

ENGINEERING CHANGE NOTICE

Page 1 of 3

1. ECN **185364**

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. B. P. Gleckler, Radiological Engineering, L8-20, 6-2468		4. Date 03/22/93
	5. Project Title/No./Work Order No. Evaluating Airborne Radionuclide Concentrations in the Tank Farms	6. Bldg./Sys./Fac. No. 241-A 241-BX/BY	7. Impact Level 3-SQ
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-TP-147 Rev. 0	9. Related ECN No(s). N/A	10. Related PO No. N/A
11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. N/A	11c. Modification Work Complete N/A Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A Cog. Engineer Signature & Date

12. Description of Change

Add an additional wind speed range to make the wind speed ranges for collecting data: 1 to 8 mph, 9 to 13 mph, 14 to 20 mph, 21 to 30 mph, and above 30 mph. This will effect the following sections:
 Section 4.2, paragraph 3
 Section 6.2, paragraph 4

Add contingency to collect air samples outside the perimeter of the tank farm fence-line(s), if air samples from the study indicate airborne concentrations at or in excess of the decision levels for alpha and beta emitters.

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13a. Justification (mark one)	Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const. <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
 See continuation form.

14. Distribution (include name, MSIN, and no. of copies)
 See distribution form.

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DATE **MAY 06 1993**

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15. Design Verification Required
 Yes
 No

16. Cost Impact	
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Additional <input type="checkbox"/> \$	Additional <input type="checkbox"/> \$
Savings <input type="checkbox"/> \$	Savings <input type="checkbox"/> \$

17. Schedule Impact (days)
 Improvement
 Delay

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD <input type="checkbox"/> Functional Design Criteria <input type="checkbox"/> Operating Specification <input type="checkbox"/> Criticality Specification <input type="checkbox"/> Conceptual Design Report <input type="checkbox"/> Equipment Spec. <input type="checkbox"/> Const. Spec. <input type="checkbox"/> Procurement Spec. <input type="checkbox"/> Vendor Information <input type="checkbox"/> OM Manual <input type="checkbox"/> FSAR/SAR <input type="checkbox"/> Safety Equipment List <input type="checkbox"/> Radiation Work Permit <input type="checkbox"/> Environmental Impact Statement <input type="checkbox"/> Environmental Report <input type="checkbox"/> Environmental Permit <input type="checkbox"/>	Seismic/Stress Analysis <input type="checkbox"/> Stress/Design Report <input type="checkbox"/> Interface Control Drawing <input type="checkbox"/> Calibration Procedure <input type="checkbox"/> Installation Procedure <input type="checkbox"/> Maintenance Procedure <input type="checkbox"/> Engineering Procedure <input type="checkbox"/> Operating Instruction <input type="checkbox"/> Operating Procedure <input type="checkbox"/> Operational Safety Requirement <input type="checkbox"/> IEFD Drawing <input type="checkbox"/> Cell Arrangement Drawing <input type="checkbox"/> Essential Material Specification <input type="checkbox"/> Fac. Proc. Samp. Schedule <input type="checkbox"/> Inspection Plan <input type="checkbox"/> Inventory Adjustment Request <input type="checkbox"/>	Tank Calibration Manual <input type="checkbox"/> Health Physics Procedure <input type="checkbox"/> Spares Multiple Unit Listing <input type="checkbox"/> Test Procedures/Specification <input type="checkbox"/> Component Index <input type="checkbox"/> ASME Coded Item <input type="checkbox"/> Human Factor Consideration <input type="checkbox"/> Computer Software <input type="checkbox"/> Electric Circuit Schedule <input type="checkbox"/> ICRS Procedure <input type="checkbox"/> Process Control Manual/Plan <input type="checkbox"/> Process Flow Chart <input type="checkbox"/> Purchase Requisition <input type="checkbox"/>
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19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision		Document Number/Revision
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20. Approvals

	Signature	Date		Signature	Date
OPERATIONS AND ENGINEERING			ARCHITECT-ENGINEER		
Cog Engineer: BP Gleckler		4/30/93	PE		
Cog. Mgr.: SR Johnson		4/30/93	QA		
QA: CD Suydam		4/30/93	Safety		
Safety: BA ^{APL} Schwer ^{Schwehr}		4/28/93	Design		
Security			Environ.		
Environ.			Other		
Projects/Programs					
Tank Waste Remediation System					
Facilities Operations			DEPARTMENT OF ENERGY		
Restoration & Remediation			Signature or Letter No.		
Operations & Support Services					
IRM			ADDITIONAL		
Other					

13b. Justification Details

A larger breakdown of the higher wind speeds may allow for the change of the 15 mph wind restriction in Section 12.4.4.3.2 of the WHC-CM-4-10 manual. It would be very advantageous to be able to change this restriction to a higher wind velocity. The additional wind speed ranges will facilitate this possibility.

