WHC-SP-0564-36

UC-607

Westinghouse Hanford Company Health and Safety Performance Report

Fourth Quarter Calendar Year 1994

Safety
Radiological Control

Date Published
March 1995

Prepared for the U.S. Department of Energy
Assistant Secretary for Environment,
Safety and Health

Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

RELEASE AUTHORIZATION

Document Number:	WHC-SP-0564-36
Document Title:	Westinghouse Hanford Company Health and Safety Performance Report - Fourth Quarter Calendar Year 1994
Release Date:	2/23/95

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

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ACKNOWLEDGEMENTS

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MANAGEMENT SUMMARY

Detailed information pertaining to ALARA/CCIP activities are outlined in Section 1. Improved commitment to the WHC ALARA/CCIP Program was experienced throughout FY 1994. Major support for the program was evident with the fulfillment of the FY 1994 facility-specific and sitewide radiological area reduction goal of over 740,000 square meters (8 million square feet). During CY 1994, 17 of 19 sitewide ALARA performance goals were completed on or ahead of schedule.

Estimated total exposure by facility for CY 1994 is listed in tables beginning on page 3-8 by organization code for each dosimeter frequency. Of note, there were four instances of loss of contamination control during this calendar quarter involving 12 workers where internal dosimetry follow-up was performed (page 3-11). The Figure 3-2-1 chart data on page 3-4 includes WHC, BCSR, and ICF KH employee exposure. The results represent the exposure of an average of 2,940 quarterly-badged employees, 1,278 monthly-badged employees, and 8,903 yearly-badged employees over CY 1994.

Five skin contaminations were reported during the fourth calendar quarter for a total of 27 (target goal was less than 29) during the calendar year in WHC-managed facilities/operations. This is an increase of three for the year over CY 1993. There were also 16 clothing contaminations during the fourth quarter. The total clothing contaminations for the calendar year is 66 which is under the target goal of less than 74 (page 3-15).

Facilities/areas continue to utilize the capabilities of the RPR tracking system in conjunction with the present site management action-tracking system to manage deficiencies, trend performance, and develop improved preventive efforts. It is expected that the RPR tracking system will be further enhanced by implementation of the new Hanford Action Tracking System (page 3-19).

Detailed information pertaining to occupational injuries/illnesses are provided in Section 2. This quarter showed an increase in lost and/or restricted workday cases reported, with the rate being higher than the overall CY 1994 rate (1.15) but equal to the CY 1993 rate (1.60). Concurrently, significant improvement was made in reducing the severity of injury/illness cases experienced. In this quarter the severity rate was 25.32 days lost/restricted per 200,000 hours worked, compared to the CY 1994 rate of 36.25 and the CY 1993 rate of 70.26.

MANAGEMENT SUMMARY (Continued)

The Industrial Safety and Hygiene programs described on pages 2-1 through 2-5 have generated several key initiatives that are believed responsible for improved safety performance. A breakdown of CY 1994 occupational injuries/illnesses by type, affected body group, cause, job type, age/gender, and facility is provided on pages 2-13 through 2-19. The contributing experience of each WHC division/department in attaining this significant improvement is described on pages 2-21 through 2-33 along with tables charting specific trends.

The Radiological Control Program, discussed in Section 3, is on schedule to meet all RL Site Management System milestones and program commitments, as documented in the current Site Support Program Plan. Significant progress was made this year in the leadership and execution of planning for 10 CFR 835 implementation. Improved focus and energy on broad areas of program management, such as ALARA, radiologically contaminated area reduction, and leadership in improving Radiological Control Program efficiency continued as areas demonstrating accomplishments. Focus remains on areas where improved radiological conduct of operations is needed, such as skin/clothing contamination trends. Financial resources and cost control continued to be acceptable in nearly all areas (page 3-1).

Dosimeters are no longer required for everyone onsite. Employee need and desire of dosimeters has been reviewed and many employees are now on an "N" (no dosimeter) frequency exchange.

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1.0 ALARA

"As Low As Reasonably Achievable" (ALARA) is an approach to radiation and hazard protection that manages and controls radiological exposures (both individual and collective) to the work force and to the general public to levels as low as reasonably achievable. This is accomplished while taking into account social, technical, economic, practical, and public policy considerations. It should be clarified that ALARA is not a dose limit, but a process with the objective of attaining and maintaining exposures as far below the applicable limits as is reasonably achievable. The purpose of this section is to address how this process is being accomplished within the WHC ALARA/ Contamination Control Improvement Project (CCIP) Program.

The focus of the ALARA section of this publication has been realigned to provide information not only of the events that occurred during the fourth quarter of calendar year (CY) 1994, but to provide an overview of the achievements of the ALARA/CCIP Program during the entire year.

During CY 1994, the ALARA Program Office was realigned from the Industrial Health and Safety organization to the Radiological Control organization. Included in the realignment was the integration of the CCIP within the ALARA Program. The integration of these two programs has strengthened both ALARA and CCIP field implementation. Combining the two programs has improved communication, interface, and administration.

Starting in fiscal year (FY) 1995, the ALARA performance goal process changed from a calendar year cycle to a fiscal year cycle. This change was designed to align the goal-setting process with the budgeting process. The change also provided facility/organizational ALARA committees with another tool for establishing ALARA performance goals that are more meaningful, realistic, and challenging. The emphasis placed on the goal process, by the U. S. Department of Energy (DOE), Richland Operations Office (RL), and Title 10, Code of Federal Regulations, Part 835 (10 CFR 835), *Occupational Radiation Protection*, has not been overlooked.

Establishment of the ALARA Program is required by 10 CFR 835, Sub-part B, "Radiation Protection Programs," Article 835.101 (c), which states:

> *"The content of each RPP (Radiological Protection Program) shall be commensurate with the nature of the activities performed and shall include formal plans and measures for applying the as low as reasonably achievable process to occupational exposure."*

1.1 ALARA PROGRAM ASSESSMENT

An ALARA Practices Self Assessment Plan was developed to assess the field implementation of radiological ALARA practices. This self assessment was divided into seven different phases and was completed in March 1994. Each phase focused on individual facilities under the cognizance of the seven Radiological Control area managers. This assessment process was accomplished as a joint effort by Radiological ALARA Engineering, ALARA/CCIP Program Office, and facility/organization ALARA committee representation. A summary of the major improvements associated to this assessment are summarized in the following.

- Workers used a glove bag to control the spread of contamination while making several pipe cuts on the Radioactive Liquid Waste System piping alterations near Building 340. The glove bag was used during the initial break into the system and then moved to other cut locations to cut up the scrap piping for disposal. Use of the glove bag allowed the work to be completed at a savings of several hundred dollars compared to the cost of a greenhouse. This type of glove bag is available for purchase by any facility from Stores.

- A movable lead shield (enclosed in stainless steel) was obtained from PUREX and is being used to reduce radiation exposure at Building 340 during liquid waste transfers. This lead shield was no longer needed by PUREX and was given to Building 340 at no charge. An "excess" concrete enclosure, formally used by security guards, was placed outside the tank car transfer building in order to reduce the distance personnel had to traverse to perform a whole body survey after removal of their protective clothing. This shield is too short for personnel surveying, but works well for the Health Physics Technicians (HPT) counting surveys. They are continuing to look for a better booth that will accommodate personnel. Personnel are presently evaluating if the addition of water to four above-ground collection tanks will reduce radiation levels in the 340 facility.

- Localized ventilation and a "catch" containment were used while grinding out a seal weld and removing a plug to obtain a sample of resin from a radioactive ion exchanger located in an underground vault. No contamination was spread. Localized ventilation was used while cutting piping in contaminated troughs instead of requiring respirators. Air samples taken during work showed no spread of radioactivity.

- The potential for spreading contamination during maintenance on floor valves at Fast Flux Test Facility (FFTF) Fuel Storage facility was significantly reduced through an upgrade of the work area containment. The existing containment was old and was replaced with a new commercial tent; the result was a significant upgrade in workers' ability to control the spread of contamination.

- Operation of the bottom-loading transfer cask at FFTF significantly increased the potential risk of spreading contamination while the loaded cask was being transported. A team approach was used to brainstorm the work steps and develop new techniques for controlling the contamination. These techniques are being evaluated now and will be implemented the next time the bottom-loading transfer cask is used.

- Plutonium sludge containers at Plutonium Finishing Plant (PFP) were lined with three layers of lead foil and radiation exposure was reduced by 75%. Lead plastic was applied to the windows of two gloveboxes and the radiation levels were reduced from 30 mrem/hour to 2 mrem/hour. Shielded port covers were installed on the 15-inch seal-out ports and some of the higher reading 8-inch ports reducing radiation exposure by 90%. A twenty foot long lead curtain, 0.2 millimeter thick, was installed in the sludge stabilization control room reducing the dose rates from as high as 15 mrem/hour to <0.5 mrem/hour.

- A recent spill at 222-S Laboratories was decontaminated using stripable latex decontamination paint obtained from the Washington Public Power Supply System. Additional plans are to spray the stripable latex into a laboratory to fix all loose contamination. The individual components will then be removed from the laboratory one at a time and the newly exposed area will be painted. When all of the laboratory components are removed, the stripable latex paint will be removed. Besides the obvious advantage of reducing the spread of contamination during the work, the latex paint is expected to attenuate a portion of the beta radiation from the surface contamination. This special paint has been placed into Stores for use by all facilities.

- Cameras were installed in the 105-KE Basin to permit real time viewing of activities in the discharge chute during barrier door installation work and sludge/debris relocation activities. The remote monitoring stations help reduce exposure by providing administrative and engineering personnel with a view of the activities from a nonradiological area.

- Telephones (with green rotating lights attached to the ringing device) have been installed in the 105 KE Basin. This has helped to improve communications by ensuring the Shift Operations Manager has direct communication ability with work crews at all times. The green rotating light is necessary due to noise levels in the basin.

- K Basins issued a new ALARA manual, WHC-IP-1028, that provides direction governing K Basins ALARA programs. A full-time ALARA Engineer has been assigned to participate in the preplanning for radiological work, promote applied ALARA in the field, and review all radiological work packages. The engineer has taken the lead on containment procurement, containment use, portable ventilation, and the design of engineering controls.

- Behavior Based Safety Training (BBST) Stations are established for 105 KE and 105 KW. They are staffed by HPTs who make observations regarding access control and Anti-C dress/undress procedures. The HPTs utilize the "Define, Observe, Record, Intervene, Test, Evaluate (DO-RITE)" process to help K Basin personnel improve radiological conduct of operations. The process serves as a key part of their ALARA Program and 1995 Safety Improvement Plan.

- Representatives from K Basins ALARA Committee and the ALARA/CCIP Program Office participated in a task team to determine the best choice for reducing radiation exposure in K East Basin. The task team recommended decontamination of an area around the basin waterline by removing a layer of concrete up to 1/2 inch deep. This is expected to reduce radiation levels in the basin by up to 80%.

- PUREX is in the process of transferring more portable lead shields, enclosed in stainless steel, to other facilities on site to help these facilities reduce their exposure and, at the same time, reduce the PUREX inventory of materials that are no longer needed. This continues to result in a significant cost and exposure savings for the other facilities.

- The use of glovebags and greenhouse containments is increasing at Tank Farms and other facilities; however, in order to get a wide acceptance of containments, it is first necessary to train the workers on how to install and work in them. Over 100 Tank Farm operators have received an abbreviated class on containments and over 75 have received a longer, practical training class on the use of glove bags, containments, Randolph pumps, and poly-bottle collection facilities. This training required the students to install the equipment and then use it to accomplish simple jobs. All HPTs received familiarization training on the use of glove bags and containments with emphasis on how to certify these containments for work.

- Tank Waste Remediation Systems (TWRS) management personnel determined that in order to accomplish work in highly contaminated pits, it is necessary to conduct mock-up training and evaluate the work practices of involved personnel. The work practices of several teams of workers and HPTs have been evaluated and the results have shown that improvements in radiological work practices are needed. These improvements are being incorporated into the training and work procedure. Additional training, scheduled later, will incorporate the applicable lessons learned.

- A system was developed by B Plant Operations and Radiological Control where supervisory personnel evaluate the need for all exposure before entry is allowed in radiation areas. This program is successful, exposure is lower and personnel are more aware of their need to keep their exposures ALARA since they have to justify what it is they want to accomplish for each entry.

- Earlier this year, low levels of loose contamination were occasionally found at B Plant in the gallery outside the canyon and on workers' shoes. No immediate source of this contamination was evident so a surveillance program was implemented to find the cause of this contamination. As a result, an open pipe penetration was located about ten feet above the floor and a crevice around a floor drain was found to be leaching contamination. These areas have been sealed. In addition, surveys of dead-ended penetrations were performed and ten areas were found that required decontamination. These surveys are continuing. Additionally some open vent lines were found that protruded from the roof edge, about 60 feet from the ground. These lines had previously been a source of contamination in the Operating Gallery and the open system allowed rain water to leak into a highly contaminated system. These lines have been sealed.

- When the ALARA self assessments were initially performed, one of the findings related to the difficult time facilities were having in getting portable air samplers recalibrated. Before PNL would recalibrate the air samplers, they had to be surveyed and released from radiological control requirements. This often required the air sampler be completely dismantled in order to survey all surfaces. The recommendation for the finding was the air samplers should be calibrated by instrument technicians at each facility using their own equipment and not sent to PNL for calibration. PNL concurred with this recommendation. In August 1994, Calibration Instruction PSCP-3-107 was issued that provides the necessary requirements to accomplish this recalibration. It is no longer necessary for each facility to send their air samplers to PNL for calibration.

1.2 WHC ALARA GOALS

In theory, ALARA is the goal in itself and other goals should not be necessary. However, in practice, other goals are required to assist in assuring that the primary goal, ALARA, is achieved. The ALARA performance goals are designed to enhance the specific operations, activities, and programs scheduled, or anticipated, to be completed during the following 12-month period. WHC evaluates the ALARA performance goals in an effort to identify areas of accomplishment as well as specific areas that need additional attention.

1.2.1 Sitewide ALARA Performance Goals

During CY 1994, 17 of 19 sitewide ALARA performance goals were completed on or ahead of schedule. Due to unforeseen circumstances, the revision of the WHC ALARA Program Manual was not completed. The manual has been rewritten and is being assessed by an independent ALARA expert but has not been submitted for management approval. It is anticipated that the WHC ALARA Program manual will be published and implemented in early CY 1995. Also, the goal to maintain the annual cumulative radiological exposure to less than 140 person-rem was exceeded. More detailed information related to sitewide ALARA goals is contained in Appendix A of this report.

1.2.2 Facility/Organization ALARA Goal Performance

Progress of the implementation of the ALARA/CCIP Program at WHC is evidenced in part by the tracking, development, and achievement of ALARA performance goals by the facility/organization ALARA committees. The CY 1994 facility/organizational specific ALARA goals were established to

effectively implement exposure reduction activities, as well as to provide a method to measure and promote effective ALARA practices. The facility/organizational ALARA goals are intended to increase employees' ALARA awareness and enhance the support and commitment that management places on reducing radiation exposure to the lowest practicable level.

In an effort to highlight facility progress towards completing ALARA performance goals, quarterly reviews were conducted of the ALARA goals status provided by each facility. Upon completion of the reviews, letters were sent to each facility director by the Radiological Engineering & ALARA Manager. The letters provided acknowledgement for the facilities accomplishments as well as highlighted areas that needed special attention. The most critical element of having an effective ALARA/CCIP program is the support of senior management.

1.3 CONTAMINATION CONTROL IMPROVEMENT PROJECT

The CCIP provides a centralized focal point for radiologically contaminated area reduction and to assist WHC facilities/programs in the sitewide effort to improve the contamination control practices. The CCIP charter includes the tracking of radiological contamination, development of associated performance indicators, and the planning and technical support of contaminated area reduction/downgrading. The goal of CCIP is to maintain a safe workplace by minimizing the occupational risks that result from the interaction between people and contamination. Reducing the number of contaminated areas and the severity of contamination will reduce the risk of skin/clothing contaminations, internal depositions, minimize personnel exposure, increase site productivity, and further protect the environment.

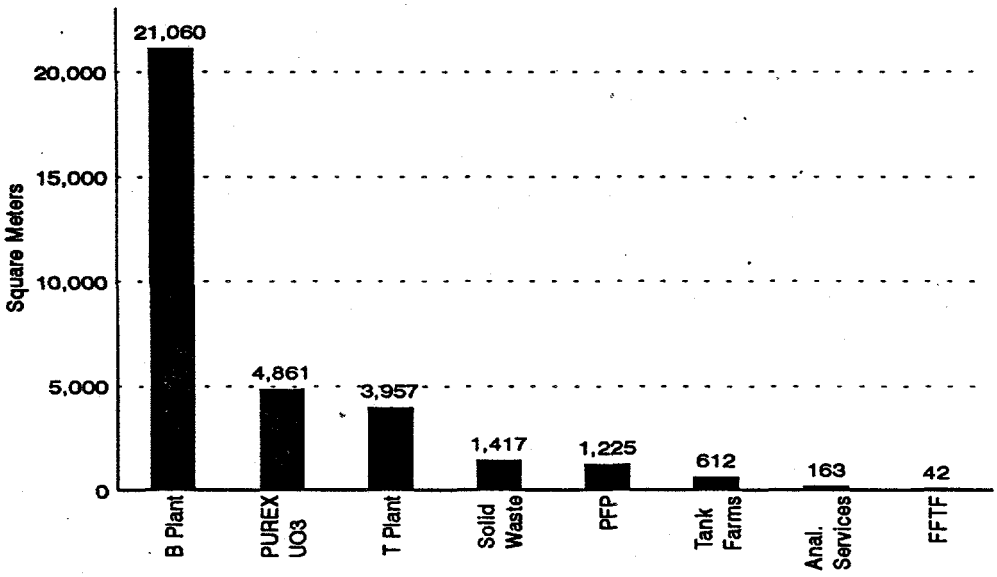
During the fourth quarter of CY 1994, the CCIP database was reformatted to implement the new posting definitions found in the Hanford Site Radiological Control Manual (HSRCM-1) and the validation of the database. Currently, for CCIP purposes, the postings are grouped as follows: Airborne Radioactivity Areas (ARA); total Contamination Areas (CA), which is the sum of high CA, CA and soil CA; total Radiation Areas (RA), which is the sum of very high RA, high RA and RA); and other Radiological Areas which is the sum of Radiologically Controlled Areas, Radiological Buffer Area, Fixed Contamination Area, Radioactive Material Area, and Underground Radioactive Materials. As a result of these mandated changes, there is no direct correlation between most of the fourth quarter data and previous quarterly data.

The CCIP tracks CAs and categorizes areas controlled for radiological reasons, and the quantification of said areas. It also tracks, separately from CAs, ARAs. The project identifies, tracks, and encourages the reduction of radioactive surface contamination and the number of RAs. It also addresses ARAs in indoor areas and CAs and RAs in indoor and outdoor operating areas.

1.3.1 Airborne Radioactivity Areas

The ARAs are tracked separately from CAs because of the inherent increased risk to the occupational worker. The size of ARAs has been generally stable since 1990. Generally, ARAs are not as easy to decrease as SCAs because they are related to the process and are engineered areas. They are decreased as the underlying process is changed or discontinued and the area is decontaminated (Figure 1-3-1).

Figure 1-3-1. Airborne Radioactivity Areas



The number (as well as the total size) of ARAs established by facility group for the fourth quarter of 1994 is listed in Table 1-3-1. Please note that the number of ARAs may be arbitrary, in that one facility may elect to group all their ARAs together (for CCIP reporting purposes), while another may report each individual ARA separately.

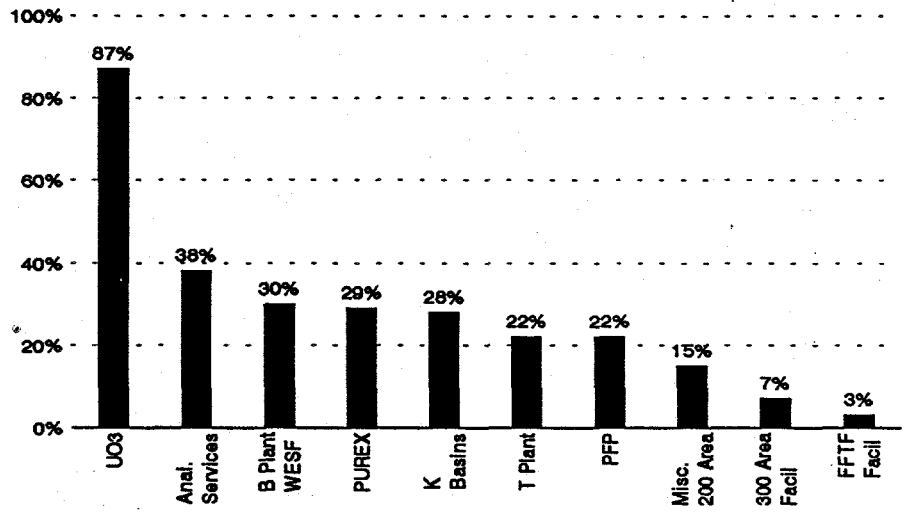
Table 1-3-1. Airborne Radioactivity Areas by Facility Group

Facility	No. of ARAs	ARAs in Sq. Meters	ARAs in Sq. Feet	Facility	No. of ARAs	ARAs in Sq. Meters	ARAs in Sq. Feet
B Plant	23	21,060	226,659	Solid Waste	4	1,417	15,249
Fast Flux Test Facility (FFTF)	1	42	450	T Plant	7	3,957	42,595
Analytical Laboratories	6	163	1,758	Tank Farms	11	612	6,586
Plutonium Finishing Plant (PFP)	5	1,225	13,194	UO_3	2	105	1,125
PUREX	20	4,756	51,192	Total	79	33,337	358,808

1.3.2 Indoor and Outdoor CA

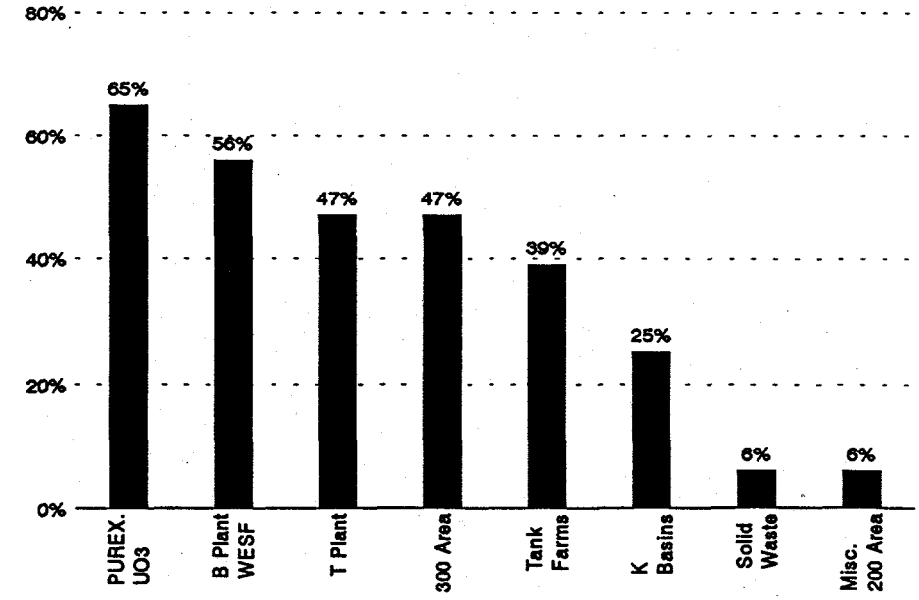
Most facilities have been reducing the amount of posted CAs indoor. During the fourth quarter of CY 1994, progress was made in the reduction of CAs within PFP and the 222-S Labs, with more than 325 square meters (3,494 square feet) and 183 square meters (1,971 square feet), respectively, being down-posted. In addition, approximately 157 square meters (1,689 square feet) was down-posted at the Regulated Vehicle Repair Building in 200 West Area. Figure 1-3-2 depicts the percentage of facility indoor total radiologically area that is posted as CA.

Figure 1-3-2. Percentage of Facility Indoor Radiological Areas Posted as CA



In outdoor areas, during the same time period, progress was made in the reduction of outdoor CAs at PUREX and B Plant, with more than 2.6 hectares (6.3 acres) and 0.8 hectares (2.1 acres), respectively, being down-posted. In addition, approximately 1 hectares (2.5 acres) was down-posted at other outdoor sites. Figure 1-3-3 depicts the percentage of operating facility outdoor total radiologically area that is posted as CA.

Figure 1-3-3. Percentage of Facility Outdoor Radiological Areas Posted as CA



Overall, the amount of indoor posted CA has been decreasing (Figure 1-3-4). Outdoor areas are separated into two categories for tracking purposes - - areas associated with "operating" facilities and those that are not (Figure 1-3-5). Refer to Section 1.3 for explanation of controlled area changes resulting in decreased numbers.

Figure 1-3-4. Indoor CA

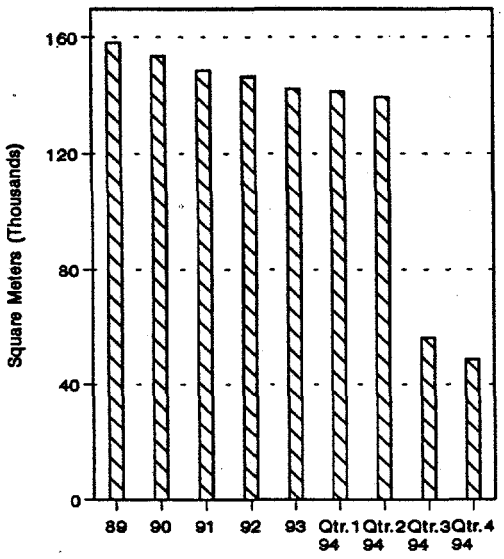
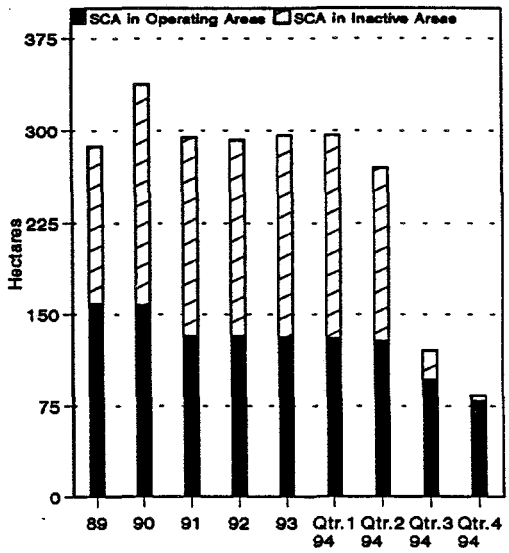


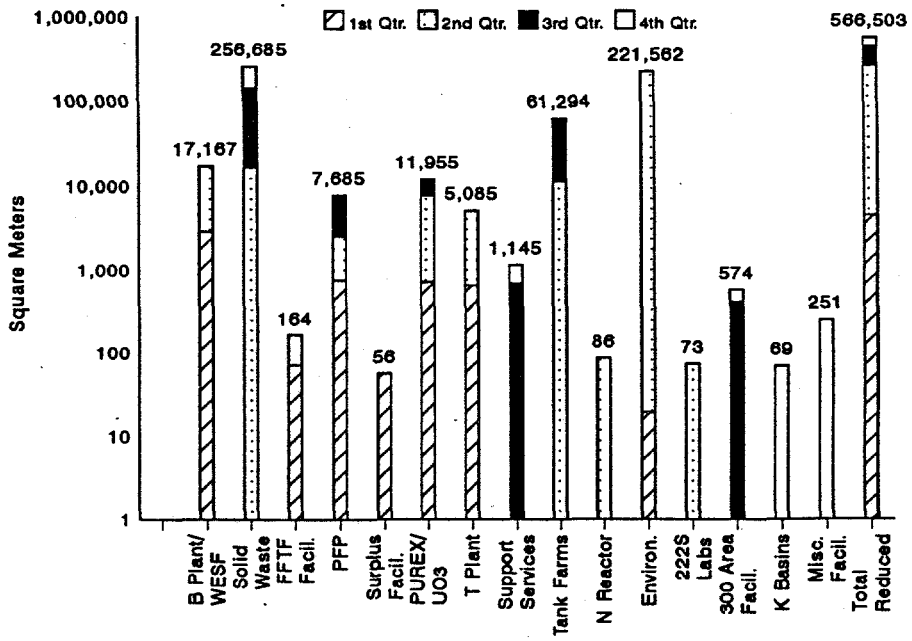
Figure 1-3-5. Outdoor CA



1.3.3 CA Reduction - Indoor and Outdoor Areas

The CCIP tracks reduction efforts separately from the overall total posted areas and tracks and trends the total area reduced by facilities on a quarterly basis. During this quarter, an approximate total of 51,462 square meters (554,000 square feet) was released from CA posting. Specific reductions by facility per quarter (in square meters) are found in Figure 1-3-6.

Figure 1-3-6. SCA Reduction by Facility Group - CY 1994



1.4 ALARA PROGRAM IMPLEMENTATION, PROGRESS, AND ACHIEVEMENTS

The ALARA/CCIP Program Office believes it is important to promote the contributions and accomplishments of the WHC ALARA/CCIP Program by communicating the progress and achievements that have been made in implementation of the WHC ALARA/CCIP Program. The following is a list of some of the contributions and accomplishments achieved in CY 1994.

- The ALARA/CCIP Program Office, Radiological ALARA Engineering, Safety Awareness and Dosimetry combined efforts in preforming analyses of the skin and clothing contaminations that occurred in WHC-managed facilities/areas during CY 1994. In most cases, thorough and complete investigations had been completed and properly documented. However, in some of the cases where "contaminated laundry" was identified as the possible source of the contamination, investigations concluded that other contributing factors should have been considered as the probable cause. A letter was issued highlighting various methods to reduce the number of skin and clothing contaminations.

- The ALARA Summary, a monthly personnel exposure report, was made available on Soft Reporting. Modifications to this report included a method to track exposure by fiscal year to coincide with ALARA performance goal tracking. The utilization of Soft Reporting to disseminate this report has made the information easier to retrieve, more readily available and less expensive to distribute. An ECCEL proposal was submitted and approved for this evolution for over $105,000 in soft dollar savings. CCIP also submitted, and had approved, an ECCEL proposal for a soft dollar savings of $30,250.00. The cost savings was achieved by placing the CCIP data on Soft Reporting which, in turn, improved the availability and support for data requests.

- The Search Hanford Accessible Records Electronically (SHARE) database was implemented for WHC ALARA users to provide the distribution of completed ALARA job information throughout the site, including lessons learned and corrective action. SHARE user comments have indicated that the SHARE system is highly beneficial and provides a valuable tool to assist in the creation of work packages.

- Dawn E. Kammenzind (PUREX), Mark D. Nuzum (Analytical Services), Ken W. Davis (K Basins), and Willis H. Taylor (FFTF) were named as ALARA Committee Chairpersons of the Quarter during CY 1994. The facility ALARA Committees represented by these individuals have made continual improvements during their tenure as chairperson.

- The ALARA/CCIP Program Office supported product demonstrations from the following ve dors.

  - Bartlett Nuclear Services: A wide assortment of decontamination products
  - Concrete Cleaning Incorporated: A method of cleaning and decontaminating concrete.
  - Environmental Scientific Incorporated: Chemical products for use in radiological control.
  - Exploration Products: Demonstrated a full line of containments and portable tents.
  - Inflatable Abatements: Specializing in quick setup containments, tents and greenhouses.
  - LANCS Industries: Large assortment of radiological containments and equipment.
  - Long Services Incorporated - Decontamination system.
  - Power Products - Demonstrated HEPA filtered vacuum systems.

  These demonstrations were attended by a combined total of over 1500 Hanford employees. Many of the new technologies presented during these demonstration are now being utilized at Hanford to reduce radiological exposure to personnel.

- The ALARA/CCIP Program Office supported Pacific Northwest Laboratories (PNL) in an ALARA workshop by promoting implementation of ALARA concepts in application to the 324 Building B-Cell clean-out project. A joint B-Cell Cleanout ALARA Workshop with PNL and WHC, facilitated by ICF Kaiser Hanford Company (ICF KH), was conducted on June 1 and 2. The workshop addressed review and reinforcement of integrated ALARA planning and emphasized risk management and ALARA philosophy, not only for individual tasks within the project, but for planning resolution of major issues. This workshop successfully integrated the PNL B-Cell project team with WHC transportation and disposal/storage teams. Success, in this case, meant all involved organizations realizing and appreciating the need for cooperation when evaluating risks and applying ALARA to the B-Cell cleanout project -- from B-Cell waste removal to storage.

- The ALARA/CCIP Program Office supported Savannah River ALARA Awareness Week activities by sharing a photo display promoting implementation of ALARA concepts. This display focused on the objective of managing and controlling exposures to the work force and general public to levels ALARA. Information on technologies and practices, available at Hanford, that illustrate innovative thinking in the field of radiation protection and pollution prevention were utilized.

- DOE-RL conducted field exercise "Fraser," in June. This exercise involved the 327 Building and all 300 Area personnel. The goal of the Emergency Preparedness exercise was to verify the readiness of DOE-RL, it's contractors, Benton and Franklin Counties, and the States of Oregon and Washington Emergency Preparedness Programs in the mitigation of the simulation of emergency conditions. The ALARA/CCIP Program Office acted as Lead Radiological Protection Controller at the simulated event scene. The primary responsibility was to monitor the WHC and PNL Radiological Control organizations and their actions in response to the simulated emergency.

- A representative from the ALARA/CCIP Program Office attended the Third International Workshop on the Implementation of ALARA at Nuclear Power Plants. The Nuclear Regulatory Commission (NRC) and Brookhaven National Laboratory ALARA Center jointly sponsored the workshop. Technical information was presented relating to decontamination and decommissioning of nuclear facilities. Eleven countries participated in the workshop including Germany, Japan, Mexico, Canada, Finland, France, Netherlands, United Kingdom, Spain, Sweden, and the United States.

- Liquid Effluent Services established a facility/organizational-specific ALARA committee. This new committee will support several unique elements including the 340 Facility, 200 and 300 Areas Liquid Effluent facilities, and members of the well drilling organization. Liquid Effluent Services submitted ALARA/CCIP performance goals for FY 1995.

- K Basins, with support from the ALARA/CCIP Program Office, reformed their ALARA committee by combining the Pollution Prevention Function with their ALARA Committee. Initial indications are that overall safety representation will be enhanced by integrating these functions. The focus of this transition is to improve the communications between these groups while streamlining the amount of time and personnel necessary to perform these functions.

1.5 ALARA TRAINING/AWARENESS ACTIVITIES

To assist facility or organizational ALARA points-of-contact, the ALARA Program Office provides tools, guidance, and training to promote the health and safety of WHC employees. The majority of ALARA training is incorporated in other training packages as a theme that is reinforced throughout the training session. This reduces the number of ALARA courses necessary while ensuring the consistent reinforcement of ALARA practices and principles. During CY 1994, Technical Training conducted 2,696 training sessions, that included the ALARA theme throughout, with 15,592 students completing the training. Some of the subjects covered in these training sessions included: Criticality Safety, Job Control Systems, and Hazardous Waste Materials Handling.

The ALARA/CCIP Program Office sponsored quarterly ALARA training utilizing the hands-on instruction approach. These training sessions focused on radiological and nonradiological ALARA issues in an effort to expand the awareness of WHC employees to ALARA principles.

- First Quarter Training - Hazardous Materials Chemistry for the Non-Chemist. This session was provided to 38 participants at the Columbia Basin Community College. This active-demonstration training course provided information for an effective understanding of chemicals and their effects on health and the environment. It focused on individuals working with, or having responsibility for compliance with Occupational Safety and Health Administration (OSHA) health and safety standards relating to hazardous waste regulations. This course heightens hazard recognition, laboratory safety and chemical spill response, and promotes the "24-hour safety" profile. The course was brought back due to its success last year during third quarter ALARA training.

- Second/Third Quarter Training - Ventilation as an Engineered Control. During the ALARA self-assessment it was found that very few facilities were using portable high efficiency particulate air (HEPA) filtered ventilation systems to assist in controlling the spread of contamination. Most facilities over-dressed their personnel in personal protective equipment (PPE) and had them wear respirators instead of using some form of engineered control to remove the source of the radioactive contamination. Several new ventilation systems have been purchased and other facilities removed their HEPA-filtered units from storage. A training class was sponsored by the ALARA/CCIP Program Office and an expert instructor was brought to Hanford to teach personnel more about using HEPA filtered ventilation. These training sessions were attended by 54 Hanford employees, and these personnel are promoting the use of ventilation sitewide. This class will be rescheduled periodically, as needed.

- Fourth Quarter Training - Household Hazardous Waste. This informative training was provided by the Benton County Regional Moderate Risk Waste Facility. This facility promotes the "Reduction, Reuse, and Recycling" principle, as applicable to household hazardous products that are common both at home and the work environment. There were over 60 Hanford employees who attended this training, including representatives from ICF-KH, PNL, and WHC.

1.6 ALARA PROGRAM LESSONS LEARNED THROUGH POST ALARA REVIEWS

The ALARA/CCIP Program Office has been involved in the development, modification, and implementation phases of the SHARE database to redeploy lessons learned and ALARA Protective Measures (APM) from work performed onsite. It is available for personnel involved in the process of designing, performing, and/or managing work projects. SHARE makes completed copies of Post ALARA Reviews (PAR) available electronically for review, retrieval, and use by planners, persons-in-charge (PIC), engineers, ALARA personnel, etc. The futuristic scope for this system is to have the completed copies of other ALARA forms that produce value added information available for utilization by facility ALARA personnel.

Improvement has been shown in the completion of the PAR process during CY 1994. The PAR process is proving to be a vital tool in helping to prevent complacency, reduce exposure, and incorporate lessons learned from completed tasks. The PAR documents the final assessment of the job. Included in this assessment are lessons-learned while doing the job and any additional APM, modifications, or changes implemented during the job. These lessons learned help to evaluate the effectiveness of the exposure controls that were implemented, and reduce future exposures by applying these experiences to similar jobs. The ALARA/CCIP Program Office compiled results from some of the PARs completed during the fourth quarter and incorporated those in this report.

- During a sampling job at T Plant several tools were taken into an airborne environment for use. These tools need to be very clean (sterile) for the work activities. Thus using tools already contaminated (pliers, scissors, etc.) is not an option. It has been suggested that scissors could be replaced with an extendable blade and wrapped to below the extension of the blade to reduce the possibility of contamination.

