Quarterly Environmental Radiological Survey Summary

Fourth Quarter 1997

100, 200, 300, and 600 Areas

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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EXECUTIVE SUMMARY

This report provides a synopsis of the radiological surveys performed in support of near-facility environmental monitoring at the Hanford Site during calendar year 1997. The Fourth Quarter 1997 survey results and the status of actions required are summarized below:

- All of the routine environmental radiological surveys scheduled during October, November, and December were performed as planned.
- One hundred twenty four environmental radiological surveys were performed during the fourth quarter 1997, 43 at the active waste sites and 81 at the inactive waste sites. Contamination above background levels was found at eleven of the active waste sites and eight of the inactive waste sites. Contamination levels as high >1,000,000 disintegrations per minute (dpm) were reported. Of these contaminated surveys 15 were in Underground Radioactive Material (URM) areas and four were in contamination areas. The contamination found within nine of the URM areas was immediately cleaned up and no further action was required. The remaining six URM sites were posted and will require decontamination. Radiological Problem Reports (RPR's) were issued and the sites were turned over to the landlord for further action as required.
- During the fourth quarter of 1997, 2.0 hectares (5.0 acres) were stabilized and radiologically down posted from Contamination Area (CA)/Soil Contamination (SC) to URM.

The survey results and accomplishments for calendar year 1997, are summarized below:

- During 1997, four hundred sixty eight radiological surveys were performed. Contamination was found at sixty one of the waste sites surveyed, 18 in CA/SC areas, 39 in URM areas and 4 in unposted areas.
- During 1997, 15.6 hectares (38.7 acres) were stabilized and down posted from CA/SC to URM.
- A Global Positioning System (GPS) survey of the 216-A-25 Gable Mountain Pond boundaries and the east side of the 241-S/SX/SY Tank farm resulted in the increase from 30.4 hectares (75.0 acres) to 34.5 hectares (85.2 acres) of URM and an additional 0.6 hectares (1.6 acres) of CA/SCA respectively, which had not been reported in previous reports.
- The 1.0 hectare (2.5 acres) surface soil contaminated section of the 216-A-25 (Gable Mountain Pond) extension discovered during the radiological mapping fly over in 1996, was stabilized and total of 3.3 hectares (8.2 acres) were posted URM.

- The Environmental Restoration Disposal Facility (ERDF) started receiving waste in July 1996. A milestone was reached in September 1997 with the ERDF having received 500,000 tons of contaminated waste. The waste came from remediation activities in the 100B/C, 100D, and 300 Areas. The ERDF posting changes were added to the third quarter report with the URM area being reported as 1.9 hectares (4.8 acres) and the CA/SC area being reported as 1.1 hectares (2.7 acres).
- Four Surveillance Compliance Inspection Reports (SCIRs) remained open and had not been resolved.

Responsibilities for the unresolved SCIRs are as follows:

LANDLORD

OPEN SCIR/CAR

Tank Farm Operations (TFO)

4

TOP TEN PRIORITY RANKING

Below is a listing of the top ten 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. 216-U-14 Trench (North of 16th Street)	TFO	NONE
7. 216-B-64 Basin	B-Plant	NONE
8. 207-A Retention Basin	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 Southern Area Remediation 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 synopsis of the radiological surveys performed in support of near-facility environmental monitoring at the Hanford Site during calendar year 1997. The Fourth Quarter 1997 survey results and the status of actions required are also discussed.

A waste site survey schedule, *Routine Environmental Monitoring Schedule , Calendar Year 1997*, WHC-SP-0098-8, was developed by Environmental Monitoring and Investigations and reviewed by the Southern Area Remediation 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 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

Figure 3

HNF-SP-0665-27

WMNW/EMI/11-98/2EC21-98

Figure 8

WMWVEM111-983CZ1-98

Figure 9

Figure 10

Table 1. Open SCIRs AND CARs
(maximum 15 points)

SCIR/CAR	SITE	DATE INITIATED	MONTHS OPEN	ECD	SITE RANKING	CUSTODIAN
8909EP200-036	241-B FARM PERIMETERS	09/01/89	100	09/30/98	13	TFO
9007EP200-056	BX-BY TANK FARM PERIMETERS	07/20/90	89	09/30/98	13	TFO
9008EP200-068	C-TANK FARM PERIMETERS	08/13/90	88	09/30/98	13	TFO
9208ERI-006	241-S, SX, SY TANK FARM PERIMETERS	08/14/92	64	09/30/98	12	TFO
9607NFM-003	218-E-10, 218-E-12B, 218-W-3A, AND 218-W-4C BURIAL GROUNDS	07/18/96	8	CLOSED	N/A	SWO

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 counts 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 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 BHT-EE-02, *Environmental Requirements*, Section 7.0 (Rev. 0), requirements.