If test plan air samples indicate that concentrations are equal or greater than 2% of the Derived Air Concentration (DAC), resuspended activity from the tank farms may pose an inhalation hazard to the public. It would be necessary and prudent to evaluate the potential for this hazard immediately, to ensure that areas are adequately posted.

RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-TP-147, REV. 0 AND REV. 0-A

Document Title: EVALUATION AIRBORNE RADIONUCLIDE CONCENTRATIONS IN THE TANK FARMS

Release Date: 1/13/95

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Chris Willingham
C. Willingham

1/13/95

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SUPPORTING DOCUMENT

1. Total Pages 22

2. Title

Evaluating Airborne Radionuclide Concentrations in the Tank Farms

3. Number

WHC-SD-WM-TP-147

4. Rev No.

0-A

5. Key Words

tank farm(s), resuspension, airborne contamination, airborne concentrations, air sampling, 241-A, 241-BX, 241-BY, health physics study, wind restriction.

6. Author

Name: B.P. Gleckler

B.P. Gleckler 4/30/93
Signature

Organization/Charge Code 33610/N54B1

7. Abstract

The objective of this study is to determine, through the collection of grab sampling data, that an indepth resuspension study should or should not be performed. Currently there is not enough data available to determine if a potential health hazard exists due to resuspended contamination in the tank farms. A detailed resuspension study is currently not justified, because the limited quantity of air sample data collected does not indicate the existence of a potential health hazard.

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DATE

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9. Impact Level 3-SQ

EVALUATING AIRBORNE RADIONUCLIDE CONCENTRATIONS IN THE TANK FARMS

B. P. Gleckler

March 1993

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Radiological Engineering
Westinghouse Hanford Company

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APPENDIX A, Data Sheets Utilized

APPENDIX B, Tank Farm Maps and Radiological Survey Data

3.0 SCOPE

To obtain valid results, tank farms with the highest probability of producing resuspended radioactive contamination have been selected for sampling. Sampling for this test plan will take place in only the 241-BX/BY and 241-A Tank Farms. These tank farms have been selected due to their higher potential for producing resuspended contamination. Their selection was based on the nearby ambient air monitoring results, extent of surface contamination migration, and extent of surface contamination within the tank farm, as indicated by radiological surveys and environmental monitoring reports (Reference 10 & Appendix B).

4.0 DESCRIPTION OF TEST

4.1 Test Item

Air samples will be collected and documented for brief periods of time, between 4 and 8 hours, during different wind velocity ranges and various work activities. All grab samples will be submitted to the 222-S Analytical Laboratory's routine air filter sample analysis program. A gross alpha and gross beta analysis will be performed on all samples. The airborne concentrations of radionuclides will then be calculated for each sampling period and location. Samples indicating airborne alpha and/or beta emitters above action levels will have a gamma energy analysis and alpha energy analysis performed on them to identify the radionuclides.

4.2 Test Environment

Outdoor air samples will be collected at only the 241-BX/BY and 241-A Tank Farms. These farms are all located in the 200 East Area of the Hanford Site. Simultaneous samples will be taken at the upwind and downwind sides of the surface contamination areas in these tank farms. Upwind samples will establish background radionuclide concentrations for the downwind samples.

The test locations are predominately contaminated with isotopes of Cs¹³⁷ and Sr⁹⁰. Other radiological contaminants may include: Co⁶⁰, Cs¹³⁴, Eu¹⁵⁴, Eu¹⁵⁵, I¹²⁹, K⁴⁰, Pb²¹⁰, Pb²¹², Pb²¹⁴, Pu²³⁸⁻²⁴⁰, Ra²²⁶, Ru¹⁰⁵, Sb¹²⁵, U²³⁵, U²³⁸, and Zn⁶⁵ (Reference 10). Contamination levels at several locations in the 241-BX/BY and 241-A Tank Farms exceed 1×10^6 dpm/100 cm² for beta and gamma emissions, as indicated by the most recent radiological surveys (Appendix B).

Attempts will be taken to collect four sets of samples at each tank farm during the following wind velocity ranges: 1 to 8 mph, 9 to 13 mph, 14 to 20 mph, 21 to 30 mph, and above 30 mph. Four sets of data may not be possible at the higher velocity ranges, since regular wind speeds of this degree are

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Attempts will be taken to collect four sets of samples at each tank farm during the following wind velocity ranges: 1 to 8 mph, 9 to 13 mph, 14 to 20 mph, above 20 mph. These wind velocity ranges were selected because a previous study by G.A. Sehmel (Reference 1) indicated these ranges have different resuspension factors. Four sets of data may not be possible at the higher velocity ranges, since regular wind speeds of this degree are

relatively uncommon. This test plan will allow eight months, from when sampling is started, to collect the specified number samples from each wind velocity range. Samples will also be taken during as many different work activities as possible, documenting the wind speed during the activity.

