Hanford Environmental Dose Reconstruction Project

Monthly Report

June 1990

Prepared for the Technical Steering Panel

DISCLAIMER

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HANFORD ENVIRONMENTAL DOSE
RECONSTRUCTION PROJECT

Monthly Report

June 1990

Prepared for the Technical Steering Panel

Pacific Northwest Laboratory
Richland, Washington 99352

HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION PROJECT

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PREFACE

This monthly report summarizes the technical progress and project status for the Hanford Environmental Dose Reconstruction (HEDR) Project being conducted at Pacific Northwest Laboratory (PNL) under the direction of a Technical Steering Panel (TSP). The TSP is composed of experts in numerous technical fields related to this project and represents the interests of the public. The U.S. Department of Energy (DOE) funds the project.

Figure 1 shows the PNL organizational structure of the HEDR Project. Table 1 shows the status of PNL work to comply with directives issued by the TSP.

FIGURE 1. Organizational Structure of the Hanford Environmental Dose Reconstruction Project

EXECUTIVE SUMMARY*

The objective of the Hanford Environmental Dose Reconstruction Project is to estimate the radiation doses that populations could have received from nuclear operations at Hanford since 1944. The project is being managed and conducted by Pacific Northwest Laboratory under the direction of an independent Technical Steering Panel.

The Technical Steering Panel consists of experts in environmental pathways, epidemiology, surface-water transport, ground-water transport, statistics, demography, agriculture, meteorology, nuclear engineering, radiation dosimetry, and cultural anthropology. Included among the members are appointed technical members representing the States of Oregon and Washington, cultural and technical experts nominated by the Indian tribes in the region, and an individual representing the public.

* This Executive Summary was approved by the Technical Steering Panel in September 1988.

The project is divided into the following technical tasks. These tasks address each of the primary steps in the path from radioactive releases to dose estimates:

- source terms
- environmental transport
- environmental monitoring data
- demographics, agriculture, and food habits
- environmental pathways and dose estimates.

The source terms task will develop estimates of radioactive emissions from Hanford facilities since 1944. These estimates will be based on historical measurements and production information.

The environmental transport task will reconstruct the movement of radioactive materials from the areas of release to populations. Movement via the atmosphere, surface water (Columbia River), and ground water will be studied.

The environmental monitoring task will assemble, evaluate, and report historical environmental monitoring data. A major effort of this task is to separate Hanford as a source of radionuclide concentrations in the environment from concentrations due to natural sources and nuclear testing fallout.

The demographics, agriculture, and food habits task will develop the data needed to determine the populations that could have been affected by the releases. Population and demographic information will be developed for the general population within the study area. This information will also be developed for several special population groups including the Native American Tribes in the study area, Army personnel stationed at Hanford, Hanford construction workers, and migrant farm workers.

In addition to population and demographic data, the food and water consumption patterns and sources of food and water for these populations must be estimated since these provide a primary pathway for the intake of radionuclides.

Historical dairy farming practices and milk distribution systems will be studied because milk is a significant pathway for iodine-131 to enter the human body. Cows could have eaten vegetation contaminated with this radionuclide.

The environmental pathways and dose estimates task will use the information produced by the other tasks to estimate the radiation doses populations could have received from Hanford.

Project reports, which have been approved by the Technical Steering Panel, and references used in the reports will be made available to the public in a public reading room. Project progress will be documented in monthly reports, which are available to the public.

Historical data, farming practices and milk distribution systems will be studied to determine milk is a significant pathway for wildlife to enter the human food chain. Cows could have eaten vegetation contaminated with this herbicide.

The environmental pathways and dose estimates task will use the information produced by the other tasks to estimate the risk to deer populations could have resulted from herbicide.

Project reports which have been approved by the Technical Steering Panel and references used in the reports will be made available to the public in a public reading room. Project progress will be documented in monthly reports, which are available to the public.

MANAGEMENT SUMMARY

PROGRESS

The following major activities were conducted by HEDR staff in June 1990:

- completed the calculation of preliminary dose estimates for the air and Columbia River exposure pathways
- prepared three draft Phase I reports: summary, air pathway, and Columbia River pathway
- performed an internal quality assurance (QA) audit on data traceability of results reported during Phase I; no major findings or observations were identified
- attended the workshop, "Public Health Aspects of Hanford Health Studies," in Richland on June 6
- made presentations at the Atmospheric Transport and Diffusion Modeling Workshop held in Richland on June 12 and 13 explaining the project approach to atmospheric transport modeling and dose calculations
- met with TSP members to review calculations regarding quantities of iodine-131 released to the atmosphere during 1944-1947
- received data from the Coeur d'Alene tribe on school enrollment and food consumption; received work plan for gathering demographic information from the Colville tribe; initiated Work Order No. 1 (developing a work plan) with the Yakima Nation
- sent draft of "protocol" on food consumption data collection to TSP Demographic Subcommittee and Native American tribes for comments
- completed writing the computer code that quantifies the effects of the modular construction of the Phase I Monte Carlo air-pathway dose model on the distributions of the dose estimates
- gave presentations at the 1990 Health Physics Society Meeting entitled, "Reconstruction of Hanford Vegetation Monitoring Data for Dose Reconstruction" and "Uncertainty Analysis of the Conversion Factor for Historic Iodine-131 Gross Beta Vegetation Measurements."

MAJOR ISSUES AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- assist the TSP in preparing for their release of preliminary dose estimates in July, and respond to subsequent requests for technical information from the public or other groups
- continue working with the TSP to plan Phase II activities
- begin preparing a summary report describing the methodology and sources of information used to calculate the quantities of iodine-131 released to the atmosphere during 1944-1947
- provide interview training to tribes that wish to use the food consumption survey developed by PNL
- develop guidelines that set forth the minimum contents of the Phase II QA Plan.

BUDGET STATUS

Projected expenditures through June 1990	\$ 2,100 K
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Actual expenditures through June 1990	\$ 2,353 K
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VARIANCE EXPLANATION

The current cumulative variance between planned and actual costs is 12%. The current month spending exceeded that originally planned because of preparation of the draft Phase I reports. We have received notification from DOE-Richland that an additional \$285K will be funded to cover additional Phase I activities directed by the TSP. The planned expenditures will be modified upon receipt of the funding.

CAPITAL STATUS

Capital equipment funding for \$141,000 was approved and allocated for the purchase of a Geographic Information System. The computers and software were delivered and set up in April.