Applicable requirements include the following:

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.

Environmental Monitoring and Investigations is responsible for:

1. Establishing radiological survey schedules of active and inactive radiological waste sites.
2. Compiling and maintaining copies of historical records, including radiological survey 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.

The above mentioned requirements apply to all 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 HSRM-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*; HSRCM-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*; and HNF-PRO-683, *Scheduled Radiation Survey Report*.

2.4.1 ROAD/RAILROAD SURVEYS

Road and Railroad Surveys are conducted with a vehicle equipped with "high railers", which allows the vehicle to travel both on the roads or railroads, and sodium iodide detectors. 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 a 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*; HSRCM-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*; and HNF-PRO-683, *Scheduled Radiation Survey Report*.

3.0 RADIOLOGICAL SURVEY RESULTS

All the routine environmental radiological surveys scheduled during the calendar year 1997, 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 WHC-SP-0098-8, Rev. 0.

One hundred twenty four environmental radiological surveys were performed during the fourth quarter of 1997. Contamination above background levels was found at eleven of the surveyed active waste site areas and nine of the inactive waste site areas. Contamination levels ranging from a low of 1,000 dpm to a high of >1,000,000 dpm were reported. Of the contamination found, fifteen sites were located in URM areas and five sites were located in a CA/SC areas.

The contamination found in nine of the URM areas was immediately cleaned up and no further action was required. The contamination found in the remaining six URM and five CA/SC areas were posted and will require decontamination. 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 new requirements as outlined in the Hanford Site Radiological Control Manual, HSRCM-1. The posting includes Contamination, High Contamination (activity >100,000 dpm/100 cm² B/Y 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 issued in 1996, 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 synopsis of the radiological survey results conducted during the calendar year 1997. The stabilization efforts and release surveys for one waste site resulted in the down posting from CA/SC to URM of 15.6 hectares (38.7 acres).

During the first quarter, stabilization efforts and release surveys for the east portion of the 216-B-3C Pond, the contaminated portion of UN-216-W-24 (under the abandoned steam line), and the 216-S-18 vehicle decontamination trench were completed and the sites were radiologically down posted from SC to URM or released.

During the first quarter of 1997 there were two radiological posted areas that increased in size. This increase resulted in an additional 4.1 hectares (10.3 acres) of URM and 1.6 hectares (4.0 acres) of CA/SCA. The areas responsible for these increases were the 216-A-25 Gable Mountain Pond and the area east of the 241-S/SX/SY Tank Farm Complex.

The primary reason for the increases in radiological posting is the advanced technology of the Global Positioning System (GPS) being used to more accurately determine the radiologically posted area boundaries.

During the second quarter, stabilization efforts and release surveys for the 216-B-3 Pond C Lobe, Slurry Line Corridor, 216-U-14 Ditch, 241-CR Vault, and UN-216-W-35 were completed and the sites were radiologically down posted from SC to URM or released.

During the third quarter, stabilization efforts and a release survey for the 216-A-25 Gable Mountain Pond extension, discovered during 1996 with the Bechtel Nevada aerial radiological survey, was completed and the site was radiologically down posted from CA/SC to URM.

During the fourth quarter, the stabilization efforts and release surveys for the REDOX railroad cut and the 107-H Basins were completed and the sites were radiologically down posted from CA/SC to URM.