Work activities will consist of whatever work activities are already planned during the execution of this test plan. Work activities will not be simulated, because of the potential for releasing and dispersing contaminants into the environment. Also, simulated work activities will not be done because it is not consistent with current ALARA practices.

NOTE: The performance of various work activities is not a requirement for the completion of this test plan. Data produced during different work activities will be beneficial but not critical to this study.

4.3 Equipment and Facilities

The following equipment will be utilized:

1. (10) constant flow or volume totalizing air samplers capable of sampling a minimum of 720 ft³ in a 4-8 hour period.
2. Numerous sample filters and envelopes.
3. TSI 8360 VelociCalc Plus, air velocity, temperature, relative humidity, and differential pressure meter.
4. Genie and/or Canberra Jupiter gas flow proportional alpha/beta counting systems using automatic sample changers.
5. Generators and extension cords as needed.

The following facilities and personnel will be utilized.

1. BX/BY Tank Farm Complexes.
2. 241-A Tank Farm Complex.
3. Tank Farm's Health Physics.
4. Waste Tank Project/Facility Operations.
5. Technical Support from Radiological Engineering.

4.4 Data

All air samples collected will be analyzed for gross alpha and gross beta activity. A Minimum Detectable Concentration (MDC) of 4.0×10^{-14} $\mu\text{Ci/ml}$ will be required for gross alpha counting, since this is the action level for alpha emitters. A MDC of 4.0×10^{-11} will be required for gross beta counting, since this is the action level for beta emitters. All sample results will have a two sigma statistical error.

4.5 Criteria/Constraints

This test is to determine if the tank farms with the highest potential for producing resuspended contamination can pose an inhalation hazard for personnel working in the tank farms. This test will provide data to assist in making the determination of whether or not the tank farms are in compliance with WHC-CM-4-10 Sections 6.0 and 15.0 and DOE Order 5480.11.

Currently personnel in the tank farms may or may not be exposed to significant concentrations of resuspended contaminants during various weather/working conditions. Unfortunately adequate air sample data has not been collected and documented to determine that no potential hazard exists.

Westinghouse Hanford Company personnel are required to participate in a bioassay program when they are exposed to contamination levels that may result in a 100 mrem annual effective dose equivalent from all intakes of radionuclides from occupational sources (Reference 5). The Hanford Internal Dosimetry Program Manual (Reference 13) states that the 100 mrem annual effective dose equivalent is approximately equal to a chronic exposure of 2.0% of a Derived Air Concentration (DAC).

Clean Sweep Item number CSI 06207 Card #630-1 and Employee Concern number 90-424 (closed 11/08/92) have expressed written concerns about this issue. The Clean Sweep Item was closed by promising the evaluation of potentially resuspended radionuclides. This issue of a potential hazard needs to be evaluated to ensure workers are not unnecessarily being exposed to airborne contaminants.

5.0 EXPECTED RESULTS

All results are expected to be below 2% of the DAC for each sampling period, for the radionuclides listed in WHC-CM-4-10 Appendix B. Exposure to 2% of a DAC is a point that may require workers to participate in a bioassay program. Currently there is no bioassay program for tank farm workers. Historically, annual whole body counts of tank farm workers have not indicated any radionuclide uptakes.

6.0 TEST PROCEDURE

6.1 Preparations

The test will incorporate the use of 10 constant flow or volume totalizing air samplers in conjunction with the currently available Health Physics procedures for collecting grab samples in surface contamination areas. Two goose-neck samplers will be located within the tank farm at the fence line upwind of the contamination source and the remaining ones will be placed at downwind locations within the tank farm fence-line. The upwind samplers will determine the background level of suspended contamination. All sampling heads will be set to 5 feet above the tank farm surface facing into the wind.

Radiological Engineering will determine and record the exact location for each of the air samplers involved with this test. All sampler locations will have location codes assigned to them so that the data can be entered into the Automated Bar Coding of Air Samples at Hanford (ABCASH) system. Radiological Engineering will prepare the filter envelopes prior to sampling, labeling the sampling locations with their individual identification numbers on each envelope (see Appendix A for example).

At the beginning of each sampling period, the samplers will be situated so that they face into the prevailing wind direction. The direction will be determined using a compass and recorded in the test plan's logbook. Hourly averaged atmospheric data such as: wind velocity, wind direction, and stability class will be collected from the PNL Meteorological Station and recorded with the test results. Radiological Engineering will determine the relative humidity and temperature at the sampling site and record the results in the test plan's logbook. Any samples collected when the hourly averaged wind direction varied by more than 45° than the direction that the samplers were facing will not be accepted.

The intent of this test is to determine that contaminants are not being resuspended into the breathing zone and causing potential respiratory hazards. Subsequently, this test is only interested in sampling the breathing zone air, approximately 5 ft above the ground. Contaminated particles larger than the respirable size range ($>10 \mu\text{m}$) may be resuspended to elevations up to the first couple of feet.