PROJECT SUMMARY REPORT

1. IDENTIFICATION NUMBER: DE-AC06-76RLO 1830		2. PROGRAM/PROJECT TITLE: HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION					3. REPORTING PERIOD: JUNE 1990			
4a. PARTICIPANT NAME AND ADDRESS: PACIFIC NORTHWEST LABORATORY P. O. BOX 999 RICHLAND, WA 99352		4b. CLIENT NAME AND ADDRESS: DOE/RL RICHLAND WA 99352					5. START DATE: OCTOBER 1989			
							6. COMPLETION DATE: SEPTEMBER 1990			

7. FY 90	8. MONTHS	O	N	D	J	F	M	A	M	J	J	A	S	FY91
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9. COST STATUS: a. \$ EXPRESSED IN THOUSANDS b. BUDGET & REPORTING NO./SUB. ACCT NO. 12578 GF0525000 c. FIN. NO. d. ACTUAL COSTS PRIOR YEARS 6332 e. FY BUDGET 2650 ** f. TOTAL BUDGET g. FY FUNDS AUTH 3656 *** h. TOTAL FUNDS AUTH 3656	2700 2400 2100 1800 1500 1200 900 600 300	
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COSTS	I. PLANNED	250	300	240	250	290	200	190	190	190	190	180	180
	J. ACTUAL	236	290	342	283	227	246	297	184	339			
	K. VARIANCE	14	10	-102	-33	63	-46	-107	6	-39			
	L. CUM PLANNED	250	550	790	1040	1330	1530	1720	1910	2100	2290	2470	2650
	M. CUM ACTUAL	236	527	870	1152	1397	1643	1940	2124	2353			
	N. CUM VARIANCE	14	23	-80	-112	-67	-113	-220	-214	-253			

10. LEGEND: PLANNED ----- ACTUAL ----- PROJECTED ----- 90% FUNDS SPENT	** projected FY budget does not include TSP budget ***FY funds authorized include TSP funding
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11. MILESTONES	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;">O</td> <td style="width: 5%;">N</td> <td style="width: 5%;">D</td> <td style="width: 5%;">J</td> <td style="width: 5%;">F</td> <td style="width: 5%;">M</td> <td style="width: 5%;">A</td> <td style="width: 5%;">M</td> <td style="width: 5%;">J</td> <td style="width: 5%;">J</td> <td style="width: 5%;">A</td> <td style="width: 5%;">S</td> <td style="width: 5%;">FY91</td> </tr> </table>	O	N	D	J	F	M	A	M	J	J	A	S	FY91
O	N	D	J	F	M	A	M	J	J	A	S	FY91		
01 Phase I Report*														
03-A Hanford Site Operations and Facilities	Report to TSP 6/89													
03-B Radionuclide List Decay Schemes														
03-C Recommendation Regarding Development of Libraries Specific to Hanford for ORIGEN Code														
03-D Description of Chemical Form and Atmospheric Chemistry of Iodine Emissions														
03-E I-131 in Irradiated Fuel at time of Processing from 12-44 Through 12-47														
04-A Preliminary Response to Directive 88-4, Ground Water	Report to TSP 3/89													
04-B Atmospheric Modeling Approach														

LEGEND: SCHEDULED TO TSP TIME LINE	COMPLETED DEVIATION	PROGRESS	TIME NOW:
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12. NAME/SIGNATURE OF PARTICIPANTS PROG/PROJ MANAGER & DATE H A Haerer	* TSP rescheduled milestone to July
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PROJECT SUMMARY REPORT

PROJECT SUMMARY REPORT - TECHNICAL STEERING PANEL

1. IDENTIFICATION NUMBER: DE-AC06-76RLO 1830		2. PROGRAM/PROJECT TITLE: HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION - TSP						3. REPORTING PERIOD: JUNE 1990																																																																																					
4a. PARTICIPANT NAME AND ADDRESS: PACIFIC NORTHWEST LABORATORY P. O. BOX 999 RICHLAND, WA 99352		4b. CLIENT NAME AND ADDRESS: DOE/RL RICHLAND WA 99352						5. START DATE: OCTOBER 1989																																																																																					
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12. NAME/SIGNATURE OF PARTICIPANTS PROG/PROJ MANAGER & DATE H A Haerer																																																																																													

Table 1 Status of Directives

STATUS OF DIRECTIVES					
		Complete	Ongoing	Phase I	Phase II
88-1	(a) Proposals (b) Source Terms		X	X	
88-2	Vegetation			X	X
88-3	Status Reports		X		
88-4	Ground Water			X	X
88-5	Maps	X			
88-6	Resumes	X			

Table 1 Status of Directives, contd.

STATUS OF DIRECTIVES					
		Complete	Ongoing	Phase I	Phase II
89-1	Indian Tribes			X	
89-2	Bioassay Data			X	X
89-3	Document Handling		X		
89-4	Reactor Purging			X	X
89-5	Phased Approach		X		
89-6	Meeting Materials		X		

Table 1 Status of Directives, contd.

STATUS OF DIRECTIVES					
		Complete	Ongoing	Phase I	Phase II
89-7	Tech Communication			X	X
89-8	Phase II Planning			X	
89-9	Project QA Plan		X	X	
89-10	Contracts with Tribes			X	
90-1	Project Direction		X		
90-2	Dose Cut-Off Limit		X		

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Source Terms

OBJECTIVE

Source terms are the amount and type of radioactive materials released to the environment. Members of the Source Terms Task will develop estimates of radioactive emissions since 1944 from Hanford facilities based on historical measurements and production information. Source term estimates will be used by Environmental Transport Task members to reconstruct the concentrations of radionuclides in the environment.

Uncertainty in calculated and measured data can result from many factors. Uncertainties in measured emissions may result from early measurement techniques; for calculated emissions, from the differences in the published variables that are used to perform calculations. By comparing the uncertainty in the available data, task staff will determine the most accurate method for developing source terms. For time periods where measured values do not exist, source terms must be calculated from available information. The proposed methods and results of this task will be reviewed, evaluated, and approved by the TSP.

PROGRESS

Activities for this reporting period included the following:

- met with TSP members to review calculations regarding quantities of iodine-131 released to the atmosphere during the Phase I time period, 1944-1947.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for the subsequent months includes the following:

- begin preparing a summary report describing the methodology and sources of information used to calculate the quantities of Iodine-131 released to the atmosphere during 1944-1947.

The following activity is proposed for subsequent months and will be performed if approved by the TSP:

- determine the need to conduct sensitivity calculations using ORIGEN2(a).

(a) A. G. Croff. 1980. *ORIGEN2: A Revised and Updated Version of ORIGEN*. Transactions of the American Nuclear Society, Volume 34, pp 349-350, June 1980.

Environmental Transport

OBJECTIVE

Members of the Environmental Transport Task will reconstruct the movement of radioactive materials (the source term information) from the areas of release to the accessible environment. Movement via the atmosphere, Columbia River, and ground water will be studied.

To track the releases to the atmosphere from the Hanford Site, meteorological data are needed including wind speed, wind direction, and other data that affect the dispersion of the releases. Mathematical models will be applied to these meteorological data and the source term data to calculate concentrations of radionuclides in the air and on the ground. The TSP will review, evaluate, and provide direction concerning the proposed models.

Reconstruction of the transport of radionuclides in the Columbia River will be based primarily on historical studies of the Columbia River and its tributaries. Computer models will be used to reconstruct radionuclide concentrations in the river for time periods when data were limited or unavailable.

