were prepared for a radiation work permit, job safety analysis, and work package. Required personnel and equipment resources were identified and obtained. This effort was initially coordinated through the team members at the Situation Room. Communication problems surfaced between the City of Richland and the PHMC, thus driving the need for the Hanford Site to station a project manager at the landfill.

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5.4.2 New Refuse Disposal Process

5.4.2.1 Agreement With BDI Transfer. The agreement with BDI Transfer of Pasco, Washington, which is retroactive to October 30, was put in place to obtain additional refuse disposal capabilities. The new agreement with BDI Transfer requires that refuse be sorted and surveyed before removal from the Site. This is a nonexclusive contract for the disposal of nonhazardous, nonradioactive refuse generated by the Hanford Site

Except as otherwise provided, the refuse contractor shall supply adequate and competent labor, supervision, equipment, transportation, transfer station facilities, licenses and permits, record keeping, and other actions necessary to provide for delivery of empty drop boxes, transportation of loaded drop boxes, and final disposal of the nonradioactive, nonhazardous, nondangerous refuse.

RL requires the Hanford Site contractors to prevent radioactive and other nonconforming refuse from being released off Site. Accordingly, *RL and the PHMC management team have implemented an enhanced business practice* to screen the refuse intended to be released to a refuse contractor for disposal. Comprehensive management systems implementing administrative controls are now in place at the Site. In addition to the administrative controls, sophisticated engineering controls are in place to manage and monitor radioactive waste, (e.g., negative pressure enclosures, ventilation systems, remote handling, encapsulation). These supplemental protective measures include surveys of refuse containers (i.e., dumpsters) and accumulated refuse to detect radioactive contamination and other nonconforming refuse.

When shipments of Hanford Site refuse to the City landfill were halted, a temporary survey station was set up in the 4843 Storage Building in the 400 Area. Beginning November 12, Hanford Site refuse has been hauled to the 4843 Storage Building, where it is dumped, sorted, and surveyed before BDI Transfer hauls it away. This activity will continue until a permanent solution is implemented.

5.4.2.2 Transfer Station

Issue: **Solid refuse can be radiologically contaminated at the Hanford Site and transported offsite to a municipal landfill for final disposal.**	
Discussion: The basic radiological control program is designed and implemented to ensure that radioactive material is managed to prevent loss of control resulting in the compromise of public, employee, and environmental safety. Biological transport vectors have radiologically compromised the solid refuse identified for offsite disposal. A graded-approach radiological verification survey program should be permanently implemented as a final verification before shipment off Site.	*Judgment of Need: Ensure the continued operation of an onsite solid refuse transfer station. Radiological surveys should continue to be conducted using a graded approach to verify the absence of contamination and should continue to be based on the potential source term and history of radioactive material from the generator.*

5.4.2.3 Graded Approach to Preventing Future Releases. A graded approach has been implemented in case the primary barriers fail and a potential release of radioactive contamination occurs. Factors considered in this graded approach include the following:

- Availability of engineering and/or administrative controls
- Proximity to sources of contamination
- The nature of the process generating the refuse
- History of past contamination
- Frequency of activities involving the use of radioactive materials
- Presence of biological vectors or other means to spread contamination
- Detection capability for the type of radioactivity expected to be emitted.

Using these factors, Site facilities or processes were grouped into four categories. Activities within each category will use protective measures commensurate with the probability of radioactive contamination spreading to refuse.[1]

Category 1: No radioactive material use.

Category 2: No ongoing use of radioactive materials. Types of contamination are readily detectable. No alpha radiation.

Category 3: Routine handling or processing of radioactive materials or Radiological Control Areas present in the vicinity. Barriers are in place to control radiological materials, and types of contamination are easily detectable.

Category 4: Same as Category 3, except alpha radiation is present with little or no beta or gamma.

5.4.2.4 Waste Reduction/Minimization

Waste reduction/minimization and pollution prevention has been a continuing goal of the Hanford Site for many years. These activities are promoted throughout RL and PHMC programs and facilities. The purpose of this goal is to reduce the amount of solid refuse generated so as to reduce costs by minimizing the quantity of material that must be handled, surveyed, and disposed of and to promote and support environmental/ecological needs. The Waste Minimization and Recycling Program is functioning and continues to reduce Hanford Site refuse quantities.