6.2 Sample Collection

Health Physics Technicians (HPTs) will collect the grab samples in accordance with the following prescribed procedures in WHC-IP-0692:

Section	7.3.4	Rev. 2	SEMI-PORTABLE AIR SAMPLERS
	2.04.01	Rev. 0	PORTABLE GRAB AIR SAMPLING

Air samplers will be equipped with flow meters calibrated with standards traceable to the National Institute of Standards Testing (NIST). All samplers will be operated at their maximum flow rates. All air samples will be taken to obtain the minimum sample of 720 ft³ of air. 8 hours, the work day length, will be the maximum duration of the sampling periods. Passing 720 ft³ of air through the filter samples is required to obtain enough activity to see 2% of the DAC on the filters. The limited sampling time will facilitate the collection of samples at the higher wind speed ranges, since the higher wind speeds usually are of short duration (<12 hours). HP Field Change Requests will be issued as necessary to ensure that these criteria are met.

Radiological Engineering will verify the accuracy of the calibrated flow meters before and after they are placed into the tank farms. The accuracy of the flow meters on the air samplers will be verified by comparing them to a secondary flow meter calibrated to NIST standards. This will be documented in the project's log book.

Radiological Engineering will utilize the wind velocity forecast data from Pacific Northwest Laboratory's Meteorological Station to determine the maximum sampling times. Sampling periods will be conducted for as long as possible within the range of 4 to 8 hours. Attempts will be made to obtain four sets of samples, at each tank farm, from the following wind velocity ranges.

1. 1 to 8 mph
2. 9 to 13 mph
3. 14 to 20 mph
4. 21 to 30 mph
5. above 30 mph

One field blank will be submitted for each sampling event as a part of the test plan's quality control. A chain of custody for all samples will be maintained per the requirements of WHC-CM-4-10 Section 16.0 Rev. 0. A chain of custody form, A-6000-407 (12/90) or Wordperfect Macro WEF061, will be initiated by an HPT, upon retrieval of the sample filters (Appendix A).

Air sample results may indicate a potential inhalation hazard to radiation workers and or the public for the area(s) outside of the tank farm fence-line(s). It would be necessary and prudent to evaluate the potential for this inhalation hazard immediately. If any air samples collected within the tank farms indicate airborne radionuclide concentrations equal to or greater than 2% of the DAC for alpha and beta emitters, air samples will be collected for the area(s) immediately outside of the tank farm fence-line(s). Additional calibrated air samplers will be obtained from the Health Physics Organization to collect any additional samples. Air sample results obtained from areas outside of the tank farm fence-line(s) will be reported immediately to the applicable Area Health Physics Organization. These results will also be discussed in this test plan's final report.

6.3 Sample Analyses

All air samples taken for this test plan will be submitted to the 222-S Analytical Laboratory for the standard air sample analyses. The standard air sample analyses consists of a gross alpha and gross beta analysis. All air sample analyses will be completed in accordance with WHC-SD-CP-LB-032, LA-508-112, SD-RE-ADP-003 and SD-CP-QAPP-001 (References 12, 14, 15, & 16).

All samples indicating airborne radionuclide concentrations of 2% of the DAC or greater will have the following additional analyses performed.

1. Gamma Energy Analysis (GEA)
2. Alpha Energy Analysis (AEA)

These will be completed using the following procedures:

LA-508-052 Gamma Energy Analysis Using the Canberra Jupiter System
LA-508-262 Gamma Energy Analysis Using the Genie System

LA-508-051 Alpha Energy Analysis Using the Canberra Jupiter System
LA-508-261 Alpha Energy Analysis Using the Genie System

Upon completion of sample analyses a report will be issued to Radiological Engineering on the results. After analysis, all samples will be retained and stored until Radiological Engineering receives the analysis report(s) and a copy of chain of custody form(s). Radiological Engineering will review data and notify 222-S Analytical Laboratory when to dispose of the samples. All samples requiring storage and/or disposal will be done so in accordance with 222-S Analytical Laboratory procedures (References 12 & 14).

6.4 Data

All collected data will be stored in accordance with WHC-CM-3-5, Document Control and Records Management. All air sample results collected for this test plan will be recorded on the ABCASH system. Also all data collected for this test plan will be stored by Radiological Engineering. A final report of the results will be on file at Central Files.

6.5 Reporting Results

A two sigma counting error will be assessed for all gross alpha and beta counting results. All airborne radionuclide concentrations will be reported with four significant digits in scientific notation as $X.XXXE-XX \pm X.XXXE-XX$ $\mu\text{Ci/mL}$. All data will be reported, including positive and negative counting results.

Wind velocity will be reported in units of mph. Wind directions will be reported in degrees. Atmospheric stability class will be recorded as classes ranging from A through G. Ambient temperatures measured at the beginning and end of each sampling period will be reported in degrees fahrenheit. The relative humidity will be logged at the beginning and end of each sampling period. The relative humidity will be reported as the percentage of the maximum amount of water vapor that the air can hold at the given temperature.