- K Basins identified that poor work practices and use of liquid stripping agents were involved in the spread of contamination and clothing contaminations. Work of this type requires constant HPT coverage to maintain adequate controls. During this job they also determined the need to perform better prejob task evaluations to better estimate actual hours needed to complete the work.

- Fifty-eight samples were transported from 1E2 to the IIA1 Hotcell at 222-S Laboratories. Sample dose rate over-the-top near contact, uncorrected, ranged from 0.1 - 3.6 Rem. The estimated collective dose established on the ALARA Management Worksheet (AMW) was 0.250 person rem. Supplemental dosimeter reading at completion of the task indicated 0.075 person rem of exposure. The use of shielded containers, lead barrier on sample cart and the use of leaded aprons all contributed to an effective job of dose minimization. The use of leaded gloves also provided a major reduction in extremity dose.

- A drum was smeared a number of times for release to storage area. Due to high background readings the HPT kept requiring more decontamination of the drum and new smears. There is a need to use a cave to shield smears for better accuracy. This should be covered during prejob briefings for similar jobs.

- During a plug handling fixture overhaul at FFTF, they determined that when using contaminated tools from Decon II, it was found that sometimes the wrong tools were brought. Time was wasted trying to find the right tools. Crafts were generally reluctant to go into DECON II to retrieve the correct tools. They felt the hassle was not worth the effort. Once the tools were removed from DECON II they had trouble keeping them separated from clean tools brought in from the tool crib or shop. To solve this problem FFTF decided to avoid using DECON II tools unless some new work is encountered with higher potential for transfer of contamination.

- The APM utilized at PFP in a panel changeout were effective in decreasing or eliminating potential exposure and contamination problems. The APM included utilizing one entry to change the panel and install the furnace, rather than making two entries. In addition, operators were provided dry-run training with a mockup model. A dry run of the job had allowed the operators to prepare lifting equipment and the necessary PPE for the work, this eliminated the need to stop the job and fix a problem.

Further information on completed PARs may be obtained from the ALARA/CCIP Program Office, by reviewing previous issues of this publication, or electronically accessing the SHARE database.

1.7 ALARA TRACKING AND MANAGEMENT SYSTEM

In order to identify, track, and manage personnel exposure within the responsible facility/organization, the ALARA Tracking and Management System (ATAMS) was developed. The system was originally designed to assist the WHC ALARA/CCIP Program Office and ALARA committee chairpersons in tracking the exposure levels of personnel under their jurisdiction and investigating any anomaly. The ATAMS has further served to heighten exposure awareness levels of personnel and, with each investigation performed, it encourages management to consider the ALARA approach to exposure. The system selects individual and organizational anomalies identified within the following set of parameters and criteria:

- The top one percent of the monthly/quarterly thermoluminescent dosimeters (TLDs) processed;
- Extrapolated exposures through year end that will exceed a WHC worker's administrative guideline level;
- Individuals with significantly higher whole body dose than peers within their craft;
- Individuals identified as having high finger ring exposure versus deep dose;
- Unusual TLD results identified during this period (i.e., shallow less than deep exposure);
- Individuals identified as having high neutron dose.

Investigative reports are required for identified individuals during the processing period to document an explanation of the anomaly, including the APMs that are in place or were considered for implementation.

1.7.1 ATAMS Investigation Results and Protective Measures

Investigations of anomalies, completed during the fourth quarter of CY 1994, provide evidence of a concentrated effort to maintain radiation exposure in the workplace ALARA. Certain trends may be identified with a direct relationship to areas where exposure-producing operations and activities are occurring within WHC-managed facilities. Although anomalies are noted, they result in exposures that are within the administrative guidelines established by WHC. The anomalies, discussions, and APMs listed in this report are the results of ATAMS investigations.

- Anomaly: PFP had eight operators identified as receiving high whole body exposure within their craft.

  Discussion: These operators were assigned various high-exposure duties at PFP.

  APM: One method utilized to reduce exposure to these operators was the procurement of leaded gloves for handling radioactive materials. An APM implemented was the use of "hot spot" stickers to identify the areas with the highest exposure in a room.

- Anomaly: Liquid Effluent Services had one employee identified under three of the criteria. The employee was listed as receiving exposure in the top 1% of the monthly TLDs processed, extrapolated exposure that through the year end would exceed an administrative guideline, and high whole body exposure for the craft.

  Discussion: A letter was issued by PNL documenting the exposure totals were reported in error.

- Anomaly: PFP had six material handling specialists identified as having received exposure that would exceed an administrative control level when extrapolated through year-end.

  Discussion: These exposure levels were commensurate with their assigned vault duties in preparation for International Atomic Energy Agency (IAEA) inspections.

  APM: An evaluation is underway to determine the feasibility of reducing the number of individuals assigned to perform these material inspections.

- Anomaly: T Plant had one worker identified as having high finger ring exposure vs. deep dose.

  Discussion: It was noted that this exposure may have been due to improper job planning.

  APM: There was a critique held and the work package was reviewed. Due to this review the RWP was changed to improve the ALARA considerations and APMs.

- Anomaly: PUREX had two employees identified as having high finger ring exposure versus deep dose.

  Discussion: Due to N-Cell cleanout activities for deactivation, finger ring doses for select individuals will continue to be high compared to whole body doses. This exposure is due to work in a glove box that include the use of hand tools to disassemble piping that has residual plutonium nitrate liquid within them. The glove box shields the majority of the exposure to the body, which explains the anomaly.

  APM: Management is continuing to review the exposures of these employees and rotate employees through the higher exposure jobs as training and experience allows. ALARA principles are being incorporated as practicable.

Further information on investigations performed may be obtained by contacting the WHC ALARA/CCIP Program Office at 376-9035, or review prior issues of this publication.

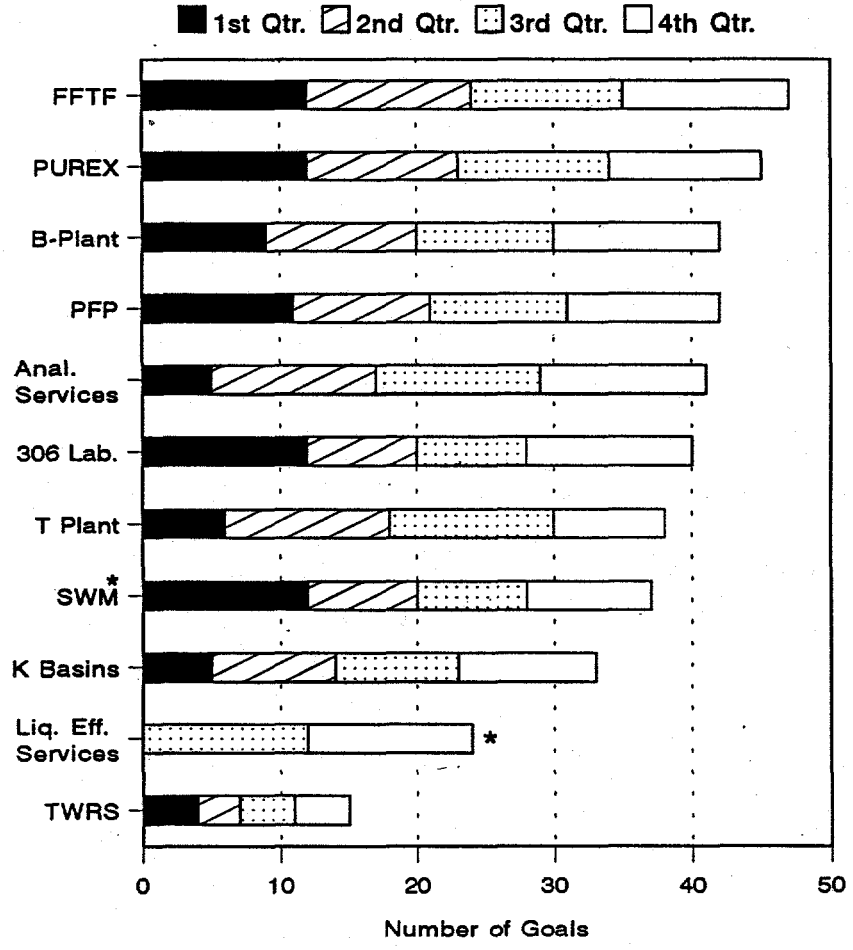
1.8 ALARA COUNCIL/COMMITTEES

The WHC ALARA Council includes the WHC ALARA/CCIP Program Coordinator; ALARA/CCIP Administrator; and each facility or organizational ALARA Committee chairperson. Representatives from support and technical organizations within Engineering, Safety, and Pollution Prevention provide representation as applicable. During CY 1994, several of the facility/organizations appointed different ALARA committee chairpersons. In most cases, there has not been a marked decrease of the effectiveness of those ALARA committees.

There are four major areas reflecting a substantial commitment to the implementation of ALARA/CCIP Programs: (1) Committee chair or representatives attendance at the ALARA Council meeting; (2) Conduct of monthly committee meetings and provide the meeting minutes to the ALARA/CCIP Program Office; (3) Timely completion and statusing of exposure investigations, as applicable; and (4) Timely statusing (monthly/quarterly) of facility-specific ALARA goals, as applicable. Organization/facility committees are credited one point for participation in each of the four areas each month; a total of 12 possible points for each quarter.

The performances depicted in Figure 1-8-1 indicate areas of successful implementation and where additional management focus is needed in implementing and statusing ALARA processes. The facility/organizational ALARA Committees achieving the highest rating (PUREX, Liquid Effluent Service and FFTF) have combined the efforts of management and the work force in performing ALARA activities.

Figure 1-8-1. CY 19943 Facility/Organizational ALARA Committee Performance



* Committee was not formed until third quarter.

1.9 ALARA POINTS-OF-CONTACT

The ALARA Points-of-Contact listing identifies the current ALARA Committee Chairperson designated by division, department, or facility management to coordinate the administration of the individual facility ALARA Program. Support personnel representing Dosimetry, Safety, and Pollution Prevention are also listed in Table 1-9-1.

Table 1-9-1. ALARA Council Members

ALARA/CCIP PROGRAM OFFICE		
Program Control and Integration, Acting Manager	P. B. Chadly	376-7971
ALARA/CCIP Program Coordinator	O. D. Berglund	376-9035
ALARA Senior Health Physicist	L. O. Waggoner	376-0818
FACILITY SPECIFIC ALARA COMMITTEES		
340 Facility	J. W. DeLine	372-3608
B Plant/Waste Encapsulation and Storage Facility	H. G. Oglesbee	372-0080
	S. L. Hathaway	372-0382
Facility Operations/PUREX	D. E. Kammenzind	373-5608
Facility Operations/Plutonium Finishing Plant	A. M. Ostby	373-3387
	R. H. Smith, Jr.	373-2506
Fast Flux Test Facility	W. H. Taylor	373-2564
K Basins Operations	D. W. Humphrys, II	373-3143
Analytical Services	M. D. Nuzum	373-5966
Solid Waste Disposal/T Plant	B. A. Watkins	373-2471
ORGANIZATIONAL ALARA COMMITTEES		
Kaiser Operations	E. C. Benson	376-2531
Liquid Effluent Services	D. D. Morrison	373-0635
Solid Waste Management	F. D. Schlien	373-4499
Tank Waste Remediation Systems	W. K. Lacey	372-3939
Hanford Technical Services	M. A. Wendling	373-7533
ALARA COUNCIL SUPPORT PERSONNEL		
Corps of Engineers	D. L. Stanton	376-9635
Dosimetry	T. J. Kelly	373-1707
Industrial Safety	D. S. Penfield	372-3291
Protective Clothing & Equipment Committee	R. H. Shanks	373-2089
Pollution Prevention	J. A. Engel	376-8737

2.0 INDUSTRIAL SAFETY AND HYGIENE

2.1 INTRODUCTION

The purpose of the Industrial Safety and Hygiene section is to provide a perspective on overall performance by WHC and BCSR Richland, Inc. (BCSR) on the Hanford Site. Additionally, this section attempts to paint the overall picture of WHC industrial safety and industrial hygiene activities through narrative and statistical data that identifies and statuses goals and initiatives, program development, as well as standards and training courses anticipated or completed for use.

The occupational injury/illness and recordable vehicle accident statistics used in this section include WHC and BCSR accident data. Statistical data for ICF KH was provided by the ICF KH Environmental, Safety and Quality department.

2.2 ONGOING INDUSTRIAL SAFETY AND HEALTH INITIATIVES

2.2.1 Voluntary Protection Program (VPP)

The Goal: To achieve DOE-HQ recognition that the WHC safety program has attained "Merit" level status per Occupational Safety and Health Administration's (OSHA) Voluntary Protection Program criteria.

Status from previous quarterly report: The VPP application was resubmitted, incorporating preliminary review comments, and awaits DOE-HQ assessment. Separate teams from Westinghouse corporate and DOE-HQ have been scheduled to conduct on site reviews to determine our current level of success in meeting the performance criteria for VPP Merit status.

Update: Worksite analysis has improved from management/worker participation in general "walk-arounds," performance of formal routine worksite inspections, and conduct of comprehensive surveys. During 1994, over 125 industrial safety or hygiene risk assessments were completed, involving various facilities.

The next quarterly *WHC Health and Safety Performance Report* will report on the results of the assessments conducted by Westinghouse corporate and DOE-HQ.

2.2.2 Culture Enhancement

The Goal: To raise awareness and promote the acceptance of safety responsibility for self, coworkers, and loved ones.

Status from previous quarterly report: More than 95 percent of our workforce has been trained in the concept of improving safety through personal involvement. The "behavioral based" safety training effort has instructed these employees on how to identify and address safety issues by interacting with their peers. This process has resulted in workplace safety intervention in areas as diverse as seat belt use and waste handling.

Current employee perceptions are being sought via site-wide surveys. The first of these surveys indicate room to improve the manager/employee safety interface.

Update: Employee surveys at three separate site locations reveal a desire to see safety communication become more timely and pertinent. These same surveys indicate a belief that employees and managers care about each other's well being. Our Accident Prevention Councils are currently assessing the survey results.

2.2.3 Traffic Control

The Goal: Reduce vehicle accident potential.

Status from previous quarterly report: The Vehicle Safety Office had been formed to focus expert attention on traffic problems at Hanford. During the past year, over 1,000 WHC, BCSR and ICF KH employees had completed vehicle safety training, and a significant reduction in government vehicle accidents has been achieved.

Since the last quarter, the opening of an additional roadway has served to reduce traffic volume on Rt 4S by 650 cars per day. This reduction has changed the hazard rating on our main highway, effectively lessening the likelihood of accidents on that roadway.

Calendar year 1994 saw a 56 percent reduction in recordable WHC government vehicle accidents. (Refer to Section 2.5.21)

2.2.4 Electrical Safety

The Goal: Find and correct the root cause behind significant electrical events.

Status from previous quarterly report: Lack of familiarity and incomplete planning were found to be contributors to more than half of the electrical incidents which occurred at Hanford since the spring of the year.

A blue-ribbon team reporting directly to the WHC President's Accident Prevention Council has determined that basic electrical safety training, tighter overview of subcontractors, and better maintenance of electric welding machines are key steps to accomplish the improvements sought.

Update: The controls described above are being administered with apparent success. During the last three months of 1994, the only electrical incident to have occurred was an arc in a junction box in the 300 Area. This incident did not cause injury, nor significant damage, but nonetheless was being formally investigated to determine the root cause.

2.2.5 Workstation Ergonomics

The Goal: Promote conformance with state-of-the-art ergonomic arrangements at office and shop workstations.

Update: The WHC Ergonomic Team, which consists of three Industrial Hygiene and Safety professionals, together with the Hanford Environmental Health Foundation (HEHF), are continuing a proactive workstation evaluation effort. The WHC Ergonomic team conducted over 230 ergonomic

assessments during the fourth quarter alone (Table 2-1). Table 2-2 reflects a dramatic increase in the number of cumulative trauma disorder (CTD) cases identified through proactive efforts to improve awareness. It also demonstrates that a proactive program can simultaneously provide dramatic reduction in the severity of these illnesses. This activity is well into its second year, and will continue as a basic function of the Industrial Hygiene program.

An Industrial Hygiene standard for workstation ergonomics is in the early development stage. When completed in June of this year, the standard will provide for greater consistency of assessments, and a higher number of persons capable of performing those assessments.

Table 2-1. CY 1994 - Second Half Ergonomic Workstation Evaluations

Department/ Company	Group/Individual Evaluation Number(s) 3rd Qtr.	Group/Individual Evaluation Number(s) 4th Qtr.
01x - President	0	1
1x - TRP	39	13
2x - SNF	1	11
3x - ESQ	3	4
4x - ADM	17	5
5x - ICF KH	2	0
6x - BCSR	3	19
7x - TWR	113	112
8x - WAE	34	67
Total	212	232

Numerous requests for proactive workstation evaluations have been received via the ^WHC Ergonomic Program on cc:Mail. Until the completion of the Industrial Hygiene standard, all evaluations have been limited to HEHF referrals/WHC accident investigations.

Table 2-2. WHC/BCSR Cumulative Trauma Disorder Case History

CY	Total Recordable Cases (Rate)	No. of Recordable Cases Resulting in Lost/Restricted Workdays (Rate)	Total Number of Workdays Lost (Rate)	Total Number of Workdays Restricted (Rate)	Combined Number of Workdays Lost/Restricted (Rate)
1990	7 (0.08)	7 (0.08)	384 (4.35)	79 (0.90)	463 (5.25)
1991	23 (0.25)	13 (0.14)	466 (5.02)	300 (3.23)	766 (8.25)
1992	28 (0.29)	8 (0.08)	121 (1.24)	245 (2.51)	366 (3.75)
1993	103 (0.97)	20 (0.19)	213 (2.00)	712 (6.70)	925 (8.71)
1994	91 (0.93)	11 (0.11)	160 (1.63)	388 (3.95)	548 (5.58)

2.2.6 Back Injury Reduction

Concerted attention and elevation of awareness levels, combined with increased use of training, has helped to significantly reduce the frequency and severity of back strain cases over the past three years (Table 2-3).

Table 2-3. WHC/BCSR Back Strain Case History

CY	No. of First Aid Only Cases (Rate)	Total Recordable Cases (Rate)	No. of Recordable Cases Resulting in Lost/Restricted Workdays (Rate)	Total Number of Workdays Lost (Rate)	Total Number of Workdays Restricted (Rate)	Combined Number of Workdays Lost/ Restr. (Rate)
1991	119 (1.28)	120 (1.29)	75 (0.81)	1,280 (13.78)	1,107 (11.92)	2,387 (25.70)
1992	108 (1.11)	128 (1.31)	81 (0.83)	1,803 (18.49)	2,042 (20.94)	3,845 (39.42)
1993	91 (0.86)	97 (0.91)	65 (0.61)	1,923 (18.10)	1,504 (14.16)	3,427 (32.25)
1994	53 (0.54)	77 (0.78)	42 (0.43)	401 (4.08)	719 (7.32)	1,120 (11.40)

2.2.7 All Strain/Sprain Injury Reduction

Awareness of ergonomic considerations in the workplace, as well as communication regarding the rewards of exercise and fitness, have increased over the past four years. The coinciding reduction in strain injuries and the remarkable improvement in workdays lost are seen as attributable to these efforts (Table 2-4). Yet, strain/sprain injuries continue to dominate department injury totals. (Refer to Sections 2.5.13 through 2.5.20)

Table 2-4. WHC/BCSR All Strain/Sprain Case History

CY	No. of First Aid Only Cases (Rate)	Total Recordable Cases (Rate)	No. of Recordable Cases Resulting in Lost/Restricted Workdays (Rate)	Total Number of Workdays Lost (Rate)	Total Number of Workdays Restricted (Rate)	Combined Number of Workdays Lost/ Restr. (Rate)
1991	295 (3.18)	199 (2.14)	131 (1.41)	1,816 (19.55)	2,317 (24.94)	4,133 (44.49)
1992	250 (2.56)	195 (2.00)	128 (1.31)	2,637 (27.04)	2,840 (29.12)	5,477 (56.16)
1993	230 (2.16)	155 (1.46)	95 (0.89)	2,822 (26.56)	2,133 (20.08)	4,955 (46.64)
1994	148 (1.51)	141 (1.44)	73 (0.74)	867 (8.83)	1,702 (17.33)	2,569 (26.16)

2.3 CHALLENGES AHEAD/LESSONS LEARNED

2.3.1 Consolidation of Safety Standards

Both ICF KF and WHC have agreed to work toward creation of a single Industrial Safety manual which will apply to both organizations. This effort, which is targeted for completion by the end of the fiscal year, will require coordination between the safety organizations, as well as end users who will have to successfully meet the requirements of the new manual.

2.3.2 Point of Contact Transition

Retirements and reorganizations have resulted in some depletion of safety and health "subject matter contacts" personnel. Reviews are now in progress to determine how best to fill any voids in given technical areas.

2.3.3 Significant Safety/Health Events

Two WHC pipefitters were called to help clear a frozen PVC pipeline in the 100 Area. Upon uncoupling a connecting joint, both were struck by fragments of ice which were suddenly ejected from the pipe, due to residual pressure which had no means of bleeding off.

This incident illustrated several important lessons:

- Changes in contracting organization, field supervision, and working personnel are classic opportunities for missed communications.

- Observations by oversight personnel, management, or employees are of little value unless proper follow-up is pursued.

- Energy control requirements are more than simple component control. They can also assure safe conditions via the preliminary checks and verifications.

The workers involved have recovered from their relatively minor injuries. The potential for more serious injury was however obvious, and the incident was investigated accordingly.

2.4 TOPICS OF INTEREST

2.4.1 Safety Resource Center

During the fourth quarter of CY 1994, approximately 884 safety videos were reserved through the Safety Resource Center. This is a decrease from approximately 1,010 safety videos reserved during the third quarter. Table 2-5 identifies the titles of videos that have been added to the Center during the reporting period.

Table 2-5. Safety Resource Center Videos-New Releases

Title	Title
Anchorages	Personal Fall Protection
Asbestos Awareness	Respiratory Protection
Chemical Handling - Corrosives	Riding and Rolling Equipment
Chemical Handling - Solvents	Safe Lifting
Chemical Handling (Flammables)	Safe Winter Driving
Compensation Induced Water Hammer	Safety Conference - Motivational
Confined Space Seminar, Parts 1-3	Say Goodbye to High Blood Pressure
Exercise It's Quick and Easy	SCBA Care and Maintenance
Fall and Winter Safety	Short Ladder
Fall Protection for Iron Workers	Stairways and Ladders
Firearms Safety and the Hunter	Survival
Hapless Hals Holiday Hints	Taking Control (Stop Smoking)
High Impact Forklift Safety	The Electrical Burn
High Impact Hand Safety	Trench Emergency
Holiday Safety	Vital Choices: Drinking and Driving
Home Safety With Sherlock Holmes	Walking and Working Surfaces
Judgement on the Water	Winter Driving and Braking Techniques
Lab Safety I - Chemical Hazards	Winter Safety
OSHA Conference Re: Confined Space	Your Heart and Circulation
Out of This World Weight Control	

Safety Awareness and Performance has made safety meeting literature available via Hanford Information, the Safety Meeting Section, on Hanford Local Area Network (HLAN) as a way to heighten safety awareness, encourage employee involvement, and make group safety meetings

informative. Particular safety topics, with four to five lesson plans, are provided each month. Topics selected for Hanford Information during the fourth quarter of 1994, were:

October 1994	November 1994	December 1994
Fire Prevention	Holiday Safety:	Material Handling
Autumn/Fall Safety:	Holiday Blues/Stress	CTD's
Wheelbarrow Use	Electrical Safety	Safety Awareness
Parking Lot Safety	Winter Safety	Wood Stove Safety
Halloween Safety		Emergency Response

In addition to the Lesson Plans that are available on Hanford Information, there is also a listing of Safety Meeting Guest Speakers. These are individuals that provide a safety meeting presentation on their area of expertise. The Safety Resource Video Catalog and some Safety Meeting Guidelines and Pointers can also be located in this section of Hanford Information.

Many resources are available through the Safety Resource Center to assist individuals with conducting effective safety meetings, and to provide information on safety and health topics. Employees are encouraged to share these resources with their families and friends. Resources available include videos, literature, awareness items, and support with individual safety programs. For assistance, contact the Safety Resource Center on 376-9059 or visit MO-286, 200 East Area.

2.5 COMPANY-WIDE AND DEPARTMENT-LEVEL TRENDING AND ANALYSIS

The following information provides an overview of the incidents being reported on site in the areas of occupational injuries/illnesses, government vehicle accidents, property damage, and fire losses. This is accomplished through the compilation of charts, trending information, and recommendations for improvement. The data has been tabulated and analyzed on both a company-wide level and for each department. Management is encouraged to share this information with employees as a way to heighten awareness, realizing that most injuries involve some element of an at-risk behavior. We need to continue to foster a safety culture where all individuals are comfortable looking out for not only their own safety, but the safety of coworkers as well.

All WHC/BCSR occupational injury/illness information is available via Soft Reporting on the HLAN. This report is updated weekly. In addition to providing the number of accidents for each organizational code or facility, the report gives a description of each accident, including location, job-type, and cause of injury. This provides each manager and their employees with a means to focus on what types of accidents are occurring (for trending purposes), and ways to prevent recurrence.

- Appendix B-1 provides a list of resources and services available to assist the workforce with injury prevention, accident investigation, and safety awareness efforts.

2.5.1 Occupational Injury/Illness Incidence Rates

Although WHC saw an increase in the Total Recordable Case (TRC) rates during the fourth quarter, it posted a solid and uniform gain from 1993 to 1994 in reduction of occupational injury/illness rates. The most striking indicator of improvement is seen in the reduction of days away from work or restricted work activity due to injury. This indicator of management commitment through personal involvement and improved case management appears to be strong.

Severity rates are an indicator of how serious injuries are. The point of reference is the number of days the employee is unable to work because of an injury, or how long an injury impacts his or her ability to perform all of their job functions. The company as a whole reduced the lost/restricted workday incidence rate by 48 percent from CY 1993 to CY 1994 (Table 2-8).

Table 2-6. WHC Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CY 1993	951	8.95	477	4.49
CY 1994	759	7.73	394	4.01
4th Qtr 1994	173	7.50	97	4.21

Table 2-7. WHC Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/ Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Work Activity Only Case Incidence Rate
CY 1993	170	1.60	128	1.20	42	0.40
CY 1994	113	1.15	65	0.66	48	0.49
4th Qtr 1994	37	1.60	17	0.74	20	0.87

Table 2-8. WHC Occupational Injury/Illness
CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Workday Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Work Activity	Restricted Work Activity Severity Rate
CY 1993	7,465	70.26	3,789	35.66	3,676	34.60
CY 1994	3,560	36.25	1,259	12.82	2,301	23.43
4th Qtr 1994	584	25.32	211	9.15	373	16.17

Table 2-9. WHC Occupational Injury/Illness History

Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost or Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1993	385	3.62	95	0.89
CY 1994	289	2.94	73	0.74
4th Qtr 1994	69	2.99	26	1.13
Cumulative Trauma Disorder				
CY 1993	103	0.97	20	0.19
CY 1994	91	0.93	11	0.11
4th Qtr 1994	25	1.08	2	0.09
All Other Occupational Injuries/Illnesses				
CY 1993	940	8.85	55	0.52
CY 1994	773	7.87	29	0.30
4th Qtr 1994	176	7.63	9	0.39

2.5.2 Lost/Restricted Workday Case Incidence Rates

The cumulative CY 1994 lost/restricted workday case incidence rate (1.15) is 28 percent below the company's CY 1993 rate (1.60), and also 32 percent below the DOE 1991-93 Average (1.70). (Figure 2-1).

The 1994 fourth quarter rate (1.60) is higher than 1993 fourth quarter rate (0.87). Part of this increase is attributed to a more frigid winter season and higher potential for slip/trip injuries. Icy conditions, especially in late November, resulted in more strain and fall injuries this year.

The control chart (Figure 2-2) plots the CY 1990 through CY 1994 monthly lost/restricted workday case incidence rates. A control line shift took place in May 1993 when WHC initiated its "Making Safety First: Campaign '93."

Figure 2-1. WHC Lost/Restricted Workday Cases
Cumulative Incidence Rate

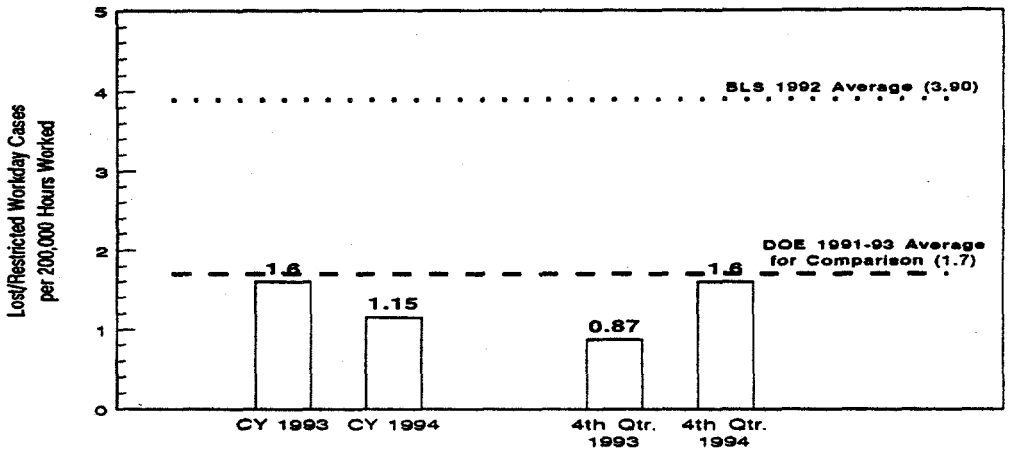
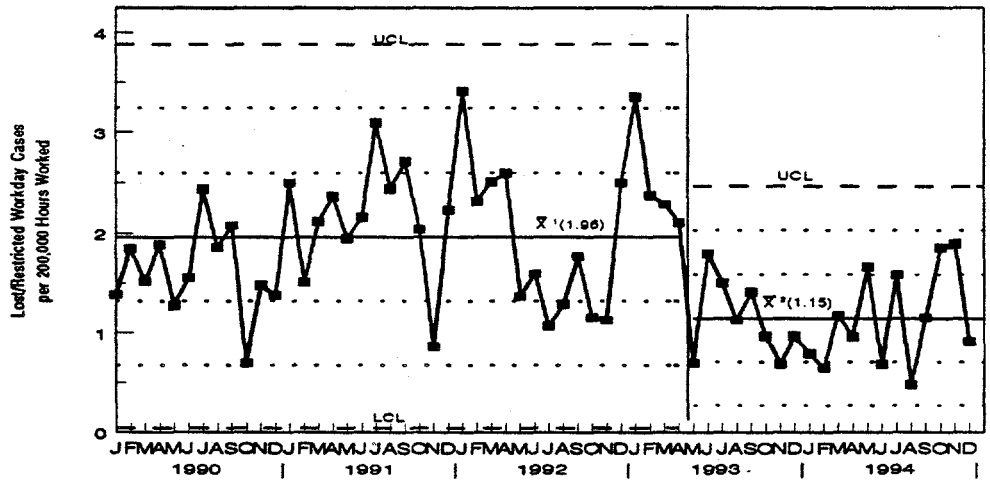


Figure 2-2. WHC Lost/Restricted Workday Case Monthly Incidence Rates
CY 1990 - CY 1994 - 3 Standard Deviations

CY 1990 - CY 1993 Monthly Rates include groups that transferred to ICF KH Operations on 01/01/94



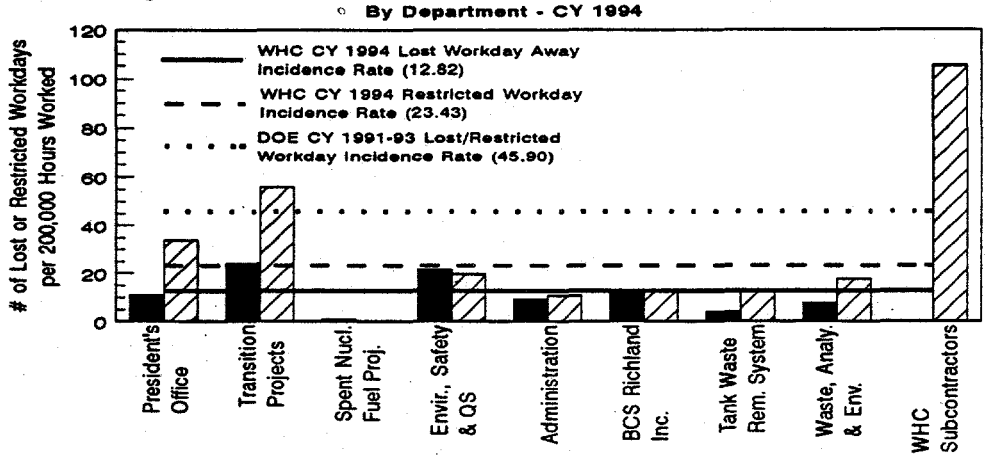
X̄ ¹ = January 1990 - April 1993 Average-1.96 / X̄ ² = May 1993 - December 1994 Average - 1.15

2.5.3 Lost/Restricted Workday Incidence Rates

Figure 2-3 provides the CY 1994 breakdown by departments of the lost workday away and restricted workday incidence rates. The combined cumulative CY 1994 lost workday away (12.82) and restricted workday (23.43) incidence rates of 36.25 are 21 percent below the DOE 1991-93 Average (45.90).

The control chart (Figure 2-4) plots the CY 1990 through CY 1994 monthly lost/restricted workday incidence rates. A control line shift took place in May 1993 when WHC initiated its "Making Safety First: Campaign '93."

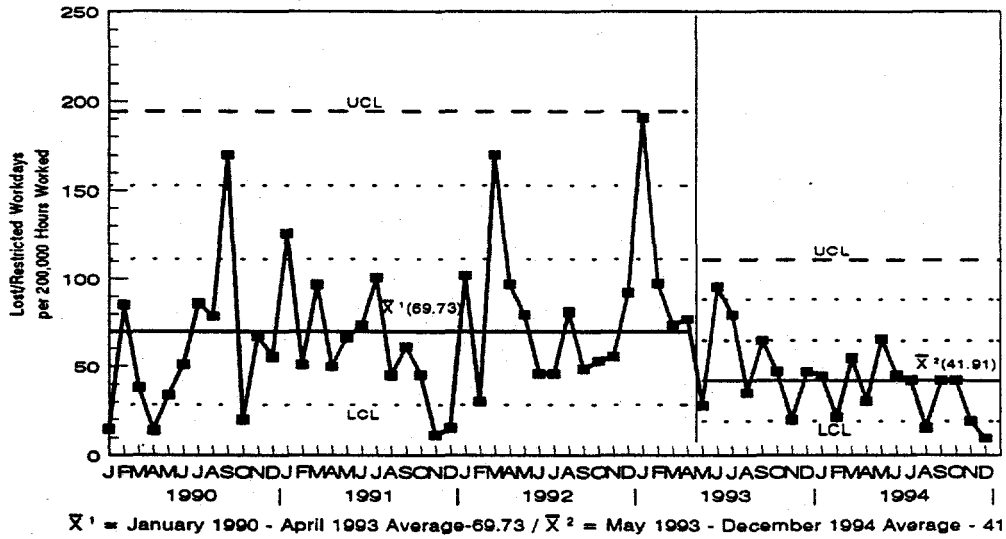
Figure 2-3. WHC Lost/Restricted Workday Incidence Rates By Department - CY 1994



	President's Office	Transition Projects	Spent Nucl. Fuel Proj.	Envir., Safety & QS	Administration	BCS Richland Inc.	Tank Waste Rem. System	Waste, Analy. & Env.	WHC Subcontractors
Lost (Away) Workdays	10.94	24.31	0.99	21.6	9.27	11.86	4.18	7.74	0
Restricted Workdays	34	55.88	0	19.55	10.74	12.47	12.96	17.65	105.11

Figure 2-4. WHC Lost/Restricted Workday Monthly Incidence Rates CY 1990 - CY 1994 - 3 Standard Deviations

CY 1990 - CY 1993 Monthly Rates include groups that transferred to ICF KH Operations on 01/01/94



X̄ ¹ = January 1990 - April 1993 Average-69.73 / X̄ ² = May 1993 - December 1994 Average - 41.91

2.5.4 Total Recordable Case Incidence Rates

The cumulative CY 1994 total recordable case incidence rate (4.01) is 11 percent below the company's CY 1993 rate (4.49), but is 8 percent above the DOE CY 1991-93 Average (3.73). (Figure 2-5).

The 1994 fourth quarter rate (4.21) is higher than 1993 fourth quarter rate (2.89). Many of the strains and sprains which produced one in three of our fourth quarter recordable cases, are traceable to sudden body contortions as an employee attempts to maintain balance after a slip on ice or snow.

The control chart (Figure 2-6) plots the CY 1990 through CY 1994 monthly total recordable case incidence rates. A control line shift took place in May 1993 when WHC initiated its "Making Safety First: Campaign '93."