The movement of radionuclides in the ground water will be initially reconstructed by using ground-water monitoring data to estimate the contribution to the surface-water pathway. As in the case of the surface-water pathway, some modeling might be required where data are lacking.

PROGRESS

Activities for this reporting period included the following:

- presented information on the project approach to atmospheric transport modeling and dose calculations at the Atmospheric Transport and Diffusion Modeling Workshop held in Richland on June 12 and 13.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

WORK PLANNED FOR SUBSEQUENT MONTHS

The following activities are proposed for subsequent months and will be performed if approved by the TSP:

- atmospheric pathway
 - sensitivity studies for computer-model development
- surface water pathway
 - conceptual model investigation
 - comparison of mass balance routing calculations to Phase I monitoring data
 - sensitivity study of Phase I results.

Environmental Monitoring Data

OBJECTIVE

Members of the Environmental Monitoring Data Task will assemble, evaluate, and summarize key historical measurements of the concentrations of radionuclides in the environment around Hanford. Radionuclide concentrations have been measured at various times in such media as air, drinking water, foods, fish, the Columbia River, soil and in other sample materials. These measurements will be evaluated to estimate their accuracies and then used by Environmental Pathways and Dose Estimates Task staff to estimate radiation doses and by Environmental Transport Task staff to calibrate computer models. Methods to attain this objective will be proposed to the TSP for review, evaluation, and approval.

PROGRESS

Activities this reporting period included the following:

- gave a presentation at the 35th Annual Meeting of the Health Physics Society in Anaheim, California, June 24-28, entitled, "Reconstruction of Hanford Vegetation Monitoring Data for Dose Reconstruction 1945-1947."

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

The following activities are proposed for subsequent months and will be performed if approved by the TSP:

- examine the magnitude of the effect of Phase I assumptions on 1945-1947 concentrations of iodine-131 on vegetation

- evaluate sensitivity of dose calculations to accuracy and precision in previously published radionuclide measurements in fish and water from the Columbia River
- determine necessary extent of database on radionuclides in terrestrial media
- determine the suitability of "green run" air data for use in later project phases.

Demographics, Agriculture, Food Habits

OBJECTIVE

Task members will develop the demographic, food consumption, and food production information needed to estimate doses.

Demographic information will be developed for the general population and for several special population groups that are not adequately represented by the U.S. Census, including Native American tribes, Army personnel stationed at Hanford, some Hanford construction workers, and migrant workers.

In addition to demographic data, the sources and quantities of food and water consumed must be estimated, because food and water provide pathways for the intake of radionuclides.

Airborne radionuclides from the plant stacks may have been deposited on fruits and vegetables. Consumption of these foods provided a pathway for radionuclide transport to humans. The pathways will be studied. In addition, milk produced from cows represents a significant food pathway for iodine-131 if the cows were fed vegetation contaminated with radionuclides. Dairy farming practices and milk distribution systems will be studied to locate the populations that may have consumed potentially contaminated milk.

Consumption of contaminated fish and shellfish is also a food pathway for exposure to radioactive materials. Estimates of the amount of potentially contaminated fish and shellfish consumed from the Columbia River and ocean bays will be developed through an extensive review of numerous past studies.

Treated Columbia River water was used by some community members downstream from Hanford. Drinking this water provided a pathway for exposure to

radioactive materials. To estimate the doses from this pathway, it is necessary to know the communities using the water, the amount of water withdrawn, the treatment process, the travel time through the system, and the amount of water consumed. Irrigation water usage downstream from Hanford will also be studied because the radioactive materials in the river water could have been deposited on crops consumed by people or animals. Recreational users of the river could also have been exposed to radiation from the river and shoreline. Food and lifestyle habits of Native Americans that differentiate them from the general population will also be considered. Methods to collect data and to estimate population densities and food consumption have been proposed to the TSP for review, evaluation, and approval.

PROGRESS

Activities for this reporting period included the following:

- initiated Work Order No. 1 (developing a Work Plan) with the Yakima Nation
- received data from Coeur d'Alene tribe on school enrollment and food consumption
- sent draft of "protocol" for collection of food consumption data to TSP Demographic Subcommittee members and Native American tribes for comments
- received Work Plan for gathering demographic information from the Colville tribe.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- present brief overview of "protocol" for food data collection during July TSP meeting and request input from the TSP and the tribes
- provide interview training to tribes that wish to use the food consumption survey developed by PNL
- contact focus group members to determine whether they want a copy of the audience analysis report.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- present draft review of "protocols" for food data collection during July
- TSP meeting and request for input from the TSP and the tribes
- provide intensive training to tribes that wish to use the food consumption survey developed by FNU
- conduct focus group interviews to determine whether they want a copy of the substance abuse survey

Environmental Pathways and Dose Estimates

OBJECTIVE

Task members will use calculated and measured concentrations of radionuclides provided by members of the Environmental Transport Task and the Environmental Monitoring Data Task to calculate doses to populations, typical individuals, and specific individuals. These calculations will include doses via direct transfer of radionuclides from concentrations in air and water to people (via breathing, drinking, immersion, etc.). The calculations will also include doses via radionuclide concentrations in air and water transferred through environmental pathways, such as soil, plants, animals, and fish, to people. All significant decisions on exposure models and input parameters will be presented to the TSP for review, evaluation, and approval.

PROGRESS

Activities for this reporting period included the following:

- completed the calculation of preliminary dose estimates for the atmospheric and Columbia River exposure pathways. Reviewed and tested major portions of the code modules. Prepared a post-processor program to combine the individual histograms and generate summary information for the Phase I reports
- planned and designed methods for data conversion and transfer from the mainframe computers to the HEDR Geographic Information System and generated map displays to graphically portray the results
- began documenting preliminary computer code for dose estimates; began writing draft users' manuals for the various modules.

Milestone 07-C, *Radionuclide Transfer Factors*, due originally January 1990

- Milestone 07-C, *Radionuclide Transfer Factors*, was not completed in time to be incorporated into the Phase I reports and will be rescheduled as part of Phase II work.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

The following activities are proposed for subsequent months and will be performed if approved by the TSP:

- perform sensitivity analysis calculations
- evaluate sensitivity of dose estimates to changes in model structure
- evaluate the need for age-dependent dose factors
- evaluate the need for a generalized uncertainty expression.

Information Resources

OBJECTIVE

Members of the Information Resources Task will work with the other task members to meet information needs, including ensuring that all data referenced in the reports are publicly available and establishing a microcomputer-based tracking system for ready retrieval of historical information.