While conducting radiological surveys, contaminated media was encountered and collected for analysis and/or disposal. Media found above actions levels defined in 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*; and HNF-PRO-683, *Scheduled Radiation Survey Report* 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 analysis 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. 1997 Contamination Samples

SAMPLE NUMBER	DATE	DESCRIPTION	LOCATION	DOCUMENT	ACTIVITY (dpm) B/G
6717	11/05/96	Darkling Beetles	272-S	cc:Mail R.Bumgarner 8/13/97	30,000
NS	01/07/97	Soil and Vegetation	Near corner of Baltimore and 12th Street	SS-97-001	2,500
NS	01/07/97	Sagebrush	Southeast of 209-E	SS-97-001	8,000
NS	01/08/97	Soil	East of 241-B tank farm	SS-97-001	5,000
NS	01/08/97	Soil	100-B Excavation Site	cc:mail dated 4/15/97	200 pci/gm
NS	01/09/97	Rabbit Brush	W-058 Pipeline between B-Plant and 241-C Tank Farm	cc:mail dated 4/15/97	25,000
NS	01/09/97	Soil	W-058 Pipeline between B-Plant and 241-C Tank Farm	cc:mail dated 4/15/97	100,000
NS	01/10/97	Specks	North of the Baltimore and 7th street intersection	cc:mail dated 1/10/97	800,000
6708	01/14/97	Rabbit feces	W-058 trench east of east 241-SY perimeter fence	SS-97-002	300,000
NS	01/21/97	Tumbleweed fragments	Trench 26 218-W-3A	SOLIDWASTE-97-0001	60,000
NS	01/27/97	Mouse feces	212B Building (old change room)	BPLANT-97-0001	400,000
NS	02/04/97	Piece of Tape	On 241-BY Fence line	TANKFARM-97-0014	140,000
6709	02/11/97	Coyote feces	216-T-4-2 Ditch and Pond	SS243842	1,000
NS	02/12/97	Specks	South of the 241-TX-151 Diversion Box	TANKFARM-97-0019	170,000
NS	02/13/97	Ant hill	East side of 241-TX-155 Diversion Box	cc:mail dated 2/14/97	48,000
6707	02/13/97	Tumbleweed fragments	East side of 241-TX-155 Diversion Box	cc:mail dated 2/14/97	120,000
NS	02/13/97	Specks	Southwest site of 241-TX-155 Diversion Box	cc:mail dated 2/14/97	300,000
NS	02/14/97	Tumbleweed Fragments	216-C-3	97-TS-024	60,000
NS	02/21/97	Tumbleweed	Perimeter of 241-AX	TANKFARM-97-0020	> 1,000,000
NS	02/24/97	Two Tumbleweeds	Between TR-2&3-EW/TR-4&5-EW (X-Site Transfer Line)	cc:mail dated 2/25/97	24,000
NS	03/04/97	Soil	Between TR-15-EW/TR-16-EW (X-Site Transfer Line)	TANKFARM-97-0026	150,000
NS	03/05/97	Speck	UN-216-E-7	TANKFARM-97-0027	700,000
NS	03/05/97	Soil speck	West side of the 3734 concrete pad	FSS-97-0002	7,500
NS	03/11/97	Speck	216-A-29 covered trench	DND-97-0006	38mrad/hr

Table 2. 1997 Contamination Samples

SAMPLE NUMBER	DATE	DESCRIPTION	LOCATION	DOCUMENT	ACTIVITY B/G (dpm)
NS	03/17/97	Risers	West and East risers at UN-216-E-13	SS244143	85,000
NS	03/19/97	Speck	Speck found in Backfill soil for 216-S-18 Cnb	DND-97-0008	75,000
NS	03/19/97	Specks	BC Control Area Road	DND-97-0010	50,000
NS	03/24/97	Soil	UN-216-E-7	TANKFARM-97-0030	200,000
NS	04/03/97	Tumbleweed	216-B-1 & 2 Dich	BH-DND-97-0012	350,000
NS	04/02/97	Pipe elbow	216-A-8 Cnb	RPNs Dated 4/02/97	5,000
NS	04/07/97	Tumbleweed	216-B-1 & 2 Dich	BH-GENAREAS-97-0001	350,000
6706	04/08/97	Bird Nest	244-TX	cc:Mail R. Bungamer 8/13/97	9,000
NS	04/14/97	Speck	241-AX	TANKFARM-97-0038	150,000
6716	04/18/97	Great Basin Pocket Mouse	1518-N	cc:Mail R. Bungamer 8/13/97	3,000
NS	04/22/97	Tumbleweed Fragments	SW Perimeter of 241-C Tank Farm	TANKFARM-97-039	100,000
NS	04/28/97	Submersible Well Pump	Well 299-W19-37	BH-GROUNDWTR-97-0002	15,000
NS	04/28/97	Alpha Caisson and Soil	218-W-4B	SOLIDWASTE-97-0003	21,000
NS	04/30/97	Tumbleweed Fragments	East of 241-A Tank Farm	TANKFARM-97-0041	300,000
NS	04/30/97	Soil/Tumbleweed Fragments	A1 Trench #42 218-E-12B	SOLIDWASTE-97-0004	150,000
NS	05/01/97	Speck	218-W-4B	SOLIDWASTE-97-0005	400,000
NS	05/01/97	Soil	South of 221-B Under Conex Box	BPLANT-97-0008	90,000
NS	05/12/97	Soil Speck/Grass Blade	241-B Tank Farm	RPNs Dated 5/12/97	1,000,000
6711	05/12/97	Great Basin Pocket Mouse	241-C Tank Farm	cc:Mail R. Bungamer 8/13/97	10,000
6715	05/12/97	12 Sage Lizards	South Side of PURRX	ARJ Weekly	2,000
6701	05/12/97	Deer Mouse (Immature)	244-A Lift Station	ARJ Weekly	600
NS	05/14/97	Tumbleweed Fragments & Soil	Outside West Perimeter Fence line @ 241-S & 241-SX	TANKFARM-97-0045	100,000
NS	05/15/97	Speck	241-B Tank Farm	RPN Dated 5/15/97	> 40,000
NS	05/15/97	Tumbleweed	Northeast corner of 200-West Perimeter Fence Line	FSS-97-0009/SS-97-026	60,000

