Quarterly Environmental Radiological Survey Summary Third Quarter 1998 100, 200, 300, and 600 Areas

B. M. Markes

S. M. McKinney

Waste Management Federal Services, Northwest Operations

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FLUOR DANIEL HANFORD, INC.

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Richland, Washington

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Christine Willingham

10/27/1998

C. Willingham

Lockheed Martin Services, Inc.

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QUARTERLY ENVIRONMENTAL RADIOLOGICAL SURVEY SUMMARY
THIRD QUARTER 1998 100, 200, 300, AND 600 AREAS

PREPARED BY

S. M. McKinney
S. M. McKinney, Scientist
Waste Management Federal Services, Inc.
Northwest Operations
Environmental Monitoring and Investigations

10-26-98
Date

B. M. Markes
B. M. Markes, Scientist
Waste Management Federal Services, Inc.
Northwest Operations
Environmental Monitoring and Investigations

10/26/96
Date

REVIEWED BY

Austin R. Johnson
A. R. Johnson, Scientist
Waste Management Federal Services, Inc.
Northwest Operations
Environmental Monitoring and Investigations

10-26-98
Date

APPROVED BY:

J. J. Dorian
J. J. Dorian, Program Manager
Waste Management Federal Services, Inc.
Northwest Operations
Environmental Monitoring and Investigations

10/26/98
Date

L. P. Diediker
L. P. Diediker, Lead Engineer
Waste Management Federal Services of Hanford, Inc.
Air and Water Services

10-26-98
Date

D. R. Rana
D. R. Rana, Environmental Engineer
Fluor Daniel Hanford, Inc.
Environmental Integration

10-27-98
Date

EXECUTIVE SUMMARY

This report provides a summary of the radiological surveys performed in support of near-facility environmental monitoring at the Hanford Site. The Third Quarter 1998 survey results and the status of actions required are summarized below:

- All of the eighty-five environmental radiological surveys scheduled during July, August and September were performed as planned. Fifty-one of the surveys were conducted at Project Hanford Management Contractors (PHMC) sites and thirty-four at Environmental Restoration Contractor (ERC) sites. Contamination above background levels was found at seventeen of the PHMC waste sites and two of the ERC waste sites. Contamination levels as high $>1,000,000$ disintegrations per minute (dpm) per 100 cm^2 were reported. Of these contaminated surveys nine were in Underground Radioactive Material (URM) areas, three were in unposted areas and seven were in contamination areas. The contamination found within four of the URM and three of the CA areas was immediately cleaned up and no further action was required. The remaining five URM and two unposted sites were posted and along with the five CA sites will require remediation. Radiological Problem Reports (RPR's) were issued and the sites were turned over to the landlord for further action as required.
- During the second quarter of 1998, 1.2 hectares (3.0 acres) were stabilized and radiologically down posted from Contamination Area (CA)/Soil Contamination (SC) to URM.
- Four hectares (10 acres) located south and west of B-Plant were posted as a radiological buffer area as a result of a contamination spread. This off-normal occurrence is currently being investigated
- Four Surveillance Compliance Inspection Reports (SCIRs) remained open and had not been resolved. Tank Farms Operations has responsibility for the unresolved SCIRs

TOP TEN PRIORITY RANKING FOR CONTAMINATED WASTE SITES

Below is a listing of the top ten contaminated waste sites in order of highest priority ranking for contamination control. Rankings are based on history of, or potential of, spreading contamination to noncontaminated areas; levels of contamination; types of contamination; size of area; and proximity to human occupied or utilized areas. The waste site may have an open SCIR identifying the contamination. An explanation of the prioritization system is on page 13 of this report.

	<u>SITE</u>	<u>CUSTODIAN</u>	<u>SCIR/CAR</u>
1.	241-C Tank Farm Perimeters	TFO	9008EP200-068
2.	241-B Tank Farm Perimeters	TFO	8909EP200-036
3.	241-BX-BY Tank Farm Perimeters	TFO	9007EP200-056
4.	241-S, SX, SY Tank Farm Perimeters	TFO	9208ERI-006
5.	UN-216-E-6, 241-BX-155 Diversion Box	TFO	NONE
6.	241-ER-151 Diversion Box	TFO	NONE
7.	216-B-64 Basin	B-Plant	NONE
8.	241-ER-152 Diversion Box	TFO	NONE
9.	207-B Retention Basin	B-Plant	NONE
10.	241-A Tank Farm	TFO	NONE

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1.0 INTRODUCTION

Routine radiological surveys are part of near-facility environmental monitoring, which monitors and helps direct the reduction of the radiological areas at the Hanford Site. The routine radiological surveys are performed by the Radiological Monitoring and Environmental Support Group and the Site Support Services Radiological Control Group as directed by Environmental Monitoring and Investigations. The surveys performed have included inactive waste sites; outdoor radiological control areas; tank farm perimeters and associated diversion boxes, lift stations, and vent stations; perimeters of active or uncovered waste sites such as burial grounds, retention basins, ponds, process trenches, and ditches; underground pipelines; and road and rail surfaces (Figures 1 through 10). This report provides a summary of the radiological surveys performed in support of near-facility environmental monitoring at the Hanford Site during the third quarter 1998. The survey results and the status of actions required are also discussed.