However, even though Site refuse quantities are decreasing, the increased visual surveillance of the refuse stream resulting from this incident has revealed some program weaknesses. It appears that excess, usable material from the lay-down yards that should be sent to the recycling facility is, instead, being sent to the offsite landfill. The system that precludes inappropriate items (e.g., hazardous and dangerous waste, recyclable items) from being transported to landfills from the

[1] It is important to heighten the awareness of all Hanford Site workers to the proper handling and disposal of all personal as well as Site-related refuse.

Hanford Site should be improved by enhancing Hanford Site workers' awareness of existing programs to recycle or dispose of material.

5.5 MANAGEMENT SYSTEMS

This section describes the incident response process and highlights those aspects that worked well and those that need to be improved. It also describes our communications process with employees and the media to ensure that Site workers and the public were well informed throughout the incident.

5.5.1 Incident Response Processes

5.5.1.1 Incident Management. This event started as a minor contamination incident and escalated quickly. Every piece of data gathered expanded the scope of the event. As the extent of the contamination spread was discovered with its potential for transport off Site, PHMC management quickly recognized the significance of the event. FDH Management also recognized the need to keep Site employees and the public up to date on the progress of the investigation.

During the event, RL, its contractors, the regulators, and the City of Richland demonstrated excellent teamwork in providing both material and personnel resources to mitigate this situation. Offsite stakeholders were invited to attend working sessions and received daily progress briefings.

The Alternate EOC was the location used during this event. Because the event was not an "emergency," the room was referred to as the Situation Room.

NOTE: This event was not an emergency as defined in the *Hanford Emergency Response Plan*, DOE/RL-94-02 (greater than 100 mrem total effective-dose equivalent). Rather, it met criteria as an "unusual occurrence" per DOE M 232.1-1A, Criteria: Group 2.E, "Any occurrence under any agreement or compliance area that requires notification of an outside regulatory agency within 4 hours or less, or triggers any outside regulatory agency action level."

Roles and responsibilities for responders were established early, communication paths were identified, and response processes were monitored carefully. A large number of government and contractor senior managers demonstrated their commitment to resolving this issue by dedicating their own time to this event and by immediately providing resources wherever necessary. Management responders to the situation were organized into four separate teams. The teams were the Policy Team, the Radiological Coordination Team, the Solid Waste Team, and the Operations Team.

Having an Alternate EOC available for use as a Situation Room is not required. That the Hanford Site has an Alternate EOC is a "good practice" and is above and beyond DOE emergency management order requirements. However, this incident identified a need for some additional level of preparedness for these types of events.

Efficient Actions.

- Established an effective response management and infrastructure in the Situation Room for onsite activities.
- Established and maintained excellent communications with Hanford Site employees and the media.
- Brought in both City of Richland officials and WDOH to provide consultation in responding to this event.
- Communicated well with other teams. The Situation Room was well staffed, contributing to a coordinated effort among the teams.
- Provided access to computer experts, which was highly beneficial to the setup and operation of the Situation Room.

5.5.1.2 Incident Management

Issue 1: The level of preparedness for similar events can be improved if found to be a worthwhile expenditure of resources.	
Discussion: Current emergency procedures, organizations, training, and facilities have been established to deal with high-impact and time-urgent events. However, a more informal process called an "event coordination team" is available. It is intended to deal with less urgent emergency incidents. The event coordination team process could be used for events such as this, if procedures were enhanced to address the flexibility, command, location, and organization of the specific working task groups.	*Judgment of Need: FDH Emergency Preparedness should evaluate the need to enhance event-coordination-team procedures. These procedures should be broadened to include the conduct of operations to deal with similar incidents. Depending on the issue at hand, responsibilities, location, and organization structure should be flexible.*
Issue 2: Some enhancements to the Alternate EOC are needed if it is to serve as a Situation Room for future events.	
Discussion: On activation of the Alternate EOC as the Situation Room, difficulties were encountered when trying to set up computers. The computers were outdated and no pre-established electronic mail boxes were available. Access to computerized mapping capabilities was nonexistent from the Situation Room. Status boards were minimally acceptable.	*Judgment of Need: FDH should enhance the Alternate EOC, including updating the computer equipment, enhancing the status-display process, and reestablishing electronic mail boxes for emergencies and similar situations.*
Issue 3: Several processes went well during this incident. These should be considered for enhancements to emergency response processes.	
Discussion: Communications with Site employees were excellent. Daily messages (as many as three in one day) were transmitted during the peak of the event. Employee "hotline" numbers were useful in helping communicators determine the information that was useful and desirable to employees. Action tracking also was effective.	*Judgment of Need: FDH Emergency Preparedness should evaluate the processes used for this response and determine enhancements that can be integrated into a formal emergency response procedure. Suggested areas include communications with employees, staffing the EOCs with computer experts, and enhancing action tracking and status.*