Table 2. 1997 Contamination Samples

SAMPLE NUMBER	DATE	DESCRIPTION	LOCATION	DOCUMENT	ACTIVITY (dpm) B/G
NS	05/19/97	Contaminated Rail Car	Release survey for excess sale	FSS-97-0010	40,000
NS	05/20/97	Specks	241-U-151 & 241-U-152 Diversion Boxes	TANKFARM-97-0046	250,000
NS	05/27/97	Turnblewced Fragments	NE Corner of 200-E Perimeter Fence Line	FSS-97-0011/R/PR-97-032	30,000
NS	05/30/97	Vegetation/Soil	East perimeter fence at 241-SY Tank Farm	RPN Dated 5/30/97	300,000
NS	06/03/97	Animal Feces (Rabbit & Mice)	Along Steam line South of 7th Street	TANKFARM-97-0050	250,000
6705	06/03/97	3-House Mice	244-AR Vault	cc:Mail R. Bumgarner 8/13/97	25 mrad/hr
NS	06/04/97	Soil	200-W Railroad Tracks west of 2713-W Green Hut	SS-97-034/RPN Dated 6/4/97	250,000
NS	06/05/97	10 Areas of Soil Specks	200-W Railroad Tracks North of soil found on 6/4/97	FSS-97-0012	30,000
6699	06/05/97	Turnblewced Fragments	200-E perimeter fence outside Gate 810	FSS-97-0013	180,000
6714	06/05/97	Mouse Nest	South of B-Plant Conex	cc:Mail R. Bumgarner 8/13/97	10,000
NS	06/09/97	Speck	2706-T yard	PLANT-97-0010	55,000
NS	06/09/97	Dust Particle	Railroad Tracks north of 283-W	RPN Dated 6/9/97	400,000
NS	06/11/97	Specks	154-U Diversion Box	TANKFARM-97-0053	450,000
6700	06/11/97	Mouse Feces	R.R. Tracks East of 218-W-4B Burial Ground	RPN Dated 6/11/97	50,000
6702	06/16/97	Great Basin Pocket Mouse	244-A Lift Station	cc:Mail R. Bumgarner 8/13/97	20,000
6703	06/16/97	Cotton Tail Rabbit	244-A Lift Station	cc:Mail R. Bumgarner 8/13/97	<D
NS	06/18/97	Dust Particle	216-S-25	RPN Dated 6/18/97	150,000
6713	06/19/97	Deer Mouse	241-S Tank Farm West Perimeter	RR SS-24509	8,000
6704	06/24/97	Deer Mouse (Immature)	244-A Lift Station	cc:Mail R. Bumgarner 8/13/97	8,000
NS	06/26/97	Turnblewced Fragments	UN-216-E-20/21	FSS-97-0015	350,000
NS	06/30/97	Turnblewced Fragments	Inside 200-E at LEAF Loop Road	FSS-97-0016	400,000
NS	07/01/97	Turnblewced	Outside the east fence line of 241-AX/AZ	TANKFARM-97-0057	600,000
NS	07/17/97	Flashed Rail Car HC-a-3407	Contamination found during excess sale survey	FSS-97-0017	11,000
NS	07/14/97	Ant mound	25 feet NW of 216-Z-b Building	CC:mail dated 7/14/97 DE	40,000