A waste site survey schedule, *Routine Environmental Monitoring Schedule, Calendar Year 1998*, HNF-SP-0098-9, was developed by Environmental Monitoring and Investigations working with Radiological Monitoring and Environmental Support Group and the Site Support Services Radiological Control Group. Environmental Monitoring and Investigations reviews the radiological survey reports and files a copy for historical purposes and reference. Radiological conditions are tracked and trends noted. All sites are surveyed at least once each year. The survey frequencies for particular sites are based on site history, radiological conditions, and general maintenance. Special surveys may be conducted at irregular frequencies if conditions warrant (e.g., growth of deep-rooted vegetation is noted at a waste site). Radiological surveys are conducted to detect surface contamination and document changes in vegetation growth, biological intrusion, erosion, and general site maintenance conditions. Survey data are compared with standards identified in HSRCM-1, *Hanford Site Radiological Control Manual*, as well as previous surveys to recognize possible trends, assess environmental impacts, and help determine where corrective actions are needed.

Landlords of the sites found out of compliance with HSRCM-1 may be issued a Radiological Problem Report (RPR) from the appropriate radiological control group. Open Surveillance Compliance Inspection Reports (SCIRs) are listed in Table 1 of this report.

Surveillance of the active nuclear facilities and inside the tank farms is the responsibility of the facility. These radiological surveys are to determine surface radiological conditions and do not constitute a release survey. Therefore, surveys that detect no contamination in radiological areas do not release the site from control but may result in a posting status change.

Figure 1. 100-B/C

Figure 3. 100-F

Figure 4. 100-H

Figure 6. 100-N

Figure 9. 300 Area

Figure 10. 600 Area

Table 1. Open Surveillance/Compliance Inspection Reports
(maximum 15 points)

SCIR/CAR	SITE	DATE INITIATED	MONTHS OPEN	ECD	SITE RANKING	CUSTODIAN
8909EP200-036	241-B FARM PERIMETERS	09/01/89	103	09/30/98	13	TFO
9007EP200-056	EX-BY TANK FARM PERIMETERS	07/20/90	92	09/30/98	13	TFO
9008EP200-068	C-TANK FARM PERIMETERS	08/13/90	91	09/30/98	13	TFO
9208ERI-006	241-S, SX, SY TANK FARM PERIMETERS	08/14/92	67	09/30/98	12	TFO

2.0 PROGRAM DESCRIPTION

2.1 ENVIRONMENTAL RADIOLOGICAL SURVEY OBJECTIVES

Environmental radiological surveys are performed to:

- Identify priorities for environmental cleanup or stabilization of surface contamination.
- Determine compliance with Department of Energy requirements and applicable policies and standards regarding operational control and environmental and radiological protection.
- Identify trends in radioactive contamination levels and contamination migration at waste sites and other radiological areas.
- Assess the surface integrity of solid and liquid waste disposal sites.
- Monitor for unplanned releases of radioactivity to the operations area environment.

2.2 PRIORITY RANKING SYSTEM

A numerical ranking system is used for sorting contaminated waste sites relative to environmental radiological concerns. This system provides a priority guideline to responsible landlords for clean up or stabilization of contaminated/soil-contaminated areas.

A numerical value is assigned based on the level of contamination, site accessibility, and contamination mobility. Site histories are examined by reviewing past and present radiological surveys. Contamination levels from 1,000 disintegration's per minute (dpm) to greater than 10 mrad/hr (as measured on Radiological Control's field survey instruments) are considered and assigned a numerical value of 1 (lowest value) to 5 (greatest value). Any removable alpha contamination will be considered a high priority and will receive a contamination value of 5. Location is evaluated for accessibility. A restricted area would receive the lowest point value of 1 progressing up to a value of 5 where the public could have access. Mobility refers to contamination that can be or has a history of being transported from where it was originally identified to places outside of the posted radiological area. Fixed contamination would receive a value of 1 progressing to contamination that is blown by the wind or the result of biological uptake receiving a value of 5. There is a maximum of 15 points possible for this ranking system.

It should be noted that this system is not intended to be a total risk assessment, but rather a way of communicating environmental significance to the landlords and their program offices. Other elements of the site clean-up process are considered such as costs, location, public/regulatory interest, risk assessments, and engineering strategies before a site is actually remediated.

2.3 ENVIRONMENTAL STANDARDS

Radiological survey data are used to determine compliance of Radioactive Waste Sites with HNF-PRO-454, *Inactive Waste Sites*, HNF-PRO-455, *Solid Waste Management*, and BHI-EE-02, *Environmental Requirements*, Section 7.0 (Rev. 0), requirements.

Environmental Monitoring and Investigations is responsible for:

1. Establishing environmental radiological survey schedules of active and inactive radiological waste sites.
2. Compiling and maintaining copies of historical records, including radiological survey reports, radiological problem reports, compliance assessment reports (CARs), surveillance/compliance inspection reports (SCIRs), and other information for each active and inactive radioactive waste site.