PROGRESS

Activities for this reporting period included the following:

- verified all references in the three Phase I draft reports: summary, air pathway and Columbia River pathway
- added new citations to the tracking system that now numbers more than 3,500
- provided the DOE-RL Public Reading Room with 35 documents of potential interest/use in the HEDR Project. A title listing of these reports is attached in Appendix A
- filled information requests from the TSP and HEDR task members.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Planned work for subsequent months includes the following:

- make necessary arrangements to determine the existence or non-existence of Hanford Site-originated documents that were transferred to the corporate headquarters of General Electric during the years 1946 through 1964

- continue to add input to the information resources tracking data base
- continue to provide documents to the DOE-RL Public Reading Room in an orderly, timely fashion
- develop a list of Hanford-originated raw data logs/notes of potential interest/use to the HEDR Project
- continue to identify and collect significant documents that address silver reactor capabilities, performance, and incidents
- watch for information that may explain in detail, and support data in, "green run" document HW-17381 DEL
- identify significant documents that address fuel element failures that occurred in now decommissioned Hanford Production Reactors
- continue to identify and collect documents and/or data of potential interest/use to the HEDR Project that address activities during the years from reactor startup through 1949.

Records Management

OBJECTIVE

Members of the Records Management Task provide storage and control of completed project records, maintain an automated inventory of all project documentation, and provide a reference service to project staff and the TSP.

PROGRESS

Activities for this reporting period included the following:

- received and processed project records
- transferred records to the DOE-RL Public Reading Room.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- continue processing incoming project records
- continue transferring processed project records to the DOE-RL Public Reading Room.

Records Management

OBJECTIVE

Members of the Records Management Task Force shall provide status and control of completed project records, maintain an updated inventory of all project documentation, and provide a reference service to project staff and the TSP.

PROGRESS

Activities for this reporting period included the following:

- received and processed project records
- transferred records to the DOE-RL Public Reading Room

MAJOR PROBLEM AREAS AND ACTION TAKEN

None

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- continue processing incoming project records
- continue transferring processed project records to the DOE-RL Public Reading Room

Quality Assurance

OBJECTIVE

The objective of this task is to ensure continuous quality assurance (QA) support and coordination with all project tasks. This objective is met through the identification and documentation of QA requirements in the form of a QA Plan and periodic monitoring of project activities during the life of the project to ensure compliance with these requirements.

PROGRESS

Activities for this reporting period included the following:

- continued working on expanding existing QA plan to include project-specific data quality objectives that will be included as part of Phase II planning
- performed an internal QA audit that focused primarily on data traceability of results reported during Phase I. No major findings or observations were identified.

MAJOR PROBLEM AREAS AND ACTIONS TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- issue remaining HEDR procedures: HEDR-TP-3, "HEDR Documentation of Critical Decisions" and "HEDR-TP-4, "HEDR Data Quality Objectives"
- develop guidelines that set forth the minimum contents of the Phase II QA plan.

Quality Assurance

OBJECTIVE

The objective of this task is to ensure continuous quality assurance (CQA) support and coordination with project tasks. The objective is met through the identification and documentation of QA requirements in the form of a QA Plan and periodic monitoring of project activities during the life cycle project to ensure compliance with these requirements.

PROGRESS

Activities for the reporting period included the following:

- continued working on expanding existing QA plan to include project specific data quality objectives that will be included as part of Phase II planning
- performed an internal QA audit that focused primarily on data responsibility to results reported during Phase I, timing of findings or observations were identified

MAJOR PROBLEM AREAS AND ACTIONS TAKEN

None

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- Issue terms and HEDR procedures, HEDR-TP-3, HEDR Documentation of Critical Decisions and HEDR-TP-4, HEDR Data Quality Objectives
- develop guidelines that set forth the minimum contents of the Phase II QA plan

Statistics

OBJECTIVE

Task members will provide statistical support to members of technical tasks and will develop and apply sensitivity and uncertainty analyses. Sensitivity analyses will be used to identify parameters with the greatest influence on dose estimates. Using sensitivity analyses results, project staff can focus resources where the benefit in terms of accurate dose estimates is greatest. Uncertainty analyses enable task leaders to determine the extent to which the accuracy and precision of the dose estimates are influenced by accuracy and precision in the input parameters.

PROGRESS

Activities this reporting period included the following:

- received from Environmental Pathways and Dose Estimates Task members approximately 190,000 histograms of preliminary Phase I dose estimates for various reference individuals, locations, months, and exposure pathways, and conducted the following activities:
 - aggregated these histograms to obtain annual and 3-year preliminary dose distributions for various pathways, census divisions and types of reference individuals
 - aggregated reference individual dose distributions to obtain preliminary dose distributions for the population in the Phase I study region during the Phase I time period
 - prepared computer graphics of these dose distributions
- completed writing the computer code that quantifies the effects of the modular construction of the Phase I, Monte Carlo, air-pathway dose model on the distributions of dose estimates

- presented the following paper at the 35th Annual Meeting of the Health Physics Society in Anaheim, California, June 24-28: "Uncertainty Analysis of the Conversion Factor for Historic Iodine-131 Gross Beta Vegetation Measurements"
- prepared the invited paper, "Statistical Aspects of the Hanford Environmental Dose Reconstruction Project," for presentation at the American Statistical Association Conference on Radiation and Health, Copper Mountain, Colorado, July 8-12, 1990. The paper will be published in an addendum to Radiation Research.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- continue evaluating results obtained using the computer code that quantifies the effects of the modular construction of the Phase I Monte Carlo air-pathway dose model on the distributions of dose estimates
- present the invited paper, "Statistical Aspects of the Hanford Environmental Dose Reconstruction Project," at the American Statistical Association Conference on Radiation and Health, Copper Mountain, Colorado, July 8-12, 1990
- conduct statistical analyses and summarizations of whole-body-counter data on schoolchildren and adults in the Richland-Pasco-Kennewick area that were obtained in the 1960s to help validate the HEDR dose model. Conduct similar analyses for gross-beta thyroid counts of Hanford workers in the mid-1940s
- develop statistical procedures for use with the recently acquired Geographical Information System
- document multiplicative lognormal code development to date.

Project Technical Coordination

OBJECTIVE

The objective of the Project Technical Coordination Task is to provide a general technical overview of the project to ensure that appropriate information is generated from the technical tasks for performing the final dose calculations.

PROGRESS

Activities this reporting period included the following:

- met with TSP members concerning data and assumptions to allow independent verification of HEDR results with independent computer models.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for the subsequent months includes the following:

- continue coordinating efforts with thyroid disease study personnel
- continue defining the overall structure of the needed HEDR database and the type of data needed for smooth project integration
- work with the International Atomic Energy Agency Coordinated Research Program on Validation of Model Predictions (VAMP) to validate portions of the HEDR model and to obtain independent estimates of certain doses.

Project Technical Coordination

OBJECTIVE

The objective of the Project Technical Coordination Task is to provide a general technical overview of the project to ensure that appropriate information is generated from the technical tasks for performing the final design activities.

PROCESS

Activities in the working period included the following:

- met with TSP members concerning data and see methods to allow independent verification of HEDR results with independent computer models.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None

PLANNED WORK FOR THE SUBSEQUENT MONTHS

Work planned for the subsequent months includes the following:

- continue coordinating efforts with the above design activity concerning computer details, the overall structure of the needed HEDR database and the type of data needed for smooth project integration.
- work with the international Atomic Energy Agency Cooperative Research Program on Validation of Model Predictions (IAEA/VA) to validate portions of the HEDR model and obtain independent estimates of certain cases.