Table 2. 1997 Contamination Samples

SAMPLE NUMBER	DATE	DESCRIPTION	LOCATION	DOCUMENT	ACTIVITY (dpm) B/G
NS	07/17/97	Mouse	100-K Basins	Telecon from Tony Dazo	4,000
NS	07/21/97	Tumbleweed Fragments	Along 23rd Street in 200-W	CC:Mail dated 7/21/96 DE	50,000
6712	07/22/97	2-Deer Mice	MO-031 east of PFP	RR SS-245267	10,000
NS	07/23/97	Flatbed Trailer HO-64-15325	Contamination found during excess sale survey	FSS-97-0018	310,000
6710	07/28/97	Great Basin Pocket Mice	6290-E Rigger's Loft	RR SS-245288	4,000
NS	07/28/97	Tumbleweed	East of 241-AZ	TANKFARM-97-0059	50,000
NS	07/28/97	Speck	South of the middle change trailer 241-C Tank Farm	TANKFARM-97-0060	50,000
NS	07/28/97	Dried vegetation	In trench #42 in 218-E-12B Burial Ground	SOLIDWASTE-97-0010	100,000
NS	07/25/97	Asphalt/roadway	Roadway at corner of Alaska/Ginko 300 Area	FSS-97-0019	90,000
NS	07/29/97	Vegetation	1301-N Vegetation Samples #6686 & 6677	RR SS-245291	35,000
NS	08/01/97	Soil	At the base of 296-B-10 Stack	WESF-97-0006	75,000
NS	08/12/97	Pebble (gravel)	Shoulder of road @ Alaska and Ginko Streets	FSS-97-0021	20,000
NS	08/13/97	Flatbed Trailer	1100 Area prior to offsite shipment	FSS-97-0022	1,600,000
NS	08/12/97	Soil	Sanitary Tile Field	BPLANT-97-0012	75,000
NS	08/19/97	Paint Chip	UN-216-W-28 (Outside the 211-U Tank Farm Perimeter)	CC:Mail dated 8/19/97	15,000
NS	08/18/97	Soil Specks	152-TX Perimeter	TANKFARM-97-0069	150,000
NS	08/22/97	Speck	Under painted surface of 307 Basins	300LEF-97-0004	750,000
NS	08/26/97	Mouse Urine	Underside conex #64-15027 & Concrete Pad	SS-97-050	95,000
NS	08/26/97	Tumbleweed Fragments	Trench #94 in 216-E-12B	SOLIDWASTE-97-0011	250,000
NS	09/08/97	Mouse Feces	2711-E Vehicle Maintenance Facility (vehicle IC-439)	CC:Mail dated 9/08/97	55,000
NS	09/11/97	Soil	222-S Radiation Material Area	ANALLAB-97-0026	85,000
NS	09/29/97	Tumbleweeds	216-A-30	SS245844	46,000
NS	10/01/97	Tumbleweed	Northeast corner of the 200-E perimeter fence	FSS-97-0025/SS-97-057	480,000
NS	10/07/97	Specks	UN-216-W-19	BHI-DND-97-0021	400,000