3. Trending radiological data, and issuing reports on the status of radiological surveys and compliance assessments for active and inactive radioactive waste sites.
4. Reviewing any proposed activity, other than routine inspections, that may impact or may be impacted by any active and inactive waste site.

Facility Managers/Landlords are responsible for the following requirements:

1. Engineered barriers shall be provided, where applicable, over the disposal site to inhibit radionuclide transport to the surface.
2. Inactive waste site boundaries shall be accurately and permanently marked with Hanford plant standard (AC-5-40) approved concrete marker posts. Sites never used and those that are no longer contaminated do not require marker posts.
3. Facility effluent lines which are potential discharge points shall be isolated, capped, or sealed off to prevent accidental releases to inactive sites. This shall be verified and documented.
4. Active and inactive waste sites shall be inspected and surveyed at least annually.
5. One or more of the following actions shall be taken when contamination of any type is detected (either new or in excess of action limits) to prevent the migration or mobilization of the contamination:
 - Small-scale stabilization (<5 acres)
 - Vegetation removal
 - Radioactive hot-spot removal
 - Fencing
 - Posting
 - Herbicide spraying
 - Immediate spill response
 - Other corrective measures
6. Information regarding all suspect waste sites or newly identified waste sites shall be provided for documentation into the Environmental Sites Database/Waste Identification Data System (ESD/WIDS).
7. Inactive waste sites shall be maintained to control deep-rooted vegetation that could provide transport of contamination to the surface through plant uptake. The application of herbicides or pesticides may be required.

Except as noted below, the above mentioned requirements apply to active and inactive radioactive waste sites which include cribs, trenches, ditches, ponds, French drains, underground pipelines, burial grounds and other areas of concern such as the perimeters of tank farms and active burial grounds, and radioactive contamination due to spills or releases. Interiors of tank farms, active burial trenches and radiological areas where operations are ongoing are not included, because monitoring and tracking is done by the facility operations and other requirements are applicable to these areas.

In order to compare standards listed in (HNF-PRO-454, *Inactive Waste Sites*, HNF-PRO-455, *Solid Waste Management* and HSRCM-1, *Hanford Site Radiological Control Manual*) with field instrument values, a conversion factor is necessary. This conversion factor has been established where 20,000 dpm (2,000 cpm) are approximately equivalent to one millirem per hour for beta-emitting radionuclides. It must be understood that converting field instrument values, which include both beta and gamma energies, is approximate and does not allow for absolute precision.

2.4 SURVEY METHODS AND PROCEDURES

Surveys documented by this report include road/railroad surfaces, cribs, underground pipelines, stabilized burial grounds, covered ponds and ditches, tank farm perimeters, active burial ground perimeters, unplanned release sites and other radiological areas. Methods and procedures for these surveys can be found in WMNW-CM-004, *Environmental Monitoring*; HSRM-1, *Hanford Site Radiological Control Manual*; HNF-PRO-677, *Release Surveys*; HNF-PRO-678, *Survey Method for Reposting Outdoor Contamination Areas*; HNF-PRO-679, *Radiological Survey Report*; HNF-PRO-683, *Scheduled Radiation Survey Report*; and BHI-EE-02, *Environmental Requirements*.

2.4.1 ROAD/RAILROAD SURVEYS

Road and Railroad Surveys are conducted with a vehicle equipped with sodium iodide detectors and "high railers", which allows the vehicle to travel both on the roads or railroads. The detector height is adjustable and the average survey height is six inches.

The vehicle is driven at less than five miles per hour. If activity above background is detected, the vehicle is stopped and a thorough survey is made with a portable count rate meter equipped with a pancake type probe to identify the extent of the contamination. Appropriate management is notified if road/railroad contamination is identified and corrective actions are initiated.

2.4.2 WASTE SITES AND OTHER RADIOLOGICAL AREA SURVEYS

Surveys at waste sites and other radiological areas may be conducted with vehicles equipped with radiation detection instruments or with portable field instruments. Field instrument survey results are reported in disintegrations per minute (using an efficiency correction factor of 10 dpm/cpm) as detected by using a Geiger-Mueller detector for beta/gamma radiation equipped with a pancake type probe. Alpha survey results are reported in disintegrations per minute (using a correction factor of 7 dpm/cpm) as measured with a portable alpha meter (PAM). Surveys include the perimeter and portions of the ground surface of radiological areas. Wherever possible, smear surveys are made on the surface of exposed equipment and other hard surfaces within a radiological area. Vegetation, animal burrows, and animal feces are also monitored to detect biological transport. Detailed survey practices and procedures are described in WMNW-CM-004, *Environmental Monitoring*; HSRM-1, *Hanford Site Radiological Control Manual*; HNF-PRO-677, *Release Surveys*; HNF-PRO-678, *Survey Method for Reposting Outdoor Contamination Areas*; HNF-PRO-679, *Radiological Survey Report*; HNF-PRO-683, *Scheduled Radiation Survey Report*; and BHI-EE-02, *Environmental Requirements*.