7.0 SAFETY

Sampling and analyses must be conducted in accordance with the General Safety Rules, Industrial Safety Manual (WHC-CM-4-3) and the Radiation Protection Manual (WHC-CM-4-10). Compliance with a Radiation Work Permit (RWP) is mandatory for collecting and handling all samples. This test plan will be executed within Surface Contamination Areas (SCAs) and Radiologically Controlled Areas (RCAs).

No unusual industrial, radiological, chemical, fire, compressed air, release of energy, or criticality safety hazards are known or expected to be associated with the performance of this test plan.

East Tank Farm Operations will be notified by Waste Tank Health & Safety prior to and at the end of each sampling period.

8.0 QUALITY ASSURANCE

- Licensing Requirements: None applicable for this test plan.
- Test Witness: No certified Quality Control witness is required for this test plan.
- Traceability: Air samplers will be equipped with flowmeters calibrated to standards traceable to the National Institute of Standards Testing (NIST).

8360 VelociCalc will be calibrated with standards traceable to the NIST.

Determination of radioactivity levels of filter samples will be made with equipment calibrated with standards traceable to the NIST.

9.0 ORGANIZATION FUNCTION AND RESPONSIBILITIES

The primary organizational interdependencies associated with this test are found within the following organizations.

- Radiological Engineering: Responsible for writing test plan; field support in determining sample locations and length of each sampling period; technical support for execution of test plan; gathering, analyzing, and reporting test plan results; notifying Tank Farm Operations of sampling periods.
- Tank Farm Health Physics: Responsible for providing input, reviewing and approving this test plan; responsible for providing support for collecting filter samples for this test plan.

Tank Farm Operations: Overall operations management responsibility.

222-S Analytical Laboratory: Responsible for providing analytical support.

Customer: Tank Farm Health Physics, same responsibilities as above.

Safeguards and Security: None

Safety Engineering: Review the test plan to ensure that the work prescribed will be completed in a safe manner.

Quality Assurance: Review the test plan and final report to ensure the quality of the test plan and results.

Outside Agencies: None Required.

10.0 SCHEDULE

#	Item	Date of Completion
1.0	Issue test plan	10/31/92
2.0	Determine sampler locations	TBD
3.0	Collect & analyze samples	TBD
4.0	Prepare & issue final report	TBD

11.0 REPORTS

A final report will be prepared and issued according to the requirements stated in the Standard Engineering Practices Manual, WHC-CM-6-1. The report will make the recommendation of whether a formal resuspension study, additional sampling, or no additional studies should be conducted. The respiratory protection requirements for radioactive contaminants in tank farms will be re-assessed in the final report. Copies of the report will be distributed to Radiological Engineering, Waste Tank Health & Safety, Waste Tank Safety Operations & Safety, and the Employee Concerns Program.

The appendix of the final report will include all calibration data for the equipment utilized during the execution of the test plan.

12.0 REFERENCES

- (1) BNWL-SA-5228, G.A. Sehmel, "Experimental Measurements and Predictions of Particle Deposition and Resuspension Rates", dated March 1975.
- (2) BNWL-2081/UC-11, G.A. Sehmel, "Radioactive Particle Resuspension Research Experiments on the Hanford Reservation", dated February 1977.
- (3) NUREG/CR-3332, ORNL-5968, J.E. Till and H.R. Meyer, "Radiological Assessment", dated September 1983..
- (4) G.F. Knoll, "Radiation Detection and Measurement", 2nd ed., John Wiley & Sons, New York, 1989.
- (4) DOE Order 5480.11, "Radiation Protection for Occupational Workers."
- (5) WHC-CM-4-10, Radiation Protection.
- (6) WHC-IP-0692, Health Physics Procedures.
Section 7.3.4, "Semi-Portable Air Samplers."
Section 2.04.01 "Portable Grab Air Sampling."
- (7) WHC-CM-4-2, Quality Assurance.
- (8) WHC-CM-6-1, Standard Engineering Practices.
- (9) WHC-CM-3-5, Document Control and Records Management.
- (10) WHC-EP-0145-4 Rev. 4, Westinghouse Hanford Company Environmental Surveillance Annual Report -- 200/600 Areas, 1990.
- (11) DOE/RW-0164 Vol. 3 of 9, Consultation Draft of Site Characterization Plan, January 1988.
- (12) SD-CP-QAPP-001 Rev. 0, Analytical Chemistry Services Laboratories Quality Assurance Plan, July 1989.
- (13) PNL-MA-552 Section 5.0, Hanford Internal Dosimetry Program Manual, July 1989.
- (14) WHC-SD-CP-LB-032 Rev. 0, Radiochemical Analysis of Routine Air Filter Samples at the 222-S Laboratory Facility, June 1990.
- (15) LA-508-112 Rev. A-1, 222-S Counting Room Calculations for Air, Water, and Smear Samples, September 1989.
- (16) SD-RE-ADP-003 Rev. 0-0, System Documentation for the Automatic Reduction of Radioactive Particulate Air Filter Sample Data, Rockwell Hanford Operations, May 1982.