5.5.1.3 Project Management

<table>
<tr><td colspan="2">Issue: City officials perceived that FDH could have improved their response to the biological vector incident at the landfill in the following areas.
• FDH should assign a project manager with environmental investigations experience and knowledge of associated Hanford Site work procedures to manage the field activities.
• Use field protocols including use of a field logbook, RSR forms, and other documentation to record field activities daily.</td></tr>
<tr><td><u>Discussion</u>: The Hanford Site contractors employed a response team that included field managers and radiological control technicians. The PHMC team is accustomed to working on the Hanford Site; however, in this situation the team was working on a site owned by another agency, the City of Richland. Establishing protocols and expectations at the onset will help clarify the roles, responsibilities, and functions of each party. Areas that need improvement include the following.
• Providing project management having environmental investigation experience at the onset.
• Establishing, with the City, a set of protocols for governing this type of offsite event.
• Improving field record keeping to capture, as a permanent record, actual events at the site to ensure traceability. Improving communications with landfill management including sharing of field notes and records.</td><td><u>Judgment of Need</u>: In the interest of teamwork and accomplishment, improved protocol bridges need to be established. RL and PHMC personnel will review the processes and protocol necessary for responding to offsite events like this with the intent of identifying improvements regarding command and control, communication, work planning functions, and record keeping at the location of the event (particularly off Site).</td></tr>
</table>

5.5.1.4 Notifications

Issue: Definition of notification expectations and interface responsibilities between discovery of a radiological event and formal classification of radiological events minimizes the time for effective intervention for control of offsite delivery of nonradioactive solid waste (refuse).	
Discussion: Overall, notification requirements were satisfied during the initiation of this event and as the event escalated in severity. On three occasions personnel not familiar with notification requirements caused minor delays in occurrence reporting requirements that have been established by DOE and RL. This occurred during initial discovery of contamination outside a radiologically controlled area, discovery of the radiological contamination off Site that was believed to be caused by the operation of a DOE facility, and the immediate reporting of an event or condition to another federal agency. In each of these cases, these errors were promptly identified and rectified.	*Judgment of Need: FDH should develop an ongoing process to identify specific managers and employees who will be required to recognize, categorize, and report occurrences as described in HNF-PRO-060. These individuals are required to attend an Introduction to Occurrence Reporting class. Those individuals who are to be assigned to develop occurrence reports are required to attend the Occurrence Report Writing class.*

5.5.1.5 Reporting Systems. The Hanford Site has several systems used to recognize, respond to, and report adverse conditions.

- The occurrence reporting process (DOE O 232.1A) is used to identify, report, analyze, and track adverse conditions or events in the DOE complex. The occurrence reporting process provides common reporting thresholds across the entire DOE complex. It requires the use of written reports prepared on a computer system. It establishes requirements for discovery, notification, investigation, causal analysis, and tracking of corrective actions. Three levels of occurrence have been identified: off-normal occurrence, unusual occurrence, and emergency. The off-normal occurrence and the unusual occurrence have established reporting thresholds. Emergency criteria are defined by each site's emergency plan.

- The "not classified notification" process is a working agreement regarding nonemergency events, stating that RL and the PHMC team will notify Washington State, Oregon State, the EPA, area tribes, and local emergency planning jurisdictions. After the May 1997 Plutonium Reclamation Facility event, RL and the PHMC team recognized the need to communicate nonemergency events to offsite jurisdictions in a timely manner. A process was developed called "not classified notifications." This process was based on occurrence reporting criteria, but with an increased sensitivity to providing timely notification. Explicit criteria were established, agreed to, and implemented to disseminate not classified notifications in a timely manner.

5.5.2 Employee Communications

The FDH employee communications activities were based on the principles of risk communication. Among these is the understanding that public outcry results when people think that information is being withheld or the information is presented so technically that it is inaccessible. RL and FDH Communications believed that the only way to maintain trust was to communicate openly, specifically, and in lay terms about the contamination spreads. At a meeting on October 4, RL and the FDH Communications personnel agreed that timely and clear information was more important than highly technical information. The deputy manager of RL approved an abbreviated review process that was agreed to on October 6. This process allowed FDH Communications personnel to release messages on only the signature authority of (1) the Vice President of FDH Environment, Safety, Health and Quality, who was the Policy Team lead, and (2) FDH Legal Services.