Figure 2-5. WHC Total Recordable Cases
Cumulative Incidence Rate

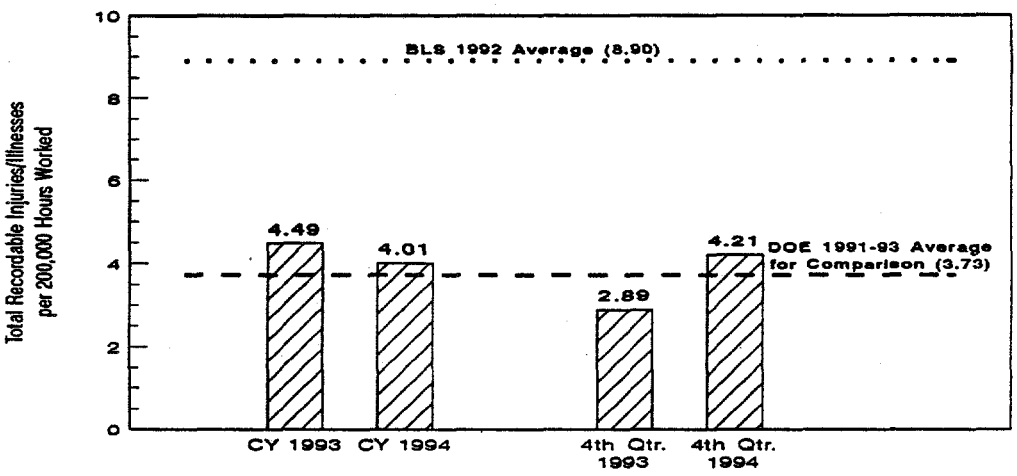
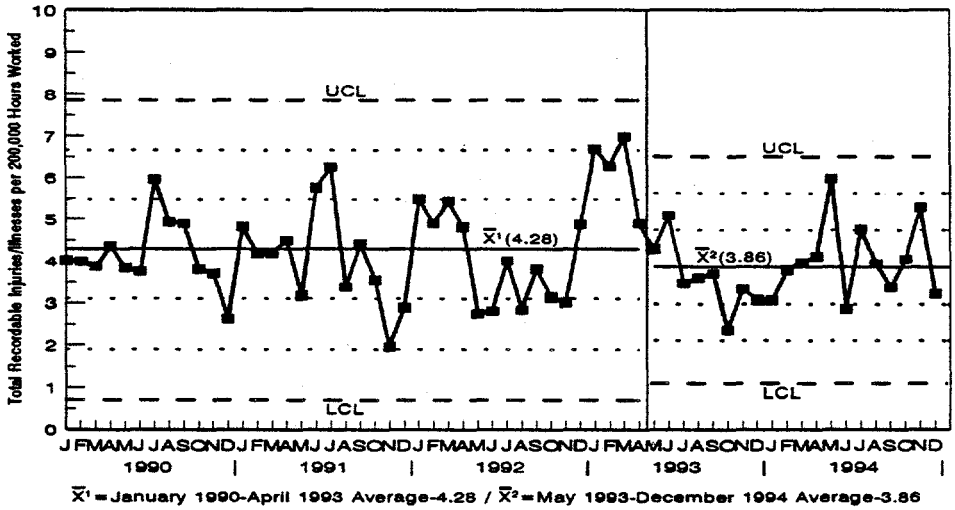


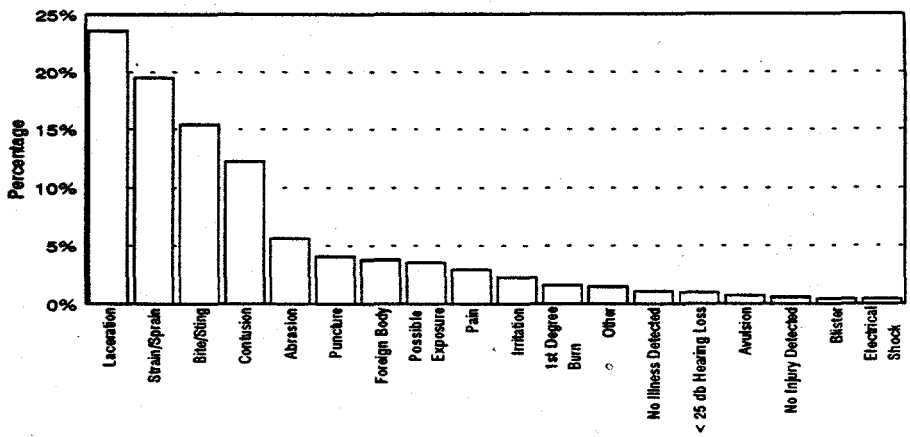
Figure 2-6. WHC Total Recordable Case Monthly Incidence Rates
CY 1990 - CY 1994 - 3 Standard Deviations
CY 1990 - CY 1993 Monthly Rates Include groups that transferred to ICF KH Operations on 01/01/94



X̄¹ = January 1990-April 1993 Average-4.28 / X̄² = May 1993-December 1994 Average-3.86

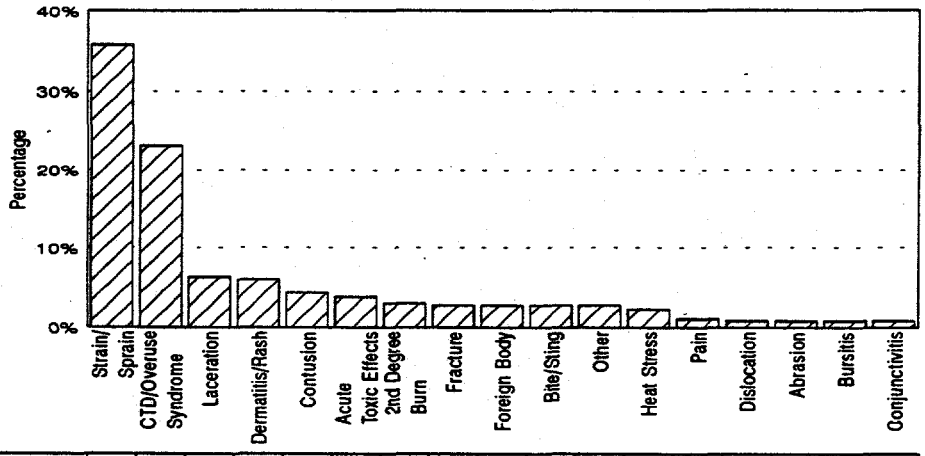
2.5.5 Occupational Injuries/Illnesses By Type

Figure 2-7. First Aid Only by Type (759 Cases)



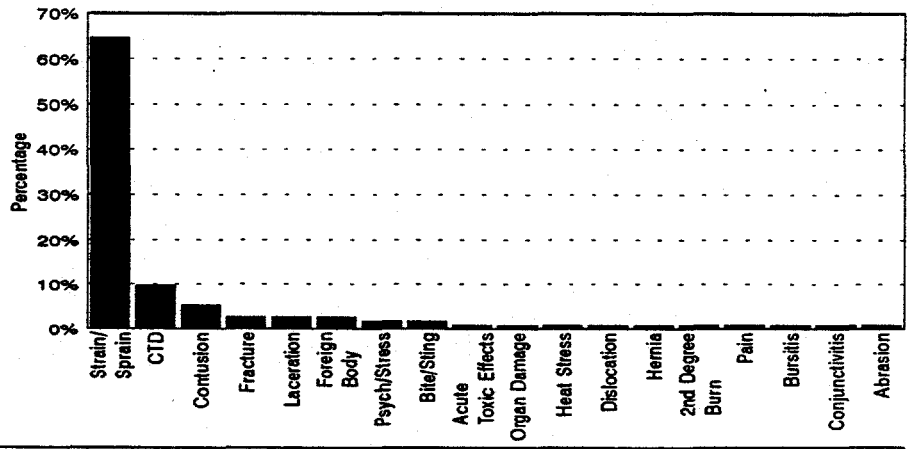
Number of Cases	179	148	117	93	43	31	29	27	22	17	12	11	8	7	5	4	3	3

Figure 2-8. Total Recordable Injuries/Illnesses by Type (394 Cases)



Number of Cases	141	91	25	24	17	15	12	11	11	11	11	9	4	3	3	3	3

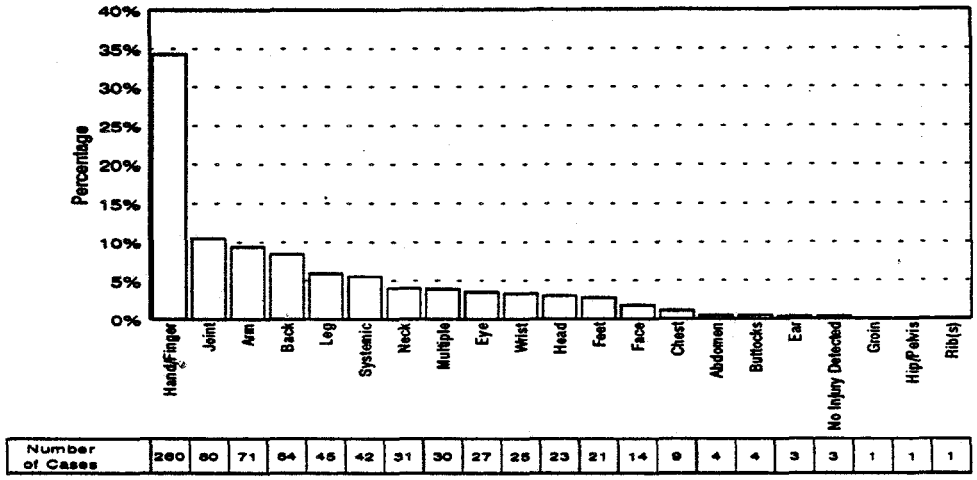
Figure 2-9. Lost/Restricted Workday Cases by Type (113 Cases)



Number of Cases	73	11	6	3	3	3	2	2	1	1	1	1	1	1	1	1	1

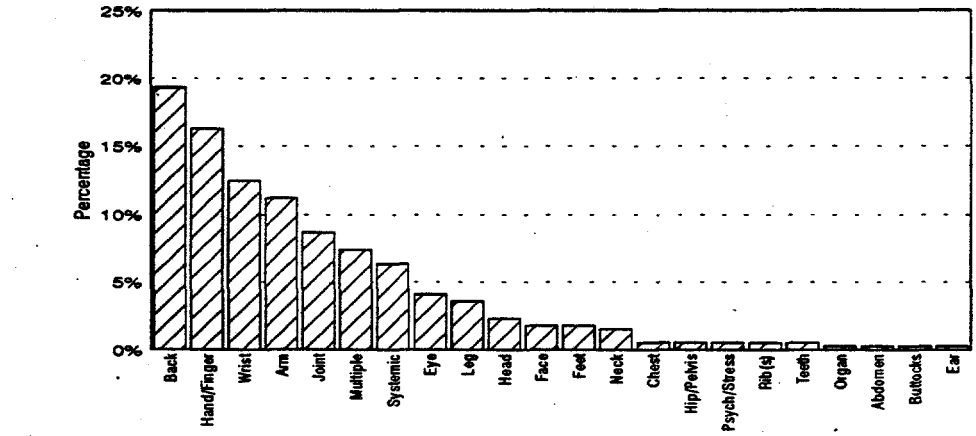
2.5.6 Occupational Injuries/Illnesses By Body Group Injured

Figure 2-10. First Aid Only by Body Group Injured (759 Cases)



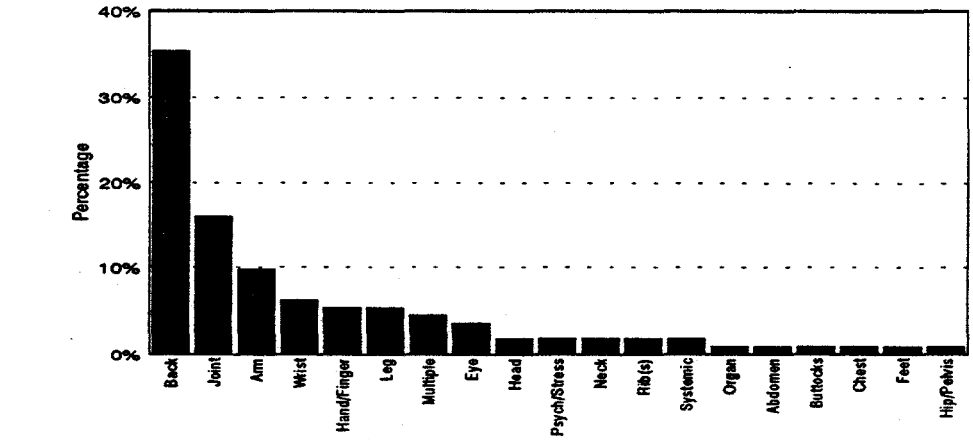
Number of Cases	260	80	71	64	45	42	31	30	27	25	23	21	14	9	4	4	3	3	1	1	1

Figure 2-11. Total Recordable Injuries/Illnesses by Body Group Injured (394 Cases)



Number of Cases	76	64	49	44	34	29	25	16	14	9	7	7	6	2	2	2	2	2	1	1	1	1

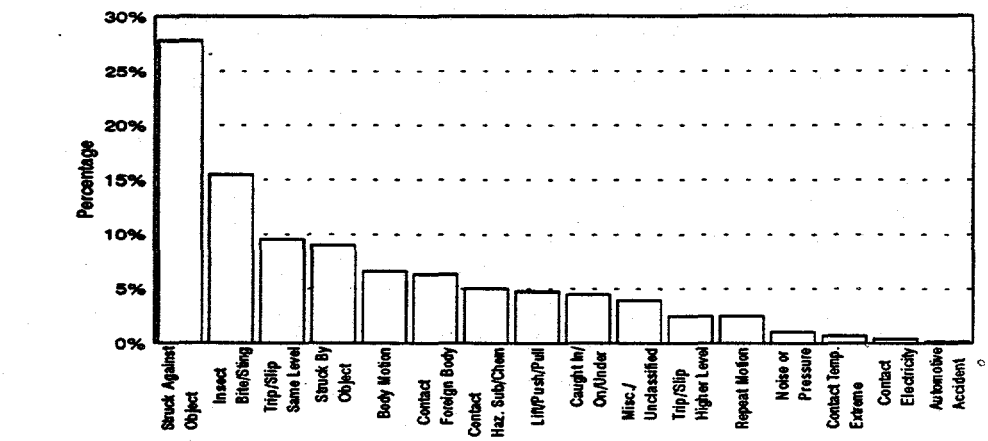
Figure 2-12. Lost/Restricted Workday Cases by Body Group Injured (113 Cases)



Number of Cases	40	18	11	7	6	6	5	4	2	2	2	2	2	1	1	1	1	1	1

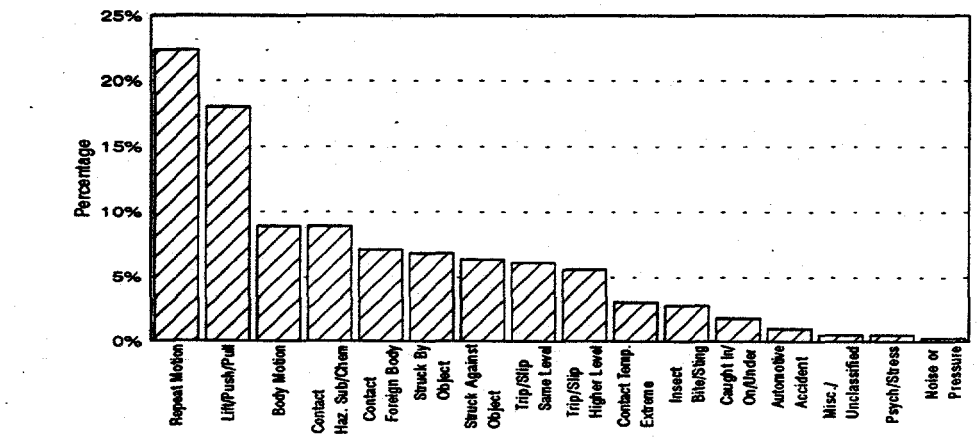
2.5.7 Occupational Injuries/Illnesses By Cause

Figure 2-13. First Aid Only by Cause (759 Cases)



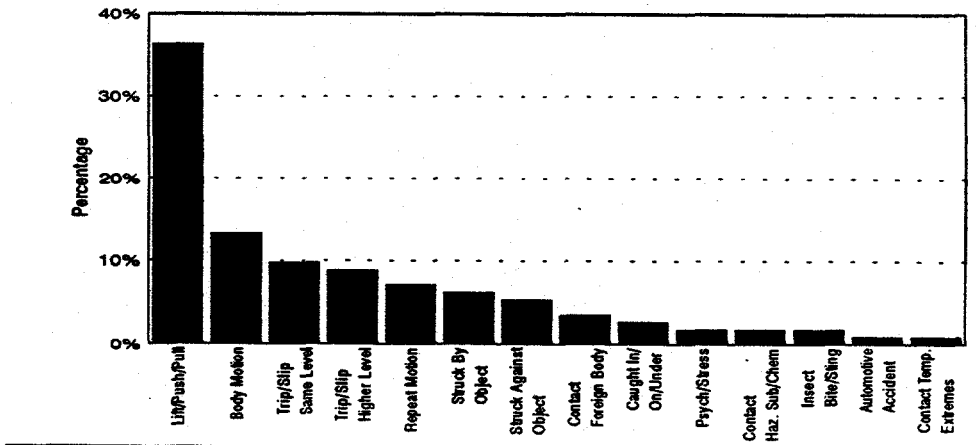
Number of Cases	211	117	72	68	50	48	38	36	34	30	19	19	8	5	3	1

Figure 2-14. Total Recordable Injuries/Illnesses by Cause (394 Cases)



Number of Cases	88	71	35	35	28	27	25	24	22	12	11	7	4	2	2	1

Figure 2-15. Lost/Restricted Workday Cases by Cause (113 Cases)



Number of Cases	41	15	11	10	8	7	6	4	3	2	2	2	1	1

2.5.8 Occupational Injuries/Illnesses By Job Type

Figure 2-16. First Aid Only by Job Type (759 Cases)

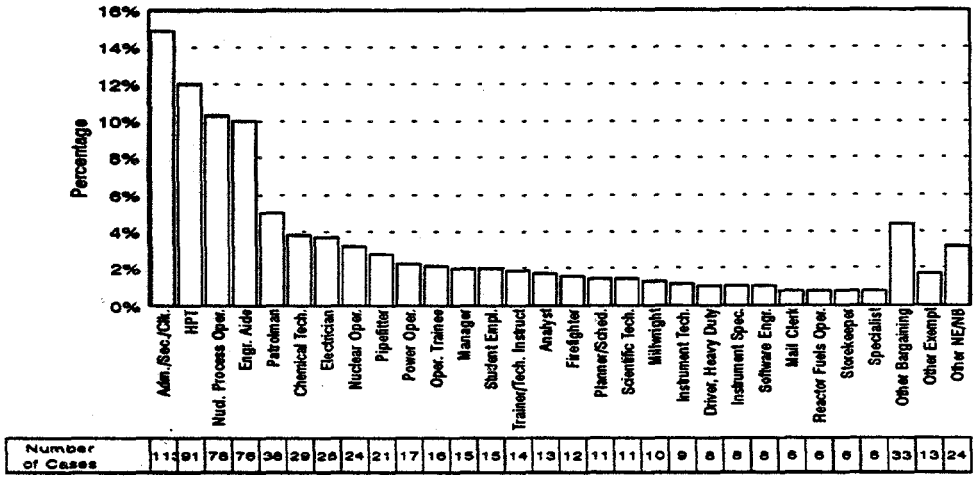


Figure 2-17. Total Recordable Injuries/Illnesses by Job Type (394 Cases)

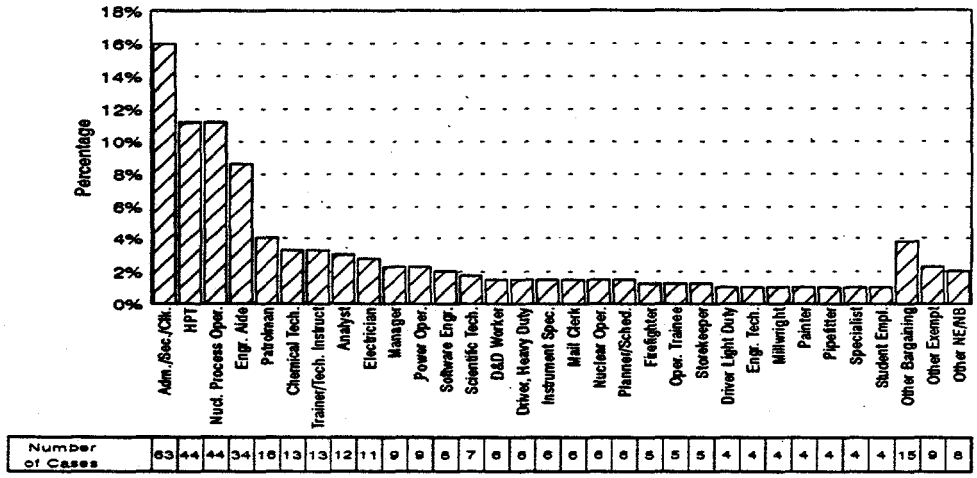
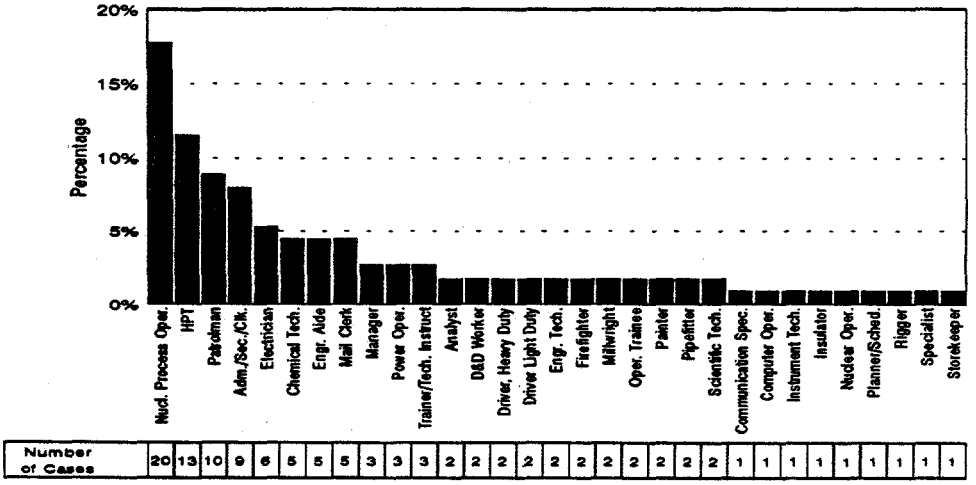


Figure 2-18. Lost/Restricted Workday Cases by Job Type (113 Cases)



2.5.9 Occupational Injuries/Illnesses By Age/Gender

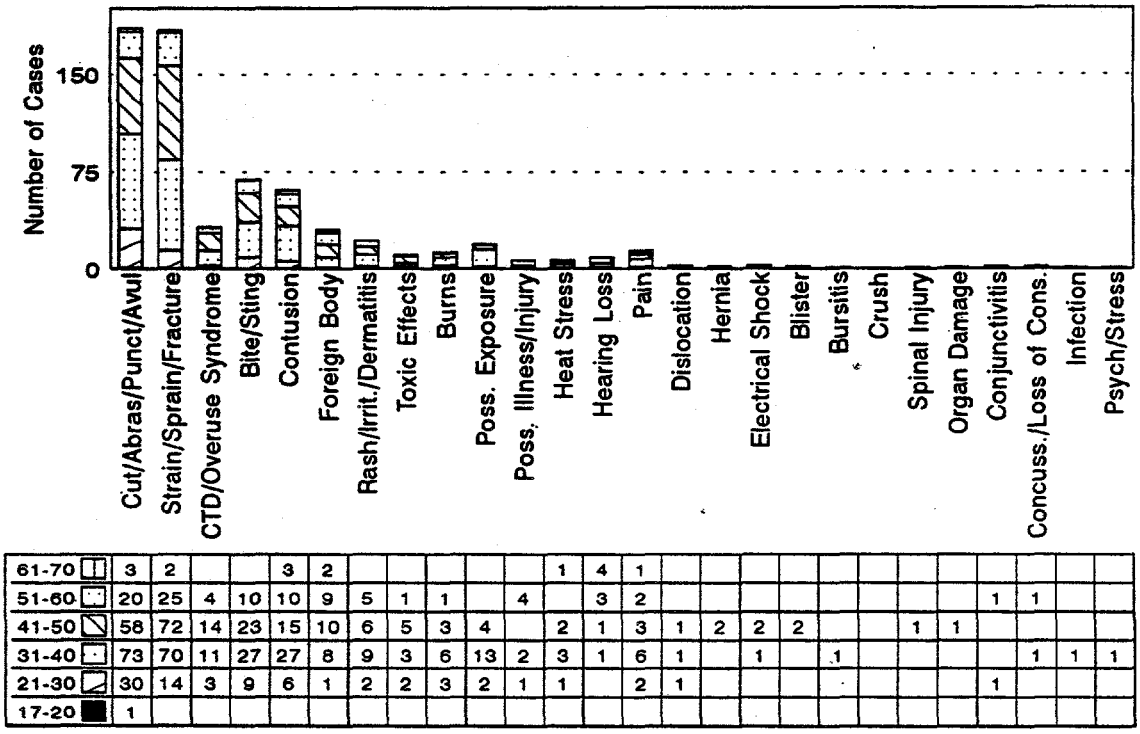
Statistically speaking, age/gender did not appear to be a major factor in injury/illness rates, although there were some minor deviations from the average. Although females make up 31 percent of the WHC/BCSR workforce, this same population accounted for 39 percent of the injuries/illnesses. On average, both genders in the 17-20 year old bracket had fewer injuries/illnesses, whereas males 31-40 experienced a rate 10 percent higher than their "fair share." Exposure to hazards in this male age group may account for the higher rate.

Cuts/abrasion/punctures/avulsions were responsible for the largest number of injuries for both genders, followed closely by strains/sprains/fractures. Although CTDs accounted for only 13 percent of female injuries/illnesses (5 percent males), females accounted for 64 percent of all CTD cases reported. Refer to table 2-10 and figures 2-19 through 2-20 for specifics.

Table 2-10. General Population - WHC/BCSR by Age and Gender

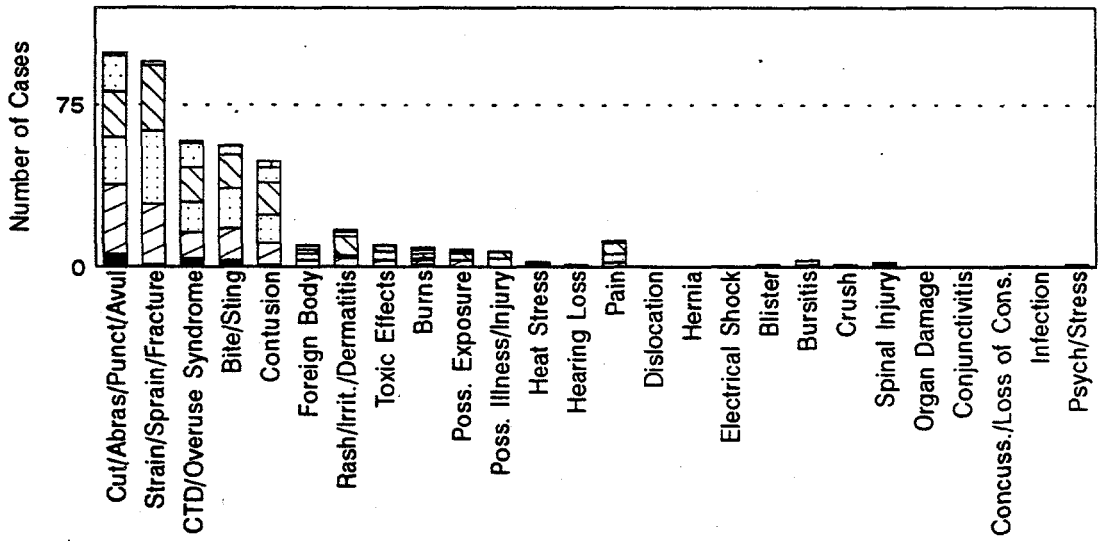
Year of Birth	Age	Female	% of Female Popul.	Male	% of Male Popul.	TOTAL	% of Total Popul.
1974-1977	17-20	336	8%	140	1%	476	3%
1964-1973	21-30	1026	23%	1204	12%	2230	16%
1954-1963	31-40	1214	27%	2766	29%	3980	28%
1944-1953	41-50	1146	26%	3086	32%	4232	30%
1934-1943	51-60	592	13%	1962	20%	2554	18%
1924-1933	61-70	108	2%	477	5%	585	4%
Pre 1933	Over 70	11	<1%	35	<1%	46	<1%
Totals		4,433	100%	9,670	100%	14,103	100%

Figure 2-19. Type of Occupational Injuries/Illnesses by Age/Gender - Male



Age	Cut/Abras/Punct/Avul	Strain/Sprain/Fracture	CTD/Overuse Syndrome	Bite/Sting	Contusion	Foreign Body	Rash/Irrit./Dermatitis	Toxic Effects	Burns	Poss. Exposure	Poss. Illness/Injury	Heat Stress	Hearing Loss	Pain	Dislocation	Hernia	Electrical Shock	Blister	Bursitis	Crush	Spinal Injury	Organ Damage	Conjunctivitis	Concuss./Loss of Cons.	Infection	Psych/Stress
61-70	3	2			3	2						1	4	1												
51-60	20	25	4	10	10	9	5	1	1		4		3	2									1	1		
41-50	58	72	14	23	15	10	6	5	3	4		2	1	3	1	2	2	2			1	1				
31-40	73	70	11	27	27	8	9	3	6	13	2	3	1	6	1		1		1					1	1	1
21-30	30	14	3	9	6	1	2	2	3	2	1	1		2	1								1			
17-20	1																									

Figure 2-20. Type of Occupational Injuries/Illnesses by Age/Gender - Female



Age	Cut/Abras/Punct/Avul	Strain/Sprain/Fracture	CTD/Overuse Syndrome	Bite/Sting	Contusion	Foreign Body	Rash/Irrit./Dermatitis	Toxic Effects	Burns	Poss. Exposure	Poss. Illness/Injury	Heat Stress	Hearing Loss	Pain	Dislocation	Hernia	Electrical Shock	Blister	Bursitis	Crush	Spinal Injury	Organ Damage	Conjunctivitis	Concuss./Loss of Cons.	Infection	Psych/Stress
61-70	1		1		3		1		1	1																
51-60	17	2	11	4	7	2	2		2	1				1					2							1
41-50	21	30	16	16	15	2	9	3	2	3	3	1		5					1	1						
31-40	22	34	14	18	13	3	1	4	1		4		1	4							1					
21-30	32	28	12	15	10	3	4	3	2	3		1		2				1			1					
17-20	6	1	4	3	1				1																	

2.5.10 Occupational Injuries/Illnesses By Facility

Figure 2-21. First Aid Only by Facility (759 Cases)

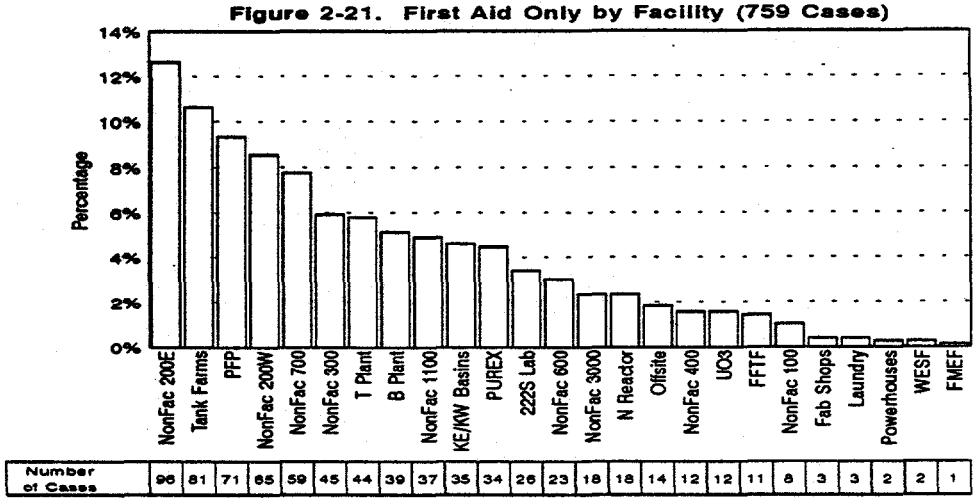


Figure 2-22. Total Recordable Injuries/Illnesses by Facility (394 Cases)

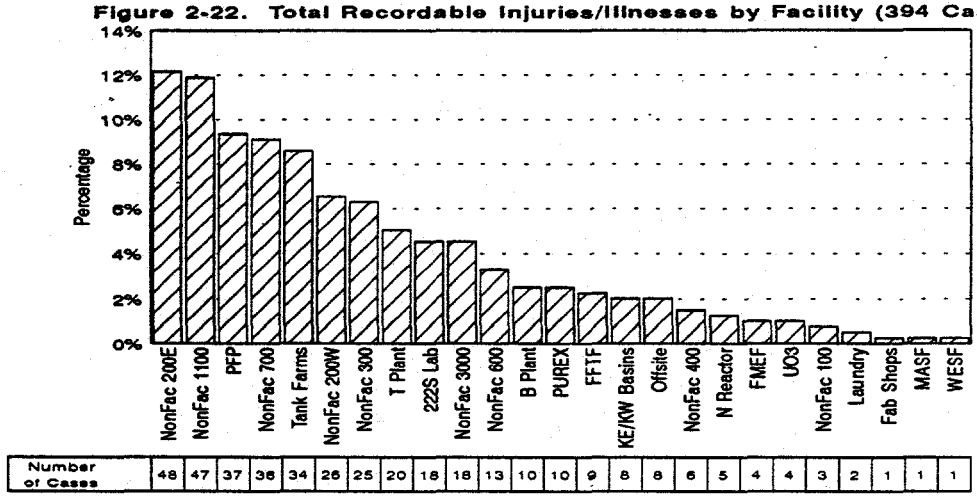
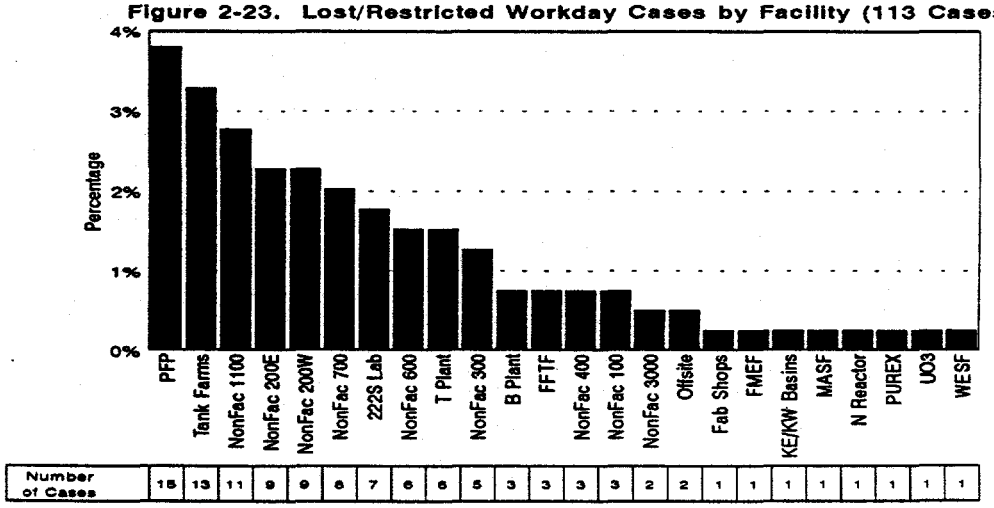


Figure 2-23. Lost/Restricted Workday Cases by Facility (113 Cases)



2.5.11 WHC Lost/Restricted Workday Cases/Rates - By Department

Table 2-11 WHC/BCSR CY 1993 & CY 1994 Lost/Restricted Workday Cases/Rates By Department				
Department	CY 1993 Lost/Restricted Workday Case Rate	# Cases	CY 1994 Lost/Restricted Workday Case Rate	# Cases
01x President	0.28	1	0.48	2
1x - TRP	1.39	27	1.53	27
2x - SNF	---	--	0.49	1
(Prev.) 2x - EA	0.57	6	0	0
3x - ESQ	1.90	19	1.69	28
4x - ADM	0.90	5	0.54	4
5x - OSS	2.89	59	---	---
6x - BCSR	0.85	9	1.05	12
7x- TWR	2.06	24	0.91	15
8x - WAE	1.43	18	1.19	23
Subcontractors	1.19	2	1.52	1
WHC - Overall	1.60	170	1.15	113

2.5.12 ICF KH Lost/Restricted Workday Cases/Rates - By DOE Computerized Accident/Incident Reporting (CAIRS) Organization

Table 2-12. ICF KH CY 1993 & CY 1994 Lost/Restricted Workday Cases/Rates By DOE Computerized Accident/Incident Reporting (CAIRS) Organization				
Department	CY 1993 Lost/Restricted Workday Case Rate	# Cases	CY 1994 Lost/Restricted Workday Case Rate	# Cases
ICF KH - Construction	5.10	54	4.36	47
ICF KH - Operations	*	*	5.60	74
ICF KH - Engineering	0.35	1	0.59	3
ICF KH - Overall	4.09	55	4.27	124
ICF KH - Contracts	10.55	22	10.18	55

* This organization was a part of WHC during CY 1993.
Refer to Department 5x-OSS listed on Table 2-10.

2.5.13 Transition Projects (TRP) (Formerly Facility Operations)

The numbers in Tables 2-13 through 2-16 reflect the job-related injuries/illnesses reported by TRP personnel during CY 1994. For comparison, CY 1993 numbers are also shown. (The numbers reflect how the Department was organized at that time.)

Table 2-13. TRP Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CY 1993	240	12.31	89	4.57
CY 1994	174	9.86	76	4.31
4th Qtr 1994	37	9.32	20	5.04

Table 2-14. TRP Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/ Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases Involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Work Activity Only Case Incidence Rate
CY 1993	27	1.39	17	0.87	10	0.51
CY 1994	27	1.53	18	1.02	9	0.51
4th Qtr 1994	10	2.52	6	1.51	4	1.01

Table 2-15. TRP Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Workday Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Work Activity	Restricted Work Activity Severity Rate
CY 1993	1,835	94.15	764	39.20	1,071	54.95
CY 1994	1,415	80.20	429	24.31	986	55.88
4th Qtr 1994	250	62.99	96	24.19	154	38.80

The rate of TRP employee injury was reduced significantly in CY 1994. This reduction, however, was not paralleled in the lost/restricted workday case category, which saw a slight overall rise.

The reason for increased lost/restricted workdays can be traced to muscle strain injuries, primarily to the back. It is notable that the cause of muscle strain in this department is split almost evenly between "exertion" and "contortion or position." Usually contortion strains are a result of a trip or slip.

The fourth quarter rates are generally higher than the yearly rates due in part to injuries caused by icy conditions.

Control of non-strain/cumulative trauma disorder cases was more successful during the fourth quarter, as lost/restricted workday case rates fell by 40 percent. This is an indicator of better hazard control.

Table 2-16. TRP-Dept. Occupational Injury/Illness History
CY 1993 - CY 1994 Statistics Comparison

Time Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost/Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1993	66	3.39	13	0.67
CY 1994	65	3.68	18	1.02
4th Qtr 1994	19	4.79	9	2.27
Cumulative Trauma Disorder				
CY 1993	8	0.41	4	0.21
CY 1994	9	0.51	2	0.11
4th Qtr 1994	2	0.50	0	0
All Other Occupational Injuries/Illnesses				
CY 1993	255	13.08	10	0.51
CY 1994	176	9.97	7	0.40
4th Qtr 1994	36	9.07	1	0.25

2.5.14 Spent Nuclear Fuel Project (SNF)

The Spent Nuclear Fuel Project Department was established in March 1994. The numbers in Tables 2-17 through 2-20 reflect the job-related injuries/illnesses reported by SNF personnel through December.