Appendix A
Data Sheets Utilized

Example of Air Sample Envelope

EDP CODE		LOCATION	
DATE ON	TIME ON	SIGNATURE (ON)	
DATE OFF	TIME OFF	SIGNATURE (OFF)	
TIMER			
GASMETER/FLOW TOTALIZER			
		FT ³	M ³
ROTAMETER			
ON		OFF	
VACUUM			
ON		OFF	

54-6700-206 (11-87)

Example of Chain of Custody Form

Westinghouse Hanford Company	CHAIN OF CUSTODY
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Custody Form Initiator	
Company Contact	Telephone
Project Designation/Sampling Locations	Collection Date
Ice Chest No.	Field Logbook No.
Bill of Lading/Airbill No.	Offsite Property No.
Method of Shipment	
Shipped to	
Possible Sample Hazards/Remarks	

Sample Identification

<input type="checkbox"/> Field Transfer of Custody	Chain of Possession	(Sign and Print Names)
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition		
Disposal Method:	Disposed by:	Date/Time:
Comments:		

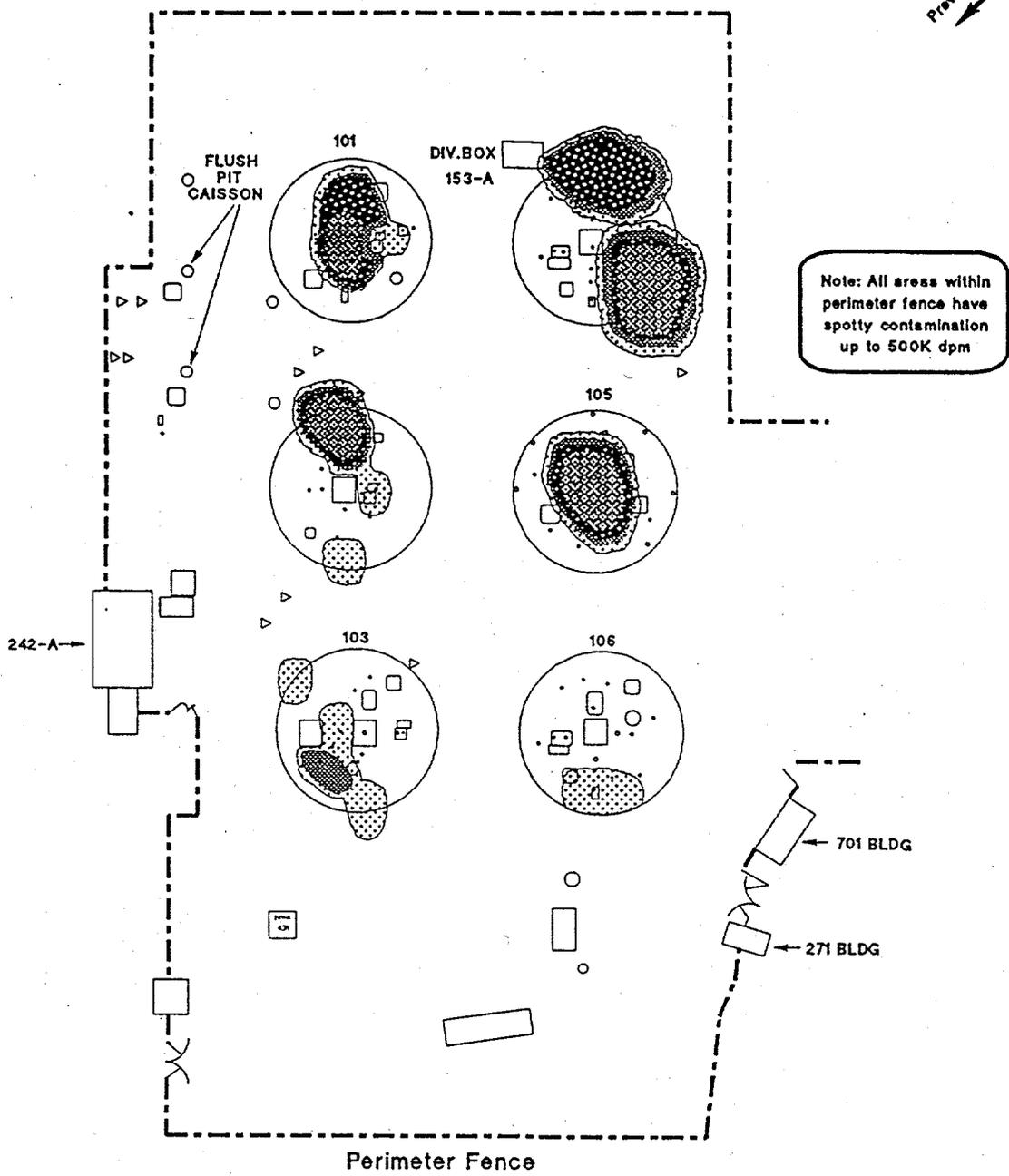
A-6000-407 (12/90) (EF) WEF061
Chain of Custody