Eleven all-employee messages were issued between October 5 and 15, three on October 7; another all-employee message was issued on October 29. All messages were distributed via the electronic mail system and included a request that they be printed and posted in all work locations to ensure the widest possible dissemination. Between midnight and 6 p.m. on October 7, one of these all-employee messages was broadcast continuously on the Hanford Site radio station (AM 530). The all-employee messages are included in Appendix F.

A web site was established by October 9. The web site contains maps, information on fruit fly biology and habits, general information on radiation, locations where employees could obtain personal and vehicle surveys, and the text of the all-employee messages. The web site address is http://www.hanford.gov/ safety/conspread/index.html. Fruit fly biology and habits are covered in Appendix J.

Stories were written for the *Hanford REACH* newspaper, appearing as the headline stories on October 19 and 26, with follow-up stories on November 9 and 16 and a summary article on January 4. The *Hanford REACH* articles are included in Appendix G.

Efficient Actions.

- Communication was open, frequent, and thorough. This benefited the Site by limiting rumors and fears, demonstrating proficiency and competency of management, and showing openness and trustworthiness. Proactive communication with workers appears to have had a positive effect. Routine bulletins kept workers informed of the status of the event. The streamlined review process for all-employee messages and *Hanford REACH* news stories was essential to providing timely information. Accessibility of key reviewers also was essential and worked well.

5.5.3 Media Relations

FDH Communications conducted and facilitated extensive media briefings and personal and telephone interviews with regional and national media. The guiding premises were based on risk communication, including the belief that openness builds trust and quells rumors and exaggerated speculation. Work at the Site can proceed effectively only if RL and the PHMC team maintain public trust.

The local newspaper, the *Tri-City Herald*, received anonymous tips about the contamination incident. In all known cases, the newspaper called FDH Communications to ask for comment. These calls allowed the team to ensure that accurate information was printed.

Senior PHMC management delivered timely and factual information to the public through media briefings, an Internet web site, and broadcasts on the Hanford radio station. These briefings gave the public the information they needed to understand the event and its associated hazards.

FDH Communications organized two large media briefings, one on October 5 and one on October 7, with staff from FDH, DYN, and the City of Richland as the principal spokespersons. FDH Communications also facilitated at least 28 other interviews, some face to face and some by telephone. The RL Office of External Affairs provided assistance and guidance in many of these interviews. The following media were included:

- Associated Press, Yakima
- *Defense Cleanup* Magazine
- *Harper's* Magazine, New York City
- KDKA Radio, Pittsburgh
- KEPR-TV, Tri-Cities
- KIRO-TV, Seattle
- KNDU-TV, Tri-Cities
- KOMO Radio, Seattle
- KONA Radio, Tri-Cities
- KVEW-TV, Tri-Cities
- KXLY Radio, Spokane
- *New Scientist* Magazine, Great Britain
- Northwest Cable News
- *Nucleonics Week* Magazine (McGraw Hill)
- *RADWASTE* Magazine
- *Tri-City Herald*.

A compilation of news stories written about the contamination incident is included in Appendix G.

5.5.4 City and Regulatory Interface

On September 30, 1998, where the investigation team determined that contaminated refuse might inadvertently have been shipped to the City landfill, DYN and FDH notified RL and City of Richland officials of possible contamination at the City landfill. Refuse shipments to the City landfill were immediately suspended. RL immediately notified the Washington State Department of Ecology and WDOH of the potential contamination issue, and an RL representative was identified as the WDOH point of contact.

In the initial meeting about the event on September 30, it was determined that the contractors would take the lead in establishing the pathway for resolving the issue. Further, it was determined that the issue was more complicated than contaminated refuse and that actions to resolve the issue raised contractual questions. As a result, four investigation teams were established and included RL representatives as well as contractors. The teams formed were a Policy Team responsible for management direction and overall issue coordination including outreach and public relations; an Operations Team responsible for meeting coordination, records, minutes, information flow, and Situation Room coordination; a Solid Waste Team responsible for coordinating all physical actions necessary to carry out (especially) immediately required actions (e.g., removal and transport of solid refuse); and a Radiological Coordination Team, to support the Solid Waste Team as well as provide insight and investigative expertise into the root cause of the event. Negotiations with the City of Richland were left to the RL representatives.