3.0 RADIOLOGICAL SURVEY RESULTS

All the routine environmental radiological surveys scheduled during the third quarter 1998 were completed as planned.

Surveys of active and inactive waste disposal sites included cribs, trenches, burial grounds, covered ponds and covered ditches. The survey schedule for environmental sites is outlined in WMNW-CM-004, Section 12, and in HNF-SP-0098-9, Rev. 0.

Eighty-five environmental radiological surveys were performed during the third quarter of 1998. Contamination above background levels was found at seventeen of the surveyed PHMC waste site areas and two of the ERC waste site areas. Contamination levels ranging from a low of 7,500 dpm/100cm² to a high of >1,000,000 dpm/100cm² were reported. Of the contamination found, nine sites were located in URM areas, three in unposted areas and seven sites were located in CA/SC areas.

The contamination found in four of the URM areas and three of the CA areas was immediately cleaned up and no further action was required. The contamination found in the remaining five URM areas and two unposted areas were posted and along with the five CA/SC areas will require future remediation. Radiological Problem Reports were issued and the remaining sites were turned over to the landlord for further action.

The radiologically contaminated areas have been reposted to meet the requirements as outlined in the *Hanford Site Radiological Control Manual*, HSRCM-1. The posting includes Contamination, High Contamination (activity >100,000 dpm/100 cm² β/γ and/or >10,000 dpm/100 cm² α), Soil Contamination, Underground Radioactive Material, Radiological Buffer, and Radiation/High Radiation Areas. For continuity between quarterly reports, the use of Surface Contamination (SC) areas in this report includes Contamination, High Contamination, and Soil Contamination areas.

3.1 RADIOLOGICAL SURVEY SUMMARY

This report provides a summary of the radiological survey results conducted during the third quarter 1998. The stabilization efforts and release survey for two waste sites resulted in the down posting from CA/SC to URM of 1.2 hectares (3.0 acres).

During the third quarter, stabilization efforts and release surveys for the 216-U-14 ditch, and unplanned release site UPR-200-W24 were completed and the sites were radiologically down posted from CA to URM.

While conducting radiological surveys, contaminated media was encountered and collected for analysis and/or disposal. Media found above actions levels defined in HSRCM-1, *Hanford Site Radiological Control Manual*, are documented with a Radiological Problem Report and/or an Occurrence Report. The samples that are deemed appropriate are sent in for analysis (Table 2). The results of these analyses can be found in the Hanford Site Near-Facility Environmental Monitoring Annual Report which is published in August of each year.

Abbreviations used in Table 2 are as follows:

- NS - Not submitted for analysis.
- NR - No activity recorded in the field.
- <D - Less than detectable with field instruments.

Table 2. 1998 Contamination Samples

SAMPLE NUMBER	DATE	DESCRIPTION	LOCATION	DOCUMENT	ACTIVITY (dpm) B/G
N/A	01/05/98	Tumbleweeds	Inside 200-E perimeter fence @ 8th & Canton Ave.	PHMC-FSS-98-0001	1,500,000
N/A	01/07/98	Gravel and Asphalt	Outside roll-up doors at 105-N Building	BHI-NREACTOR-98-001	30,000
N/A	01/07/98	Soil (Coyote Urine)	2904-S-160 Diversion Box	RSR-TS-98-0004	10,200
N/A	01/08/98	Tumbleweed	216-U-11 Stabilized Trench	RSR-TS-98-0005	4,200
N/A	01/21/98	Speck	216-U-10 Pond	BHI-GENAREAS-98-001	72,000
N/A	01/23/98	Soil Speck	Just south of the 3734 concrete slab, 300 Area	PHMC-FSS-98-002	15,000
N/A	01/27/98	Speck	216-U-5	RSR-TS-98-0042	>1,000,000
N/A	02/02/98	Soil	216-T-21 through 24	RSR-TS-98-0055	20,000
N/A	02/03/98	Speck	216-T-5	RSR-TS-98-0060	120,000
6756	02/03/98	3-Mice	2025-E Building	SS 246737	5,500
N/A	02/06/98	~15 Tumbleweeds	Cross Site Transfer Line East of Fuel Station	SS 246748	180,000
N/A	02/09/98	Tumbleweed	Cross Site Transfer Line East of Fuel Station	SS 246752	30,000
N/A	02/17/98	Tumbleweed	216-E-12B	2/23/97 Morning Report	400,000
6766	02/18/98	Soil Specks	241-ER-151	SS 246776	26,000
N/A	02/24/98	Specks	241-TX-155 Diversion Box	SS 246795	60,000
N/A	02/27/97	Two Specks	Adjacent to BX-302-C Underground Storage Tank	TANKFARM-98-0018	30,000
N/A	03/16/98	Sample Valve #59A-204	291 Load in Station @the 200 LWDF	200LWDF-98-0003	15,000
6759	03/17/98	Soil Specks and Debris	UPR-200-E-95 (UN-216-E-23)	SS 247054	>1,000,000
N/A	03/18/98	Fork Lift Radiator	2711-E Garage	SOLIDWASTE-98-0002	60,000
6758	03/18/98	Soil Speck	241-TX-152 Diversion Box	TANKFARM-98-0025	350,000
N/A	03/24/98	Portable Diesel fuel Tank	1163 Excess Yard	TANKFARM-98-0030	35,000