Appendix B

Tank Farm Maps and Radiological Survey Data

A-FARM

Prevailing Wind
↙

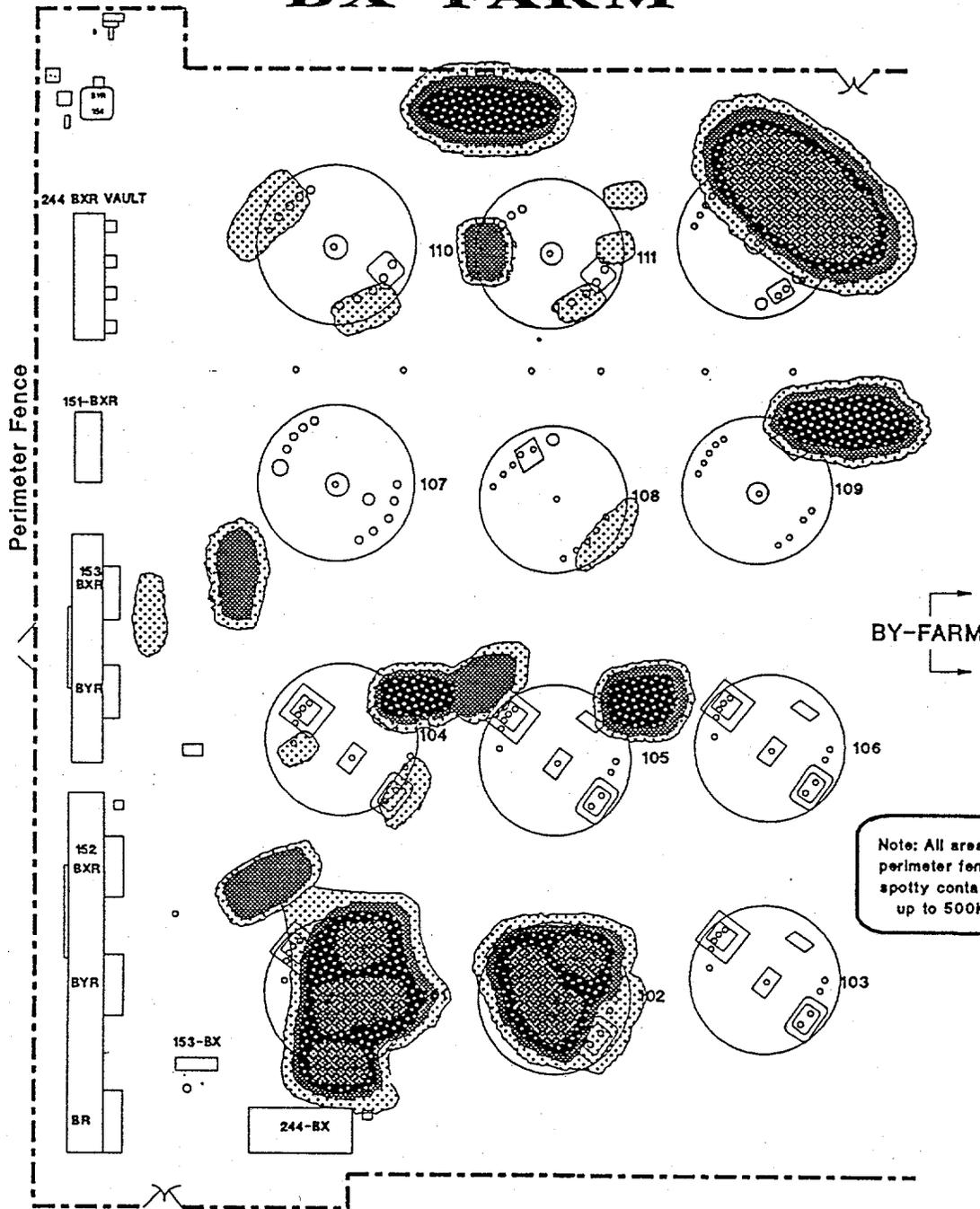


RADIOACTIVE CONTAMINATION LEVELS (disintegrations per minute)	
10K to 50K	50K to 200K
200K to 10 ⁶	> 10 ⁶

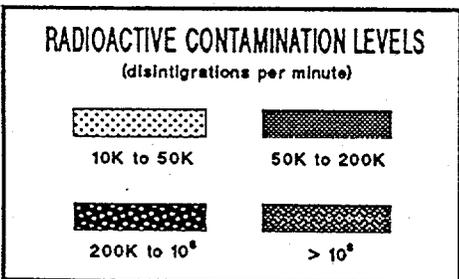
Title: 241-A Surface Contamination (Composite of 1991 & 1992 Survey Data)	
Organization: Radiological Engineering	
Date: 10/30/92	Dwg. No.: RERESUS3