Table 2-17. SNF Occupational Injury/Illness CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CYTD 1994	17	8.38	9	4.44
4th Qtr 1994	3	4.40	3	4.40

Table 2-18. SNF Occupational Injury/Illness CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/ Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases Involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Workday Activity Only Case Incidence Rate
CYTD 1994	1	0.49	1	0.49	0	0
4th Qtr 1994	0	0	0	0	0	0

Table 2-19. SNF Occupational Injury/Illness CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Workday Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Work Activity	Restricted Workday Only Severity Rate
CY 1994	2	0.99	2	0.99	0	0
4th Qtr 1994	0	0	0	0	0	0

A positive sign is seen in reversal of the non-strain accident rate in the fourth quarter. If this reduction is held, the department's lost/restricted workday case rate should also decline. Much of this improvement is seen in SNF employees' ability to avoid the laceration/abrasion type injury which occurs in offices and lunch rooms.

Further indication of a working safety program is reflected in SNF's ability to keep injuries down during winter conditions which can cause exertion and slip/trip injuries.

Table 2-20 SNF-Dept. Occupational Injury/Illness History
CY 1994 Statistics Comparison

Time Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost/Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1994	5	2.47	1	0.49
4th Qtr 1994	1	2.93	0	0
Cumulative Trauma Disorder				
CY 1994	3	1.48	0	0
4th Qtr 1994	2	1.46	0	0
All Other Occupational Injuries/Illnesses				
CY 1994	18	8.88	0	0
4th Qtr 1994	3	4.40	0	0

2.5.15 Emergency, Safety, Quality Services Department (ESQ).

The numbers in Tables 2-21 through 2-24 reflect the job-related injuries/illnesses reported by ESQ personnel during CY 1994. For comparison, CY 1993 numbers are also shown. (The information for CY 1993 does not include Safeguards and Security, Emergency Preparedness, and Hanford Fire Department, that were a part of Operations Support Services Department in CY 1993).

Table 2-21. ESQ Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CY 1993	90	8.98	44	4.39
CY 1994	186	11.22	79	4.77
4th Qtr 1994	44	11.25	21	5.37

Table 2-22. ESQ Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/ Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases Involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Work Activity Only Case Incidence Rate
CY 1993	19	1.90	17	1.70	2	0.20
CY 1994	28	1.69	15	0.90	13	0.78
4th Qtr 1994	11	2.81	4	1.02	7	1.79

Table 2-23. ESQ Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Workday Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Workday Activity	Restricted Workday Activity Severity Rate
CY 1993	435	43.41	139	13.87	296	29.54
CY 1994	682	41.14	358	21.60	324	19.55
4th Qtr 1994	102	26.09	18	4.60	84	21.48

Total injury rates rose sharply in CY 1994 for ESQ. Forty percent of this year's total injuries were caused by simply running into or scraping against office equipment and furniture.

Although lost/restricted workday case rates were lowered from CY 1993 to CY 1994, this rate for the fourth quarter was markedly higher. The fourth quarter injury rates were impacted by slips on icy walkways and resulting strain injuries due to sudden awkward movements. In fact, only forty percent of the strain injuries involving this department's employees were caused by exertion, such as lifting or pushing.

Table 2-24. ESQ-Dept. Occupational Injury/Illness History
CY 1993 - CY 1994 Statistics Comparison

Time Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1993	44	4.39	13	1.30
CY 1994	83	5.01	21	1.27
4th Qtr 1994	25	6.39	9	2.30
Cumulative Trauma Disorder				
CY 1993	4	0.40	0	0.00
CY 1994	9	0.54	2	0.12
4th Qtr 1994	1	0.26	0	0
All Other Occupational Injuries/Illnesses				
CY 1993	86	8.58	6	0.60
CY 1994	173	10.44	5	0.30
4th Qtr 1994	39	9.98	2	0.51

2.5.16 Administration Department (ADM)

The numbers in Tables 2-25 through 2-28 reflect the job-related injuries/illnesses reported by ADM personnel during CY 1994. For comparison, CY 1993 numbers are also shown. (The CY numbers reflect how the Department was organized at that time.)

Table 2-25. ADM Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CY 1993	13	2.34	27	4.86
CY 1994	28	3.76	22	2.95
4th Qtr 1994	4	2.42	5	3.02

Table 2-26. ADM Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/ Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases Involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Work Activity Only Case Incidence Rate
CY 1993	5	0.90	5	0.90	0	0
CY 1994	4	0.54	2	0.27	2	0.27
4th Qtr 1994	0	0	0	0	0	0

Table 2-27. ADM Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Days Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Work Activity	Restricted Work Activity Severity Rate
CY 1993	383	68.99	178	32.06	205	36.93
CY 1994	149	20.01	69	9.27	80	10.74
4th Qtr 1994	0	0	0	0	0	0

The Administration department posted strong reductions in all occupational injury/illness categories during CY 1994. The key to success appears to be better control of strain injuries. Another contributor to success during the fourth quarter was the ability to avoid slips and falls on the ice.

This department has achieved over one million consecutive workhours worked without a lost workday away injury/illness, and is on track to complete a full year free of lost workday away injuries/illnesses!

Table 2-28. ADM-Dept. Occupational Injury/Illness History
CY 1993 - CY 1994 Statistics Comparison

Time Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1993	12	2.16	4	0.72
CY 1994	13	1.75	3	0.40
4th Qtr 1994	2	1.21	0	0
Cumulative Trauma Disorder				
CY 1993	5	0.90	0	0
CY 1994	7	0.94	1	0.13
4th Qtr 1994	1	0.60	0	0
All Other Occupational Injuries/Illnesses				
CY 1993	23	4.14	1	0.18
CY 1994	30	4.03	0	0
4th Qtr 1994	6	3.62	0	0

2.5.17 BCSR.

Job-related injuries/illnesses reported by BCSR personnel during CY 1994 are shown in Tables 2-29 through 2-32. Numbers for CY 1993 are also shown for comparison. (The CY numbers reflect how the Department was organized at that time.)

Table 2-29. BCSR Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CY 1993	79	7.45	30	2.83
CY 1994	79	6.89	53	4.62
4th Qtr 1994	15	5.45	13	4.72

Table 2-30. BCSR Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases Involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Work Activity Only Case Incidence Rate
CY 1993	9	0.85	6	0.57	3	0.28
CY 1994	12	1.05	7	0.61	5	0.44
4th Qtr 1994	1	0.36	0	0	1	0.36

Table 2-31. BCSR Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Workday Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Work Activity	Restricted Work Activity Severity Rate
CY 1993	459	43.26	281	26.49	178	16.78
CY 1994	279	24.33	136	11.86	143	12.47
4th Qtr 1994	14	5.09	0	0	14	5.09

BCSR saw total occupational injuries/illnesses rise in CY 1994. The leading type of injury was laceration. About 50 percent of BCSR's injuries are laceration/contusion type, virtually all of which affect the hands, fingers, or wrist.

The increase in reported cumulative trauma disorders for CY 1994 was a direct result of an aggressive proactive program to conduct ergonomic assessments of all work stations. This has allowed early identification of illnesses and allowed timely corrective action.

The department posted a strong fourth quarter, with rates running below the CY 1994 rates in most categories. In fact, BCSR had no lost workday away cases during the fourth quarter.

Table 2-32. BCSR Occupational Injury/Illness History
CY 1993 - CY 1994 Statistics Comparison

Time Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1993	22	2.07	3	0.28
CY 1994	26	2.27	7	0.61
4th Qtr 1994	2	0.73	0	0
Cumulative Trauma Disorder				
CY 1993	13	1.23	4	0.38
CY 1994	27	2.35	3	0.26
4th Qtr 1994	3	1.09	1	0.36
All Other Occupational Injuries/Illnesses				
CY 1993	74	6.98	2	0.19
CY 1994	79	6.88	2	0.17
4th Qtr 1994	23	8.36	0	0

2.5.18 Tank Waste Remediation Systems Department (TWR).

The numbers in Tables 2-33 through 2-36 reflect the job-related injuries/illnesses reported by TWR personnel during CY 1994. For comparison, CY 1993 numbers are also shown. (The CY numbers reflect how the Department was organized at that time.)

Table 2-33. TWR Dept. Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CY 1993	99	8.49	47	4.03
CY 1994	113	6.84	55	3.33
4th Qtr 1994	29	6.75	17	3.96

Table 2-34. TWR Dept. Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/ Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases Involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Work Activity Only Case Incidence Rate
CY 1993	24	2.06	16	1.37	8	0.69
CY 1994	15	0.91	8	0.48	7	0.42
4th Qtr 1994	8	1.86	4	0.93	4	0.93

Table 2-35. TWR Dept. Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Workday Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Work Activity	Restricted Work Activity Severity Rate
CY 1993	964	82.66	396	33.96	568	48.70
CY 1994	283	17.14	69	4.18	214	12.96
4th Qtr 1994	127	29.55	47	10.94	80	18.61

The TWR department posted "across-the-board" reduction in injury/illness rates for CY 1994. This success was driven by a 49 percent reduction in all cases due to muscle strain, with a 56 percent reduction in the lost/restricted workday case category. This level of control for strain injury continued in the fourth quarter, where only one of six strains was attributable to exertion.

The overall case and lost/restricted workday case rate reduction combined constitute the strongest performance against the previous year's total, of any WHC department.

Table 2-36. TWR-Dept. Occupational Injury/Illness History
CY 1993 - CY 1994 Statistics Comparison

Time Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost/Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1993	40	3.43	13	1.11
CY 1994	29	1.76	8	0.48
4th Qtr 1994	6	1.40	3	0.70
Cumulative Trauma Disorder				
CY 1993	10	0.86	3	0.26
CY 1994	14	0.85	0	0
4th Qtr 1994	7	1.63	0	0
All Other Occupational Injuries/Illnesses				
CY 1993	96	8.23	8	0.69
CY 1994	125	7.57	7	0.42
4th Qtr 1994	33	7.68	5	1.16

2.5.19 Waste, Analytical and Environmental Department (WAE)

The numbers in Tables 2-37 through 2-40 reflect the job-related injuries/illnesses reported by WAE personnel during CY 1994. For comparison, CY 1993 numbers are also shown. (The CY numbers reflect how the Department was organized at that time.)

Table 2-37. WAE-Dept. Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CY 1993	71	5.64	39	3.10
CY 1994	137	7.07	81	4.18
4th Qtr 1994	38	7.84	15	3.09

Table 2-38. WAE-Dept. Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/ Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases Involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Work Activity Only Case Incidence Rate
CY 1993	18	1.43	12	0.95	6	0.48
CY 1994	23	1.19	13	0.67	10	0.52
4th Qtr 1994	6	1.24	2	0.41	4	0.83

Table 2-39. WAE-Dept. Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Workday Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Work Activity	Restricted Work Activity Severity Rate
CY 1993	415	32.94	156	12.38	259	20.56
CY 1994	492	25.39	150	7.74	342	17.65
4th Qtr 1994	50	10.31	9	1.86	41	8.46

The WAE department reduced its lost/restricted workday case rates in CY 1994, while its overall injury/illness rates were on the rise. Normally, lost/restricted workday case rates will follow the overall rate. If first aid cases are not reduced, it is likely that lost/restricted workday case rates will soon rise.

The fourth quarter performance was relatively strong, with strain injuries accounting for 4 of 6 lost/restricted workday cases. Overall, strain injuries were equally divided in cause between exertion and sudden contorted movement.

Table 2-40. WAE-Dept. Occupational Injury/Illness History CY 1993 - CY 1994 Statistics Comparison

Time Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost/Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1993	30	2.38	9	0.72
CY 1994	59	3.04	13	0.67
4th Qtr 1994	13	2.68	4	0.83
Cumulative Trauma Disorder				
CY 1993	9	0.71	3	0.24
CY 1994	14	0.72	2	0.10
4th Qtr 994	5	1.03	1	0.21
All Other Occupational Injuries/Illnesses				
CY 1993	71	5.64	6	0.48
CY 1994	145	7.48	8	0.41
4th Qtr 1994	35	7.22	1	0.21

2.5.20 Subcontractors to WHC

The numbers in Tables 2-41 through 2-44 reflect the job-related injuries/illnesses reported by WHC subcontractor personnel during CY 1994. For comparison, CY 1993 numbers are also shown.

The following WHC subcontractors reflect the CY 1994 cases:

- Los Alamos Technical Associates - one recordable only case
- Scientific Ecology Group - two recordable only cases
- Boeing - Seattle - one recordable case with restricted workdays

Table 2-41. WHC Subcontractors Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of First Aid Only Cases	First Aid Only Case Rate	No. of Recordable Cases	Total Recordable Case Incidence Rate
CY 1993	19	11.32	2	1.19
CY 1994	6	9.14	4	6.09
4th Qtr 1994	0	0	1	21.17

Table 2-42. WHC Subcontractors Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Recordable Cases Resulting in Lost/ Restricted Workdays	Lost/ Restricted Workday Case Incidence Rate	No. of Cases Involving Days Away from Work	Lost Workday Away Only Case Incidence Rate	No. of Cases Involving Days of Restricted Work Activity Only	Restricted Work Activity Only Case Incidence Rate
CY 1993	2	1.19	1	0.595	1	0.595
CY 1994	1	1.52	0	0	1	1.52
4th Qtr 1994	0	0	0	0	0	0

Table 2-43. WHC Subcontractors Occupational Injury/Illness CY 1993 - CY 1994 Statistics Comparison

Time Period	No. of Lost/ Restrict. Workdays	Lost/ Restrict. Days Severity Rate	No. of Workdays Away Only	Workdays Away Only Severity Rate	No. of Days Restricted Work Activity	Restricted Work Activity Severity Rate
CY 1993	107	63.73	69	41.10	38	22.63
CY 1994	69	105.11	0	0	69	105.11
4th Qtr 1994	0	0	0	0	0	0

Subcontractors had no lost/restricted workday cases during the fourth quarter, improving an injury case rate which exceeded that of the previous year. Because the subcontract data is sparse and somewhat transient, these trends are less conclusive than are the departmental figures.

Table 2-44. WHC Subcontractors Occupational Injury/Illness History CY 1993 - CY 1994 Statistics Comparison

Time Period	Total No. of All Cases (First Aid/ Recordable/ Lost/Restricted)	All Case Rate	No. of Cases Resulting in Lost or Restricted Workdays	Lost/Restricted Workday Case Incidence Rate
All Strain/Sprain				
CY 1993	6	3.57	1	0.595
CY 1994	1	1.52	0	0
4th Qtr 1994	0	0	0	0
Cumulative Trauma Disorder				
CY 1993	0	0	0	0
CY 1994	1	1.52	1	1.52
4th Qtr 1994	0	0	0	0
All Other Occupational Injuries/Illnesses				
CY 1993	15	8.93	1	0.595
CY 1994	8	12.19	0	0
4th Qtr 1994	1	21.17	0	0

2.5.21 Recordable Government Motor Vehicle Accidents

There was one recordable government vehicle accident (resulting in $500 damage or greater) reported by a WHC employee during the fourth quarter of CY 1994, as compared to 8 recordable vehicle accidents for the same time period in CY 1993. The WHC CY 1994 recordable government vehicle accident rate is 1.84, which is 56 percent below the company's CY 1993 rate (4.20), and 29 percent below the DOE CY 1991-93 average of 2.60.

The WHC CY 1994 recordable government vehicle dollar loss rate (from the recordable vehicle accidents) is 2.70, which is 52 percent below the company's CY 1993 rate (5.63), and 35 percent below DOE CY 1991-93 average of 4.17.

Tables 2-45 and 2-46 provide a breakdown of the recordable government vehicle accidents by organization, and type of accident. Refer to Appendix B-2 for a complete description of the fourth quarter loss.

Table 2-45. WHC CY 1994 - Recordable Vehicle Accidents By Organization

Organization Code	Organization	Number of Losses	Total Dollar Loss
02	Communications	1	$ 2,177
33	Health Physics	2	$ 1,939
38	Quality Assurance	1	$ 3,417
3B	Safeguards & Security	1	$ 967
3C	Hanford Fire Dept.	1	$ 1,009
68	End-User Support	1	$ 1,254
7C	Tank Waste Remediation Plant	1	$ 2,386
83	International Envir. Inst.	1	$ 0 *
85	100 Area Projects	1	$ 901
8H	Hanford Technical Services	1	$ 1,586
Sub	Subcontractor to 87xxx	1	$ 2,000
WHC Total		12	$17,636

Table 2-46. WHC CY 1994 - Recordable Vehicle Accidents By Cause of Accident

Cause of Accident	Number of Losses	Total Dollar Loss
Operator Error-Backing	5	$ 4,816
Operator Error-Clearance	3	$ 5,972
Operator Error-Other	2	$ 5,594
Non-Operator Error	2	$ 1,254 *
WHC Total	12	$17,636

* One of the non-operator error government vehicle accidents resulted in no damage to the vehicle, but the employee's injury was classified as recordable. This classifies the vehicle accident as recordable also.

2.5.22 Recordable Property Damage - Non-Fire Losses

There were seven recordable non-fire property damage losses that occurred during the fourth quarter. Refer to Appendix B-3 for a complete description of the fourth quarter losses.

The cumulative recordable non-fire loss rate (0.17) is 37 percent below the company's CY 1993 rate of 0.27, and 11 percent below the DOE CY 1991-93 average of 0.19. (Figure 2-25)

Figure 2-24. Cumulative Dollars Lost
CY 1994 Recordable Property Damage - Non-Fire

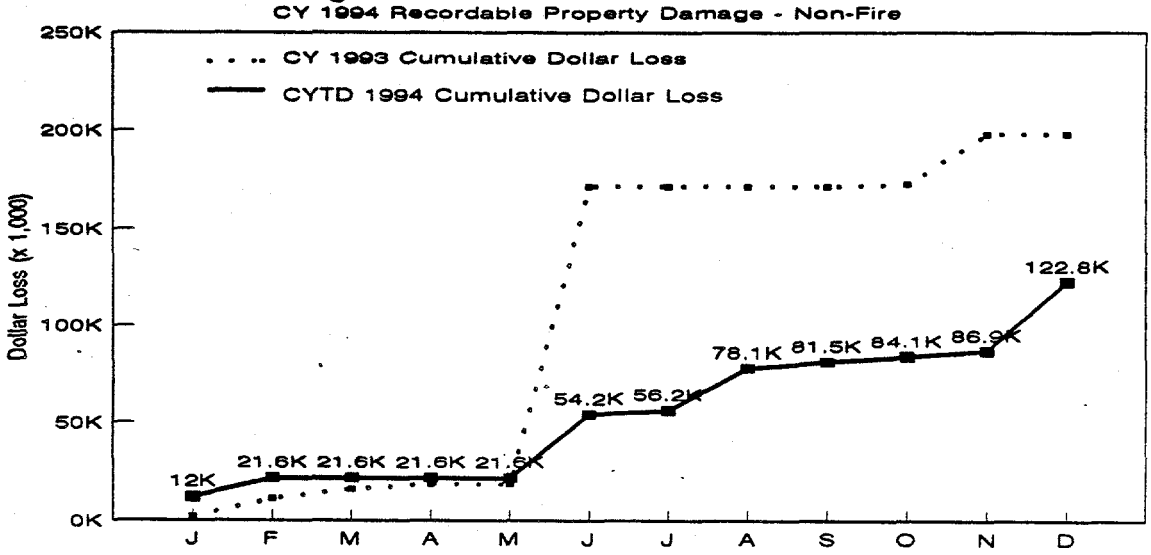
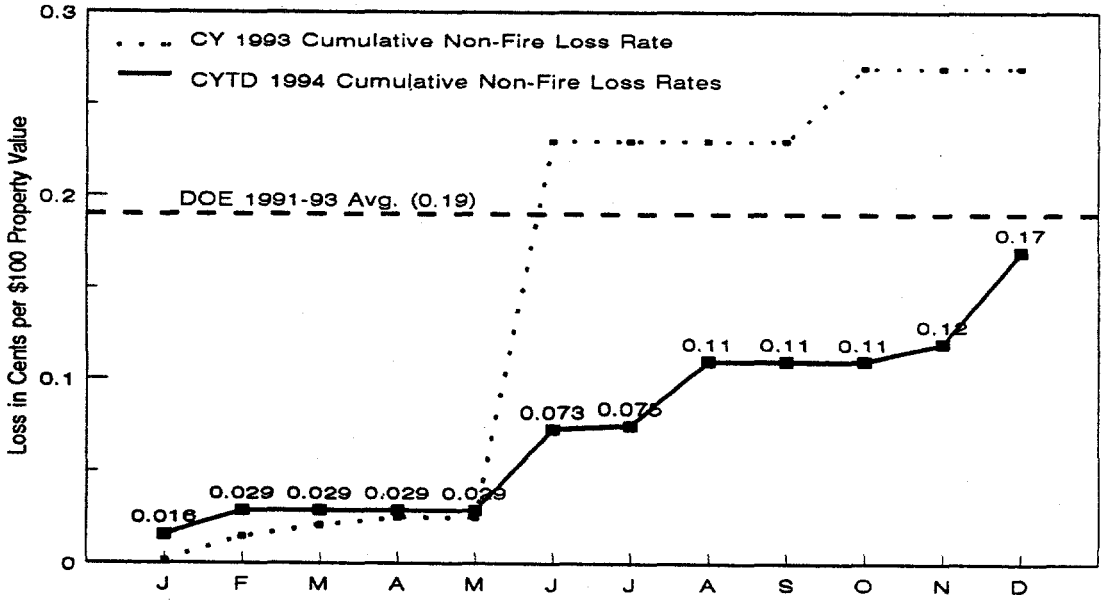


Figure 2-25. CY 1994 Recordable Non-Fire Loss Rate



2.5.23 Recordable Property Damage - Fire Losses

There were no recordable fire property damage losses that occurred during the fourth quarter.

The cumulative recordable fire loss rate (0.023) is 15 percent below the company's CY 1993 rate of 0.027, and 54 percent below the DOE CY 1991-93 average of 0.05. (Figure 2-27)

Figure 2-26. Cumulative Dollars Lost
CY 1994 Recordable Property Damage - Fire

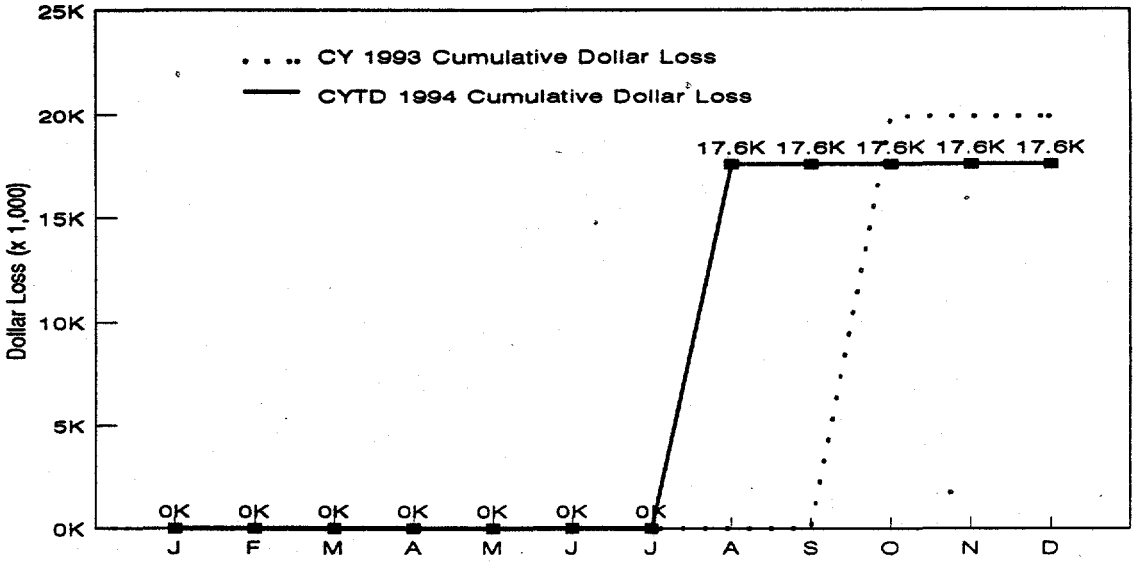
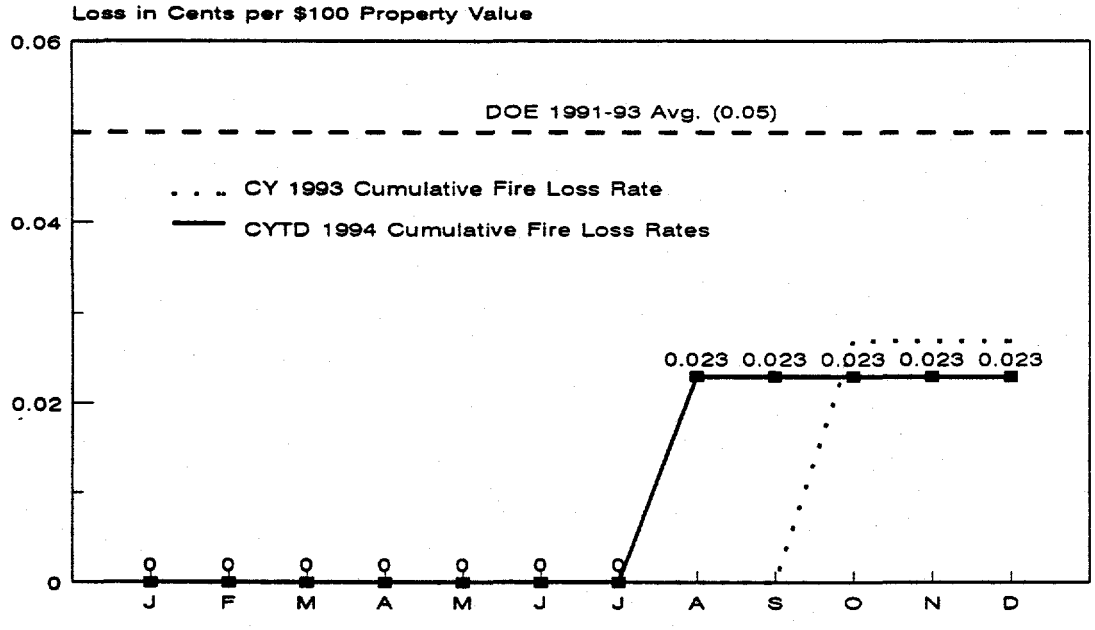


Figure 2-27. CY 1994 Fire Loss Rate



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3.0 RADIOLOGICAL SAFETY

Radiological health and safety of the WHC and ICF KH workforce is ensured through the development and effective implementation of the Radiological Control Program. Occupational radiation safety is the primary focus of this program. This section provides management with a perspective on performance of the WHC Radiological Control organization in implementing processes that seek to reduce individual and collective doses to levels ALARA.

3.1 RADIOLOGICAL CONTROL PROGRAM PERFORMANCE

In this section, key performance trends, occupational statistics, and program accomplishments occurring throughout the fourth quarter and CY 1994 are discussed.

3.1.1 Key Performance Trends

The Radiological Control Program is on course to meet all RL Site Management System milestones and program commitments, as documented in the current Site Support Program Plan, on schedule. Significant progress was made this year in the leadership and execution of planning for 10 CFR 835 implementation. Improved focus and energy on broad areas of program management, such as ALARA, radiologically contaminated area reduction, and leadership in improving Radiological Control Program efficiency remained as areas demonstrating accomplishments. Focus continues on areas where improved radiological conduct of operations is needed, such as injury/illness rates and skin/clothing contamination trends. Financial resources and cost control continued to be acceptable in nearly all areas.

3.1.2 Program Assessment Detail

The Radiological Control Program attained a significant achievement with the submittal of the Radiation Protection Program (RPP), as required by 10 CFR 835, to RL. The RPP, combined with the validation and verification process, provides an accurate assessment of the program requirements to implement 10 CFR 835.

Throughout 1994, significant progress was made in facilitating detailed plans and evaluations in support of implementation of 10 CFR 835. Improvements in enhancing training curriculum associated to these requirements was also accomplished.

The validation and verification process for 10 CFR 835 compliance is proceeding. Seventeen separate facility and program baseline validation packages are complete. These assessments address all radiological activities conducted by WHC. The validation process has identified that 64 out of 234 10 CFR 835 requirements are implemented through the PNL site services contract. The final audit of the site services contract will not be completed until April of 1995. WHC will not claim full compliance with any of these requirements until the assessment is complete.

In addition, WHC will coordinate with ICF KH to ensure that activities conducted at all ICF KH-operated facilities under subcontract to WHC are in full compliance with the WHC-approved RPP by January 1, 1996.

WHC is requesting an exemption to 10 CFR 835 §835.404(b). The exemption requests that the terminology "prevent the inadvertent transfer of removable contamination..." be modified to; "reduce to as low as is reasonably achievable the inadvertent transfer of removable contamination...".

Radiological Control Organization successfully integrated the CCIP into the ALARA Program. This integration is proving to be beneficial for the implementation of both programs across the site through combining efforts and resources to improve radiological control performance.

Improved commitment to the WHC ALARA/CCIP Program was experienced throughout FY 1994. Major support for the program was evident with the fulfillment of the FY 1994 facility-specific and sitewide radiological area reduction goal of over 8 million square feet. Since RL defined radiological area reduction as a high priority, adequate resources are being made available to support continued progress on reduction efforts for FY 1995 commitments. Detailed information pertaining to ALARA/CCIP activities are outlined in Section 1 of this report.

3.1.3 Program Status

The Radiological Control Program experienced an overall improvement in most areas for this reporting period. This improvement is primarily led by efforts associated to implementation of 10 CFR 835 and is expected to continue. Cost controls are in place and schedules are being met. Scheduled SMS milestones, completion of the Site Support Program Plan elements, and technical commitments are being completed on time.

3.1.3.1 Technical Status. Radiological Control has taken steps to increase the confidence of radiological release by rewriting and issuing a new release procedure, training HPTs, and reevaluating release methods currently being used at exempt facilities and areas. The line Radiological Control Organizations are implementing the new release procedure.

Radiological Control is also evaluating options for the development of a volumetric release criteria procedure. The options have been presented to management representatives of the affected facilities/organizations. One alternative being considered is currently utilized within the Nuclear Regulatory Commission (NRC), and another is based on the EH-1 accepted approach for mixed waste. After comments have been resolved the proposal will be submitted to RL and DOE-HQ for approval.

3.1.3.2 Schedule (DOE-HQ/FO/RL) Status. All 45 DOE-RL milestones for FY 1994 were completed by year end. During November and December the Radiological Control Organization completed four FY 1995 milestones, three of which were RL milestones. The completed RL milestones dealt with the submittal of the RPP to RL (RAD-95-016); submittal of the WHC FY 1995 ALARA Performance Goals to RL (RAD-95-014); and conducting the end-of-year ALARA Program Review with RL (RAD-95-010). WHC milestone RAD-95-024 was also completed which was associated with performing a quarterly radiological emergency preparedness drill. All other milestone commitments are on schedule.

The RL and WHC have agreed to change the due date for milestone RAD-95-017, "Year End Report of Hanford Site Radiological Control Manual Compliance," from December 31, 1994 to February 28, 1995. This change was processed through formal change control and will not impact the program for execution during 1995. No schedule or significant cost variances or recovery plans are needed or anticipated at this time.

3.1.4 Key Program Issues

There were no issues identified in Radiological Control that meet the SMS definition for this reporting period. Refer to Section 3.5, "Radiological Problem Reports," for additional information.

3.1.5 Program Accomplishments

Program accomplishments are compiled monthly by Radiological Control and are presented during interfaces with RL and published via company reports. Some notable accomplishments are listed here and in Section 1, "ALARA."

- An interpretation of RCM Article 775 has been provided to WHC Radiological Control by DOE-HQ which will result in a $250,000 cost savings.
- WHC submitted the Radiation Protection Program (RPP) plan, as required by 10 CFR 835, to RL.
- The HSRCM was signed and issued; WHC-CM-1-6, *"WHC Radiological Control Manual"*, has been rescinded.
- The new dosimetry system was implemented during the December 31, 1994, exchange.
- The Radiological Control SMS reporting system was greatly streamlined.
- An ECCEL proposal for consolidation of WHC and ICF KH Radiological Control organizations was approved by the DOE resulting in a $770,000 hard-dollar savings.
- Radiological Control and Operations personnel are continuing to work together to resolve radiological control problems as they're identified in work procedures.
- The Radiological Control Program is being reviewed for cost savings and manpower cuts to meet "challenge 170" goals.
- WHC and PNL have identified a method of complying with 10 CFR 835 environmental qualifications without performing all the ANSI 42-17 environmental testing requirements.
- An alternate sign proposed for posting radiological buffer areas was approved.
- A team of facility Radiological Control posting POCs conducted facility tours to review the implementation of posting requirements.
- Radiological Control has developed a briefing outline for training radioactive source users.

Appendix C-1 lists more detailed information on these, and many other, program accomplishments which have occurred during the past year.

3.2 EXTERNAL DOSIMETRY

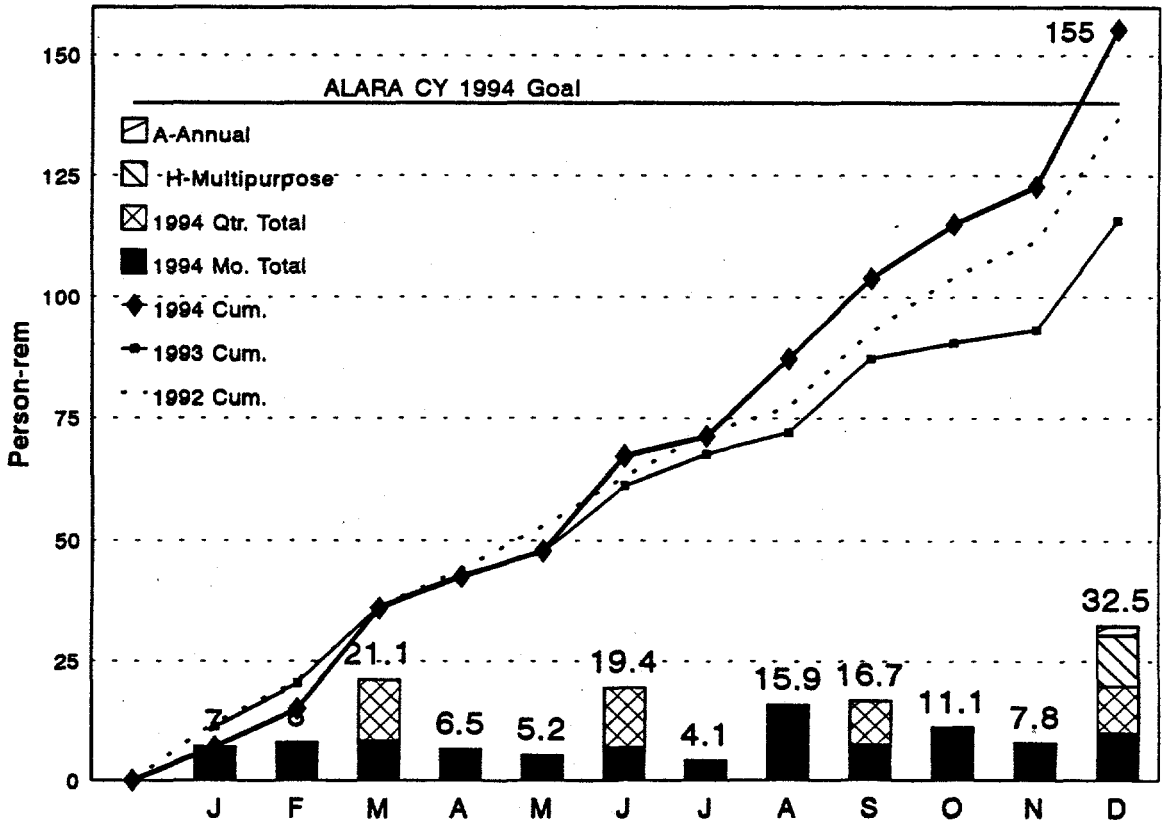
The protection of worker health and safety is of paramount concern within WHC. Since the Hanford Site is one of the largest nuclear sites in the nation, radiation safety is a key element in the protection program. The measurement of accumulated annual dose provides an indicator of the effectiveness of WHC radiation work practices and the ALARA Program with consideration given to fluctuating operating activities.

3.2.1 Occupational Collective Dose

Record dose reflected in this report is for period ending December 31, 1994. Numbers reflect data available from the Radiological Exposure (REX) system on February 8, 1995.

3.2.1.1 Cumulative Annual Occupational Collective Dose. The Figure 3-2-1 chart data includes WHC, BCSR, and ICF KH employee exposure. The results represent the exposure of an average of 2,940 quarterly-badged employees, 1,278 monthly-badged employees, and 8,903 yearly-badged employees over CY 1994. July and September totals were in the range expected. In August, extraordinary work at a PNL job by ICF KH crafts accounted for a majority of the relatively large increase in the exposure. About four rem of the increase remains unexplained except that it is believed to be a function of the dosimeter system. September through December results returned to an expected level.

Figure 3-2-1. Monthly, Quarterly & Annual Exchange Dosimeter Results



The Figure 3-2-2 control chart presents the monthly employee exposure since the last major process change onsite, the stabilization of N Reactor prior to April 1990. The cluster of data points above the mean in mid-1991 reflects the performance of special work: Nonroutine packaging of material at PFP, encapsulating of material in the KE Basin, and Tank Farm work to meet Tri-Party Agreement milestones. The September through December results returned to the expected region after the spike in August.