APPENDIX A

List of Hanford-Originated Documents
of Potential Interest/Use to the HEDR Project
Placed in the DOE-RL Public Reading Room in June 1990

HANFORD SITE ORIGINATED DOCUMENTS OF
POTENTIAL INTEREST/USE TO THE HEDR PROJECT -
PLACED IN THE DOE/RL PUBLIC READING ROOM
DURING THE MONTH OF JUNE, 1990

DUH-12536	Summary of Meeting to Consider 107 B Outlet Water. 4.p.	10/31/44
DUH-13013	Weekly Report - 100-F Area 2/25/45 - 3/2/45. 2 p.	3/2/45
* HAN-45761	200 Area Daily Logs Vol.1: 7/2/45 to 5/31/46. 241 p.	5/31/46
* HAN-45800	200 Area Monthly Production Reports, December 1944 thru December 1946. 143 p.	12/31/46
* HAN-45801	200 Area Monthly Materials Reports, January thru June 1947. 177 p.	6/30/47
* HAN-45830-DEL	100 Areas Monthly Reports for 1951. 124 p.	12/31/51
* HAN-63605-DEL	200 Area Monthly Reports for 1949. 108 p.	12/31/49
HW-3-1603	Simulated Jacket Failure Test. 8 p.	2/9/45
* HW-3-1946	200 Area Report for Technical Progress 3/21/45 thru 6/28/45. 149 p.	3/26/45
HW-3-2475	Control Limits for Decay Curves of 105 B Water Samples. 5 p.	5/25/45
* HW-7-1141-DEL	Hanford Engineer Works Monthly Report, December 1944. 90 p.	1/10/45
HW-7-1291-DEL	Technical Progress Letter 2/2/45 - 2/8/45. 23 p.	2/10/45
HW-7-1293-DEL	Hanford Engineer Works Monthly Report, January 1945. 96 p.	2/14/45
HW-7-1388-DEL	Hanford Engineer Works Monthly Report, February 1945. 107 p.	3/13/45
* HW-7-1544-DEL	Hanford Engineer Works Monthly Report, March 1945. 110 p.	4/18/45
HW-7-1938	Summary of Plant Results 7/5/45 thru 5/22/46. 371 p.	7/5/45

* Declassified by new directive

* HW-7-2177-DEL	Hanford Engineer Works Monthly Report, July 1945. 101 p.	8/13/45
* HW-7-3171-DEL	Hanford Engineer Works Monthly Report, December, 1945. 93 p.	1/8/46
HW-7-4675	Meeting on 200 Area Problems, August 16, 1946. 5 p.	8/28/46
* HW-7-6048-DEL	Hanford Engineer Works Monthly Report, March 1947. 159 p.	4/14/47
HW-12689	Test Sputum Survey for Radioactive Particles in the 200 Areas. 3 p.	3/1/49
HW-21415	Recomputation & Extension of Parameters Involved in Sutton's Diffusion Hypothesis. 28 p.	6/19/51
HW-21844	Preliminary Report on the Radiochemical Analysis of Hanford Pile Effluent Water. 38 p.	8/1/51
HW-32173	Analysis of REDOX Sand Filter Data. 4 p.	6/18/54
HW-32262	Evaluation of Routine REDOX Stack Sampling Procedures & Radiochemical Analysis. 15 p.	7/1/54
HW-33830	REDOX Particle Study, Progress Report 9/1/54 to 10/28/54. 6 p.	11/22/54
HW-34544	Effects of Water Quality on Pile Operation. 99 p.	9/23/55
HW-54351	Preliminary Considerations Regarding Burning Slug Incidents. 4 p.	1/2/58
HW-56146	Development of Continuous Calciner Off Gas Scrubber. 9 p.	10/31/58
HW-63985	REDOX Dissolver Off-Gas Monitor, Calibration & Test. 26 p.	5/4/60
HW-64517	Effect of Proposed HAPO Reactor Production Increases on Radioactivity Discharged to the Columbia River. 5 p.	3/29/60
HW-66023	Effect of Water Quality on Effluent Activity. 29 p.	7/11/60
HW-70844	Filter Efficiencies & Activity Level of the Off-Gas System for the REDOX Multipurpose Dissolver. 7 p.	8/24/61

* Declassified by new directive

EW-70937

Reduction of Radioisotopes in Reactor
Effluent Water. 28 p.

9/5/61

EW-72819

River Contamination Reduction Studies:
An Evaluation of the Artificial Lake Concept.
18 p.

2/26/62

APPENDIX B

HEDR Publications - to Date

HEDR PUBLICATIONS - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information	Status
Hanford Environmental Dose Reconstruction Project Monthly Report	Haerer, HA	Ongoing	PNL-6450 HEDR	Monthly report-cleared one time for documentation	Periodic report; TSP approval not necessary
Hanford Environmental Dose Reconstruction Project - Work Plan	Haerer, HA	9/88	PNL-6696 HEDR	Superseded by new work plan	TSP approved
Work Plan for the Hanford Environmental Dose Reconstruction Project	Haerer, HA	12/89	PNL-6696 HEDR REV 1		TSP approved; published 12/89
Proposed Approach for Developing Information on Population Food Consumption and Lifestyles of Native Americans in the HEDR Study Area	Rhoads, RE, and Bruneau, CL	1/89	PNL-6803 HEDR	Working document	TSP comments were incorporated into PNL-6834 HEDR
Summary Report of HEDR Workshop on Sensitivity and Uncertainty Analysis	Sagar, B., and Liebetrau, AM	3/89	PNL-SA-16804 HEDR	Summary of workshop held January 16-18, 1989	Sent to Till 3/89 - no written response provided to PNL
Demographic, Agricultural, Food Consumption, and Lifestyle Research for the Hanford Environmental Dose Reconstruction Project	Beck, DM, et al.	2/89	PNL-6834 HEDR	Incorporates TSP comments	TSP received 3/89; no written response provided to PNL
Response to TSP Directive 88-4, Ground-Water Contamination Data	Freshley, MD	3/89	PNL-6847 HEDR		TSP received 3/89; no written response provided to PNL
A History of Major Hanford Operations Involving Radioactive Material	Ballinger, MY, and Hall, RA	6/89	PNL-6964 HEDR		TSP reviewed; PNL addressing comments
Summary of Workshop on Milk Production and Distribution, November 30, 1988 - HEDR Project	Beck, DM, et al.	7/89	PNL-6975 HEDR		To TSP 8/89
Feasibility of Using ¹²⁹ I Concentrations in Human Tissue to Estimate Radiation Dose From ¹³¹ I	McCormack, WD	4/89	PNL-6889 HEDR		TSP approved 9/89; published 1989
Hanford Environmental Dose Reconstruction	Bruneau, CL	1/89	PNWD-1323 HEDR	Informational brochure used in PNL's work with Tribes	TSP approval not required