BX-FARM

Prevailing Wind ↙



Note: All areas within perimeter fence have spotty contamination up to 500K dpm



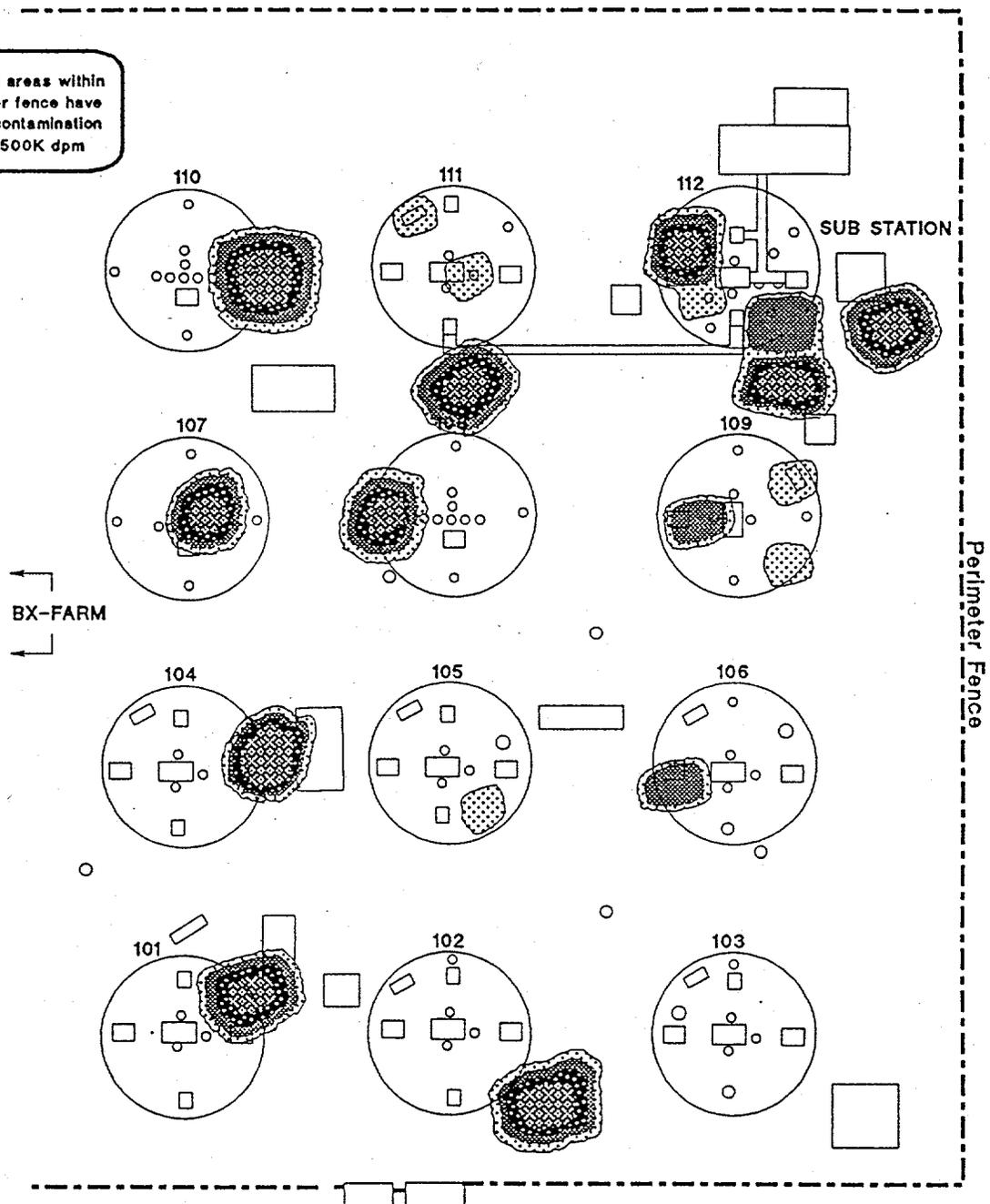
NORTH →

Title: 241-BX Surface Contamination (Composite of 1991 & 1992 Survey Data)	
Organization: Radiological Engineering	
Date: 10/30/92	Dwg. No.: RERESUS2

BY-FARM

Prevailing Wind

Note: All areas within perimeter fence have spotty contamination up to 500K dpm



RADIOACTIVE CONTAMINATION LEVELS (disintegrations per minute)	
10K to 50K	50K to 200K
200K to 10 ⁶	> 10 ⁶

Title: 241-BY Surface Contamination (Composite of 1991 & 1992 Survey Data)	
Organization: Radiological Engineering	
Date: 10/30/92	Dwg. No.: RERESUS1