Figure 3-2-2. Monthly Exchange Dosimeter Results Control Chart

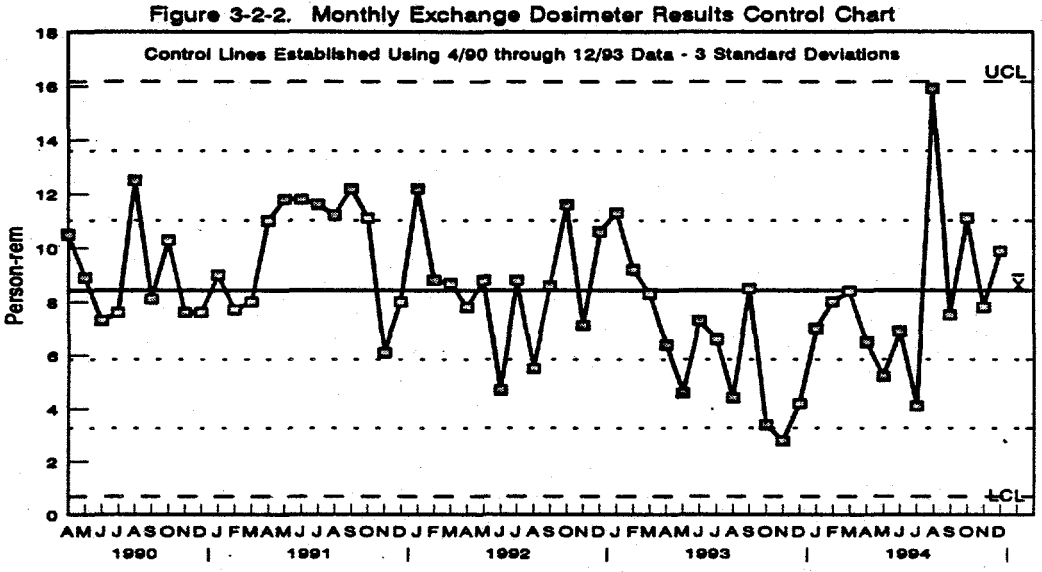
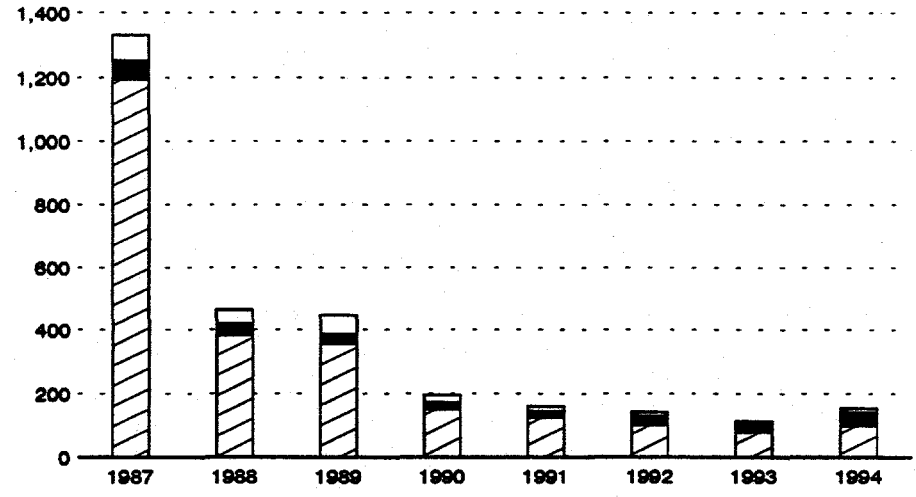


Figure 3-2-3 provides an eight-year history of annual collective dose for radiation workers. The inclusion of ICF KH in 1994 resulted in an apparent increase in the total. Although part of the increase is a result of increased work mainly at PFP.

Figure 3-2-3. Cumulative Occupational Collective Dose

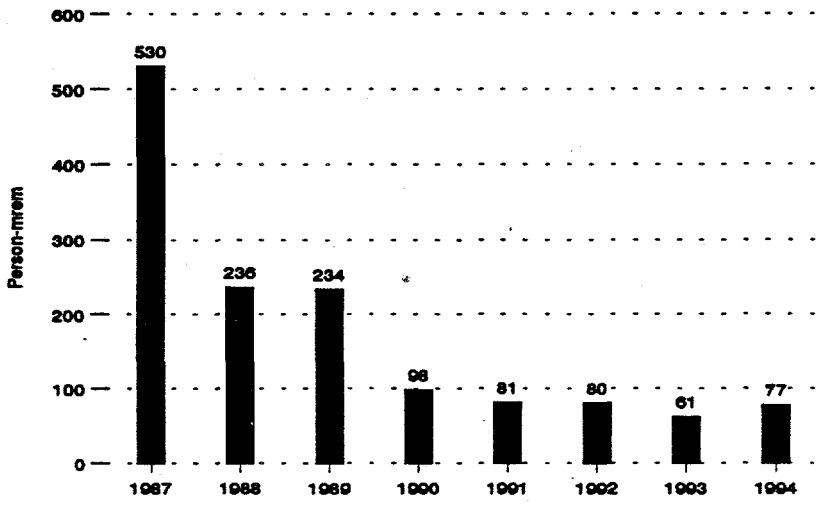
(1987-1994 = WHC and BCS employee dose; 1994 also includes ICF KH dose.)



	1987	1988	1989	1990	1991	1992	1993	1994
H - Ann.	78	43	60	23	14	11	10	11
Q - Qtr.	60	38	30	22	22	31	25	44
M - Mo.	1,194	383	357	149	123	99	77	98
Total	1,332	464	447	194	159	141	112	153

3.2.1.2 Individual Radiation Dose. Figure 3-2-4 depicts the cumulative average dose in mrem for monthly badged personnel for CY 1987 through CY 1994.

Figure 3-2-4. Monthly Badged Employee Average Cumulative Radiation Dose

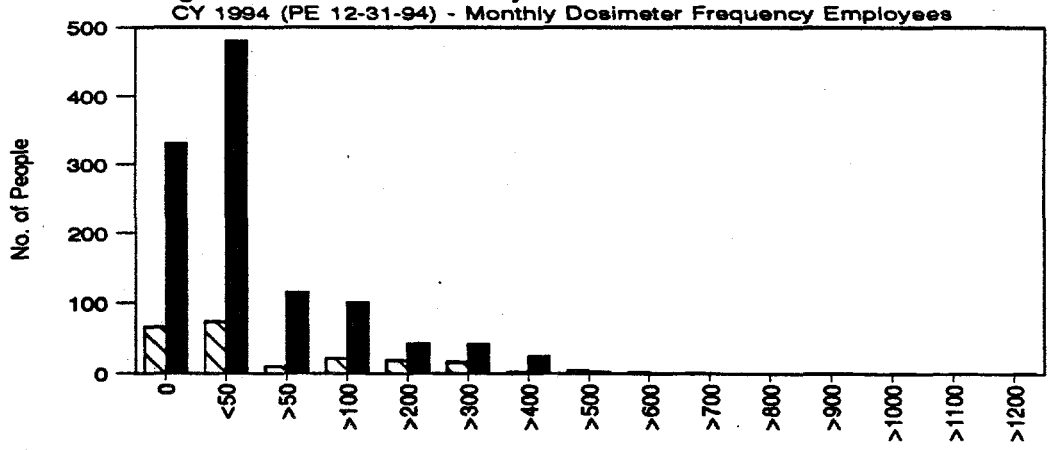


3.2.2 High Whole Body Dose Evaluation

Figure 3-2-5 illustrates whole body dose distribution, received onsite, among all WHC, BCSR, and ICF KH monthly frequency badged employees. Table 3-2-1 lists workers having the highest whole-body doses received onsite, during CY 1994, for monthly and quarterly frequency badged employees.

During the fourth quarter of CY 1994, there were three unplanned exposures, resulting in a dose greater than the administrative control level of 500 mrem/year for a total of three for CY 1994.

Figure 3-2-5. Whole Body Dose Distribution - Cumulative
CY 1994 (PE 12-31-94) - Monthly Dosimeter Frequency Employees



	0	<50	>50	>100	>200	>300	>400	>500	>600	>700	>800	>900	>1000	>1100	>1200
ICF KH Mo.	66	74	10	21	19	16	3	4	3	1	0	1	0	0	0
ICF KH Qtr.	604	164	22	25	19	4	1	1	1	0	0	0	0	0	0
WHC Mo.	331	481	115	101	42	41	25	3	1	0	0	1	1	1	2
WHC Qtr.	2082	472	89	55	6	2	0	0	0	0	0	1	0	0	0

Dose Interval - mrem

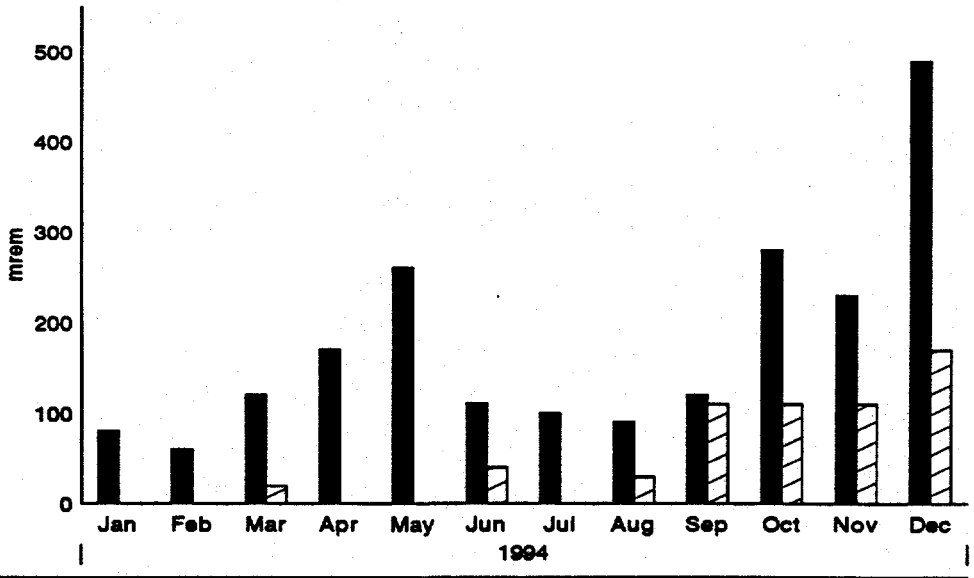
Table 3-2-1. Highest Whole Body Dose Employees
Includes external dose received by monthly and quarterly frequency badged employees.

Craft	Whole Body (mrem)	Organi-zation Code	Craft	Whole Body (mrem)	Organi-zation Code
Engineering Technician	1230	15370	Engineer	530	56A00
Engineering Technician	1220	15370	Misc. Service	520	15300
Engineering Technician	1150	15370	Administrative Support	490	15900
Engineering Technician	1090	15370	Manager/Administrator	480	15370
Health Plysics Technician	920	33920	Manager/Administrator	480	7C610
Sheet Metal Worker	910	52791	Manager/Administrator	470	7C610
Manager/Administrator	791	7CB61	Plant/Utility Operator	460	15900
Plant/Utility Operator	620	15900	Scientist	460	8E110
Manager/Administrator	570	15D00	Handler/Laborer	450	85400
Plant/Utility Operator	550	15360	Electrician	450	15630

3.2.3 High Neutron Dose

Figure 3-2-6 provides a 12-month rolling window of the highest neutron doses received onsite. The five highest neutron doses received during all of CY 1994 were recorded for employees at PFP.

Figure 3-2-6. Highest Neutron Dose



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WHC	80	60	120	170	260	110	100	90	120	280	230	490
ICF KH	0	0	20	0	0	40	0	30	110	110	110	170

3.2.4 Facility-Specific Exposure for CY 1994

Exposure for the facilities listed in the tables below, is based upon information shown in the REX database. Each facilities' exposure is listed by organization code for each dosimeter frequency. Facility data is limited in that exposure received at these facilities by multifacility personnel (i.e., employees performing work at more than one facility) is not included.

An effort was made to include all organization codes used by facility-specific personnel, throughout the year. Therefore, the "number of persons" only represents those receiving dose while the organization code was in effect and cannot be totaled by facility for an accurate number of persons working at the facility during the year.

Table 3-2-2. FFTF

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		A	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
144xx	1	0	0	0	010	10	12	0
18xxx	2	70	137	200	111	300	37	30
33120	0	0	10	75	2	0	0	0
38550	0	0	5	0	10	0	4	0
43150	0	0	0	0	1	0	7	0
52463	0	0	0	0	3	0	9	0
5271x	0	0	13	0	1	0	5	0
57540	0	0	1	0	1	0	0	0

Table 3-2-3. K Basins

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		A	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
117xx	1	0	0	0	2	30	0	0
13220	0	0	2	0	1	0	0	0
147xx	2	80	0	0	11	110	4	130
2Axxx	68	10380	64	1080	30	70	5	10
3391x	23	2940	4	150	4	80	1	0
43130	0	0	0	0	6	20	0	0
52461	0	0	0	0	3	10	4	0
856xx	23	780	7	20	10	10	2	0
857xx	0	0	3	20	1	30	0	0

Table 3-2-4 PFP

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		A	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
15xxx	216	30929	164	5840	81	750	5	90
31K20	0	0	5	0	0	0	0	0
3392x (does not include 33921)	39	6560	10	430	2	0	0	0
38530	0	0	9	110	7	40	0	0
8E120	8	1450	2	100	0	0	0	0

Table 3-2-5. PUREX/UO_3

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		A	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
143xx	0	0	0	0	15	20	1	0
17xxx	9	260	140	1010	98	290	11	0
33931	0	0	26	187	3	20	0	0
57610	0	0	6	0	9	10	0	0
8E490	1	20	9	110	1	0	0	0

Table 3-2-6. Waste Tank Farms

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		A	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
3331x	6	770	29	1230	3	0	0	0
3332x	23	1680	4	30	2	10	0	0
382xx	0	0	10	80	27	40	11	0
52230	10	990	0	0	0	0	0	0
52240	11	820	2	10	0	0	0	0
57640	0	0	12	0	3	0	1	0
7xxxx	273	12200	390	2350	431	780	491	70

Table 3-2-7. Process and Analytical Laboratories

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		Ring	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
12xxx	1	0	4	50	134	28	42	70
33921	1	10	21	1190	0	0	0	0
8Exxx (does not include 8E120 & 8E490)	21	1650	216	3720	33	20	11	0

Table 3-2-8. B Plant/WESF

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		A	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
16xxx	58	1420	48	90	90	300	27	10
33940	2	140	17	480	0	0	0	0

Table 3-2-9. T Plant

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		A	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
33541	19	500	4	10	0	0	0	0
874xx	53	1000	46	60	28	20	3	0

Table 3-2-10. Solid Waste Management

Organization Code	Whole body deep exposure is listed for Monthly (M), Quarterly (Q), 5-Chip Annual (H), and 1-Chip Annual (A) TLD totals.							
	M		Q		H		A	
	# Per.	mrem	# Per.	mrem	# Per.	mrem	# Per.	mrem
33542	10	190	2	0	1	0	0	0
872	3	30	72	970	52	50	4	0

3.3 INTERNAL DOSIMETRY

Radiological Control is responsible for internal dosimetry emergency response following radiological events and for providing an internal dosimetry advisor to interface between: WHC, BCSR, and ICF KH workers, DOE, PNL Internal Dosimetry, WHC Dosimetry, HEHF, Radiological Control management and staff, and WHC Communications following events of positive routine bioassay examinations.

3.3.1 Internal Depositions

Beginning in CY 1993, the DOE Radiological Control Manual required the dose from internal depositions be calculated as the 50-year committed effective dose equivalent (CEDE), and DOE Order 5000.3B established reporting criteria for internal depositions as $\geq$100 mrem CEDE.

There were no intakes of radioactive material with assessed CEDE greater than or equal to 100 mrem by inhalation or by wounds during this reporting quarter.

3.3.2 Internal Dose Incident Follow-Up

There were four instances of loss of contamination control during this calendar quarter involving 12 workers where internal dosimetry follow-up was performed.

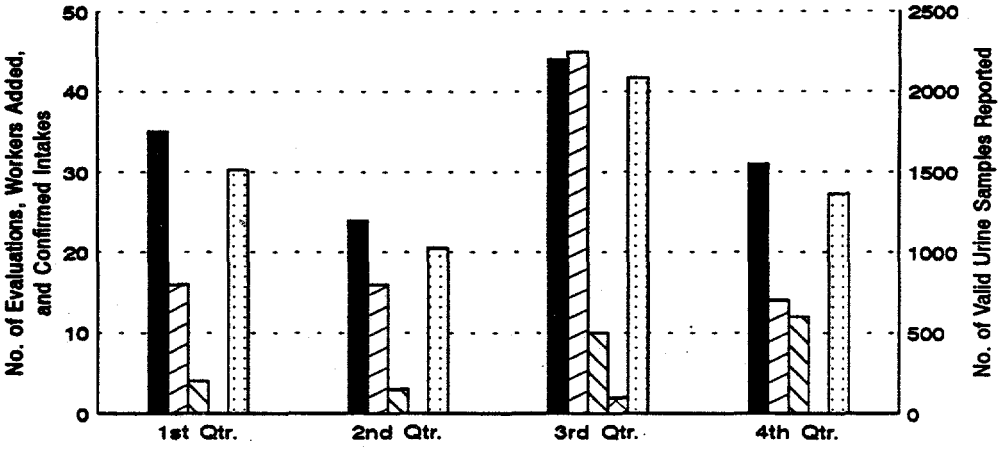
- On October 10, 1994, unanticipated contamination was detected on the floor of an enclosure in the C-Tank Farm where excavation had just concluded. Follow-up whole body counts of three workers detected no intake of mixed fission products.

- On October 6, 1994, an HPT was contaminated during a survey of the ageing waste facility, Building 801 8XA. The radioactive source term at that facility is mixed fission product waste. Contamination was detected on the worker's clothes and face. Follow-up whole body counting and a strontium bioassay both confirmed an intake had occurred. The resulting dose was less than one mrem and rounded down to zero mrem.

- On December 12, 1994, three workers were working with drummed, mixed fission product waste at the 209E Building in the 200 East Area when there was a loss of contamination control. As a precaution, all three workers were counted at the whole body counter. There was no indication of an intake for any of the workers.

- On December 13, 1994, there was a loss of contamination control at PFP where workers were handling a container of scrap material as part of the plutonium sludge stabilization work. A room continuous air monitor (CAM) alarmed and workers immediately left the work area. Two of five workers at the scene had positive nasal smears. The two workers with positive nasal smears were given the option of receiving a chelating agent, diethylenetriaminepentaacetate (DTPA), and chose to receive it. Follow-up bioassays showed indications of uptakes for the two workers who had positive nasal smears. Bioassay results also indicate small intakes for the three remaining workers. Final dose assessments are anticipated from the Battelle Pacific Northwest Laboratory Exposure Evaluator for these workers late in the first quarter of CY 1995.

Figure 3-3-1. 1994 Evaluations of In Vitro and In Vivo Measurements
WHC and ICF KH Employees



	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
(1) - ■	35	24	44	31
(2) - ▨	16	16	45	14
(3) - ▨	4	3	10	12
(4) - ▨	0	0	2	0
(5) - □	1515	1026	2083	1364

(1) Number of evaluations in progress.
(2) Number of workers added for evaluation during quarter as a result of a routine bioassay.
(3) Number of workers added for evaluation during quarter as the result of an incident.
(4) Confirmed intakes greater than or equal to 100 mrem committed effective dose equivalent.
(5) Number of valid urine samples reported during quarter (Y2 Axis).

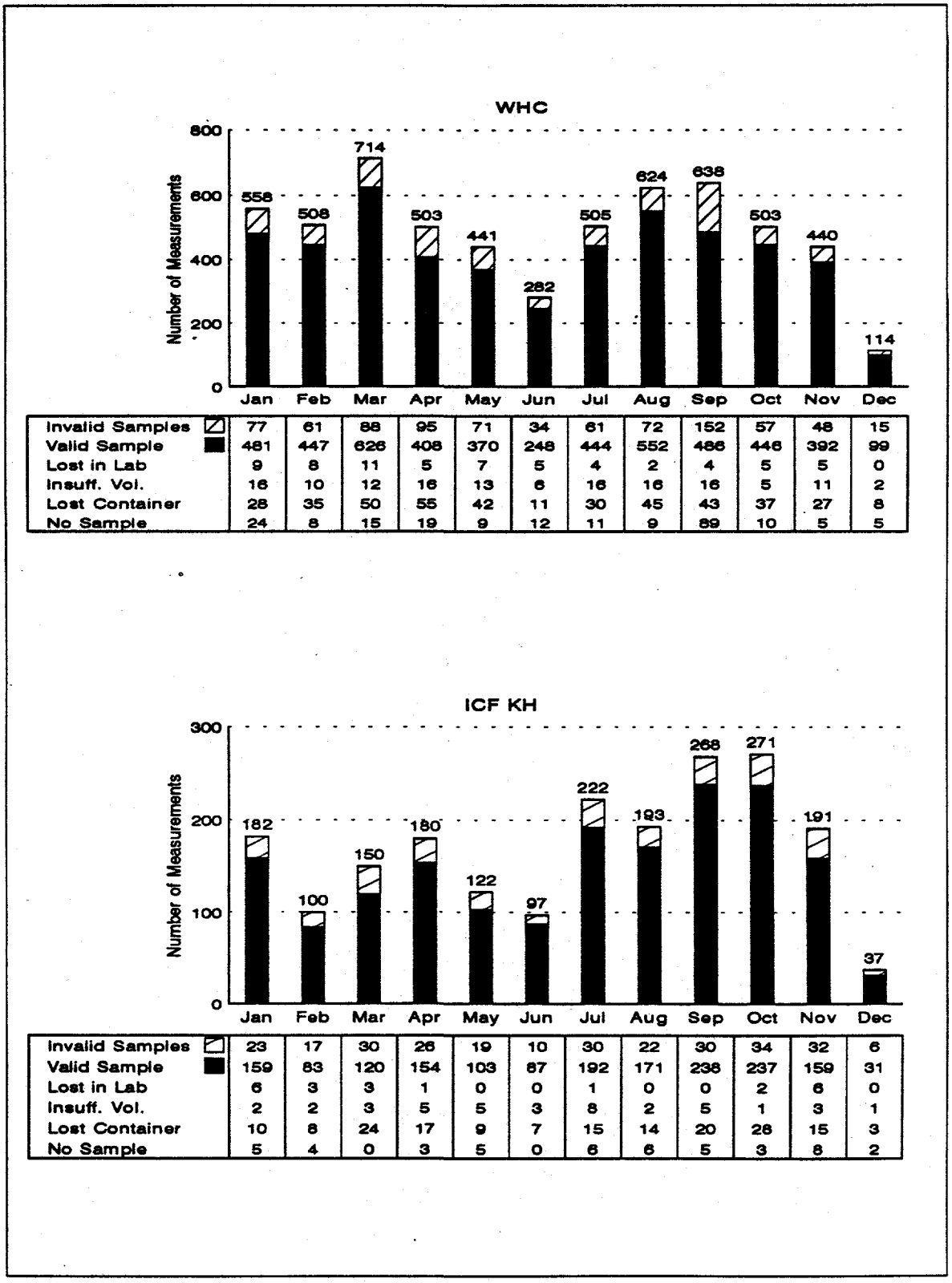
3.3.3 Direct (*in vivo*) and Indirect (*in vitro*) Measurement

The statistics for total number of urine samples is based on the total number sampled. *In vitro* measurement statistics are presented in Figure 3-3-2 for CY 1994. Statistics are also included for invalid samples:

- No sample - Workers did not provide a sample for a delivered container
- Lost containers - Workers did not return the containers to the analytical laboratory, or as in the first quarter, the containers were deficient
- Insufficient volumes - Workers did not provide an acceptable amount of urine for analysis
- Lost in laboratory - The analytical laboratory lost the worker's sample during the processing.

Note that, beginning in January of 1994, statistics for ICF KH are also included in this report.

Figure 3-3-2. Indirect (*In Vitro*) Measurements

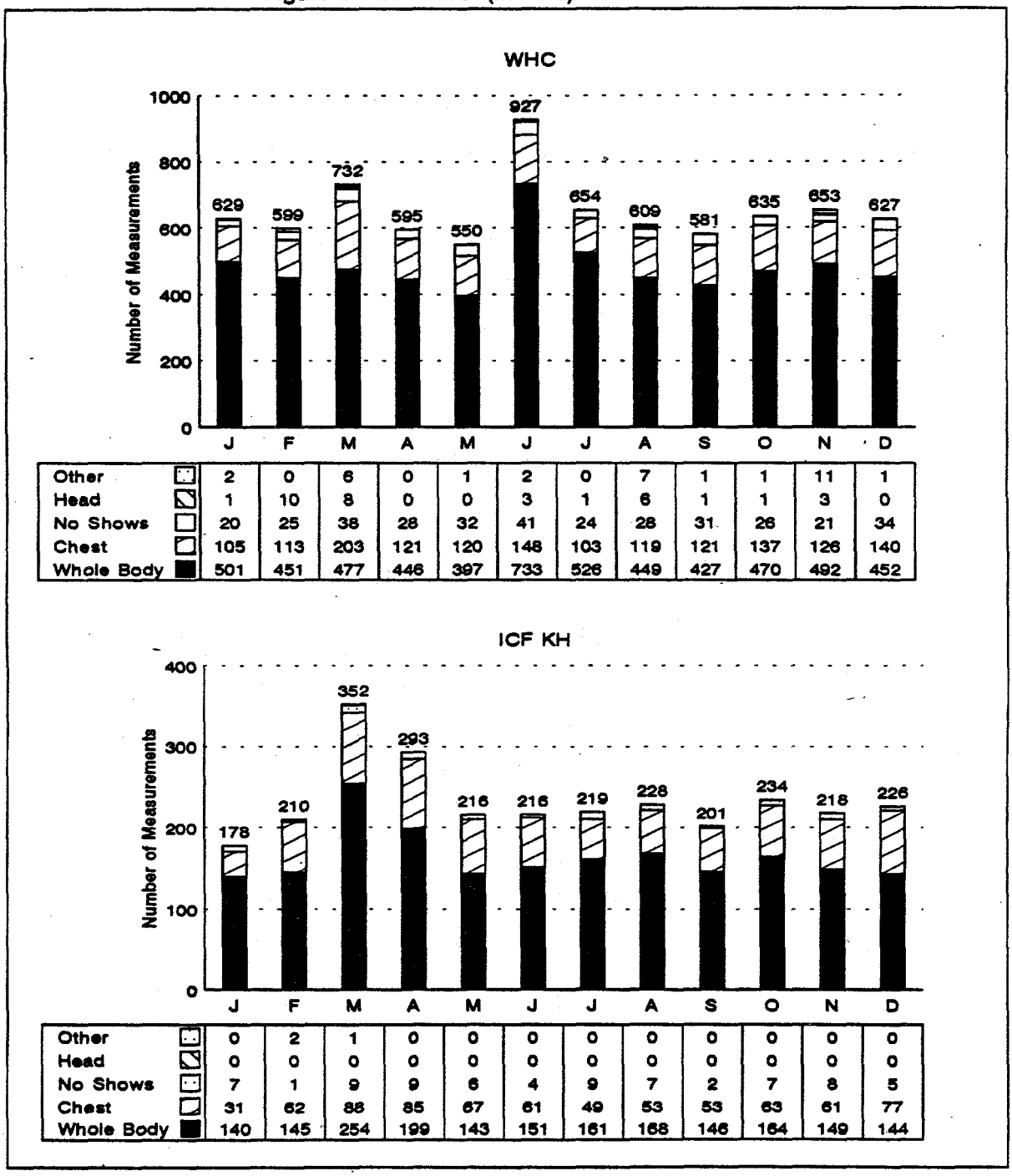


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Invalid Samples	77	61	88	95	71	34	61	72	152	57	48	15
Valid Sample	481	447	626	408	370	248	444	552	486	446	392	99
Lost in Lab	9	8	11	5	7	5	4	2	4	5	5	0
Insuff. Vol.	16	10	12	16	13	6	16	16	16	5	11	2
Lost Container	28	35	50	55	42	11	30	45	43	37	27	8
No Sample	24	8	15	19	9	12	11	9	89	10	5	5

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Invalid Samples	23	17	30	26	19	10	30	22	30	34	32	6
Valid Sample	159	83	120	154	103	87	192	171	238	237	159	31
Lost in Lab	6	3	3	1	0	0	1	0	0	2	6	0
Insuff. Vol.	2	2	3	5	5	3	8	2	5	1	3	1
Lost Container	10	8	24	17	9	7	15	14	20	28	15	3
No Sample	5	4	0	3	5	0	6	6	5	3	8	2

In vivo measurements are accumulated by measurement type: Whole body, chest (lung), and head. All other types of measurements performed (e.g., wound, thyroid) are contained in the "Other" category. The "no-show" category contains the number of chest measurements in which scheduled workers did not report to the PNL *In Vivo* Radioassay and Research Facility (Figure 3-3-3).

Figure 3-3-3. Direct (*In Vivo*) Measurements



3.3.4 Internal Dosimetry Cost Savings

Internal Dosimetry identified an audit process to cancel bioassays not required by the worker's historical job assignments. A compilation of actual savings for FY 1994 showed hard dollar savings of $113,506.00 for *in vitro* bioassays and soft dollar savings of $24,397.00 for *in vivo* bioassays. An ECCEL cost reduction proposal was approved for this activity. The observed reduction in *in vitro* bioassays, and resulting hard-dollar savings, was almost twice the $60,000.00 savings predicted for FY 1994.

3.4 SKIN AND CLOTHING CONTAMINATIONS

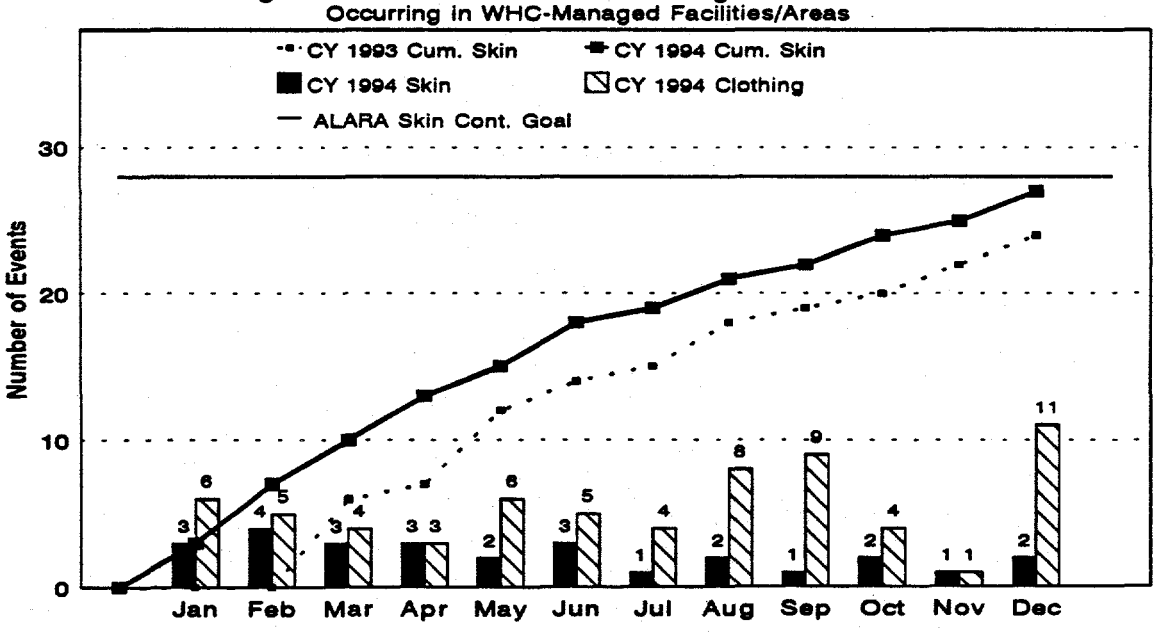
Skin contaminations are of little consequence to employee health and safety, unless they result in significant radiation dose or internal depositions. Each skin contamination incident, however, does represent the potential for a more serious occurrence.

WHC-CM-4-16, *Dosimetry and Medical Services Manual*, Section 1.2, contains the criteria used for reporting skin and clothing contamination events in this report.

3.4.1 Cumulative Skin Contaminations and Clothing Contaminations

There were five skin contaminations reported during the fourth calendar quarter for a total of 27 during the calendar year in WHC-managed facilities/operations. The fourth-quarter skin contaminations occurred at PFP (2), B Plant (2), and Tank Farms (1). There were also 16 clothing contaminations during the fourth quarter: Tank Farms (10), K Basins (2), T Plant (2), and one each at PUREX and Analytical Laboratories. The total clothing contaminations for the calendar year is 66. Both ALARA goals, noted in Figure 3-4-1, were met.

Figure 3-4-1. 1994 Skin and Clothing Contaminations Occurring in WHC-Managed Facilities/Areas



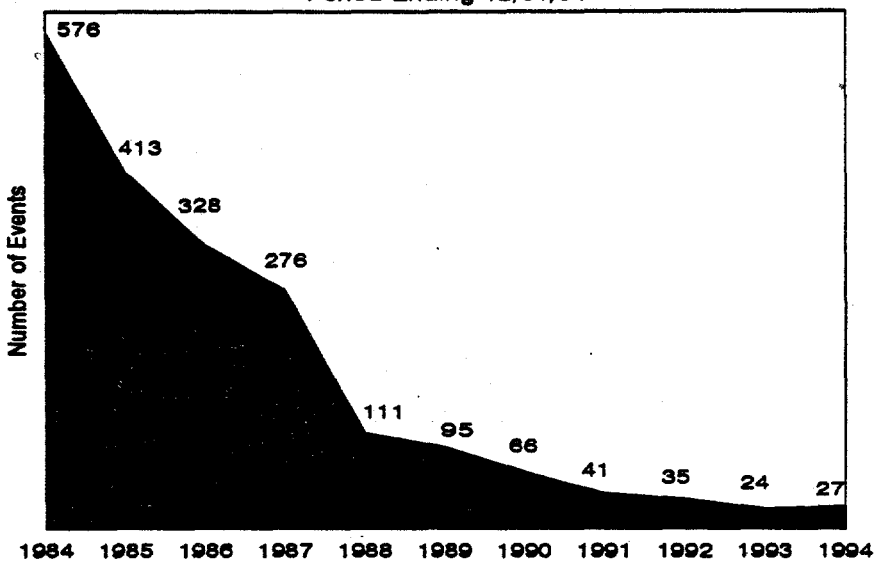
ALARA CY 1994 Sitewide Goal No. 17: <28 Skin Contaminations; 0 Significant
ALARA CY 1994 Sitewide Goal No. 19: <73 Clothing Contaminations

3.4.2 Historical Skin Contaminations

Tracking the total number of skin contaminations provides an indication of the effectiveness of contamination control measures and ALARA programs.

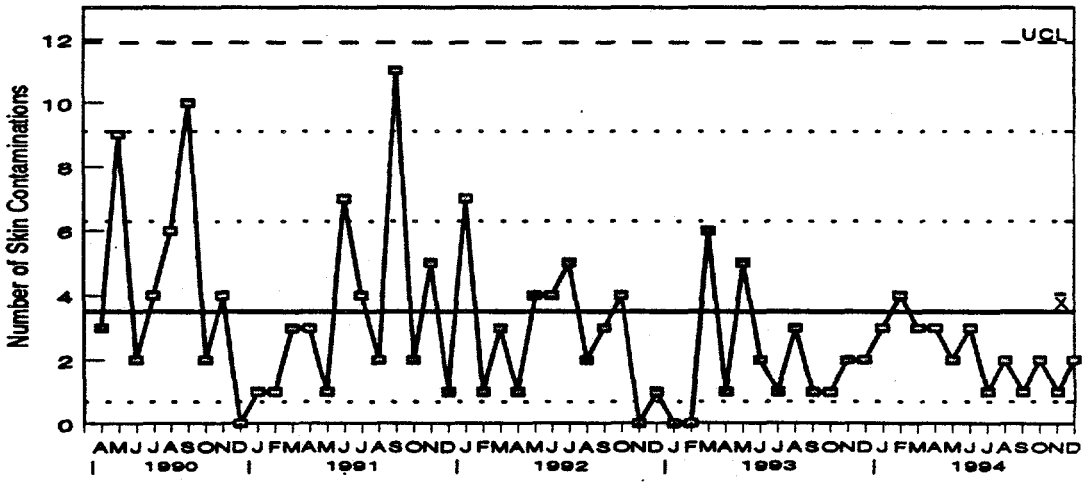
3.4.2.1 Skin Contamination Comparison by Year. The eleven-year trend for skin contaminations has been downward until this year. (Figure 3-4-2).

Figure 3-4-2. Eleven-Year Skin Contamination Comparison
Period Ending 12/31/94



The Figure 3-4-3 control chart indicates performance during CY 1994 is better than average over the last five years.

Figure 3-4-3. Skin Contaminations Occurring in WHC-Managed Facilities/Areas



Baseline established using April 1990 through December 1992 Data

3.4.2.2 Significant Skin Contaminations. Significant skin contaminations are defined as a skin contamination resulting in a skin dose greater than or equal to one percent of the DOE dose limit, and are an indicator of the effectiveness of WHC radiation work practices and the efficiency of protective equipment. There have been no significant skin contaminations reported in WHC-managed facilities/areas since the one reported in CY 1988.

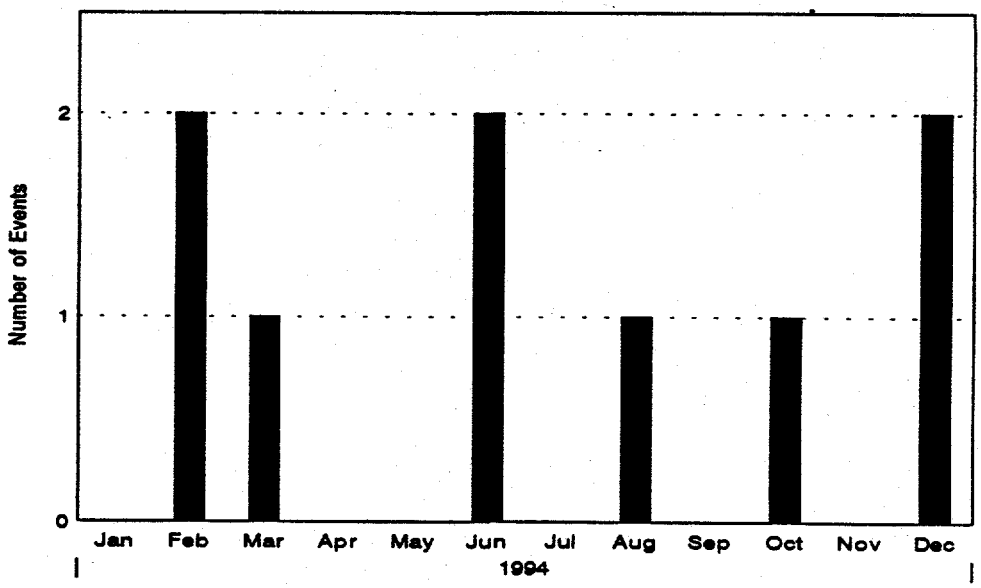
3.4.3 Facial Contaminations

Facial contaminations hold the potential for inhalation of radioactive material resulting in an internal deposition. The probable cause of the two facial contamination incidents involving three employees during this quarter is given below. All three individuals received confirmed intakes (refer to Section 3.3.2). Figure 3-4-4 depicts the number of facial contaminations for the last 12 months.