Table 2. 1997 Contamination Samples

SAMPLE NUMBER	DATE	DESCRIPTION	LOCATION	DOCUMENT	ACTIVITY (dpm B/G)
NS	10/07/97	Tumbleweed	241-C Tank Farm	PHMC-TANKFARM-97-0080	70,000
NS	10/09/97	Raven's Nest (Mouse Bones)	221-S Water Tower	Telecon 10/09/97 Phpps	15,000
NS	10/09/97	Soil and Grass	URM Pipeline 3-BB ENC. East of 241-TY	CC:Mail dated 10/09/97 Phpps	240,000
NS	10/10/97	Metal Can	1100 Excess Yard	PHMC-FSS-97-0026	247,000
6742	10/16/97	Mouse	272-S Building	Telecon 10/16/97 Phpps	> 1,000,000
6743	10/22/97	Rabbit Brush	South of 241-T across 22nd St.	RPN dated 10/21/97	180,000
NS	10/22/97	Soil and Tumbleweeds	South of 26th and 241-U	RPN dated 10/22/97	8mRad/hr
6744	10/23/97	Tumbleweeds	NE Corner of 221-U in UN-216-W-9	Telecon 10/23/97 Bungartner	> 1,000,000
6745	10/29/97	Mouse Nest	600 Area Lay-Down Yard	RPN dated 10/29/97	
N/A	10/29/97	Tumbleweeds	UN-216-W-36 next to 216-T-30	RPN dated 10/29/97	200,000
N/A	10/31/97	ANTI-C Rubber Shoes	Richland Landfill	PHMC-FSS-97-0028	60,000
6749	11/03/97	Mouse	275-E Carpenters Shack (Behind B-Plan)	RPN Dated 11/03/97	4,500
N/A	11/04/97	Tumbleweeds	216-U-14 Ditch	RPN dated 11/04/97	10,000
N/A	11/11/97	Steam Line Stanchion	Between 244-AR and FDNW Office Trailers	TANKFARM-97-0087	60,000
N/A	11/12/97	Truck Bed	105-N RA/RMA area	NREACTOR-97-0018	50,000
N/A	11/15/97	Tumbleweeds	218-E-12B Burial Ground	SOLIDWASTE-97-0016	150,000
N/A	11/17/97	Tumbleweeds	East Side of Canton Ave. across from 241-AX	SS246348	15,000
N/A	11/17/97	Soil Spec	East side of 241-AZ	SS246360	450,000
N/A	11/22/97	Tumbleweeds	241-ER-152 Diversion Box	TANKFARM-97-0094	600,000
N/A	12/01/97	Electrical Conduit	2727 Sodium Laydown Yard	TANKFARM-97-0096	60,000
N/A	12/03/97	Tumbleweed	216-B-59	RPN dated 12/03/97	95,000
N/A	12/08/97	6 Specs	WESF Truck Port drain grating	WESF-97-0012	100,000
N/A	12/10/97	Tumbleweed	216-A-42 Basins	RPN dated 12/10/97	12,000
N/A	12/17/97	Spec	244-A Lih Station	TANKFARM-97-0102	200,000

Table 2. 1997 Contamination Samples

SAMPLE NUMBER	DATE	DESCRIPTION	LOCATION	DOCUMENT	ACTIVITY (dpm) B/G
N/A	12/18/97	Pipe Gasket	Interior North fence Line - 200-East	FSS-97-0031	1,500,000
N/A	12/18/97	Tumbleweed	Interior North fence Line - 200-East	RPN dated 12/18/97	120,000
N/A	12/20/97	Soil	Outside the 2706-T Building	PLANT-97-0020	75,000
N/A	12/30/97	Tumbleweed Fragments	218-E-12B Trenches #16 and #17	SOLIDWASTE-97-0017	100,000

Note: Activity is reported in disintegrations per minute beta/gamma.

3.2 SURVEILLANCE AND COMPLIANCE INSPECTION REPORTS CLOSED

One SCIR was closed during calendar year 1997. None were closed during the fourth quarter of 1997.

3.3 STATUS OF OPEN SURVEILLANCE AND COMPLIANCE INSPECTION REPORTS

Four SCIRs, from past activities, remained open at the end of the fourth quarter of 1997. 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:

- CAR - Compliance Assessment Report
- 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 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 nuclides 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. One incident of note occurred in 1990, on an active crib outside 200-East involving 1.2 hectares (3.0 acres) of contaminated and uncontaminated tumbleweeds. The clean up costs for the removal and disposal of the tumbleweeds cost approximately six hundred thousand dollars.

A review of radiological reports (Radiological Problem Reports, Occurrence Reports, and Radiological Survey Records) indicates that in 1997, there were 39 incidents of contaminated tumbleweeds. This number is over twice the next highest number (19) recorded between 1994 and 1997 (Table 4). The higher incidence of contaminated vegetation indicates that weed control was not carried out in a consistent manner as is warranted by the contamination control problems posed by deep-rooted vegetation up taking contamination on radiologically controlled sites.

The significant increase in vegetation-caused-contamination in 1997 illustrates the importance of tumbleweed control on stabilized radiation sites. The potential for very expensive cleanup requirements overshadows the reality that neglecting one year increases the level of required control for several subsequent years.