Table 2. 1998 Contamination Samples

6757	03/24/98	Soil & Tumbleweed	200-E Portion of Cross Site Transfer Line	SS-247080	30,000
N/A	03/25/98	Brick	UPR-200-E-98 (UN-216-E-26)	SS-247085	230,000
6764	04/10/98	Bird Nest	MO-461 by 241-S Tank Farm	SS-247326	60,000
N/A	04/13/98	2 Pipe Gaskets	WMNW Borehole Gamma Ray Calibration Site	WRAP-98-0004	30,000
N/A	04/13/98	Tumbleweeds	200-E East fence line	SS-248008/FSS-98-0007	350,000
6762	04/14/98	Tumbleweeds	200-E East fence line	SS-248015/FSS-98-0007	>1,000,000
N/A	04/14/98	Tumbleweeds	200-E East fence line near Gate 809	SS-98-016/FSS-98-0008	177,000
6755	04/14/98	3-Deer Mice	241-S Tank Farm	NFM-1107	
N/A	04/15/98	Soil	On road near 241-TX/TY	SS-248019	>1,000,000
6760	04/16/98	Soil	North & west perimeter 241-TX/TY	SS-248208	19,250
N/A	04/16/98	Speck	MO-930 and B-Plant Stack	SS-248025	14,000/100Cm ²
6761	04/16/98	Soil	216-B-13 Crib	SS-248025	14,000
N/A	04/17/98	Soil & Vegetation	216-U-14 Ditch	SS-248033	9,000
6765	04/20/98	Mud Dauber Wasp Nest	200-E Slab yard RR tracks	SS-248038	20,000
6763	04/22/98	Ant Hill	200-W-063, NW of 241-TX/TY	SS-248055	118,500/100Cm ²
6767	04/23/98	Tumbleweeds	50' West of 241-EW-151 Vent Station	SS-248063	>1million/100Cm ²
N/A	04/22/98	Shaving Unit	3718-N Building	FSS-98-0009	12,000/100Cm ²
N/A	05/01/98	Tumbleweed Fragments	NE Corner 200-W Fence line	SS-248307	20,000
N/A	05/04/98	Speck	241-T	SS-248313	79,250/100Cm ²
N/A	05/04/98	Tumbleweed	NW Side of 241-S Complex	SS-248314	8,000/100Cm ²
N/A	05/05/98	Rabbit Feces/Soil Specks	241-BX/BY	SS-248317	597,000/100Cm ²
6783	05/05/98	Tumbleweed	East fence line 241-TY	SS-248319	25,000/100Cm ²
6784	05/06/98	Soil Specks	241-BX/BY	SS-248323	399,500/100Cm ²

Table 2. 1998 Contamination Samples

6768	05/07/98	Mouse	272-S	SS-248326	29,500/100Cm ²
6785	05/07/98	Rabbit Feces & Soil Specks	241-C	SS-248327	10,500/100Cm ²
N/A	05/11/98	Tumbleweed Fragments	241-A Tank Farm Complex	SS-248344	39,000/100Cm ²
6786	05/12/98	Specks	North side of 241-AN Tank Farm	SS-248349	>1,000,000/100Cm ²
N/A	05/12/98	Rust Stains	3730 Building	PNNLBOPEM-98-0004	30,000/100Cm ²
6787	05/15/98	Mouse	241-S	NFM-1107	4,000/100Cm ²
N/A	05/15/98	Tumbleweed	2706-T RMA	TPLANT-98-0010	100,000/100Cm ²
N/A	05/15/98	Boron Balls	RMA @ 2706-T105-C Ball 3X Hopper Elevator area	BHI-DND-98-0002	175,000/100Cm ²
6788	05/27/98	6-Mice	200-E Pipe Yard	NFM-1107	<D
N/A	05/28/98	Rust Scale	105-C	BHI-DND-98-0004	75,000
N/A	06/01/98	Wall	221-T Plant	TPLANT-98-0011	75,000/100Cm ²
N/A	06/10/98	Asbestos fragments	PUREX fence line	GENAREAS-98-0005	100,000/100Cm ²
6790	06/10/98	Tumbleweed fragments	PUREX fence line	GENAREAS-98-0005	250,000/100Cm ²
6789	06/12/98	Bat	105-KE, Room 113	NFM-1107	2,000/100Cm ²
6791	06/16/98	Tumbleweeds	200-E fence line north of 8th St. off Canton Ave.	FSS-98-0012	>1,000,000/100Cm ²
N/A	06/19/98	Specks	South of 241-B Tank Farm	TANKFARM-98-0065	160,000/100Cm ²
N/A	06/19/98	Speck	241-AX Perimeter	TANKFARM-98-0066	80,000/100Cm ²
6792	06/23/98	Tumbleweed fragments	C8S5 Substation in 200-W RMA	SS-98-036	44,000/100Cm ²
N/A	06/25/98	Rabbit feces	NE of 241-BY tank farm change trailer	TANKFARM-98-0070	60,000/100Cm ²
N/A	06/26/98	Tumbleweed	218-W-4B Burial Ground	SOLIDWASTE-98-0004	75,000/100Cm ²
6793	06/29/98	Tumbleweed	T-Plant RR Spur	SS-248599	25,000/100Cm
N/A	07/06/98	6"X 3/4" Channel iron	Excess Material Storage NE of 306-E	FSS-98-0013	1,800/100Cm ²
6794	07/08/98	Rabbit & Sage Brush	216-Z-9 Crib	C-of-C NFM-1107	<D
N/A	07/14/98	Vegetation, soil, & feces	On URM pipeline between Semi Works and Baltimore Ave.	TANKFARM-98-0082	355,500/100Cm ²