The discussions with the City of Richland involved issues related to removing radioactive contaminated refuse from the City landfill as the investigation progressed and dealing with any subsequent problems identified in that cleanup effort. One such issue was the need to obtain an NOC from the WDOH and EPA to remove identified radiologically contaminated refuse from the City landfill. The preparation and regulator approval of the NOC were completed within 48 hours through a collaborative effort by RL, contractors, WDOH, and EPA. At the same time, the breadth and scope of the cleanup were discussed. With participation from the Washington State Department of Ecology and the WDOH, the extent of the area to be uncovered and surveyed and the amount of material to be removed were defined. On completion of the landfill survey and removal effort, a report was submitted to the Richland City Council on December 8. The Council accepted the City engineering report that RL indeed had met its commitment regarding the cleanup.

Concurrently, RL held a number of meetings with city engineering staff and management to determine the conditions under which the Site could resume shipments of refuse to the City landfill. As the contractors and RL reviewed refuse pickup practices on the Site, they realized that refuse picked up from the various locations posed different levels of risk of radiological contamination and that verification surveys were needed to confirm that radiological controls at the source were still effective. A related issue arose concerning the surveys at the City landfill, the frequency of the surveys, and the need for an operating transfer station.

Taking into consideration that refuse pickup locations have different levels of risk, a draft memorandum of agreement was arrived at with the City that contains a table defining the extent of radiological surveillance and control for all locations on the Hanford Site and, in essence, defines a new policy under which the Site would transfer or transport solid refuse to the City

landfill. During the December 8 City Council meeting at which the Council agreed that the landfill cleanup was complete, the Council provided the City Manager with the authority to negotiate and sign a memorandum of agreement with RL that would permit sending Hanford Site refuse to the City landfill. The City Manager's authorization included the provision that a radiological consultant be secured, at a cost not to exceed $100,000 to be paid for by RL, to assist in reviewing and establishing the City's program for refuse acceptance. RL requested that the contract be renegotiated or amended before transport of Hanford Site refuse to the City landfill is resumed. A draft contract modification subsequently was submitted to the City for review and consideration on December 22, 1998.

Refuse on Site began accumulating beyond capacity. Negotiations with the City were protracted, and treating normal refuse as though it were contaminated and burying it in low-level trenches is unduly expensive. Accordingly, other disposal options were pursued concurrently. RL opened negotiations with other service entities, to ensure that a disposal service is always available. On November 10, 1998, DYN signed a basic ordering agreement with BDI Transfer of Pasco, Washington, for the disposal of nonhazardous, nonradioactive refuse generated at the Hanford Site.

The graded-approach process was developed to verify that the refuse is not contaminated, consistent with the memorandum of agreement with the City. The process will verify that the refuse to be handled by BDI Transfer is uncontaminated. RL is continuing negotiations with the City of Richland. Meanwhile, RL and its contractors are evaluating longer term options for refuse disposal.

5.6 OPPORTUNITIES FOR ENHANCED OPERATIONS

Radiological Control	• Radiological monitoring of PHMC waste streams (liquid, gaseous, and solid) should be consistent in approach and application among contractors, subcontractors, and facilities (e.g., consolidate/exchange data, integrate biological vector control, integrate surveys). • Testing and evaluation of products, equipment, and techniques should consider special-handling requirements and potential impacts to the environment, including possible pathways for loss of control.
Integration	• Interface between radiological and biological experts should take place during the planning of operations to ensure protective measures. • During loss-of-contamination-control recovery efforts, a project or work manager should be assigned immediately to that location.
Laboratory Capabilities	Onsite laboratory capabilities need to be funded at such a level that they can quickly respond to analysis needs for onsite events. This includes, in particular, quick-turnaround laboratory analysis in support of emergency response to onsite radiological contamination events. Recommended enhancements include the following. • Obtain contingency funding to support unexpected operational requirements. • Establish clear priorities for all laboratory work, giving precedence to event support. • Maintain staffing levels and equipment that can support reasonable laboratory workloads, allowing nonpriority work to be backlogged when necessary, so that unacceptable programmatic impacts are avoided when emergency work is being performed. • Explore feasibilities, needs, and benefits of including a mobile field laboratory. • Maintain a list of resources, capabilities, and their locations. • Explore the feasibility of a standby arrangement with an offsite laboratory to handle increased sample-analysis requirements during an event. The implementation of these enhancements will ensure a timely response to emergency needs.