HEDR PUBLICATIONS - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information	Status
Radionuclide Sources and Radioactive Decay Figures Pertinent to the HEDR Project	Heeb, CM	10/89	PNL-7177 HEOR		PNL addressing TSP comments
Uncertainties in Source Term Calculations Generated by the ORIGEN2 Computer Code for Hanford Production Reactors	Heeb, CM	12/89	PNL-7223 HEDR		PNL addressing TSP comments
Selection of Dominant Radionuclides for Phase I of the HEDR Project	Napier, BA	12/89	PNL-7231 HEDR		PNL addressing TSP comments
Atmospheric Transport and Dispersion Modeling for the Hanford Environmental Dose Reconstruction Project	Ramsdell, JV	12/89	PNL-7198 HEDR		PNL addressing TSP comments
Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data (DRAFT)	Woodruff, RK	11/89	PNL-SA-17641 HEDR		To TSP for review 12/89
Atmospheric Transport Modeling and Input Data for Phase I of the Hanford Environmental Dose Reconstruction Project	Ramsdell, JV, and Burk, KW	12/89	PNL-7199 HEDR		PNL addressing TSP comments
Fission-Product Iodine During Early Hanford-Site Operations: Its Production and Behavior During Fuel Processing, Off-Gas Treatment, and Release to the Atmosphere	Burger, LL	12/89	PNL-7210 HEDR		PNL addressing TSP comments
The Hanford Environmental Dose Reconstruction Project: Background Information	Byram, SJ	12/89	PNL-SA-17658 HEDR	For use with focus groups	TSP approval not required
Summary of Literature Review of Risk Communication	Byram, SJ	12/89	PNL-7226 HEDR		PNL addressing TSP comments
Milk Cow Feed Intake and Milk Production and Distribution Estimates for Phase I	Beck, DM	12/89	PNL-7227 HEDR		PNL addressing TSP comments

HEDR PUBLICATIONS - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information	Status
Estimates of Columbia River Radionuclide Concentrations: Data for Phase I Dose Calculations	Richmond, Waters	1/90	PNL-7248 HEDR		PNL addressing TSP comments
Evaluation of Thyroid Radioactivity Measurement Data From Hanford Workers, 1944-1946	Ikenberry, T	1/90	PNL-7254 HEDR		PNL addressing TSP comments
I-131 in Irradiated Fuel at Time of Processing From December 1944 Through December 1947	Morgan, LG	1/90	PNL-7253 HEDR		PNL addressing TSP comments
Population Estimates for Phase I	Beck, DM	2/90	PNL-7263 HEDR		PNL addressing TSP comments
Estimates of Food Consumption	Callaway	2/90	PNL-7260 HEDR		PNL addressing TSP comments
Soil Ingestion by Dairy Cattle	Darwin, RF	2/90	PNL-SA-17918 HEDR		For possible use later in project; TSP approval not required
Computational Model Design Specification for Phase I of the Hanford Environmental Dose Reconstruction Project	Napier, BA	2/90	PNL-7274 HEDR		PNL addressing TSP comments
Estimations of Traditional Native American Diets in the Columbia Plateau	Hunn, E. S. and Bruneau, C. L.	8/89	PNL-SA-17296		Reviewed by tribes
A Preliminary Examination of Audience-Related Communications Issues: Hanford Environmental Dose Reconstruction Project	Holmes, C. W.	4/90	PNL-7321 HEDR		PNL addressing TSP comments
MESOILT2, A Lagrangian Trajectory Climatological Dispersion Model	Ramsdell, J. V.	4/90	PNL-7340 HEDR		PNL addressing TSP comments

HEDR PUBLICATIONS - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information	Status
Draft Summary Report	HEDR Staff	7/90	PNL-7410 HEDR		To be released 7/12/90 by the TSP
Draft Air Pathway Report	HEDR Staff	7/90	PNL-7412 HEDR		To be released 7/12/90 by the TSP
Draft Water Pathway Report	HEDR Staff	7/90	PNL-7411 HEDR		To be released 7/12/90 by the TSP

APPENDIX C

HEDR Presentation Handouts to the TSP - To Date

HEDR PRESENTATION HANDOUTS TO THE TSP - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information
Availability of I-131 Vegetation Data	Price, KR	1/89	PNL-SA-16573 HEDR	Presented at HEDR workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA
Atmospheric Pathway	Ramsdell, J. V.	1/89	PNL-SA-16565 HEDR	Presented at the HEDR workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA
HEDR Demography, Agriculture, and Lifestyle Research	Beck, DM	1/89	PNL-SA-16568 HEDR	Presented at the HEDR workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA
Task 6 - Population, Food Consumption and Lifestyles	Rhoads, RE	3/89	PNL-SA-16785 HEDR	Presented at the Native American Workshop, March 14-15, 1989, Richland, WA
HEDR Native American Population, Food Consumption and Lifestyle Study - Data Requirements	Bruneau, CL	3/89	PNL-SA-16784 HEDR	Presented at the Native American Workshop, March 14-15, 1989, Richland, WA
Hanford Environmental Dose Reconstruction Project Report to the Technical Steering Panel	Haerer, HA	3/89	PNL-SA-16794 HEDR	Presented at the TSP meeting, March 17, 1989, Spokane, WA
Defining Demographic Categories for Phase I	Napier, BA, and Beck, DM	5/89	PNL-SA-17035 HEDR	Presentation handout for the TSP mtg, May 18-20, '89, Toppenish, WA
Methods for Presenting the Results to the Public	Rhoads, RE	8/89	PNL-SA-17368 HEDR	Presented at the TSP meeting, September 6, 1989, Portland, OR
Discussion with TSP Subcommittee on Communication Strategy	Rhoads, RE	10/89	PNL-SA-17475 HEDR	Presented at the TSP Subcommittee meeting on Communication Strategy, October 5, 1989, Portland, OR
Surface Water Exposure Pathways	Napier, BA and Poston, TM	10/89	PNL-SA-17502 S HEDR	Presented at the TSP meeting, October 12-14, 1989, Portland, OR
Hanford Environmental Dose Reconstruction Project	Haerer, HA	12/89	PNL-SA-17661S HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Aspects of Sensitivity/Uncertainty Analysis in the HEDR Project	Sagar, B.	1/89	PNL-SA-16571 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA

HEDR PRESENTATION HANDOUTS TO THE TSP - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information
Estimated Quantity of 131I Contained in Irradiated Fuel at Time of Fuel Processing, CY 1944-1945	Jackson, P. O. and Morgan, L. O.	11/88	PNL-SA-16398 HEDR	Presented at the TSP mtg, November 11-12, 1988, Olympia, WA
Communications Directive	Rhoads, RE	12/89	PNL-SA-17653 S HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Preliminary Evaluation of Thyroid Bioassay Data From Hanford Workers, 1944-1946	Ikenberry, T. and Napier, BA	12/89	PNL-SA-17670 S HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Overview of Project Model - Air Pathway	Napier, BA	12/89	PNL-SA-17673 HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Source Terms - Air Pathway Source Terms - Surface-Water Pathway	Morgan, LG	12/89	PNL-SA-17657 HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Atmospheric Transport Model	Freshley, MD	12/89	PNL-SA-17662 S HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Environmental Monitoring Data: Vegetation, 1945-1947	Woodruff, RK	12/89	PNL-SA-17671 HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Preliminary Calculated and Measured Concentrations of Iodine-131 in Vegetation for Phase I	Napier, BA	12/89	PNL-SA-17674 HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Milk Production and Distribution	Beck, DM	12/89	PNL-SA-17659 S HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Overview of Project Model - Surface-Water Pathway	Napier, BA	12/89	PNL-SA-17672 HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Surface-Water Pathway	Freshley, MD	12/89	PNL-SA-17660 S HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
HEDR Demography, Agriculture, and Lifestyle Research	Beck, D. M.	1/89	PNL-SA-16568 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA
Surface Water Transport	Walters, W.	1/89	PNL-SA-16572 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA

HEDR PRESENTATION HANDOUTS TO THE TSP - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information
Environmental Measurements - Columbia River	Poston, TM, and Dirkes, R	12/89	PNL-17669 HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Phase II Planning	Haerer, HA	12/89	PNL-17661 S HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, WA
Detailed Example Calculations for HEDR, Phase I	Napier, BA	2/90	PNL-SA-17913 HEDR	Presented at the TSP mtg, Feb 15-17, 1990, Richland, WA
Communications Directive	Rhoads, RE	2/90	PNL-SA-17903 S HEDR	Presented at the TSP mtg, Feb 15-17, 1990, Richland, WA
HEDR Project Report to the TSP	Haerer, HA	2/90	PNL-SA-17904S HEDR	Presented at the TSP mtg, Feb 15-17, 1990, Richland, WA
Source Terms	Morgan, L. G.	1/89	PNL-SA-16566 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA
Experience with Gress and Swats	Piepho, M. G.	1/89	PNL-SA-16567 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA
HEDR Project Report to the TSP	Haerer, H. A.	10/89	PNL-SA-17501 HEDR	Presented at the TSP mtg, Oct 12-14, 1989, Portland, OR
HEDR Project - Report to the TSP July 21, 1989	Haerer, H. A.	7/89	PNL-SA-17218 HEDR	Presented at the TSP mtg, July 21, 1989, Richland, WA
HEDR Project Report to the TSP for May 1989 Public Mtg	Haerer, H. A.	5/89	PNL-SA-17032 HEDR	Presented at the TSP mtg, May 18-20, 1989, Toppenish, WA
Purpose of Workshop	Gilbert, D.	1/89	PNL-SA-16569 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA
Radionuclides Transported by the Columbia River	Freshley, M. D.	7/89	PNL-SA-17235 HEDR	Presented at the TSP mtg, July 21, 1989, Richland, WA
Example of Sensitivity/Uncertainty Analysis	Streng, D. L.	1/89	PNL-SA-16570 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA

HEDR PRESENTATION HANDOUTS TO THE TSP - TO DATE

Title	Author	PNL Clear. Date	Clearance No.	Additional Information
Hanford Environmental Dose Reconstruction Project - Phase I Report	Haerer, HA	5/90	PNL-18304 S HEDR	Presented at the workshop, "Public Health Aspects of Hanford Health Studies, A Workshop for State, Local, and Tribal Health Officials," June 6, 1990.

APPENDIX D

HEDR-Related Publications

Note: This appendix lists publications that present aspects of dose reconstruction in the open scientific literature; TSP approval is not required.

HEDR-RELATED PUBLICATIONS

Title	Author	PNL Clear. Date	Clearance No.	Audience	Status
Estimating Atmospheric Dispersion for Reconstruction of Doses from Hanford Operations	Ramsdell, JV	4/88	PNL-SA-15818 HEDR	69th Annual Meeting of the Pacific Division of the American Association for the Advancement of Science, June 19-23, 1988, Corvallis, OR	Presented 6/88
Potential Applications of Geographical Information Systems for Analyzing Hanford Environmental Dose Reconstruction Data	Stephan, JG, et al.	3/89	PNL-SA-16767 HEDR	Regional Symposium of the HPS Computer Applications in Health Physics, March 16-17, 1989 Richland, WA	Presented 3/89
The Hanford Environmental Dose Reconstruction Project: The Role of Applied Sociology	Beck, DM	4/89	PNL-SA-16880 HEDR	Pacific Sociological Association Meeting, April 13-16, 1989 Reno, NV	Presented 4/89
Temporal Variations in Atmospheric Dispersion at Hanford	Ramsdell, JV	9/89	PNL-SA-17375 HEDR	Hanford Symposium on Health & the Environment, Oct 16-19, 1989 Richland, WA	Presented 10/89
The Hanford Environmental Dose Reconstruction Project: Overview	Haerer, H A et al.	9/89	PNL-SA-16859 HEDR	Hanford Symposium on Health & the Environment, Oct 16-19, 1989 Richland, WA	Presented 10/89
The Hanford Environmental Dose Reconstruction Project: Technical Approach	Napier, BA et al.	9/89	PNL-SA-16874 HEDR	Hanford Symposium on Health & the Environment, Oct 16-19, 1989 Richland, WA	Presented 10/89
The Identification of Terrain-Induced Circulations Using Principal Components	Skyllingstad, ED and Schwartz, MN	10/89	PNL-SA-17164 HEDR	American Meteorological Society Conference on Probability and Statistics, October 1-5, 1989 Monterey, CA	Presented 10/89
Demographic Forecasting Using Trends from Ratio Correlation Variables	Beck and Pittinger			Demography (journal) or Journal of Rural Society	Planning for 1990
Reconstructing Historical Milk Prod/Dist Systems	Beck, DM			Journal of Health Physics	Planning for 1990