Table 2. 1998 Contamination Samples

N/A	07/14/98	Metal Storage Cabinet	306-E NE Excess Yard	FSS-98-0015	15,000/100cm ²
N/A	07/17/98	Water Leak	Leak from Tanker #3859 @ ERDF	200LWP-98-0008	4,500/100cm ²
N/A	07/28/98	5' Step Ladder	306-E NE Excess Yard	FSS-98-0016	28,000/100cm ²
N/A	08/03/98	Tumbleweed Fragments	15' X 5' area NE of the 241-TX-155 Diversion Box	SS-248911	400,000/100cm ²
N/A	08/03/98	Tumbleweed Fragments	South side of 225-B by the burial box filter.	WESF-98-0007	200,000/100cm ²
N/A	08/04/98	Tumbleweed Fragments & Soil	Transfer line between T-Plant and 241-TX-155	SS-248914	120,000/100cm ²
N/A	08/04/98	Tumbleweed Fragments & Soil	216-B-64 Basin	SS-248916	57,000/100cm ²
	08/04/98	2-Mice	225-B K-3 Filter Building		2,000
N/A	08/06/98	Soil	244-A lift station perimeter	SS-248920	108,500/100cm ²
N/A	08/05/98	Specks/rodent feces	311-ER	TANKFARM-98-0096	1,000,000/100cm ²
N/A	08/05/98	Photometer	1167 Bldg.	PNNLBOPER-98-0012	40,000/100cm ²
N/A	08/14/98	Tumbleweeds	Transfer Line NE of 241-TY	SS-248958	600,000/100cm ²
N/A	08/18/98	Tumbleweed Fragments	URM Pipeline south of 241-T (6'x15' mound)	SS-248965	120,000/100cm ²
N/A	08/18/98	Darkling Beetle/Shoe	WESF SWP Lobby	WESF-98-0009	1.5mrad/hr
N/A	08/18/98	Ant Mounds	241-ER-151	SS-248974	800,000/100cm ²
N/A	08/20/98	Hat	241-BY-105, Sample Truck #3	TANKFARM-98-0104	4,000/100cm ²
N/A	08/25/98	Tumbleweed Fragments	216-A-37-2	TANKFARM-98-0106	65,000/100cm ²
N/A	08/25/98	Soil	NE of 241-C	FSS-98-0019	> 1,000,000/100cm ²
N/A	08/27/98	Mouse	W. Perimeter fence 116-N-3 Crib	SS-249017	49,250/100cm ²
N/A	08/28/98	Soil	South side of 221-B	BPLANT-98-0007	60,000/100cm ²
N/A	08/31/98	2-Mice	W. Perimeter Fence 116-N-3 Crib	SS-249029	19,250/100cm ²
N/A	09/01/98	Tumbleweed	314- Pipeline Project URM Line from 241-A to A-Cribs	SS-249038	18,000/100cm ²
N/A	09/02/98	Tumbleweed	241-BX-155 Diversion Box	SS-249052	4,000/100cm ²
N/A	09/02/98	Tape	241-BX-155 Diversion Box	SS-249052	> 1,000,000/100cm ²
N/A	09/09/98	Cardboard Box	UPR-200-E-43 (SE of 244-A Lift Station)	SS-249073	30,500/100cm ²
N/A	09/10/98	8-Ant Hills	Area around 241-ER-151	TANKFARM-98-0112	> 1,000,000/100cm ²

Table 2. 1998 Contamination Samples

N/A	09/14/98	Soil	UPR-200-E-144 (Area NE of 241-B)	SS-249094	23,500/100cm ²
N/A	09/14/98	7-Ant Hills and Soil	241-ER-151	SS-249096	> 1,000,000/100cm ²
N/A	09/15/98	Rail Cars	At Siding Vittrification Test Site across from 300 Area	SS-249141	30,000/100cm ²
N/A	09/15/98	Tumbleweeds	UPR-200-E-77 (Area around 241-B-155)	SS-249100	34,500/100cm ²
N/A	09/17/98	Speck	NE Corner of MO-972 @ 241-ER-151	TANKFARM-98-0116	100,000/100cm ²
N/A	09/16/98	Fence Post	UPR-200-E-144	TANKFARM-98-0115	90,500/100cm ²
N/A	09/24/98	Specks	241-BX Tank Farm perimeter	TANKFARM-98-0119	56,500/100cm ²
N/A	09/24/98	Continuous Air Monitor	MO-306	TPLANT-98-0019	8,000/100cm ²
N/A	09/28/98	Tumbleweeds	2715-W RMA	FSS-98-0020	400,000/100cm ²
N/A	09/28/98	Mouse feces, kitchen counter, etc.	MO-967 south of B-Plant	FSS-98-0021	400,000/100cm ²
N/A	09/29/98	Window Sill	MO-958	FSS-98-0022	200,000/100cm ²
N/A	09/29/98	Tumbleweeds	216-B-59	SS-249373	7,500/100cm ²