- On October 6, after performing routine surveys in the 801-AX-A Building, 241-AX Tank Farm, an HPT was found to have multiple spots of contamination on the face and head. The apparent cause of the event was the HPT rearranging shielding in the small building without an adequate procedure/method to preclude stirring up unfixed contamination.

- On December 13, two nuclear process operators' nasal smears tested positive following a release of airborne contamination at PFP.

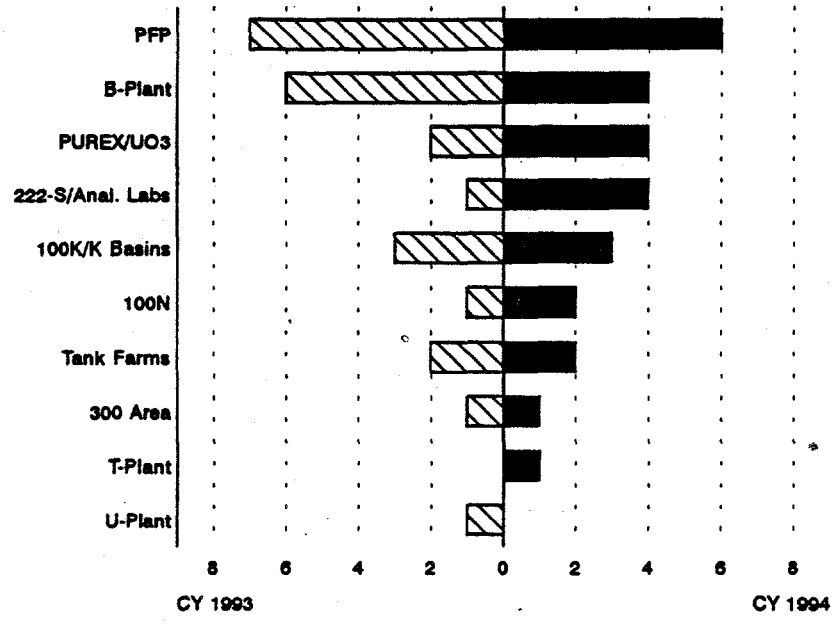
Figure 3-4-4. Facial Contaminations
Received in WHC-Managed Facilities/Areas



3.4.4 Skin and Clothing Contamination Trends

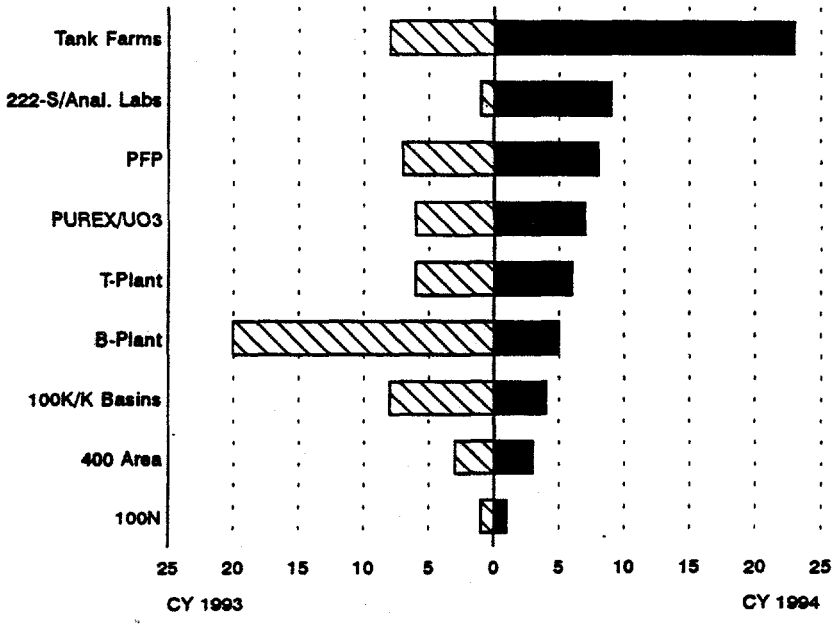
There is no significant trend in the number of skin contaminations when comparing the numbers of skin contaminations by facility between CY 1993 and CY 1994. There is an overall increase from 24 skin contaminations in CY 1993 to 27 in CY 1994 (Figure 3-4-5).

Figure 3-4-5. Skin Contamination Comparison by Facilitiy



There is a slight increase in the overall number of clothing contaminations from 60 in CY 1993 to 66 in CY 1994. Tank Farms and 222-S/Analytical Laboratories showed significant increases in the number of clothing contaminations, and 100K/K Basins and B Plant showed decreases. The increases at Tank Farms may be attributed to the substantial increase in work scope and are under investigation. The decrease in the number of clothing contaminations at B Plant may be attributed to increased levels of awareness by management and workers which resulted in better practices in the field (Figure 3-4-6).

Figure 3-4-6. Clothing Contamination Comparison by Facilitiy



3.5 RADIOLOGICAL PROBLEM REPORTS

A Radiological Problem Report (RPR) is issued to responsible managers as a method to communicate potential problems needing attention. Tracking the number of issued reports can provide an indication of both the number of potential problems and ensures documentation of these events by Radiological Control. Tracking the length of time needed to close an RPR is an indicator of the cooperative efforts expended by Radiological Control personnel and the line management in resolving these problems. .

Most facilities/areas continue to utilize the capabilities of the RPR tracking system in conjunction with the present site management action-tracking system to manage deficiencies, trend performance, and develop improved preventive efforts. It is expected that the RPR tracking system will be further enhanced by implementation of the new Hanford Action Tracking System (HATS).

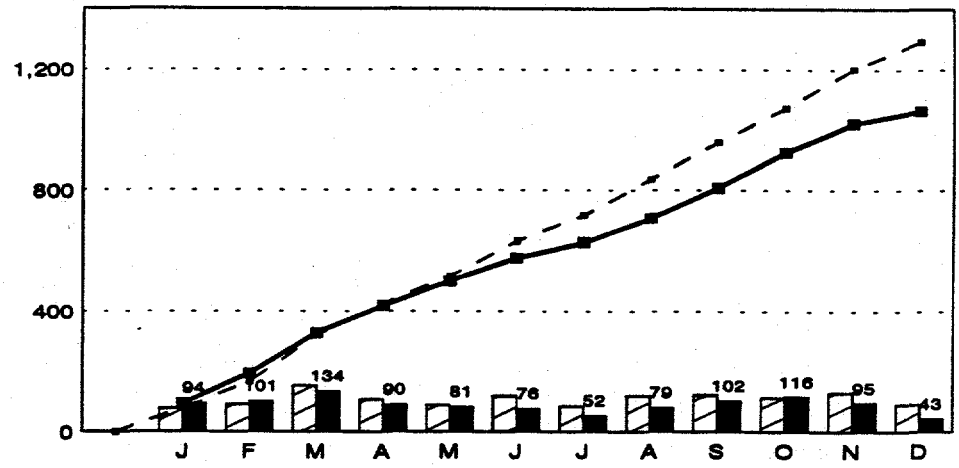
The deficiencies noted by the RPR system are coded by type and cause. This information allows extraction of the data for analysis of the types of deficiencies which are occurring, the causes of those deficiencies, and the length of time necessary to accomplish resolution. Refer to Appendix C-4 and C-5 for cause code and type code descriptions.

The actionee is responsible for determining the priority and weight of each deficiency. Once this has been determined and concurrence with the originator reached, assigned values make the evaluation of the urgency of completion more readily understandable. Eighty-two percent of graded RPRs have been weighted at under six. Thirteen percent were weighted at ≥ 6 and < 11, and only 5% were weighted at ≥ 11 and < 25. Refer to Table 3-5-1 for definitions of the weighting system. Refer to WHC-CM-1-4, *Corrective Action Management Manual*, Sections 2.0 and 3.0.

3.5.1 RPRs Issued

In CY 1994, the average number of RPRs issued per month was 89 (Figure 3-5-1). In CY 1993, the monthly average issued was 108 RPRs.

Figure 3-5-1. Cumulative RPR Reports Issued



		J	F	M	A	M	J	J	A	S	O	N	D
1993 Cumulative	0	77	167	320	427	515	633	717	837	959	1,072	1,202	1,292
1993 Mo. Total	0	77	90	153	107	88	118	84	120	122	113	130	90
1994 Cumulative		94	195	329	419	500	576	628	707	809	925	1,020	1,063
1994 Mo. Total		94	101	134	90	81	76	52	79	102	116	95	43

The total number of RPRs written during the fourth quarter of 1994 was 254, a 24% decrease from the same period in 1993. One reason for this decrease continues to be an increasingly cooperative effort between Radiological Control and the actionees to avoid radiological problems through a proactive approach (ALARA).

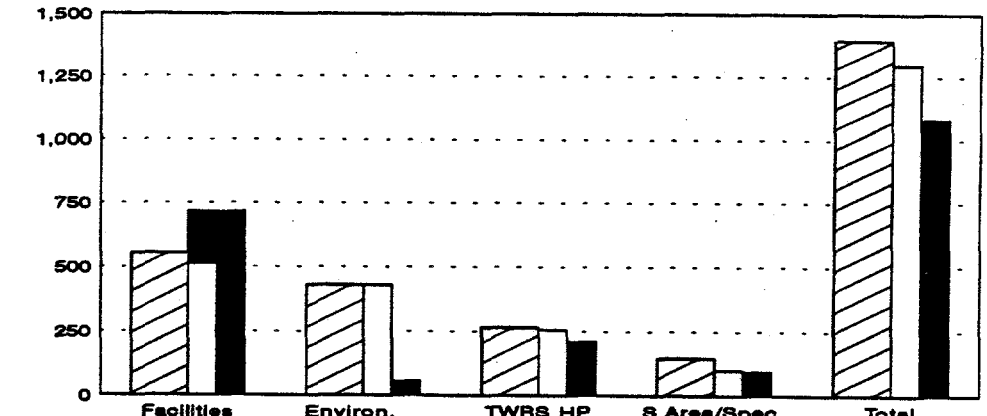
3.5.1.1 Number of RPRs Written - Fourth Quarter CY 1992 to Fourth Quarter CY. The majority of RPRs continue to be written by PUREX/UO3, TWRS, T Plant, and 100K. Although production has decreased and the number of RPRs written has decreased by 26% since 1991, there was an increase in reporting from year-end 1993 to year-end 1994 (6%)

3.5.1.2 Factors Influencing the Number of RPRs Written

- The general decrease in numbers of RPRs written from 1991 to 1994 reflected the continued down-sizing of production at the Hanford facilities in addition to an increased awareness of radiological issues. The 1993 administrative hold at Tank Farms is indicative of management support for this program of awareness, and was a causal factor in the fewer numbers of RPRs written in those areas in 1993. Also, the transition of the ERO to a new contract strongly impacted Radiological Control's activities. Refer to paragraph 3.5.1.3.

- Additional adjustments to the source code and cost accounting codes due to the restructuring of the company during the later half of 1994 have altered the data points for the gathering of statistical data. Whereas a continued down-sizing effort is expected to continue in 1995, this is also expected to further skew the data points in certain areas making it even more difficult to make valid statistical comparisons. A series of new baselines is to be established beginning with the next quarterly report to reflect these changes. Refer to Figure 3-5-2.

Figure 3-5-2. Number of RPRs Written - CY 1992 to 1994 Comparison



	Facilities HP	Environ. Restor. HP	TWRS HP	S.Area/Spec. Serv. HP	Total
1992	553	429	266	146	1,394
1993	511	429	257	100	1,297
1994	717	56	211	95	1,079

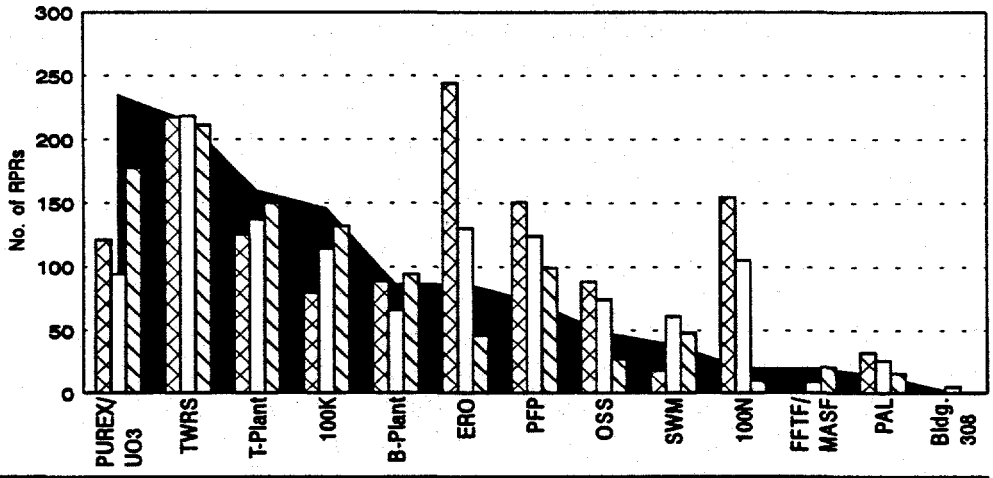
- Continued increased awareness of ALARA principles and application to performance accounts for some of the decrease in reporting of deficiencies. Cooperative efforts between Radiological Control and its customers have increased the focus on ALARA as a continuing successful approach to hazard management and safe job performance.

- Changes in work scope and general attention to detail may account for the changes in numbers. The numbers for 1994 may be accounted for by even closer attention to detail as work scopes change or slow down. The totals are also currently showing a dip in report frequency with the effect of the ERO transition to another contractor, however, the increase in Tank Farm activity and general remediation efforts as defined by the Tri-Party Agreement, are expected to be reflected by a proportional increase in RPR reporting during the fourth quarter of 1994 and 1995 work efforts. The recent clean-up declaration by the three Tri-Party Agreement agencies, in September 1994, of slightly more than 40% of the 267-hectare (560-acre) Hanford Site complex, is the result of the concurrent efforts on the part of the contractors to fulfil their remediation mission to the public. The RPR activity is expected to continue an as inherent part of the clean-up mission process.

3.5.1.3 Facilities Issued RPRs. There was an overall decrease in the actual number of RPRs issued in facilities during CY 1994 compared to the total number extrapolated earlier in the year (see Figure 3-5-3). Some areas, such as TWRS, maintained about the same numbers as in previous years and others, such as B Plant and PFP, an increase. Changes in facility organization codes, tracking codes, cost centers, and general restructuring of the Company, made statistical data comparisons difficult. Certain cost centers disappeared altogether (e.g., ICF KH control codes changed with the amortization of both WHC and ICF KH centers in 1994). Additionally, effective July 1, 1994, the ERO and 100N Areas no longer reported through this system and that reduced the numbers of reported RPRs.

The decreases in activity and the steady decommissioning of facilities/areas will also continue to account for some changes. Liquid Effluent Facility activity, now beginning an active role, is expected to generate the need for performance tracking and monitoring as their activities increase.

Figure 3-5-3. Facilities Issued RPRs - Cumulative



	PUREX/ UO3	TWRS	T-Plant	100K	B-Plant	ERO	PFP	OSS	SWM	100N	FFTF/ MASF	PAL	Bldg. 308
1994*	234	214	160	146	86	86	72	48	38	20	20	14	0
1994	178	211	150	132	94	46	99	27	48	10	21	16	0
1993	94	218	137	114	66	130	124	74	61	105	9	26	5
1992	121	217	125	79	88	244	151	88	18	155	2	32	1

*Projected RPR performance based on previous (1993 and prior) performance and trends .

3.5.2 RPR Trends

The deficiencies noted by the RPR system are coded to allow extraction of the data for analysis of the types of deficiencies which are occurring, the cause and severity of those deficiencies, and the length of time necessary to accomplish resolution.

3.5.2.1 RPRs by Priority Planning Grid (PPG). The Hanford Site is now in full compliance with DOE requirements to change the weighting system of radiological and safety deficiencies to the PPG system (Table 3-5-1). This system has strengthened the valuative efforts of the actionees and the originators of the RPRs when applying causal definitions to each deficiency.

Of the RPRs that have not been assigned PPG values, most were issued for information only or were closed with rapid corrective actions within 30 days, as a continuing cooperative effort on the part of Radiological Control and its' customers, to maintain the site ALARA. Many of these RPRs, issued for information purposes, record issues already being tracked by the facilities as occurrence reports and these RPRs therefore were not evaluated for PPG since the primary tracking is done via the occurrence report system.

3.5.2.2 RPRs by Type and Cause. A total of 1,020 RPRs were written on radiological deficiencies during 1994, and of those written, 690 (68%) were reported for various radiation contamination situations (EV - Event). Of those issued for Events, 395 (57%) were listed as unknown causes (the absence of directly discernable evidence) for the source of the radiological contamination, and personnel error accounted for 28% of the total. Of all deficiencies for 1994, 169 were specifically correlated with radiological contamination control (EV-02-004). Those 169 are 25% of the total reported (Figure 3-5-4).

Of all RPRs written, "Other" continues to be listed as the primary cause (395 - 57%), with personnel issues (192-28%) second. It is easier to work with the personnel issues since they are very specific and can be detailed. Within the framework of the Other categories, those issues with unknown causes (no directly discernable evidence as to the specific origin of the event cause) can only be trended by area/location and watched for recurrence. "Natural phenomena" can only be controlled to a certain extent -- tumbleweeds gathered and destroyed, areas blocked from animal intrusion. Those unknown causes, as they recur, need to be revisited and trended closely. The Radiological Control organization attempts to monitor causal factors by more appropriately designating causes to deficiencies as much as is discernable. The trend toward an increase of personnel- and procedure-caused events is a reflection of the increased awareness of personal accountability in the workplace.

Of the RPRs listed with PPGs ≥ 6 and < 11, the majority are type coded as Event (57%) and then Administrative (40%). Causes in this area are listed as Other (49%) with Personnel Error listed as a cause for 37% of the issues within this PPG range. In the Other category, 56% list an unknown cause.

The RPRs listed with a PPG of ≥ 11 (16 total open in 1994) list Event as the primary type (50%) and Personnel as the primary cause (50%). "Other" cause category accounts for 19% of these. The highest rated RPR (PPG 15) dealt with a compilation of RPRs regarding eating and drinking of materials inside radiologically controlled areas.

The RPRs are written to document radiological problems. The majority of them therefore list radiological events (EV) as primary types. Causal factors do need to be identified and investigated, especially those that recur. Personnel errors, administrative issues, procedural and training issues are

Table 3-5-1. Graded Approach to Deficiency Tracking and Corrective Action

Priority Planning Grid Value	Priority Actions	Enter Into HSADB [4]	Corrective Action[1]					Reporting
			Root Cause Analysis		Lessons Learned	Close-Out	Follow-Up	Status of Corrective Action
			Minimum[2] Training Reqm'ts	Procedure Documentation Requirements	Evaluation If Conditions Exist Elsewhere	Verification that Action was Completed as Specified By:_____	Verification of Corrective Action Effectiveness	
PPG ≥25	Immediate Action consider Stop Work and Stabilization of Operations Activity. Notify RL PGM Mgr/PGM Office	Yes	At Least One Person In Group Must Have Had 1 Week Formal Training in Root Cause Analysis	Formal Proc. Supported by Detailed Documentation of Methodology Analysis and Results	Review of Site-wide Activities as Applicable	DOE-RL	Yes, by Contractor on Sampling Basis During Scheduled Audits and Surveillances	As Requested by RL Program Office
<25 & ≥11	Prompt Action; Evaluate Acceptability of Continuing Work/Activity	Yes	At Least One Person Must Have Had 1 Day Orientation Course in Root Cause analysis Techs.	Formal Proc. or Reference to Generally Accepted Methodology; Documentation of Conclusions	Review of Affected Plant or Program, as Applicable	Contractor Oversight Organization [5]	None Required [6]	Monthly Status Update in HSADB
<11 & ≥6	Routine Action and Response	No. Entered into RL and/or Contractor Central Database	No Formal Training Reqd. Will Normally be Accomplished Using Simple Methodology & Use of Check List/Logic Tree, as Approp.	If Required by [3] Governing Document, or at Discretion of Cognizant Mgr.	None Required	Actionee Manager, Oversight Organization on Sample Basis	None Required	As Required by Actionee Organization
PPG <6	Routine Action and Response	No. Tracked by Actionee Manager	None Required	None Required	None Required	Actionee Manager	None Required	As Required by Actionee Organization

[1] Action to correct underlying cause and prevent recurrence
[2] Accident investigator (A1) must be employed if required by DOE Order
[3] Some governing documents; e.g., DOE Order 50000.3B, for off-normal occurrences, require a degree of evaluation to determine cause and define corrective action
[4] All conditions are to be entered into a trending database
[5] For DOE-RL initiated items, close out will be by originating organization
[6] A consideration for contractor oversight planning

observed and monitored, and the correlation of causal factors must be done at each field office, recurrences taken into account, and trends established. Taken together, "Personnel" and "Other" issues consistently account for the majority of all coded RPRs. Radiological Control and the actionees have shown improvement in specifying causes and resolving them without need of escalation. This effort is indicated by the less frequent assignment of "Other" as a cause (Figure 3-5-5).

Figure 3-5-4. RPRs by Type

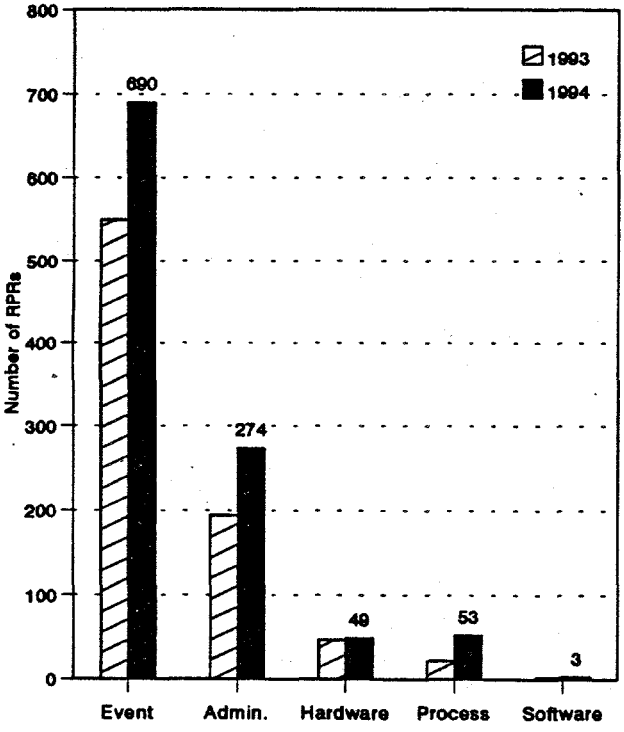
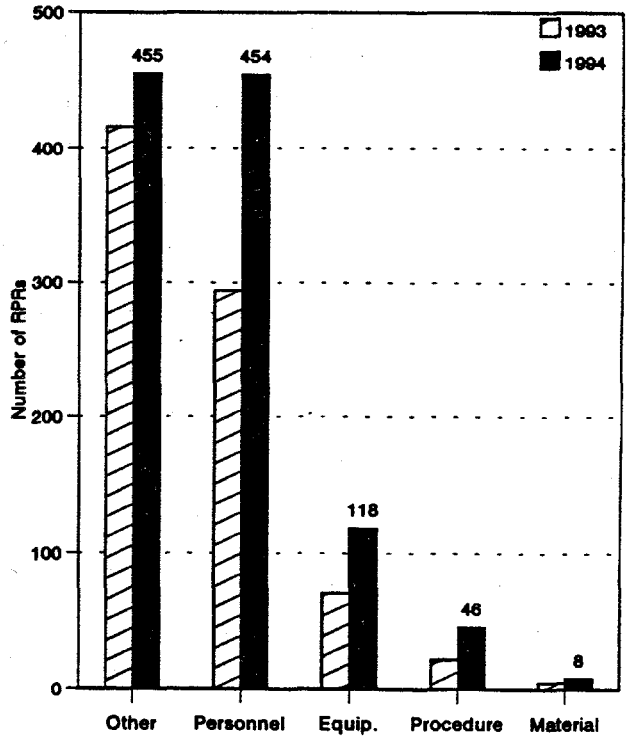


Figure 3-5-5. RPRs by Cause

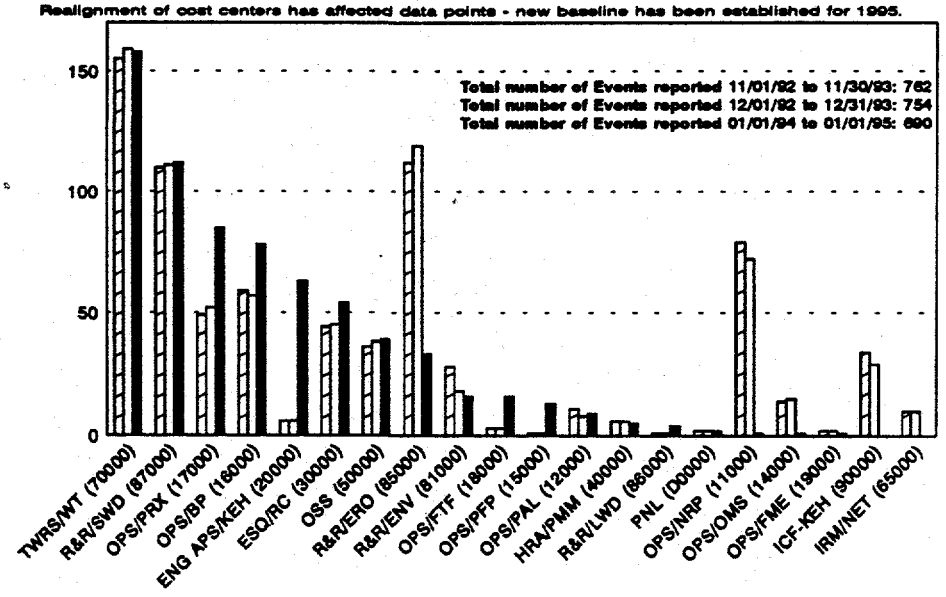


3.5.2.3 Contamination Events. The total number of contamination events reported for December decreased from the September yearly cycle indicator evaluation of 724 to 690 (about 5%). Causes listed for all events include Equipment, Material and Hardware (14%), Personnel Errors (28%), and Procedure. Administrative controls, communication problems and management methods account for 44% of the personnel designated causes, and these numbers are 12% of the overall total for the December cycle. Lack of attention accounted for 19% of personnel related causes and not following procedures accounted for 21% of that same group. Training was listed as an 8% causal factor during this cycle evaluation of all contamination event cases listed.

The data for the Other cause category (57%) indicate that the largest number of causes reported in the December cycle are of the Unknown category (66% of the Unknown contamination event cause types). Trending of the location and frequency of these incidents allows Radiological Control to monitor for solutions to the problems and to provide a more accurate designation of causal factors.

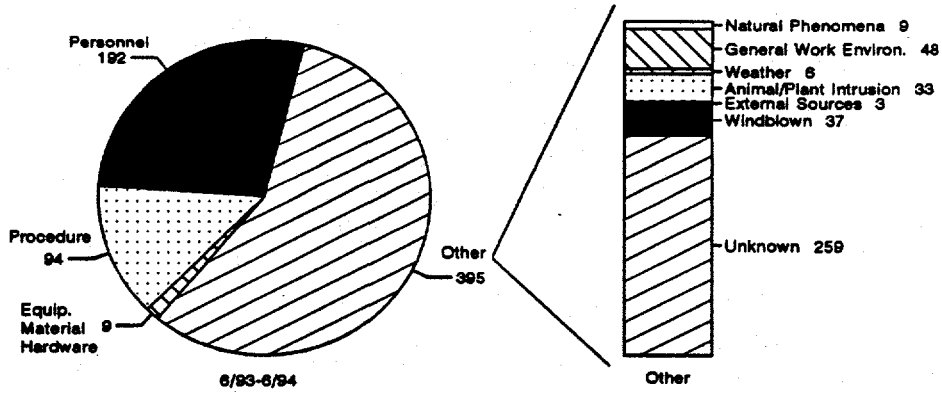
Of the designated categories where personnel issues account for 28% of the events listed, personnel issues, equipment, material, hardware and processes are situations that can be remedied and controlled. Those numbers continue to remain lower than the broader grouping of the Other category. See Figure 3-5-6 for actionee organizations of RPR contamination events and Figure 3-5-7 for reported causes for RPR contamination events.

Figure 3-5-6. RPR Contamination Events - Actionee Organizations (Yearly Cycles)



	TWRS/WT (70000)	R&R/SWD (87000)	OPS/PRX (17000)	OPS/BP (16000)	ENG APS/KEH (20000)	ESQ/RC (30000)	OSS (50000)	R&R/ERO (85000)	R&R/ENV (81000)	OPS/FTF (18000)	OPS/PFP (15000)	OPS/PAL (12000)	HRA/PMM (40000)	R&R/LWD (86000)	PNL (D0000)	OPS/NRP (11000)	OPS/OMS (14000)	OPS/FME (19000)	ICF-KEH (90000)	IRM/NET (65000)
11/92-11/93	155	110	49	59	6	44	36	112	28	3	1	11	6	1	2	79	14	2	34	10
12/92/12/93	159	111	52	57	6	45	38	119	18	3	1	8	6	1	2	72	15	2	29	10
01/94-01/95	158	112	85	78	63	54	39	33	16	16	13	9	5	4	2	1	1	1	0	0

Figure 3-5-7. RPR Contamination Events
Reported Causes

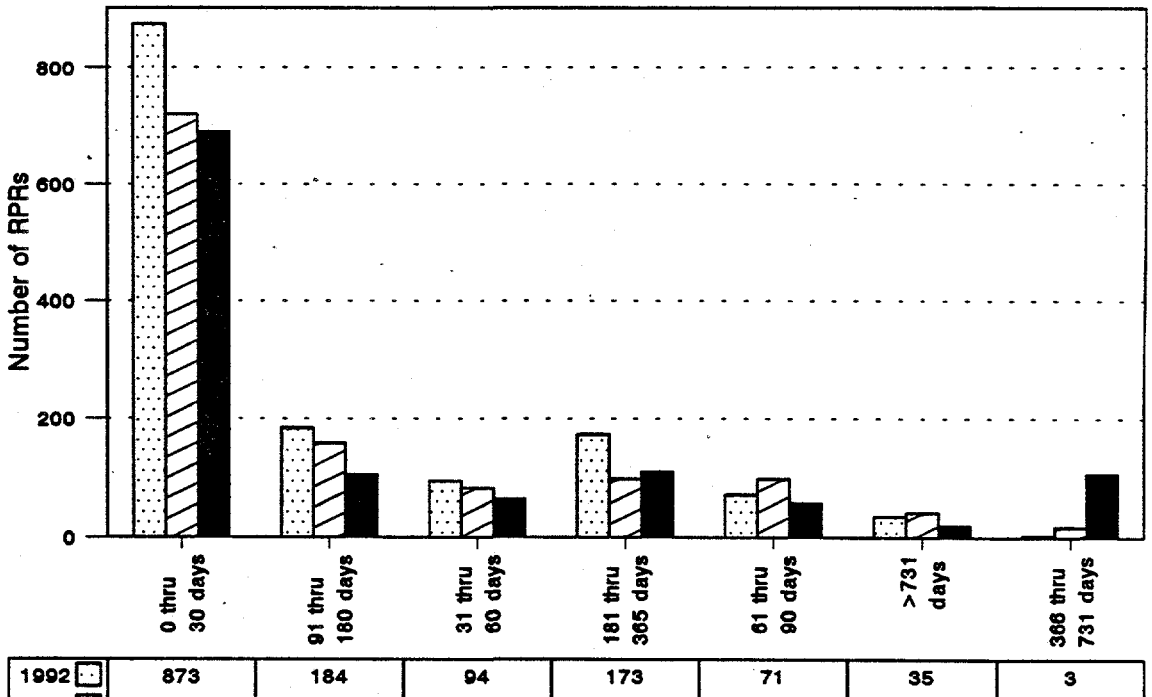


Period	Other	Personnel	Equip.,Mat'l., Hardware	Procedure
6/93-6/94	519	160	82	5
9/93-9/94	483	169	68	4
12/93-12/94	395	192	94	9

3.5.3 Average Time to Close an RPR

There were 1,154 RPRs closed during the fourth quarter compared to 1,214 closed during the fourth quarter of 1993; a variance of about -5% in closure activity. Most RPRs are closed during the 0 to 30-day time frame (41% in 1993 and 60% in 1994) with the balance following closure through two years. Most RPRs are closed within the first six months (79% in 1993; 75% in 1994). Those that have been open longer than a year are currently being worked and extensions have been requested in order to complete them adequately. Efforts remain underway to resolve these issues and allow closure of the RPRs (Figure 3-5-8).

Figure 3-5-8. Age of RPRs Closing During Third Quarter of 1994 - All Organizations

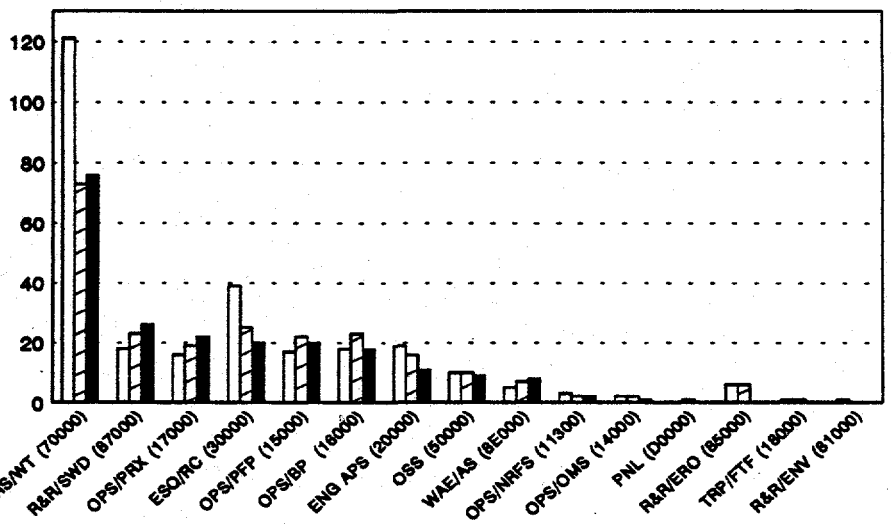


	0 thru 30 days	91 thru 180 days	31 thru 60 days	181 thru 365 days	61 thru 90 days	>731 days	366 thru 731 days
1992	873	184	94	173	71	35	3
1993	720	158	82	98	98	41	17
1994	691	106	64	110	57	19	107

RPR Closure Time in Days

3.5.3.1 Open RPRs. There were 214 RPRs open at the end of December 1994; a decrease of about 20% from January 1994. On an annual basis, about 6% of open RPRs have been open longer than six months. See Figure 3-5-9 for the break-down of open RPRs by organizational code.

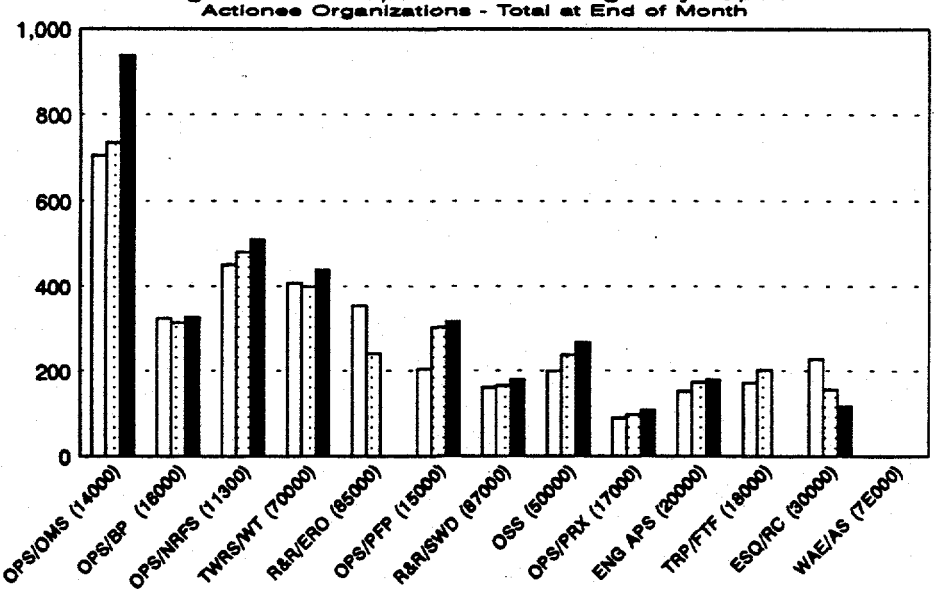
Figure 3-5-9. Open RPRs
Actionee Organizations for Period Ending 12/30/94



October	121	18	16	39	17	18	19	10	5	3	2	0	6	1	1
November	73	23	19	25	22	23	16	10	7	2	2	1	6	1	0
December	76	26	22	20	20	18	11	9	8	2	1	0	0	0	0

3.5.3.2 RPR Average Days Open. Radiological Control continues to work with the actionees to close out the older RPRs. The rest have extended committed completion dates due this year. Of the delinquent RPRs that have been prioritized, the average range is below 6 on the priority grid. (Figures 3-5-9 and Figure 3-5-10).

Figure 3-5-10. Open RPRs - Average Days Open
Actionee Organizations - Total at End of Month



October	705	324	451	408	354	204	161	200	88	152	172	229	0
November	735	314	481	400	241	303	165	238	96	174	202	156	0
December	938	326	511	439	0	316	180	268	108	180	0	117	0

3.6 DOSIMETRY

The WHC Dosimetry organization administers the dosimetry system that measures and records various types of external and internal radiation exposures occurring in WHC-managed facilities. All record and supplemental dosimeters for WHC, BCSR, ICF KH, and DOE, all of their visitors, subcontractors, vendors and tour participants are issued and processed by the Dosimetry Group. These dosimeter data are recorded and reported as required.