Table 4. Contaminated Tumbleweed Samples (1994 to 1997)

Year	Number of Samples	Max. Activity (dpm)B/G	Min. Activity (dpm)B/G
1997	39	>1,000,000	2,500
1997	19	800,000	6,000
1995	11	250,000	2,000
1994	19	600,000	2,000

5.0 SUMMARY

All the routine outdoor radiological surveys were completed during calendar year 1997 in the 100, 200-East/West, 300 and 600 areas with no exceptions.

One SCIR was 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.

1997 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 first quarter of 1997, 5.6 hectares (13.8 acres) were stabilized and down posted from CA/SC to URM; during the second quarter of 1997, 7.7 hectares (19.1 acres) were stabilized and down posted from CA/SC to URM; during the third quarter of 1997, 2.0 hectares (5.0 acres) were stabilized and down posted from CA/SC to URM; and during the fourth quarter of 1997, 2.0 hectares (5.0 acres) were stabilized and down posted from CA/SC to URM.

From the beginning of 1991 through the end of calendar year 1997, 565 hectares (1,385 acres) have been stabilized and down posted to URM with 3,990 hectares (9,859 acres) remaining to be stabilized and down posted or cleaned up and released. Table 3 shows the downward trend of the contamination status during this time period.

Radiological posting changes, by waste site, noted during calendar year 1997, are as follows:

First Quarter:

The remaining surface soil contaminated portion of UN-216-W-24, which was under the abandoned steam line, was scraped and placed into the 216-S-18 Vehicle Decontamination Trench and the trench was covered with clean soil. The area that was under the steam line was sampled and released and the decontamination trench was down posted from CA/SCA to URM, 0.4 hectares (1.0 acres).

The eastern portion of the 216-B-3C Pond was backfilled and down posted from CA/SCA to URM, 5.2 hectares (12.9 acres).

A GPS survey of the 216-A-25 Gable Mountain Pond boundaries resulted in the increase from 30.4 hectares (75.0 acres) to 34.5 hectares (85.2 acres) of URM.

A GPS survey of the east side of the 241-S/SX/SY Tank Farm complex resulted in an additional 0.65 hectares (1.6 acres) of CA/SCA which had not been reported in previous reports.

Second Quarter:

The surface soil contaminated portion of UN-216-W-35, which was around the 207-U Basin was cleaned up and down posted from CA/SCA to URM, 0.8 hectares (2.0 acres).

The remaining contaminated portions of the 216-U-14 Ditch were backfilled, stabilized and down posted from CA/SCA to URM, 1.0 hectares (2.4 acres).

The majority of the C lobe of the 216-B-3 pond was backfilled, stabilized and down posted from CA to URM, 5.2 hectares (12.9 acres).

The slurry line corridor was decontaminated and down posted from CA to URM, 0.4 hectares (1.0 acres).

The 244-CR Vault perimeter was decontaminated and down posted from CA to URM, 0.35 hectares (0.9 acres).

Third Quarter:

The surface soil contaminated section of the 216-A-25 (Gable Mountain Pond) extension discovered during the radiological mapping fly over in 1996, was cleaned up and down posted from CA/SCA to URM, 2.0 hectares (5.0 acres).

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. A milestone was reached in September 1997 with the ERDF having received 500,000 tons of contaminated waste. The waste came 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. This is the first quarter that the posting changes have been added to this report, 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).

Fourth Quarter:

The berms on the east and west sides of the REDOX railroad cut were used to backfill and stabilized the contaminated portion of the railroad bed. Resulting in the down posting from CA/SC to URM 0.33 hectares (0.83 acres).

A portion of the 107-H that had become recontaminated and posted as a CA/SC area was stabilized and down posted to URM 1.7 hectares (4.2 acres).

Table 3. Outdoor Contamination Status (CA/SC Areas) 1991 through 1997
[approximate surface area in hectares (acres)]

Hanford Site Area	1991	1992	1993	1994	1995	1996 ^a	1997
100 Areas	65(160)	65(160)	65(160)	63(155)	52(129)	47(116)	47(116)
200 Areas	157(389)	133(329)	129(318)	105(261)	92(228)	99(245)	91(225)
300 Areas	18(45)	18(45)	18(45)	21(52)	21(52)	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
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)

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 Control Area.

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

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