3.2 SURVEILLANCE AND COMPLIANCE INSPECTION REPORTS CLOSED

No SCIR's were closed during the third quarter 1998.

3.3 STATUS OF OPEN SURVEILLANCE AND COMPLIANCE INSPECTION REPORTS

Four SCIRs, from past activities, remained open at the end of the third quarter of 1998. These reports are summarized on Table 1 to include the referenced site number, priority ranking points (maximum of 15 points based on contamination levels, location and mobility), responsible custodian, SCIR report number, and estimated completion date.

Abbreviations used on Table 1 include:

- SCIR - Surveillance/Compliance Inspection Report
- ECD - Estimated Completion Date
- ERC - Environmental Restoration Contractor
- TFO - Tank Farm Operations
- PTS - Points
- TBD - To Be Determined

4.0 BIOTIC TRANSPORT

4.1 DEEP ROOTED VEGETATION ON RADIOLOGICALLY CONTROLLED SITES

Waste management, environmental protection, safety and ALARA practices on the Hanford Site require that whenever possible, radiological contamination exposed to the environment be cleaned up, or stabilized so that it is not easily transported from posted radiological control. Many waste sites at Hanford have been surface stabilized, but contain radiological contaminants within a few feet of the ground surface.

Deep-rooted vegetation (e.g., tumbleweeds) growing over underground sources of radionuclides can draw contaminants into their roots. When radionuclides are transported from roots to aerial portions of the plant, surface contamination is created. This surface contamination poses a risk of environmental transport or human contact and can be very costly to clean up or stabilize. The PHMC procedure, HNF-PRO-454, *Inactive Waste Sites*, requires that the facility managers and landlords keep all waste sites free of tumbleweeds.

A review of radiological reports (Radiological Problem Reports, Occurrence Reports, and Radiological Survey Records) indicates that during the third quarter of 1998, there were fourteen incidents of contaminated tumbleweeds. This brings the total for the year to date of thirty-three contaminated tumbleweed incidents, which is comparable to 1997, the highest year in the past four years. Table 3 shows the incidents of contaminated tumbleweeds found and the range of activity encountered between 1994 and the third quarter of 1998.

Table 3. Contaminated Tumbleweed Incidents (1994 through September 1998)

Year	Number of Incidents	Max. Activity (dpm)/B/G	Min. Activity (dpm)/B/G
1998	33	>1,000,000/100cm ²	4,000/100cm ²
1997	39	>1,000,000	2,500
1996	19	800,000	6,000
1995	11	250,000	2,000
1994	19	600,000	2,000

4.2 ANIMAL/INSECT VECTORS

Biotic transport of radiological contamination through animal (insects, mice, etc.) vectors has been the cause of contamination spread through out the Hanford Site. The most notable incident occurred in 1958 when contaminated rabbit and coyote feces were found scattered through out the 216-BC crib and trench area south of 200-East and beyond. It was postulated that badgers burrowed into the 216-B-28 backfilled trench and a salt layer exposed. Rabbits subsequently used the burrow and as a result, the radioactive materials in the trenches were reached and contamination was found as far as two and one half miles away. In all, over 1,000 hectares (2,500 acres) were posted as a result of this contamination spread.

The most recent incident is a radiologically controlled area of approximately 4.0 hectares (10.0 acres) at a location west and south of the 221-B Plant and around the 216-B-55 crib, the 216-B-64 basin, and the 241-ER-151/152 diversion boxes. This has been an area of concern at least since 1984. At that time spotty contamination was found through out the area between the 216-B-55 crib and the 216-B-64 basin ranging from between 400 cpm to 55,000 cpm/probe area beta/gamma. This contamination had been brought to the surface by harvester ants. Again in 1996, an area of, approximately, 0.5 hectares (1.2 acres) was

contaminated by mice and harvester ants between the 241-ER-151 and 241-ER-152 diversion boxes. Contamination levels ranged from 2,500 cpm/probe area to 440 millirads per hour beta/gamma in the mice and from 10,000 cpm/probe area to 100 millirads per hour beta/gamma for the harvester ant mounds. No alpha contamination was found.