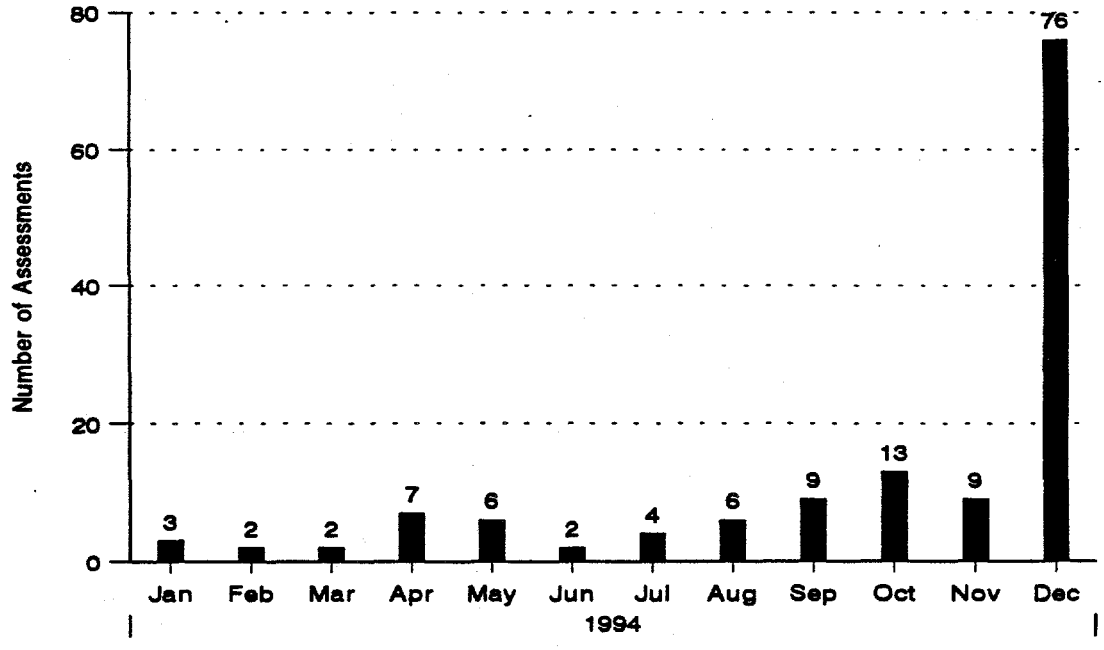
The Dosimetry organization is responsible for tracking and monitoring declared pregnant workers, conducting monthly dosimeter audits and status reports, and in vivo and in vitro scheduling and reporting. To ensure exposures are kept ALARA, the Dosimetry Group performs daily exposure checks and audits, provides the ALARA Program Office with daily input on exposures, and provides an ongoing history for tracking employees from date of hire to date of termination.

Dosimeters are no longer required for everyone onsite. Employees' need and desire of dosimeters have been reviewed and many are now on an "N" (no dosimeter) frequency exchange.

At the end of December, Dosimetry was monitoring seven pregnant workers monthly. The highest dose received by a pregnant worker was 20 mrem. Work restrictions were issued for nonreturn of 528 dosimeters and 48 finger rings.

Estimates and investigations of dosimeter results are performed when Dosimetry is notified of a lost or damaged dosimeter. The results of these investigations are sent to PNL to be included in the employee's record radiation exposure file. The December total is high due to the year-end closeout (Figure 3-6-1).

Figure 3-6-1. Dose Assessments Performed for Lost or Damaged Dosimeters
(Does not include assessments performed to close work restrictions issued for late dosimeter returns.)



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CONTENTS

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Appendix A-1. CY 1994 ALARA Sitewide Goals		
No.	Goal	ECD
1.	Evaluate and revise where necessary the WHC-CM-4-11, ALARA Program Manual, to reflect the enhanced ALARA philosophy of including non-radiological and radiological issues in the ALARA process. Ensure compliance with DOE policies, standards, and guidelines that pertain to ALARA, health, and safety requirements. Actionee: ALARA Program Office Analysis of Performance: The ALARA Program Manual, WHC-CM-4-11, has undergone a complete revision during CY 1994. The rewrite is being completed with the focus on 10 CFR 835, "Implementation Guide for Occupational ALARA Programs," and will be completed in the form of an internal publication (IP-1043). This goal was not completed as scheduled, but is expected to be completed in early 1995.	10/31/94 Open
2.	The ALARA Program Office will provide quarterly ALARA training, utilizing the hands-on instruction approach, as applicable, for ALARA Council and ALARA Committee members. This training will focus on radiological and non-radiological ALARA issues in an effort to expand the awareness of WHC employees to ALARA principles. Actionee: ALARA Program Office Analysis of Performance: Quarterly training has been provided during each quarter of CY 1994. Detailed information is provided in section 1.5 of this publication.	12/31/94 Complete
3.	Implement an electronic database system to document and compile examples of corrective actions and lessons learned utilizing ALARA Program documentation. This database will be available to share between WHC organizations in order to assist in ALARA reviews and work-plan preparation. Actionee: ALARA Program Office and ALARA Council Analysis of Performance: The ALARA Program Office identified the Search Hanford Accessible Reports Electronically (SHARE) database to accomplish the task of re-distributing lessons learned and corrective actions from completed jobs. ALARA users are currently utilizing this database in creating new work package. Due to the successes of this database, inquiries have been made from other contractors regarding the potential of their utilization of this type of database. Efforts are being made to integrate this system for their use.	08/31/94 Complete
4.	Develop a course to instruct cognizant engineers, persons-in-charge (PIC), planners, schedulers, and/or personnel completing ALARA documentation in applications of ALARA methodology. Actionee: ALARA Program Office and Technical Training Analysis of Performance: The ALARA Program Office and Technical Training have combined their efforts in designing the necessary curriculum for this course. C. P. Lesperance was assigned the lead in this project. The final lesson plan for this course was approved in December and focuses on articles 652 & 653 from the HSRCM.	12/31/94 Complete

Appendix A-1. CY 1994 ALARA Sitewide Goals		
No.	Goal	ECD
5.	Evaluate the feasibility of integrating the ALARA Program with other existing safety programs, i.e, Accident Prevention Council, Safety Observer, and Waste Minimization. Conduct meetings with each applicable facility/organization to review and evaluate the utilization of this integrated approach. Actionee: ALARA/CCIP Program Office Analysis of Performance: The ALARA and CCIP programs were integrated into one program with the focus on improving implementation of both programs. Seven of the current facility specific ALARA Committees have integrated other safety programs into their committees. The integration of several existing safety program into one group has been beneficial. All ALARA Committee chairpersons have been encouraged to evaluate this integration for possible benefit.	06/30/94 Complete
6.	Redesign the ALARA recognition program to provide accomplishment awards for exceptional ALARA performance by personnel, organizations, and/or committees. Integrate this revision, as applicable, into the WHC-CM-4-11, ALARA Program Manual rewrite. Actionee: ALARA Program Office and ALARA Council Analysis of Performance: The ALARA Recognition Program has been redesigned to include merit based recognition awards for personnel that demonstrate commitment to the ALARA process in meeting the objective of managing and controlling exposures to the work force and and to the general public.	06/30/94 Complete
7.	Perform, complete, and compile biannual ALARA Self-Assessments. Evaluate non-radiological and radiological issues during the assessment cycle. These assessments will be completed and the results published in the first and third quarter WHC Health & Safety Performance Report. Revised: Perform, complete, and compile ALARA Self-Assessments. Evaluate non-radiological and radiological issues during this assessment. This assessment will be completed and the results published in the first quarter WHC Health & Safety Performance Report. Actionee: ALARA Program Office and ALARA Council Analysis of Performance: ALARA self-assessments will be replaced with the rewrite of the ALARA Program Manual and be formalized as a section titled, "Internal ALARA Program Reviews and Radiological Work Practice Assessments." ALARA Assessments were completed of work practices throughout WHC. As a part of these assessment, there were letters issued providing a detailed status of methods to improve the field implementation of ALARA.	10/31/94 Complete

Appendix A-1. CY 1994 ALARA Sitewide Goals		
No.	Goal	ECD
8.	Promote the reduction of radiological areas at WHC by 4,280,000 square feet in support of CCIP. Revised: Promote the reduction of radiological areas at WHC by 8,570,503 square feet in support of the CCIP. Actionee: ALARA/CCIP Program Office Analysis of Performance: As of October 1, 1994, 8,608,611 ft.^{2} of reductions have been documented sitewide. The process for contaminated area reduction via the ALARA/CCIP Program Office and the facility ALARA Committees followed the goal formation process as defined in section 8 of the ALARA Program Manual, WHC-CM-4-11. Each ALARA Committee, as a part of their yearly goal package, developed reduction targets for outdoor and/or indoor contaminated areas to be reported in square footage. The facility targets were either a reduction in severity, such as downposting a Surface Contamination Area (SCA) to an Radiological Control Area (RCA), or a reduction in size, such as free releasing a RCA or other posted area. The facility ALARA Committee goals were then rolled up to form a WHC sitewide ALARA/CCIP contaminated area reduction goal for this reporting year. Lessons Learned: CY 1994 was the first time a sitewide reduction goal had been attempted and the following lessons learned resulted: a) The majority of the facility ALARA Committees formed their goals on a calendar year basis while a few were, at least for the reduction goal, were on a fiscal year basis. This led to some challenges in both the planning and reporting of the sitewide reduction goal. The ALARA/CCIP Program Office have addressed these challenges by implementing fiscal year planning for ALARA goals via the rewrite to the ALARA Program Manual. b) CCIP data collection and reporting process have been solely a Health Physics function up to this point. Using the ALARA Committees to establish reduction goals made it evident that the CCIP point of contact at each facility should be part of the facility specific ALARA Committees. This has also been addressed in the ALARA Program Manual change.	12/31/94 Complete
9.	Develop functions, qualification standards, and training requirements for ALARA Committee chairpersons. Actionee: ALARA Program Office Analysis of Performance: The criteria has been established and is currently available. This information is also part of the ALARA Program Manual revision.	06/30/94 Complete

Appendix A-1. CY 1994 ALARA Sitewide Goals		
No.	Goal	ECD
10.	Prepare and issue a sitewide listing of tools developed and used to implement the ALARA Program at WHC. This listing shall include, but not be limited to, items such as signs, training aids, postings, equipment, etc.). Actionee: ALARA Program Office and ALARA Facility/Organizational Committees Analysis of Performance: The ALARA/CCIP Program Office prepared a list of "tools" that can be used to reduce radiation exposure and limit the spread of contamination. This listing will be made available soon to all facilities and then upgraded periodically. It includes sketches of containments available through "stores," lists of vendors that sell products/services, and detailed information on engineered controls for radiological work.	09/30/94 Complete
11.	Promote the completion of "Facility Condition Update Reports" to support compiling asbestos inventories per the Hanford Site Asbestos Abatement Plan (WHC-EP-0390, Rev.1) through the use of facility-specific ALARA Committees. Status accomplishment in the Health & Safety Performance Report quarterly. Revised: Promote the completion of "Facility Condition Update Report" to support compiling asbestos inventories per the Hanford Site Asbestos Abatement Plan (WHC-EP-0390 Rev.1) through the use of facility-specific ALARA Committees. Status the accomplishments in the Fourth Quarter Health & Safety Performance Report. Actionee: ALARA Program Office and B. S. Mewes Analysis of Performance: The Facility Condition Update Report was compiled and completed during CY 1994. The targeted asbestos inventories were provided with assistance from the individual facility/organization ALARA Committees.	12/31/94 Complete
12.	Provide monthly "ALARA Accomplishment" articles to the Hanford Reach promoting non-radiological and radiological elements of the ALARA Program. The ALARA Program Office will compile examples submitted by the committees and select appropriate topics to be submitted to the Hanford Reach. Actionee: ALARA Program Office and ALARA Council Analysis of Performance: During 1994, there were 34 ALARA sponsored articles published in the Hanford Reach. These articles promoted management and control of exposures through applied ALARA principles and practices across the site. Included in these articles was information on ALARA/CCIP integration, new ALARA/CCIP methodologies and techniques, as well as information on ALARA-sponsored vendor demonstrations.	12/31/94 Complete
13.	Demonstrate that WHC is actively managing personnel radiological exposure by formally documenting the results of exposure investigations from the "ALARA Tracking and Management System" Section in the WHC Quarterly Health & Safety Performance Report. Actionee: ALARA Program Office Analysis of Performance: This information has been provided in each quarters Health & Safety Performance Report published in CY 1994.	12/31/94 Complete

Appendix A-1. CY 1994 ALARA Sitewide Goals		
No.	Goal	ECD
14.	Establish, status, and communicate timely completions of company-level and facility/organizational CY 1994 ALARA goals. Performance indicators relative to these goals will be published quarterly in the ALARA section of the Quarterly Health & Safety Performance Report. Actionee: ALARA Program Office and ALARA Committees. Analysis of Performance: Appendix A provides detailed information on WHC Sitewide ALARA goals. Section 1.1.2 discusses facility/organizational specific ALARA goals.	12/31/94 Complete
15.	Provide "ALARA Accomplishment" information for distribution on the Health & Safety Bulletin Board on a quarterly basis. Actionee: ALARA Program Office Analysis of Performance: Information has been submitted to the Health & Safety Bulletin Board on a quarterly basis throughout CY 1994. It is anticipated that this will be a common practice based on the amount of information relating to the Health Physics organization being generated from the ALARA Program.	12/31/94 Complete
16.	Compile and issue to DOE-RL the fiscal year (FY) 1995 ALARA Goals Report. Actionee: ALARA Program Office. Analysis of Performance: This goal was completed on November 22, 1994, a week ahead of schedule. At the request of RL, there will be revisions to the initial goals submitted, to include adding more "qualitative and/or quantitative" features to the ALARA goals.	11/30/94 Complete
17.	New: Maintain the number of skin contamination at 0 significant, and not more than 28 cumulative skin contaminations occurring in WHC-managed facilities/operations. Actionee: ALARA Program Office and ALARA Council Analysis of Performance: Throughout CY 1994, there were 0 significant and 27 cumulative skin contaminations that occurred in WHC-managed facilities/operations. See section 3.4 for further information relating to this goal.	12/31/94 Complete
18.	New: Maintain the CY 1994 annual cumulative radiological exposure goal for radiation workers (monitored with a multipurpose dosimeter) in WHC-managed facilities/operations at less than 140 person-rem. Actionee: ALARA Program Office and ALARA Council Analysis of Performance: This goal was not achieved. The annual cumulative exposure for radiological workers for CY 1994 was 155 person-rem. The inclusion of ICF KH exposure and an increase in work, mainly at PFP, were contributing factors in not attaining this goal.	12/31/94 Complete
19.	New: Maintain the number of personal clothing contaminations occurring in WHC-managed facilities/operations for CY 1994 at less than 73. Actionee: ALARA Program Office and ALARA Council Analysis of Performance: Throughout CY 1994, there were 66 personal clothing contaminations that occurred in WHC-managed facilities/operations. Due to the relatively short time WHC has been tracking clothing contaminations it is difficult to establish effective goals in this area. See section 3.4 for further information relating to this goal.	12/31/94 Complete

Appendix A-1. FY 1995 WHC ALARA Sitewide Goals		
No.	Goal	ECD
1.	Administer a written system to alert line management of individuals approaching exposure administrative control guidelines. Data output reports will be disseminated so that adverse radiological trends can be readily identified and corrected, as necessary. Champion: APO/ALARA Committees Analysis of Performance: A review of the current ALARA Tracking and Management System (ATAMS) has been initiated with a focus on improving and streamlining the process to ensure it is as "user friendly" as possible.	09/30/95 Open
2.	Develop a system by which materials for employee training and retraining incorporate lessons learned from the corrective actions listed in the radiological occurrence reports and Post ALARA Reviews. Champion: APO/ALARA Council Analysis of Performance: Don Gardner has been assigned as a training liaison between Radiological Control and the Training organizations. Technical reviews of ALARA/CCIP related training materials, by the ALARA/CCIP Program Office, assist in ensuring that lessons learned and corrective actions are incorporated into employee training and retraining.	12/31/94 Complete
3.	Develop and implement an employee "ALARA recognition program" to reward workers that demonstrate an increased consciousness towards reducing their exposure and the spread of radioactive contamination. Champion: APO/ALARA Council Analysis of Performance: The WHC ALARA Recognition Program has completed a new purpose statement which includes recognizing and rewarding employees and teams that meet or exceed the established safety performance criteria. The recognition program includes awards in three categories: ALARA Committee Chairpersons, Individual/Group, and On-the-Spot recognition. Awards are issued for the effective application of ALARA practices and principles in maintaining exposures well below regulatory limits.	12/31/94 Complete
4.	Further integrate ALARA Program/Radiological Engineering support and methodology within facilities by continuing to provide information at both the operational and field levels. Champion: APO/Radiological Engineering Analysis of Performance: The ALARA/CCIP Program Office has added a Senior Health Physicist to its staff to assist in the field application of ALARA. As a result of this addition, the field implementation and operational successes of ALARA are on the increase.	09/30/95

Appendix A-1. FY 1995 WHC ALARA Sitewide Goals		
No.	Goal	ECD
5.	Each ALARA Committee shall identify or develop a system to review, evaluate, and implement applicable ALARA suggestions. Champion: APO/ALARA Committees Analysis of Performance: The majority of the facilities have identified a method to review, evaluate, and implement ALARA suggestions, as applicable. The methods will be formally documented during the revisions to their controlling ALARA manuals.	09/30/95
6.	Coordinate and sponsor an ALARA Workshop during FY 1995. Champion: APO/ALARA Council Analysis of Performance: Due to budgetary constraints, the ALARA Workshop will not be held as an exclusive training session. However, it will be conducted as a part of the Hanford Health and Safety Exposition that is scheduled to be completed in early CY 1995.	09/30/95
7.	The WHC ALARA Program will be reviewed to ensure compliance with Title 10, Code of Federal Regulations, Part 835, "Occupational ALARA Program" expectations. This shall include a review of the site programs technical content and applicability. Champion: APO Analysis of Performance: A review of the WHC ALARA Program is currently underway. It is anticipated that this review will be completed prior to the issuance of the WHC ALARA Program Manual, WHC-IP-1043.	09/30/95
8.	Develop a training package that covers the changes in the WHC ALARA Program resulting from the changes in the WHC ALARA Program Manual. Champion: APO Analysis of Performance: Progress is currently being made to revise training on all of the ALARA documentation. The focus of these training sessions will be directed toward making the ALARA processes "user friendly" and implementing only "value added" processes.	09/30/95
9.	Evaluate the necessity of developing a charter for the Hanford ALARA Forum. Champion: APO Analysis of Performance: Initial indications are that the Hanford ALARA Forum may be combined with another group. Evaluations are continuing to determine if there is another group that will address the mission of the Hanford ALARA Forum.	03/31/95

Appendix A-1. FY 1995 WHC ALARA Sitewide Goals		
No.	Goal	ECD
10.	Develop and/or revise the facility/organizational specific ALARA implementing procedure or plan (per the requirements of WHC-IP-1043) for each WHC ALARA Committee. Champion: APO/ALARA Committees Analysis of Performance: The suggested format and contents have been determined and an implementation plan will be designed after WHC-IP-1043 is issued.	09/30/95
11.	Maintain the number of skin contamination at 0 significant (< or = 1% of DOE dose limit), and not more than 29 cumulative skin contaminations occurring during FY 1995 at WHC-managed facilities/operations. Champion: APO/ALARA Committees Analysis of Performance: Through the first quarter of FY 1995 there were five cumulative skin contaminations.	09/30/95
12.	Maintain the FY 1995 annual cumulative radiological exposure for radiation workers (monitored with a Hanford standard dosimeter) at WHC-managed facilities/operations at less than 136 person-rem. Champion: APO/ALARA Committees Analysis of Performance: A total of 39 person-rem was received during the first quarter of FY 1995.	09/30/95
13.	Maintain the number of personal effects clothing contaminations occurring at WHC-managed facilities/operations for FY 1995 at 73 or less. Champion: APO/ALARA Committees Analysis of Performance: Through the first quarter of FY 1995 there were 16 cumulative clothing contaminations.	09/30/95
14.	Promote the reduction of radiological areas at WHC-managed facilities/operations by a minimum of 274,699.08 sq. meters (2,956,933 sq. feet), in support of the Contamination Control Improvement Project. Champion: APO/ALARA Committees Analysis of Performance: Through the first quarter of FY 1995 over 1.8 million square feet of radiological area was reduced/downgraded.	09/30/95
15.	Perform a quarterly review and evaluation of exposure tracking reports and skin/personnel contamination incidents, for potential trends. If trends are noted that are correctable, utilize the DORITE process to correct these issues. Champion: APO/ALARA Council Analysis of Performance: This initial review resulted in baselining activities, which included revising the root cause of several of the recorded skin/clothing contamination. The statistics that are available have not indicated any trends that the DORITE process can address.	09/30/95

Appendix B-1

Resources

Listed below are a variety of resources available to assist in the injury/illness prevention effort.

WHC Field Safety Offices - Staff members are available to assist the line manager and Safety Awareness and Performance accident investigators with occupational injury/illness investigations. The staff members will also assist with hazard evaluations, review of work practices, and safety meetings. To request assistance, contact one of the following field safety points-of-contact.

- Analytical and Environmental Safety - 372-3102
- Solid Waste Safety - 372-2991
- Tank Waste Remediation Systems Safety - 372-2481
- Spent Nuclear Fuel Safety - 373-4188
- PFP Safety - 373-5311
- PUREX/B-Plant Safety - 373-2643
- FFTF/Fuel Facility Safety - 376-0399
- Safety Operations Support - 372-2598

WHC Safety Awareness and Performance (SA&P) Group - This organization can provide the following:

- Occupational Injury/Illness Investigations - Accident Investigators are available to assist with investigation and OSHA recordability determination. To request assistance, contact 376-9146, 376-2354, or 376-9003.

- Occupational Injury/Illness Information - To receive more information on the following, contact 376-9149.
  - WHC Occupational Injury/Illness Report - A report that is provided weekly on Soft Reporting which is sorted by organization code or facility.
  - Daily Report of WHC Occupational Injuries/Illnesses via cc:mail.
  - President's Accident Prevention Committee (PAPC) - Information that is provided to the PAPC.

- Safety Meeting Materials - Many resources are available through the Safety Resource Center to assist individuals with conducting their safety meetings effectively and to provide information on safety and health topics. Resources available include films, videos, literature, and assistance with individual safety programs. For information on these resources, contact the Safety Resource Center, 376-9059.

- Safety Awareness Programs - For information regarding company wide health and safety awareness programs that have been implemented for prevention of occupational injuries, illnesses and accidents, contact 376-9050.

ALARA - ALARA support is provided for goal development, training and awareness activities. For more information, contact 376-9035.

Appendix B-1 (Continued)

Ergonomics Evaluation - To arrange for an ergonomics evaluation by Hanford Environmental Health Foundation (HEHF) specialists, contact WHC Safety on 376-0194 or 372-3422. Once a diagnosis has been made of the employee's physical problem and the specialist has evaluated the employee's worksite, the specialist will make recommendations. Approximately 4-6 weeks later, a reevaluation is made to determine if corrective actions are beneficial.

Behavioral-Based Safety Training Course is a behavior based approach to safety. The course allows participants to identify barriers to safety, discuss the three elements of a Total Safety Culture, and learn how they can implement seven fundamental principles of the safety process. The course is currently being offered once each month.

- To schedule training, send your request by cc:mail to the Training Registration mailbox. In the cc:mail message, include employee name, payroll #, charge code, name of class, and course code number 020107. Also, if there is a date the employee is not available, include this information in order to avoid rescheduling of the class. Refer Hanford Training Center (376-6736) if they have questions on how to use the cc:mailbox.

- Additional support training for implementation of behavioral-based safety processes is available to Accident Preventions Councils, Safety Teams, or Safety Work Groups. To schedule a class, contact Health and Safety Training (372-3910).

Safety Observer Training This program is designed to assist in the training of employees in the recognition of the basic causes of accidents in the workplace (unsafe acts and unsafe conditions). Program provides 8 hours of initial training, and follow up training on request. For information, contact 372-3910, or 376-0913.

Root Cause Analysis - Attendees of this course develop an understanding of several analysis methods for use in accident investigations. For information on this course, contact DOE-RL Quality Training and Resource Center (QTRC) on 376-7117.

Back Injury Prevention Program - The purpose of this program is to provide employees with the knowledge of proper body mechanics, correct posture, and the importance of maintaining good physical condition to prevent back injury. The reasons for common back injury are discussed, as well as the proper posture and body mechanics. A portion of this program is devoted to a stretching and strengthening session. The requestor has an option of requesting a 15 minute video that emphasizes the above objectives. For information call Health Promotion Services Department, HEHF (376-0655).

Your Healthy Back - This is a four hour course that is offered by QTRC. This class also provides employees with information on what are the common reasons for back injury, and ways to prevent back injuries. A portion of this program is devoted to a stretching and strengthening session. For more information, contact 376-7117.

Supervising to Prevent Back Injuries - This is a five hour course that provides supervisors with information pertaining to the prevention of back injuries in the work place. For more information, contact QTRC (376-7117).

Appendix B-1 (Continued)

Hearing Conservation - This one hour course provides an explanation of the physiology of the ear, the effects of noise, the hearing conservation program, and information about hearing protection. This information is followed by an overview of each Hanford Contractor's Hearing Prevention program. For more information, contact QTRC (376-7117).

Wellness Seminars - Wellness seminars are available by HEHF Occupational Health professionals for delivery at the Hanford site on a request basis to groups of 12 or more employees. These presentations have been designed to promote employee health and safety, increase productivity and well-being, as well as reduce absenteeism. To schedule a particular seminar, managers and supervisors may cc:Mail HEHF Health Promotions mailbox or call HEHF Health Promotion Services at 376-0655. Please schedule your presentations at least three weeks in advance.
Below you will find a brief description of the seminars.

- Adjusting Your Hardware, Maintaining Your Software (60 minutes)

  It isn't just the heavy lifters who are suffering from the day's work; millions of office workers are victims of aches and pains caused by the stress of sitting down - too long, too awkwardly - and more work days are lost from back pain than from any other cause.

  This ergonomics program teaches good posture and optimum comfort at the workstation. Making the proper adjustments at the VDT/computer terminal and learning stretching and relaxation exercises that relieve eye and muscle strain will reduce fatigue, stress, long term injuries and strains and increase comfort and productivity.

  Practical and attractive reference materials will be distributed to all participants.

- Battling Bug Bites (30 minutes)

  This is a presentation on prevention and treatment of insect bites.

- BackUp (2 hours)

  Every job has the potential for creating back problems--even sitting at a desk or driving a car. This session, which is targeted toward the office worker, will provide the essentials for understanding and managing back injuries in the workplace. Participants will gain an understanding of the common causes of back pain and injury, anatomy and physiology of the back, proper body mechanics and back self care. BackUp will instruct employees how to properly perform exercises that can be implemented at the worksite to reduce risk of injury and time loss in the workplace. This presentation is a "hands on" demonstration. Employees will be encouraged to establish a routine exercise plan which will be tracked by the BackUp facilitator. Program participants will ultimately measure the effects of the exercise program pertaining to muscular strength, endurance and flexibility through self-assessments. This is comprehensive and on-going program which will promote a more healthy and productive employee with fewer incidents of back injuries.

Appendix B-1 (Continued)

- Cheers to Your Health (30 minutes)

  The holiday season is for most, the biggest partying time of the year. For many, this involves an increase in alcohol consumption and a greater chance of being involved in an alcohol related accident. "Cheers" is a 30-minute safety program offered between Thanksgiving and the New Year, which promotes safe and sober driving. Participants are 1) presented information on the consequences of drinking and driving, 2) taught how alcohol impacts the body and the mind, 3) educated on how much one can drink and still be a "safe" driver, 4) provided tips on how to drive defensively, and 5) given creative ways to be a responsible party host or hostess. Alcohol-free beverages are made and sampled by participants during the program.

- HIV and Hepatitis B Awareness (30 minutes)

- Understanding and Preventing Heat Stress (60 minutes)

  Under certain conditions, the body may have trouble regulating its temperature. As a result, the body can overheat and suffer from some degree of heat stress. Whether mild, moderate, or severe, heat stress can come on suddenly and be dangerous to your health. This presentation focuses on understanding what heat stress is and what precautions employees can take to avoid the adverse health and safety effects of heat stress.

- Walking Your Way To Fitness (45 minutes)

  Walking is considered by many as the best overall fitness exercise. It requires no cost and can be done at any time, anywhere. This presentation is terrific for walkers and non-walkers alike. The seminar is designed to assist employees to understand the basic fundamentals for a successful fitness program, how to design an individualized walking program, as well as, developing proper walking mechanics. The WalkLife program will be introduced and membership information will be available. (WalkLife is an incentive based walking program designed to enhance employee health and wellness through fitness walking.)

- Be a Better Butter Burner (70 minutes)

  In this easy to understand and humorous video, Covert Bailey explains how aerobic exercise burns fat. His discussions include why, out of shape people have a difficult time losing "fat" and why they gain weight so easily. Solid nutrition principles are taught as he talks about how muscles use sugar and fat molecules for energy. Covert provides practical suggestions for optimal nutrition and weight management. If you need motivation to help you get back on the fitness or healthy eating track, and could benefit from a good laugh while learning, this video would be time well spent. For groups requesting bodyfat analysis during this seminar and/or to allow employees to view the video screen, group size is limited to 20 employees.

Appendix B-1 (Continued)

- Energizing Your Metabolism (70 minutes)

  The only true magic pill for long term weight loss and successful weight maintenance: energizing your metabolism. This presentation considers the ways in which eating behavior, nutrition, and physical activity interface for successful weight control.
- Humor, Risk and Change (60 minutes)

  Is stress taking its toll on your life? Stress doesn't only worsen illness, it can also increase one's chance for illness. There are many ways to keep the effects of different stressors to a minimum. This videotape presentation Humor, Risk and Change, has many virtues, humor among them, but its goal is to help employees excel in a changing and risk-filled world. Employees will be informed on how laughter can be a secret ingredient to help manage stress in the workplace and to handle the curveballs life will inevitably throw one's way.

- Low Fat Feasting (45 minutes)

  If you're in need of losing unwanted pounds or wish to improve the health status of your heart, then living a low fat lifestyle is the answer. This isn't a diet or deprivation seminar, but rather one which encourages eating real food that is both delicious and healthy. During this 45 minutes talk, we'll discuss why fats make us fat, learn how fats affect our health, and discover the difference between a "good" fat and a "bad" fat. Employees will receive tips to help cook and shop the low fat, high taste way and help in setting "heart-smart" goals, which embrace improved health through low fat feasting.

- Seasonal Self Care (30 minutes)

  One of the greatest causes of poor health in this nation is that most Americans neglect and surrender to others the responsibility of their own health. Although self care is our oldest form of medicine, many self care remedies in the past were based on superstition and folklore. Fortunately, today we have a better understanding of what's going on inside the body. Modern self care approaches can offer relief from symptom discomfort while supporting the body's efforts to heal itself. This presentation focuses on teaching simple, effective self-care techniques and assist employees in feeling more confident about how they are helping their bodies feel better and heal more quickly.

- Stick-To-It Program (30 minutes)

  The Sagebrush Games promote health awareness by encouraging individuals to practice healthy lifestyles through participation in over 40 fitness and recreational events. The Stick-To-It program is a key event of the Sagebrush Games which encourages employee's and their families to engage in a healthy lifestyle change.

  The Stick-To-It book is an educational and awareness tool that will help employees begin practicing a lifestyle change such as weight management, activity, smoking cessation or health and safety awareness (with stress management) and to better understand the benefits received from living a healthy lifestyle.

Appendix B-2 CY 1994 Fourth Quarter Recordable Government Vehicle Accidents			
Date	$ Amount	Area	Description of Accident
10/12/94	$1,586.	Gas Pump Island/1100 Area	A temporary barricade was set up South of the gas pump island. After cleaning windows, mirrors, and lights, employee entered government vehicle. The employee turned vehicle slightly to the left to avoid the barricade. The vehicle struck a post on the Southeast corner of the raised pump island. CAIRS Case Number 94-019 Westinghouse Hanford Services [7509004]

Appendix B-3 CY 1994 Fourth Quarter Non-Fire Damage Losses of $1,000 or Greater (Does not include moving government vehicle accidents)			
Date	$ Amount	Area/Building	Description of Event
10/11/94	$1,065	Government Vehicle Parked/ Unoccupied	A government truck was parked in 1171 Bldg. Equipment Repair Shop parking lot awaiting parts for service and repair. The vehicle damage was discovered after the vehicle had been serviced and returned to 400 Area Fire Station. Damage was traced back to 1171 parking lot. The vehicle was parked in the lot on 9/12/94, and picked up on 10/11/94. Cause of the damage is unknown. There was a large construction project in the immediate area. (As vehicle was parked/unoccupied, this is considered a property damage loss.) CAIRS Case Number 94-021 Westinghouse Hanford Services [7509004]

Appendix B-3
CY 1994 Fourth Quarter Non-Fire Damage Losses of $1,000 or Greater
(Does not include moving government vehicle accidents)

Date	$ Amount	Area/Building	Description of Event
10/26/94	$1,559	272AW Maintenance Parking Lot/200E Area	Tank Farm Operations was demonstrating the use of a containment tent in an open area West of the 272AW Parking Lot/200E Area. The containment tent was set up to demonstrate use of the tent. A strong gust of wind caught the tent, and it kited across the open area and struck a properly parked/unoccupied government pickup. (As vehicle was parked/unoccupied, this is considered a property damage loss.) CAIRS Case Number 94-026 Westinghouse Hanford Services [7509004]
11/16/94	$2,830	284W Bldg./ 200W Area	On 11/16/1994, at approximately 0930 hours, the operator of a track-hoe, with the aid of a spotter, was positioning the unit to begin trenching activities. Once the track-hoe was in position, the operator checked the counterweight swing in relationship to the MO-240 trailer, located near the rear of the track-hoe. After successfully completing the check, the spotter left. After the spotter left, the operator re-positioned the track-hoe closer to the area of excavation. Once re-positioned, the operator was in the process of conducting a "quick second check" of the counterweight swing when the arm of the track-hoe struck a power pole, breaking the pole. CAIRS Case Number 94-022 Westinghouse Hanford Services [7509004]

Appendix B-3
CY 1994 Fourth Quarter Non-Fire Damage Losses of $1,000 or Greater
(Does not include moving government vehicle accidents)

Date	$ Amount	Area/Building	Description of Event
12/04/94	As of 01/20/95, an initial dollar loss amount has not been established	B3S4 Substation/300 Area	At 2132 hours, on 12/04/94, an electrical power outage occurred in the 300 Area. Concurrently an electrical fault was identified in vault R122V in the B3S4 Substation yard. Approximately twenty facilities were affected by the outage. Power was restored at 2318 hours to all facilities. There was no personnel injury or damage to the facility as a result of this incident. A Type B Accident Investigation is in progress to determine the causes of the loss. As of 01/20/95, an initial dollar loss amount has not been established. Once an estimate has been made, a DOE CAIRS report will be submitted. (Refer to Unusual Occurrence Report RL-WHC-KHELEC-1994-0018)
12/07/94	$33,424	284W Bldg./ 200W Area	At approximately 1530 hours on, an ICF KH subcontractor ruptured a 12" sanitary water line North of the 284W boilerhouse while excavating for a new pipeline. Two water lines had been located, but not identified. The third water line is the line that was ruptured. The water line was broken by a track-hoe digging into the pipe. ICF KH Construction forces initiated repair work. CAIRS Case Number 94-023 Westinghouse Hanford Services [7509004]
12/14/94	$2,450	600 Area	At approximately 1520, a WHC subcontractor working on decommissioning wells in the 600 Area struck a power pole with a truck. The power pole is located 1/4 mile west of the Gable Mountain Storage Bunker (213J). There was no disruption of electrical power, however the pole required replacement. There was no personnel injury. CAIRS Case Number 94-027 Westinghouse Hanford Services [7509004]

APPENDIX C-1

Radiological Control Program Accomplishments

The following information has been categorized into ten "functional areas" in order to provide an itemized look at the overall organizational accomplishments. ALARA accomplishments are reported in Section 1, "ALARA."

- **Organization and Administration**

  - The WHC Radiological Control Program achieved a significant accomplishment with the submittal of the RPP, as required by 10 CFR 835, to RL. The RPP, combined with the validation and verification process, provides an accurate assessment of the program requirements to implement 10 CFR 835. This closes milestone RAD-95-016.

  - A. L. Trego and the other Hanford Site senior executives signed the Hanford Site Radiological Control Manual (HSRCM). In conjunction with the distribution of this manual, the WHC-CM-1-6, *WHC Radiological Control* Manual, is being recalled.

  - An interpretation of RCM Article 775 has been provided to WHC Radiological Control by DOE-HQ which will result in a $250K cost savings. Clarification was needed on the degree of physical protection needed for radiological records. As it turned out, the $250K reserved for the purchase of new 2 hour fire resistance rated cabinets to store radiological records was not warranted. This will result in a "Challenge 170" savings.

  - By agreement between RL and WHC Radiological Control, a Class I change request was initiated to change the due date for the Yearly Report of Compliance to the Hanford Site Radiological Control Manual to February 28, 1995.

  - The first Bi-monthly Program review was conducted for RL on November 30, 1994. This completes milestone RAD-95-004.

  - Two compliance issues related to HSRCM-1 were processed. One exemption, dealing with an ALARA concern, related to labelling Special Nuclear Material, and one Technical equivalency determination, dealing with color requirements for radiological area boundary markers, are being pursued as the best method of achieving full compliance.

  - The validation and verification process for 10 CFR 835 compliance is proceeding. Seventeen separate facility and program baseline validation packages are complete. These assessments address all radiological activities conducted by WHC. The validation process has identified that 64 out of 234 requirements per 10 CFR 835 are implemented through the PNL site services contract. The final audit of the site services contract will not be completed until April of 1995. WHC will not claim full compliance with any of these requirements until the assessment is complete.

  - WHC will coordinate with ICF KH to ensure that activities conducted at all ICF KH-operated facilities under subcontract to WHC are in full compliance with the WHC approved RPP by January 1, 1996.

  - WHC is requesting an exemption to 10 CFR 835 §835.404(b). The request asks that the terminology "prevent the inadvertent transfer of removable contamination..." be modified to "reduce to as low as is reasonably achievable the inadvertent transfer of removable contamination..." WHC will not claim compliance with any of these requirements until the assessment is complete.

- The Radiological Control Program is being reviewed for cost savings and manpower cuts to meet "Challenge 170" goals. Class one change requests will be initiated for funding, manpower and reduction of work scope to meet the cost reduction goals. Preliminary reviews indicate that several areas could report significant savings.