HEDR-RELATED PUBLICATIONS

Title	Author	Date Cleared	Clearance No.	Audience	Status
Sensitivity and Uncertainty Analyses for Environmental Dose Reconstruction	Sagar et al.	11/89		Workshop on uncertainty, Nov 13-16, 1989, Santa Fe, NM	Presented 11/89
Reconstructing Food Consumption Habits: The Backcasting Method	Callaway and Carr			Journal of Health Physics	Planning for 1990
Statistical Aspects of Reconstructing the I-131 Dose to the Thyroid of Individuals Living Near the Hanford Site in the mid-1940s	Gilbert, RO et al.	3/90	PNL-SA-17384	Workshop: Statistics of Human Radiation Exposure to Ionizing Radiation, April 2-4, 1990, Oxford, UK	Presented 4/90
Using the Ratio-Correlation Methods for Backcasting	Beck and Swanson	Spring/90		Chapter in applied demog book	To be published Spring '90
Experience in Collaborative Research with Native American Tribes *	Bruneau, CL, and Rhoads, RE			Journal (not yet determined)	Planning for 1990
Uncertainty in 64-66 Data on Fish, Water, and Sediment	Poston, TM			Health Physics Society Mtg, Anaheim, CA	Planning for 1990
Communicating Radiation Dose Estimates to Affected Populations	HEDR Staff			Journal of the Society for Risk Analysis	Planning for 1990
Reconstructing Demography of Native Americans*	Beck, DM, and Bruneau, CL			Journal of Rural Sociology	Planning for 1990
Fish Concentration Ratios	Poston, TM			Journal (not yet determined)	Planning for 1990
Uncertainty Analysis of the Conversion Factor for Historic Iodine-131 Gross Beta Vegetation Measurements	Streng, DL et al.	12/89	PNL-SA-17713 HEDR	1990 Health Physics Soc. Mtg, June 24-28, 1990, Anaheim, CA	Presented 6/90

HEDR-RELATED PUBLICATIONS

Title	Author	Date Cleared	Clearance No.	Audience	Status
Reconstruction of Hanford Vegetation Monitoring Data for Dose Reconstruction for 1945-1947	Woodruff, Mart and Hant	1/90	PNL-SA-17760 A HEDR	1990 Health Physics Society Meeting, June 24-28, 1990, Anaheim, CA	Presented 6/90
Mathematical and Statistical Aspects of Reconstructing Doses to Individuals Living Near the Hanford Site since the 1940s	Liebetrau, AM et al.	10/89	PNL-SA-17498 HEDR	SIAM Conference on Applied Probability in Science and Engineering, March 5-7, 1990, New Orleans, LA	Presented 3/90
Statistical Aspects of the Hanford Environmental Dose Reconstruction Project	Gilbert, RO et al.		PNL-SA-18396 S HEDR	American Statistical Association Conference on Radiation and Health, July 8-12, 1990, Copper Mountain, CO	To be presented 7/90

*All publications addressing Native American
research will be reviewed and approved by the
appropriate tribes

APPENDIX E

Communications Log

COMMUNICATIONS LOG - June 1990

<u>INITIATED BY</u>	<u>CONTACT</u>	<u>TYPE</u>	<u>SUBJECT</u>
PNL/W Haerer	TSP, Chairman/J Till	Phone	Ongoing discussions re: HEDR Project
PNL/W Haerer	TSP, Executive Secretary/ B Shleien	Phone	Ongoing discussions re: HEDR Project
TSP/J Stohr	PNL/S Finch	Phone	Ongoing discussions re: meeting planning
PNL/S Finch	TSP, Chairman/J Till	Phone	Question on invoices
TSP/P Klingeman	PNL/S Finch	Phone	New mailing address
TSP, Executive Secretary/ B Shleien	PNL/S Finch	Phone	Status of invoices, clearance, budget information
TSP/D Walker	PNL/S Finch	Phone	Status of invoices
Public/J Hidy	PNL/S Finch	Phone	Obtain TSP phone numbers
TSP/M Robkin	PNL/S Finch	Phone	Status of mag card
PNL/J Daer	TSP/J Stohr	Phone	Use of document cover sheets for TSP documents
TSP, Executive Secretary/ B Shleien	PNL/R Gilbert	Phone	Assessment of uncertainty in Phase I results
TSP/M Robkin	PNL/D Schneider	Phone	Status of mag card and property pass
PNL/L Morgan	TSP/M Robkin	Phone	Requested a copy of various documents
TSP/R Morrill	PNL/C Bruneau	Phone	Native American workshop
PNL/R Rhoads, D Beck, C Bruneau	TSP/R Morrill	Phone	Native American workshop

<u>INITIATED BY</u>	<u>CONTACT</u>	<u>TYPE</u>	<u>SUBJECT</u>
Kalispel Tribe/M Cardwell	PNL/C Bruneau	Phone	Write-up on interviews
PNL/C Bruneau	Yakima Nation/D Saluskin	Phone	HEDR contract
PNL/C Bruneau	Warm Springs Tribe/ M Queahpama	Phone	HEDR contract
Colville Tribe/C Carroll	PNL/C Bruneau	Phone	HEDR contract
PNL/C Bruneau	Coeur d'Alene Tribe/D Seyler	Phone	Status of project
PNL/C Bruneau	Umatilla Tribe/B Burke	Phone	Food data collection protocol
PNL/C Bruneau	Spokane Tribe/D Ernst	Phone	Progress
Colville Tribe/C Carroll	PNL/C Bruneau	Phone	Payment for workshop
PNL/C Bruneau	Coeur d'Alene Tribe/D Seyler	Phone	Data collection
TSP/D Walker	PNL/D Beck, C Bruneau and TSP/V Nguyen	Phone	HEDR Native American food consumption data collection method
PNL/C Bruneau	Warm Springs Tribe/ M Queahpama	Phone	HEDR contract
Yakima Nation/D Saluskin, B Barry, & R Jim	PNL/C Bruneau	Phone	Request for proposal for work order number 1
PNL/C Bruneau	Warm Springs Tribe/ M Queahpama	Phone	Revised contract
Yakima Nation/D Saluskin	PNL/C Bruneau	Phone	Work order number 1
PNL/C Bruneau	Umatilla Tribe/B Burke	Phone	Proposal for work order number 1
PNL/C Bruneau	Umatilla Tribe/R Gray	Phone	Proposal for work order number 1

<u>INITIATED BY</u>	<u>CONTACT</u>	<u>TYPE</u>	<u>SUBJECT</u>
Colville Tribe/C Carroll	PNL/C Bruneau	Phone	Tribal data collection and protocol
TSP, Executive Secretary/ B Shleien	PNL/B Napier	Phone	Continuing discussions on assumptions and data for independent model verification
PNL/S Grover	City of Richland Water Dept/ S Meyer	Phone	City of Richland water supply, 1960's
PNL/S Grover	City of Kennewick, Water Dept/J Clark	Phone	City of Kennewick water supply, 1964-1966
PNL/S Grover	Mayger Oregon Dock Owner/ D Hyke	Phone	City of Mayger, Oregon water supply
PNL/S Grover	City of Camas Water & Sewer Dept/J Anderson	Phone	City of Camas water supply
PNL/S Grover	Arlington City Recorder's Office/K West	Phone	City of Arlington water supply
PNL/S Grover	St. Helen's Water Dept/ R Mallory	Phone	St Helens & Columbia City water supply
PNL/A McMakin	HTDS/E Kohler	Phone/Fax	Thyroid diagnostic procedures
PNL/A McMakin	TSP/J Stohr	Phone	Phase I report logistics
PNL/J Danko and A McMakin	TSP/A Beers	Phone/Fax	Locations of public information meetings
PNL/J Danko	TSP/M Blazek, G Roessler, and J Till	Phone/Fax	HEDR summary booklet

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