Several vectors caused the current contamination spread, namely harvester ants, deer mice, and vinegar (also known as fruit) flies. Contaminated ant mounds were first noted on August 18, 1998 during a routine radiological survey. Contamination attributed to vinegar flies was first discovered on September 28, 1998. Since that initial survey, contamination has been detected in two site garbage trucks, a dumpster, two mobile office trailers, five other buildings, a government van, on the personnel clothing of one worker, and in garbage deposited at the Richland Landfill. Contamination levels range from 2,000dpm/100cm² to >1,000,000dpm/100cm². The highest dose rate measured during this incident was about 15 millirads per hour. This incident is being investigated as an off-normal occurrence and received considerable coverage by the news media.

Table 4. Contaminated Animal/Insect Incidents (1994 through September 1998)

Year	Number of Incidents	Max. Activity (dpm)B/G	Min. Activity (dpm)B/G
1998	23	>1,000,000/100cm ²	<D
1997	28	>1,000,000	<D
1996	43	>1,000,000	<D
1995	40	>1,000,000	2,000
1994	38	>1,000,000	2,000

5.0 SUMMARY

All the routine outdoor radiological surveys were completed during the third quarter of 1998 in the 100, 200-East/West, 300 and 600 areas with no exceptions.

No SCIR's were closed (Section 3.3).

Four SCIRs remain open. Open reports have been addressed and clean-up plans with completion dates have been developed or are to be provided to Environmental Monitoring and Investigations.

RADIOLOGICAL POSTING CHANGES

An on going effort to stabilize and/or clean up areas of known contamination and to down post or release these areas from posting is being performed by the Environmental Restoration Contractor and by the facility managers. During the third quarter of 1998, 1.2 hectares (3.0 acres) were stabilized and down posted from CA/SC to URM. From the beginning of 1991 through the end of the third quarter of 1998, 567 hectares (1,390 acres) have been stabilized and down posted to URM with 3,991 hectares (9,867 acres) remaining to be stabilized and down posted or cleaned up and released. Table 4 shows the downward trend of the contamination status during this time period.

Radiological posting changes, by waste site, noted during the third quarter of 1998, are as follows:

The UPR-200-W-24 unplanned release site across 16th street from the 207-U basins was stabilized and the site was radiologically down posted from CA to URM and portions of the 216-U-14 ditch between the 207-U basins and the 241-U tank farm, that had become re-contaminated, were radiologically down posted from CA to URM, 0.9 hectares (2.3 acres).

Portions of the 241-SX/XY tank farm were re-surveyed and down posted from CA to URM, 2.9 hectares (0.73 acres) and 0.2 hectares (0.5 acres) of URM were added.

Portions of the 216-S-1/2 crib were released from posting.

Portions of the 241-C tank farm were re-posted with a net increase of the posted URM areas of 0.2 hectares (0.5 acres).

Although already posted as URM, the risers were cut, blanked, and the surface obstructions removed at the 216-W-LWC laundry crib.

Four hectares (10 acres) located south and west of B-Plant and associated with the 241-ER-151 and 241-ER-152 diversion boxes, the 216-B-64 retention basin, the 216-B-55 crib and the connecting transfer lines were posted as a radiological buffer area as a result of a contamination spread. This off-normal occurrence is currently being investigated.

The Environmental Restoration Disposal Facility (ERDF) started receiving waste in July 1996. Currently the ERDF consists of two cells, measuring 230 m (750 ft.) wide by 305 m (100 ft.) long and 24 m (80 ft.) deep, capable of holding 1.4 million tons of waste material. The waste comes from remediation activities in the 100B/C, 100D, and 300 Areas. Mapping the changes in contamination and underground radiation areas in the ERDF will be conducted semiannually. Currently there are 13.9 hectares (34.4 acres) available for waste disposal, with the URM area being reported as 1.9 hectares (4.8 acres) and the contamination area being reported as 1.1 hectares (2.7 acres).

Table 5. Outdoor Contamination Status (CA/SC Areas) 1991 through September 1998

[approximate surface area in hectares (acres)]

Hanford Site Area	1991	1992	1993	1994	1995	1996 ^a	1997	1998
100 Areas	65(160)	65(160)	65(160)	63(155)	52(129)	47(116)	47(116)	47(116)
200 Areas	157(389)	133(329)	129(318)	105(261)	92(228)	99(245)	91(225)	91(225)
300 Areas	18(45)	18(45)	18(45)	21(52)	21(52)	20(49)	20(49)	20(49)
600 & BC Control Areas	1,465(3,620)	1,060(2,620)	1,063(2,627)	1,063(2,627)	1,063(2,627)	3,850(9,513) ^b	3,832(9,469) ^c	3,832(9,469) ^c
Totals	1,705(4,214)	1,276(3,154)	1,275(3,150)	1,320(3,261)	1,275(3,150)	4,016(9,923)	3,990(9,859)	3,990(9,859)

Note: ^a There are some discrepancies as to the total acreage reported and areas remediated. This is due to the gained accuracy in measurement from the exclusive use of GPS equipment for the measurement of the contaminated surface areas.

^b The large increase in 600 & BC Control Areas is due to increased acreage posted around the BC Cribs Control Area.

^c The ERDF was added during the 3rd quarter of 1997, 1.9 ha (4.8 acres).

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