- An ECCEL proposal for consolidation of WHC and ICF KH Radiological Control Organizations was approved by the DOE resulting in a $770K hard-dollar savings.

- **Records and Reports**

  - An in-depth evaluation of Radiological Control records is being conducted to determine a potential for cost savings.

  - The SMS reporting system within Radiological Control has been greatly streamlined reducing the time necessary to prepare the report. This action has also reduced the time necessary to prepare the bimonthly program reviews.

  - The monthly program review with the Radiological Control RL monitor has been eliminated. The Radiological Control Director and the RL monitor have agree to spend more time in the various facilities to replace this report.

  - The initial phase of the FY 1995 Radiological Control Self-Assessment Program has started with the identification and definition of performance objectives and criteria which cover the major functional elements of the WHC Radiological Control Program.

- **Dosimetry**

  - The new dosimetry system was implemented during the December 31, 1994, exchange. PFP experienced an increase in the use of combination neutron dosimeters during the exchange due to modifications of their RWPs. Many personnel assigned basic dosimeters have been turning in both dosimeters due to unfamiliarity of wearing a separate one. Overall, the change over has been relatively smooth.

  - Access Control Entry System (ACES) training began on November 7, 1994. An operational test procedure is being prepared for testing in early January 1995. Final details for implementing the new system are near completion. A *Hanford Reach* newspaper article explaining the new system was published. Department of Energy Laboratory Accreditation Program certification for the new system has been received.

- **Conduct of Radiological Operations**

  - The line Radiological Control organizations are implementing the new radiological release procedure. The new procedure, and additional awareness of the release procedure, should increase confidence in the release of materials from radiologically controlled areas.

  - WHC Radiological Control and Operations personnel are continuing to work together to resolve radiological control problems as they are identified in work procedures. Facilities and projects are utilizing the critique process and discovering it to be a valuable tool for the evaluation of problems occurring during the performance of specific jobs.

  - Radiological Control and Tank Waste Remediation Systems have initiated a review of all operations which involve radiological controls.

- Radiological Control field procedures are in the process of being labelled "for field use," in accordance with DOE 5480.19.

- **Workplace Monitoring**

  - Several areas report that continuous air monitors (CAMS) are being evaluated and upgraded or removed, as needed, to meet current status and work scope.

  - WHC and PNL have identified a method of complying with 10 CFR 835 environmental qualifications without performing all the ANSI 42-17 environmental testing requirements. This will be accomplished through sharing evaluation data with other DOE facilities, vendors supplying data, and historical data, etc. Actual testing of instruments will only be performed in the event data cannot be obtained from other sources. Cost estimates for testing are being formulated at this time.

  - A draft volumetric release criteria-procedure has been submitted by Health Physics Technology to management for review. After comments have been resolved the proposal will be submitted to RL and DOE-HQ to obtain EH-1 approval.

  - Health Physics Technology has completed the 10 CFR 835 assessment of WHC maintained instruments used for radiological control measurements.

- **Posting/Labelling/Survey for Release**

  - The Hanford Radiation Protection Forum approved an alternate sign proposed by the WHC Radiological Control organization for posting a radiological buffer area (RBA). Posting of the sign allows facility personnel to traverse RBAs outside of a contamination area without a dosimeter.

  - The reposting of facilities to meet the DOE Radiological Control Manual and 10 CFR 835 is progressing on schedule. The posting is scheduled to be completed by March 31, 1995.

  - Radiological Control Technology staff has coordinated the request for radiological posting signs. Procurement has been supplied with a recommended inventory list.

  - A team of facility Radiological Control posting POCs conducted tours of T Plant, PUREX, and 300 Area facilities to review the implementation of posting requirements. This will help ensure that posting requirements will be applied consistently within WHC facilities.

  - A special team of HPTs successfully supported a significant campaign to survey, decontaminate, and release for public sale many large pieces of equipment left over from the Clinch River Breeder program.

- **Emergencies/Accidents**

  - Drills were conducted by several WHC facilities in support of internal milestone RAD-95-024. Valuable lessons learned are being realized which should improve future radiological emergency responses. Several other facilities are preparing for future quarterly emergency preparedness drills.

- **Training**

  - Updating of the HPT On-the-Job Training for the facilities is about 95% complete and expected to be finished in January of 1995.

  - Radiological Control Technical Training, and Radiological Control Program Control and Integration, have developed a lesson plan for training radiological work permit preparers. This training is the result of lessons learned in the 333 facility uptake occurrence.

  - Twenty-five new HPTs have graduated from initial qualification training. This class was divided by prior experience level to facilitate an accelerated on-the-job portion of the class.

- **Sealed Source Control/Radiation Generating Devices**

  - Radiological Control has developed a briefing outline for training source users on the proper care and handling of radioactive sources. This outline will be included in the WHC-CM-4-14 manual and incorporated into HPT training.

  - The Source Control Program had no anomalies for the month of December 1994. The program improvement and operation is proceeding as planned.

  - To date, 45 orphan radiation sources have been identified. The Source Control Program has taken custody of these sources and is arranging for their reassignment or disposal.

  - Arrangements were completed for the WHC Source Control Office to maintain accountability documentation for 14 radiation-generating devices and 11 radioactive sources for ICF KH.

- **Procedures**

  - A revised procedure for release of material and equipment has been prepared. It provides greater flexibility for applying requirements to specific items that are valid candidates for release from radiological controls.

  - Upgrade efforts to the WHC-CM-4-14, Applied Radiological Controls Manual, are nearing completion. Five sections of Part 1 have been issued and anticipate issuing the first five sections of Part 3 by February 15, 1995.

  - During this reporting period the HSRCM was approved and implemented within WHC as the sole radiological control manual. The WHC-CM-1-6 manual has been rescinded.

  - Nine urgently needed facility-specific procedures have been issued in support of field operations. The majority of these procedure issuances were not planned activities.

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SKIN CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity		First Detected	Body Location	Defined Cause	Comments
940111	14360	U03 224-U	MILLWRIGHT	9000	DPM BG	PCM-1B	HAND	UNKNOWN, SUSP. LAUNDRY	NO PERFORATION FOUND IN GLOVES POSSIBLY CAUSED BY CONT. LAUNDRY.
940110	33541	T-PLANT 221-T	HPT	40000	DPM BG	HPT	HAND	PC FAILURE	HANDS CONT. WHEN GLOVE BROKE, HEAD & BODY CONT. BY EXCESSIVE SWEAT.
940113	16910	B-PLANT 221-B	NUCL OPER	1000	DPM BG	HPT	LEGS	INATTENTION TO DETAIL	CLOTHING DID NOT PROTECT FROM CONT. LAUNDRY WORKER REMOVED FROM CANYON
940216	53280	ANAL LABS 222-S	KEH PIPEFTR	10000	DPM BG	H/F	HAND	INATTENTION TO DETAIL	WORKER TOUCHED CONTAMINATED DOSIMETER
940217	11700	K BASINS 105KE	RX OPERATOR	10000	DPM BG	PCM-1B	FACE	TOUCHING SKIN	TOUCHED CHIN TO OUTER PC WHEN LOOKING DOWN AND ADJUSTED HEAD PPE
940218	52740	300 AREA 333	KEH PIPEFTR	2500	DPM BG	HPT	FACE	TOUCHING SKIN-INATT TO DETAIL	WORKER PERIODICALLY ADJUSTED SAFETY GLASSES & HOOD CONTAMINATING FACE
940223	3C640	PUREX 202-A	FIREMAN	1500	DPM BG	PCM	HAND	OTHER, UNKNOWN, MISC.	WORKER CLEARED 1ST SURVEY CONT. DETECTED AT PCM
940301	124A0	ANAL LABS 222-S	CHEM TECH	2100	DPM A	HPT	BODY	TOUCHING SKIN-INATT TO DETAIL	WORKER'S CONTAMINATED DOSIMETER TOUCHED SWEATER AND SKIN
940321	85400	100N 105N	D&D WORKER	2000	DPM BG	PCM-1B	FACE	PC NOT WORN AS PRESCRIBED	CONTAMINATED HOOD SLIPPED OVER CHIN
940330	33920	PFP 201-Z	HPT	750	DPM A	SELF	HAND	INADEQ PROC-INATT TO DETAIL	SURVEYING OUT EQUIP. FROM SCA. FUTURE SURVEY WORK WILL REQUIRE PC'S.

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SKIN CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity		First Detected	Body Location	Defined Cause	Comments
940405	16900	B PLANT 221-B	OPERATOR	3500	DPM BG	PCM-1B	HAND	OTHER, UNKNOWN, MISC.	AFTER COLLECTING ANTI-C CLOTHING FOR A JOB, OPER. COULD NOT CLEAR PCM
940415	124P0	PUREX 202A	CHEM TECH	8000	DPM BG	PCM-1B	HAND	OTHER, UNKNOWN, MISC.	WORK AREA FOUND CONTAMINATION FREE, FOLLOW-UP SURVEYS INCONCLUSIVE
940420	17300	U03 224-U	NUCL OPER	6000	DPM BG	SELF	ARM	INADE PROC-INATT TO DETAIL	HEAVY PHYSICAL ACTIVITY PERSPIRATION WICKED CONT. THROUGH CLOTHING
940516	53280	ANAL LABS 207SL	KEH PIPEFTR	840	DPM A	HPT	ARM	PC NOT ADQUATE-INADE PROCEDURE	BRUSHED AGAINST WALL WHILE GOING DOWN LADDER. CONT. DUE TO PRESPIR.
940531	15370	PFP 234-5	NUCL OPER	500	DPM A	HPT	HAND	TOUCHING SKIN	RECEIVED CONTAM. WHILE HANDLING RIPPED LOW-LEVEL WASTE BAG
940629	85400	100N 105N BSN.	D&D WORKER	11000	DPM BG	PCM-1B	HEAD	PC NOT ADEQUATE	SWP HOOD FLEW UP AND HIT EMPLOYEE'S FACE WHILE MOVING MAT'L UNDERWATER
940629	15400	PFP 231Z	LAB TECH	3000	DPM BG	HPT	HAND	EQUIPMENT FAILURE	MOVEMENT OF HEPA FILTER FOR NDA CREATED LOOSE CONT. ON FLOOR
940629	15400	PFP 231Z	SCIENTIST	9500	DPM BG	H/F COUNTER	HAND	EQUIPMENT FAILURE	MOVEMENT OF HEPA FILTER FOR NDA CREATED LOOSE CONT. ON FLOOR
940720	7C930	TANK FARMS U FARM	OPERATOR	1000	DPM BG	SELF	HEAD	PC NOT ADEQUATE	CONT. ELECTRICAL BOX BEING REMOVED CAME IN CONTACT WITH WORKER'S HAIR.
940804	2A450	K BASINS 105KE	OPERATOR	2500	DPM BG	HPT	HEAD	TOUCHING SKIN	WORKER WIPED FACE WITH CONTAMINATED GLOVE WHILE FILLING RAILCAR.

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SKIN CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity		First Detected	Body Location	Defined Cause	Comments
940805	53280	ANAL LABS T4/T3	KEH PIPEFTR	4000	DPM BG	HPT	LEG	INADEQUATE PROCEDURE/METHOD	DUE TO HEAT AND CONT LEVEL-CONT PERMEATED (2) SWP-NEED PLASTIC ON KNEE
940912	2A620	K BASINS 105KE	RIGGER	1500	DPM BG	HALF-BOD Y	LEG	PROTECTIVE CLOTHING FAILURE	CONTAMINATION WORE THROUGH PROTECTIVE CLOTHING
941006	33311	TANK FARMS 301AXA	HPT	15000	DPM BG	SELF	HEAD	INADEQUATE PROCEDURE/METHOD	HPT RECEIVED CONT WHILE REARRANGING SHIELDING AFTER DOSE SURVEYS
941025	16510	B PLANT 221-B	NUCL OPER	6000	DPM BG	PCM-1B	HEAD	PC NOT WORN PROPERLY	PONY TAIL WAS LEFT OUTSIDE INNER SWP CLOTHING AND BECAME CONT
941110	16A40	B PLANT 221-B	ELECTRICIAN	6000	DPM BG	SELF	HAND	PREJOB PLANNING INADEQUATE	ELECT WORK PERFORMED WITHOUT PRIOR WORK SURVEY IN AREA
941213	15900	PFP 234-5Z	NUCL OPER	125	DPM A	HPT	HEAD	AIRBORNE	AIRBORNE CONT. OCCURRED FOLLOWING RUPTURE OF A CONTAINER BEING REMOVED
941213	15900	PFP 234-5Z	NUCL OPER	68	DPM A	HPT	HEAD	AIRBORNE	AIRBORNE CONT. OCCURRED FOLLOWING RUPTURE OF A CONTAINER BEING REMOVED

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CLOTHING CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity		Clothing Contaminated	Defined Cause	Comments
940104	16620	B-PLANT 221-B	OPERATOR	4500	DPM BG	SHOE	UNKNOWN	NONE GIVEN
940105	124E0	PUREX 202-A	SCIENTIST	20000	DPM BG	T-SHIRT	UNKNOWN, SUSP LAUNDRY	SPECK OF CONT. REMOVED AND SENT FOR ANALYSES
940113	33932	B-PLANT 221-B	HPT	4500	DPM BG	SHOE	UNKNOWN, SUSP LAUNDRY	CONT. FOUND WHEN EXITING CANYON
940113	14540	B-PLANT 221-B	ELECTRICIAN	2500	DPM BG	MODESTY SHORTS	UNKNOWN, SUSP LAUNDRY	POSSIBLE CONTAMINATION FROM PROTECTIVE CLOTHING
940119	7C550	TANK FARMS MO822	NUCL OPER	8000	DPM BG	SWEATSHIRT	UNKNOWN, SUSP LAUNDRY	INITIAL SURVEY WAS DONE ON OUTSIDE OF SLEEVE, DURING DECON ON INSIDE
940121	124P0	PUREX 202-A	CHEM TECH	2500	DPM BG	SHOE	PC NOT ADEQUATE	WATER WAS ABSORBED THRU ANIT-C BOOTS AND MAY HAVE ABSORBED INTO RUBBER
940202	14200	PFP 234-5	ELECTRICIAN	1100	DPM A	SHOE	PC NOT ADEQUATE	CLOTH SHOE COVERS WERE USED AND WORKER STEPPED IN LIQUID
940203	33130	FFTF 437	HPT	25000	DPM BG	SHOE	EQUIPMENT FAILURE	REMOVED SPECK OF CONT. WITH TAPE
940207	11700	K BASINS 105KE	RX OPERATOR	10000	DPM BG	MODESTY CLOTHING	PROC VIOL, INATTENTION	CUT SHIRT OFF AND REPLACED WITH NEW ONE
940218	17300	U03 224-U	OPERATOR	15000	DPM BG	MODESTY CLOTHING	EQUIPMENT FAILURE	SUSPECT CONTAMINATED LAUNDRY

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CLOTHING CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity	Clothing Contaminated	Defined Cause	Comments
940227	7C563	TANK FARMS AY TF	NUCL OPER	10000 DPM BG	BLUE COVERALLS	EQUIPMENT FAILURE	NO DETECTABLE CONT. IN CHANGE TRAILER, ON ANTI-C'S, OR SOP AREA
940301	124A0	ANAL LABS 222-S	CHEM TECH	14000 DPM A	SWEATER	INATTENTION TO DETAIL	LIKELY SOURCE IS PLACING CONTAMINATED HAND INTO JACKET
940315	124A0	ANAL LABS 222-S	SCIENTIST	2800 DPM A	TROUSERS	EQUIP FAIL, SUSP LAUNDRY	ASSESSMENT INDICATES PROTECTIVE CLOTHING AS SOURCE
940321	85620	100N 105N	ENGINEER	25000 DPM BG	SHOE	UNKNOWN	SURVEYED ALL AREAS VISITED BY EMPLOYEE AND FOUND NO OTHER CONT.
940323	7C620	TANK FARMS C FARM	NUCL OPER	15000 DPM BG	BLUE COVERALLS	UNKNOWN	NO CONT. FOUND IN TRAILER, CHANGE ROOM OR LOCKER - SOURCE UNKNOWN
940406	17870	U03 224-U	INSTRM TECH	10000 DPM BG	BOOT	EQUIPMENT FAILURE	NONE GIVEN
940407	16620	B PLANT 271-B	TECH-SCIENC	50000 DPM BG	SHOE	INADEQUATE PROCEDURE	UNDETERMINED SOURCE. SHOE DECONTAMINATED AND RETURNED
940408	7C811	TANK FARMS 242-A	NUCL OPER	6000 DPM BG	JACKET	UNKNOWN	OLD DENIIM JACKET, NOT USED FOR 3 YRS, FOUND HANGING IN CHANGE ROOM
940501	DOE RL	TANK FARMS 242A		10000 DPM BG	JACKET	UNKNOWN	VERY OLD COAT, LIKELY WORN OVER ANTI-C'S YRS AGO, USED FOR TOUR
940506	8E490	PUREX 202A	CHEM TECH	6000 DPM BG	SHOE	UNKNOWN, SUSP LAUNDRY	POSSIBLY CAUSED BY CONTAMINATED SHOE COVERS FROM LAUNDRY

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CLOTHING CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity	Clothing Contaminated	Defined Cause	Comments
940513	7C550	TANK FARMS 241AY	ENGINEER	10000 DPM BG	MODESTY SHORTS	UNKNOWN, SUSP LAUNDRY	CONT. SPECK FOUND AFTER COMPLETING VENT AND BALANCE JOB. CAUSE UNKNOWN
940526	53580	T PLANT 200 BP-1	KEH LABORER	2500 DPM BG	GLOVES	PROC VIOL, INATTENTION	GLOVES CONT. WHILE PACKAGING A BURIAL BOX. RWP NOT ADHERED TO
940526	86800	T PLANT 200 BP-1	ENGINEER	4000 DPM BG	GLOVES	PROC VIOL, INATTENTION	GLOVES CONT. WHILE PACKAGING A BURIAL BOX. RWP NOT ADHERED TO
940526	53580	T PLANT 200 BP-1	KEH LABORER	2000 DPM BG	GLOVES	PROC VIOL, INATTENTION	GLOVES CONT. WHILE PACKAGING A BURIAL BOX. RWP NOT ADHERED TO
940601	8E450	ANAL LABS 222S	CHEMIST	12000 DPM BG	SHOE	UNKNOWN, SUSP LAUNDRY	SPECK CONT. FOUND WHEN EXITING 222-S RCA
940603	8E450	ANAL LABS 222-S	CHEM TECH	30000 DPM BG	SHOE	UNKNOWN, SUSP LAUNDRY	TINY SPECK DETECTED ON SHOE WHEN EXITING AN SCA
940613	8E730	ANAL LABS	CHEM TECH	5000 DPM BG	T-SHIRT	UNKNOWN, SUSP LAUNDRY	SUSPECTED CONT. SPECK REMAINING IN LAUNDERED COVERALLS
940629	15400	PFP 231Z	LAB TECH	5000 DPM BG	MODESTY CLOTHING	UNKNOWN	CONT. SKIN AND CLOTHING WHEN HEPA FILTER WAS MOVED FOR NDA
940629	15400	PFP 231Z	SCIENTIST	4000 DPM BG	BLUE COVERALLS	UNKNOWN	CONT. SKIN AND CLOTHING WHEN HEPA FILTER WAS MOVED FOR NDA
940705	7C930	TANK FARMS 152ER	NUCL OPER	20000 DPM BG	COAT	UNKNOWN	COAT WAS FOUND IN VEHICLE. SOURCE IS UNKNOWN

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CLOTHING CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity		Clothing Contaminated	Defined Cause	Comments
940713	87423	T PLANT 2704T	OPERATOR	20000	DPM BG	SHOE	EQUIPMENT FAILURE	CLEARED SURVEY AT STEP-OFF PAD, PROGRESSED TO PCM-1B AND ALARMED
940727	53200	B PLANT 221-BF	LABORER	12000	DPM BG	T-SHIRT	INADEQUATE PROCEDURE	CAUSE OF CONT NOT FOUND, PROBABLE WORK SPACE SPECK
940728	15400	PFP 234-5	LAB TECH	2500	DPM A	SHOE	UNKNOWN	WHEN EXITING AN RCA, SELF SURVEY DETECTED CONT. ON SHOE
940813	18110	FFTF FSF	MANAGER	5000	DPM BG	SHOES	UNKNOWN	SMEAR SURVEY CONDUCTED THROUGHOUT FSF WITH ALL RESULTS <SMEARABLE
940815	15520	PFP 234-5	STUDENT	700	DPM A	SHOES	PROCEDURE VIOLATION	SHOES PASSES HAND/FOOT COUNTER TWICE, WAS THEN DETECTED BY SELF SURVEY
940815	57630	PFP 234-5	KEH	2100	DPM A	SHOES	PROCEDURE VIOLATION	SHOES PASSED HAND/FOOT COUNTER TWICE, THEN HPT DETECTED CONT.
940815	15510	PFP 234-5	ENGINEER	3000	DPM A	SHOE	PROCEDURE VIOLATION	BOTH SHOES PASSED HAND/FOOT COUNTER, THEN DETECTED BY SELF SURVEY
940817	18860	FFTF	CRANE OPER	8000	DPM BG	SHOE	INADEQUATE PROCEDURE	CRANE OPERATOR ALARMED HAND/FOOT COUNTER
940822	8E420	ANAL LABS 222S	CHEM TECH	12000	DPM BG	SHOE	UNKNOWN, SUSP LAUNDRY	SMALL SPECK FROM SHOE COVER
940830	8A820	ANAL LABS 222S	SCIENTIST	3000	DPM BG	T-SHIRT	UNKNOWN, SUSP LAUNDRY	T-SHIRT REMOVED AND BAGGED, SKIN SURVEYED AND NO CONT. FOUND

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CLOTHING CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity		Clothing Contaminated	Defined Cause	Comments
940826	15530	PFP 234-5Z	ENGINEER	250	DPM A	SHOE	PROCEDURE VIOLATION	CONTAMINATED STEP-OFF PAD APPEARS TO BE CAUSE OF EVENT
940903	33920	ANAL LABS 222S	HPT	6500	DPM BG	SHOE	INADEQUATE PROCEDURE	CONTAMINATION RECEIVED FROM SMALL AREA SPILL FROM LEAKING HOOD BAG
940908	17230	PUREX 202A	OPERATOR	6000	DPM BG	T-SHIRT	UNKNOWN	CONT. DISCOVERED AFTER ENTRY TO E CRANE IN CANYON, NO CONT. ON ANTI-C
940912	2A620	K BASINS 105KE	ENGINEER	3000	DPM BG	SHORTS	PC FAILURE	PROTECTIVE CLOTHING FAILURE IS PROBABLE CAUSE OF THIS AND SKIN CONT
940913	7C563	TANK FARMS 241-BY	OPERATOR	9000	DPM BG	T-SHIRT	UNKNOWN, SUSP LAUNDRY	PROB. CAUSE, CONTAMINATED "CLEAN" COVERALLS, NO OTHER CONT. FOUND
940914	33341	TANK FARMS 241SX	HPT	4000	DPM BG	SHOE	PC NOT ADEQUATE	PROBABLE CAUSE--PROTECTIVE CLOTHING NOT ADEQUATE
940914	33341	TANK FARMS 241SX	HPT	3000	DPM BG	SHOE	PC NOT ADEQUATE	PROBABLE CAUSE--PROTECTIVE CLOTHING NOT ADEQUATE
940923	53400	TANK FARMS 241SY	ELECTRICIAN	40000	DPM BG	T-SHIRT	UNKNOWN, SUSP LAUNDRY	DOUBTFUL CONT. CAME FROM DESCRIBED WORK, POSSIBLE CONT. CLEAN LAUNDRY
940927	7C550	TANK FARMS 241AY	NUCL OPER	6000	DPM BG	SHOE	UNKNOWN	FLOOR OF CONEX BOX FOUND TO HAVE SMEARABLE CONT., NO OTHER DETECTED
940927	7C550	TANK FARMS 241AY	NUCL OPER	3000	DPM BG	SHOE	UNKNOWN	FLOOR OF CONEX BOX FOUND TO HAVE SMEARABLE CONT., NO OTHER DETECTED

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CLOTHING CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity		Clothing Contaminated	Defined Cause	Comments
941006	33311	TANK FARMS 801AXA	HPT	3000	DPM BG	PANTS	INADEQUATE PROCEDURE	CONT CLOTHING IN NUMEROUS PLACES WHILE MOVING SHIELDING IN SM BLG
941018	33931	PUREX 202A	HPT	70000	DPM BG	SHOE	UNKNOWN	SOURCE OF CONT WAS SPOT OF FIXED CONT ON PAVEMENT AT MAINT DOCK
941020	2A400	K BASINS 105KE	RX OPERATOR	7500	DPM BG	MODESTY CLOTHING	PC FAILURE	CLOTHING WAS CONT WHEN ANTI-C CLOTHING CAME OPEN WHILE WORKING
941026	2A630	K BASINS 105KE	MILLWRIGHT	10000	DPM BG	SHOE	UNDRESSING	NONE PROVIDED
941108	87423	T PLANT 2406T	NUCL OPER	10000	DPM BG	JACKET	OTHER, UNKNOWN, MISC.	CONT. POSSIBLY FROM HANDLING RADIOACTIVE LAUNDRY.
941205	7C610	TANK FARMS 241-BY	NUCL OPER	35000	DPM BG	COVERALLS	PC NOT ADEQUATE	OPERATOR KNELT IN WATER IN CONTAINMENT TENT OVER PUMP PIT
941208	7C640	TANK FARMS 209-E	NUCL OPER	5000	DPM BG	GLOVES	PROCEDURE VIOLATION	WORKING ON LEAD SHIELDING IN RCA WITHOUT SWP CLOTHING
941208	7C640	TANK FARMS 209-E	NUCL OPER	400000	DPM BG	COAT & GLOVES	PROCEDURE VIOLATION	WORKING ON LEAD SHIELDING IN RCA WITHOUT SWP CLOTHING
941215	52230	TANK FARMS AY FARM	RIGGER	40000	DPM BG	INSUL. COVERALLS	UNKNOWN	CONT. ALSO FOUND ON COAT IN LOCKER (REF. PEC-94-082)
941215	52230	TANK FARMS RIG. LOFT	RIGGER	5000	DPM BG	COAT	UNKNOWN	CONT. COAT FOUND IN LOCKER FOLLOWING DETECTION OF COVERALL CONT.

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CLOTHING CONTAMINATIONS
OCCURRING IN WHC-MANAGED FACILITIES DURING CY 1994

Date	Org. Code	Facility & Building	Craft	Maximum Activity		Clothing Contaminated	Defined Cause	Comments
941212	7C562	TANK FARMS 272AW	NUCL OPER	2000	DPM BG	SHOE	PC NOT WORN PROPERLY	LOST RUBBER SHOE AND STEPPED INTO PUDDLE THEN REPLACED RUBBER SHOE
941216	7C640	TANK FARMS 209-E	NUCL OPER	5000	DPM BG	GLOVES	UNKNOWN	CAUSE WAS CONT. TOWEL IN BACK OF WASTE TRUCK
941216	7C640	TANK FARMS 209-E	NUCL OPER	5000	DPM BG	GLOVES, SHOE	UNKNOWN	CAUSE WAS CONT. TOWEL IN BACK OF WASTE TRUCK
941216	33321	TANK FARMS 209-E	HPT	5000	DPM BG	SHOE	UNKNOWN	CAUSE WAS CONT. TOWEL IN BACK OF WASTE TRUCK
941220	33920	ANAL LABS 222-S	HPT	4000	DPM BG	PANTS	PC FAILURE	DUE TO CONT. LAUNDRY - NOT IN SMEARABLE CONT. AREA DURING DAY
941220	87422	T PLANT 221-T	NUCL OPER	15000	DPM BG	MODESTY CLOTHING	PC FAILURE	CONT. DISCOVERED AFTER REMOVAL OF 2 PAIR OF COVERALLS, POSS. LAUNDRY

APPENDIX C-4

TYPE CODE INFORMATION FOR RPRs

The information in this appendix is a list of the various types of areas and situations in which radiological deficiencies are found, and these types of problems are stated on the RPR for the purposes of defining the type of problem(s) encountered. These items are individually numbered for the purpose of facilitating tracking and trending through the use of the RPR database.

1. **HARDWARE (HW)**
   Includes the following subject matter:
   - Piping
   - Electrical
   - HVAC
   - Civil
   - Structural
   - Fire/Industrial Equipment
   - Supports
   - MTE & I (OSR Equipment and Instrumentation)
   - Welds
   - Heavy Equipment
   - Pumps
   - Valves
   - Motors
   - Generator
   - Vessels
   - Containment
   - Fuel Elements/Assembly
   - Gloveboxes
   - Material
   - Safety Equipment
   - Lock and Tag
   - Improved Risk (Property Prot. Value/Program)
   - Computer
   - Special Tools
   - Refueling Equipment
   - Compressor
   - Sampling Equipment
   - Concentrator
   - Aqueous Makeup
   - Radiation Monitoring (CAM, Liquid Eff. Monit., Area Rad Monit.)
   - Trains and Railroads

2. **SOFTWARE**
   Includes the following subject matter:
   - Documentation
   - Drawings
   - Specifications
   - Records
   - Logs
   - Computer Programs
   - Job Control System

3. **ADMINISTRATIVE**
   Includes the following subject matter:
   - Procurement
   - Contractor
   - Planning
   - Procedures
   - Configuration Control
   - Personnel
   - Housekeeping
   - Environmental
   - Supplier
   - Training
   - Technical Review
   - Life Safety Code
   - Controls
   - Document Release

4. **EVENT**
   Includes the following subject matter:
   - Fire
   - Contamination (Air, Personnel, Material, Cont. control)
   - Exposure
   - Vehicle Accident
   - Firearm Discharge
   - Reactor Scram
   - Hazardous Material
   - Security
   - Roads
   - Dosimetry
   - Radioactive Source

5. **PROCESS**
   Includes the following subject matter:
   - Fabrication/Install
   - Testing/Monitoring
   - Inspection
   - Design
   - Material Transfer
   - Maintenance
   - Chemistry
   - Handling/Shipping
   - Storage
   - Nondestructive Exam
   - Surveillance
   - Product
   - Scheduled Routines

APPENDIX C-5

ROOT CAUSE DETERMINATION MATRIX FOR RPRs

The information in this appendix is a list of the various causes of situations in which radiological deficiencies are found, and these types of problems are stated on the RPR for the purposes of defining the root cause of the problem(s) encountered. These items are individually numbered for the purpose of facilitating tracking and trending through the use of the RPR database.

1. **EQUIPMENT**
   Includes the following subjects:
   - Design
   - Installation
   - Manufacturing
   - Maintenance
   - Electrical Power Outage
   - Plant/System Contamination
   - Man-Machine Interface
   - Non-Fault Tolerant
   - Weld Failure
   - Equipment Satisfactory
   - Detailed Investigation Unjustified

2. **MATERIAL**

3. **PROCEDURE**
   Includes the following subjects:
   - Procedure Nonexistent
   - Procedure Incomplete/LTA
   - Procedure Incorrect
   - Procedure Not a Problem

4. **PERSONNEL**
   Includes the following subjects:
   - Training
   - Procedure Not Followed
   - Lack Attn/Concentration
   - Miscommunication
   - LTA/No Communication
   - Administrative Controls LTA
   - Change Management
   - Resource Allocation
   - Management Methods
   - Personnel Not a Problem

5. **OTHER**
   Includes the following subjects:
   - Natural Phenomenon
   - Sabotage
   - External
   - Technical Error
   - Aquifer
   - Work Environment
   - Unknown

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GLOSSARY

ABBREVIATIONS, ACRONYMS, AND INITIALISMS

ALARA	As Low As Reasonably Achievable
ADM	Administration Department (40000)
APM	ALARA Protective Measures
APO	ALARA Program Office
ARA	Airborne Radioactivity Area
AMW	ALARA Management Worksheet
ANSI	American National Standards Institute
ATAMS	ALARA Tracking and Management System
BBST	Behavioral-Based Safety Training
BCS	BCS Richland, Incorporated (60000)
BCSR	BCS Richland, Incorporated
BECHTEL	Bechtel National, Incorporated
BLS	Bureau of Labor Statistics
CA	Contamination Area
CAIRS	Computerized Accident/Incident Reporting System
CAM	Continuous Air Monitor
CAS	Central Alarm System
CCIP	Contamination Control Improvement Project
CEDE	Committed Effective Dose Equivalent
CM	Controlled Manual
CSO	Cognizant Secretarial Office
CTD	Cumulative Trauma Disorder
CY	Calendar Year
CYTD	Calendar Year to Date
D&D	Decontamination and Decommissioning
DO-RITE	Define, Observe, Record, Intervene, Test, Evaluate
DTPA	Diethylenetriaminepentaacetate
DOE	U. S. Department of Energy
DOE-HQ	U. S. Department of Energy - Headquarters
DOE-RL	U. S. Department of Energy - Richland Operations Office
DOP	Disecoctyl Phthalate
DPETS	Daily Personnel Exposure Tracking System
ECD	Estimated Completion Date
ERMC	Environmental Restoration Management Contractor
ERO	Environmental Restoration Operations
ES&H	Environment, Safety and Health
ESQ	Emergency, Safety, and Quality Assurance Department (30000)
FCA	Fixed Contamination Area
FFTF	Fast Flux Test Facility
FMEF	Fuels and Materials Examination Facility
FY	Fiscal Year
FYTD	Fiscal Year to Date
GERT	General Employee Radiological Training
GOCO	Government Owned, Contractor Operated
HAMTC	Hanford Atomic Metal Trades Council
HEHF	Hanford Environmental Health Foundation
HEPA	High Efficiency Particulate Air (filter)
HGET	Hanford General Employee Training
HLAN	Hanford Local Area Network
HPT	Health Physics Technician

GLOSSARY (Continued)

HRA	Human Resources and Administration Department
HSRCM	Hanford Site Radiological Control Manual
IAEA	International Atomic Energy Agency
ICF KH	ICF Kaiser Hanford Company (50000)
LWC	Lost Workday Case
LWD	Lost Workday
MACTC	MAC Technical Consultants
MSDS	Material Safety Data Sheet
NRC	Nuclear Regulatory Commission
NRRPT	National Registry of Radiological Protection Technologists
OJT	On-the-Job Training
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
OSS	Operations Support Services
PAL	Processing and Analytical Laboratories
PAPC	President's Accident Prevention Council
PAR	Post ALARA Review
PFP	Plutonium Finishing Plant
PIC	Person In Charge
PNL	Pacific Northwest Laboratory
PPE	Personal Protective Equipment
PPG	Priority Planning Grid
PRE	President's Office (01000)
PRF	Plutonium Reclamation Facility
PUREX	Plutonium-Uranium Extraction (Facility at Hanford Site)
QUEST	Quality, Environmental, Safety Tracking
RA	Radiological Area
REX	Radiological Exposure System
RPR	Radiological Problem Report
RWD	Restricted Workday
RWP	Radiation Work Permit
SCA	Surface Contamination Area
SHARE	Search Hanford Accessible Reports Electronically
SIC	Standard Industrial Classification
SWP	Special Work Permit (clothing)
TLD	Thermoluminescent Dosimeter
TRC	Total Recordable Cases
TRP	Transition Projects Department (10000)
TWR	Tank Waste Remediation Systems Department (70000)
TWRS	Tank Waste Remediation System
TRU	Transuranic
UPS	Uninterruptable Power Source
VPP	Voluntary Protection Program
WAE	Waste Analytical and Environmental Department (80000)
WESF	Waste Encapsulation and Storage Facility
Westinghouse Hanford	Westinghouse Hanford Company (Richland, WA)
WesTIP	Westinghouse Task Improvement Plan
WHC	Westinghouse Hanford Company (Richland, WA)
WID	Waste Isolation Division (Carlsbad, NM)
WINCO	Westinghouse Idaho Nuclear Company (Idaho Falls, ID)
WRAM	WHC Radiation Area Monitoring
WSRC	Westinghouse Savannah River Company (Aiken, SC)
WVNS	West Valley Nuclear Services Company (West Valley, NY)

GLOSSARY (Continued)

DEFINITIONS OF TERMS

Days Away From Work (LWD). Unable to be present in the work environment during the normal work shift as a result of a job-related injury/illness.

First Aid. A nonrecordable occupational injury/illness involving one-time treatment and/or subsequent observation, not ordinarily requiring medical care, even though treatment may be provided by a physician or medically trained person.

Insufficient Volumes. Workers did not provide an acceptable amount of urine for the requested analysis.

Lost Containers. Workers did not return the urine sample containers to the analytical laboratory, or the containers were deficient.

Lost in Laboratory. The analytical laboratory lost the urine sample during the processing.

Lost Workday. A recordable case where the employee cannot perform any or all of normal job duties. Lost workdays include both days away from work and/or days with restricted work activity as defined under "Restricted Workday."

Motor Vehicle Incidence Rate. Number of recordable government motor vehicle accidents x 1,000,000, divided by actual vehicle miles driven.

Motor Vehicle Dollar-Loss Rate. Government motor vehicle dollar loss x 1,000, divided by actual vehicle miles driven.

No Sample. Workers did not provide a urine sample for a delivered container.

No Show. Worker did not appear for a scheduled medical or test appointment.

Occupational Injury/Illness Incidence Rate. Incidence rates represent the number of occupational injuries/illnesses per 100 full-time workers and were calculated as: (N/EH) X 200,000 where: N = number of injuries/illnesses; EH = total hours worked by all employees during the reporting period; 200,000 = base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year).

Organization Code. The organization to which the employee was officially reporting at the time of the report.

Property Loss Rate. Actual government property damage (fire or nonfire) dollar loss x 10,000, divided by property dollar valuation.

Recordable Case. An occupational injury/illness resulting in one or more of the following: a fatality, lost workdays, loss of consciousness, restricted work or motion, bone fracture, medical treatment beyond first-aid, transfer to another job, termination of employment, or any illness diagnosed by a physician as work related.

Restricted Workday. Physically or mentally unable to perform all or any part of normal work assignment during all of any part of the normal workday or shift. These are cases where the employee was: 1) Assigned another job on a temporary basis; 2) Worked at a permanent job less than full time: or 3) Worked at permanently assigned job but could not perform all duties normally connected with it.

Severity Rate. Severity rates represent the number of days lost or restricted per 100 full-time workers and were calculated as: (N/EH) X 200,000 where N = number of days lost or restricted; EH = Total hours worked by all employees during the reporting period; 200,000 = base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year).

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