Hanford Environmental Dose Reconstruction Project

Monthly Report

May 1989

Prepared for the Technical Steering Panel

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**Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute**

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HANFORD ENVIRONMENTAL DOSE
RECONSTRUCTION PROJECT

Monthly Report

May 1989

Prepared for the Technical Steering Panel

Pacific Northwest Laboratory
Richland, Washington 99352

WORLDWIDE LEADERSHIP GROUP
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Presented for the Technical Steering Panel

1998

Project Report

RECONSTRUCTION PROJECT
HAWAIIAN ENVIRONMENTAL DOSE

HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION PROJECT

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Hazardous Environment 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 (structure shown in Figure 1) 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. Hanford Environmental Dose Reconstruction Project Organization Structure

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.

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* 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.

exposure to the sun.

Less than 10% of the subjects had been exposed to ultraviolet radiation, which was the only factor used in the study to determine exposure to the sun.

Subjects were also asked if they had ever been exposed to the sun.

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MANAGEMENT SUMMARY

PROGRESS

This summary covers progress for the month of May 1989:

- completed the following scheduled milestones:^{*}
  - 03 Radionuclide Source Terms from Fuel Processing 1944-1947
  - 03 Focus Radionuclide Release Fractions on Dominant Radionuclides
  - 03 Description of Chemical Form and Atmospheric Chemistry of Iodine Emissions
  - 03 "Best Estimate" of I-131 Contained in Irradiated Fuel at Time of Dissolution 1944-1945
  - 06 Native American Traditional Diet Description (Air Pathway)
  - 06 Census District Boundaries Plotted on Map
  - 07 Create Fish Model
  - 07 Agricultural Product Soil-to-Plant Transfer Factors
  - 07 List Dominant Radionuclides
- presented project status update, an overview of the project computational modeling scheme, and other project information at the TSP meeting held May 18-20 in Toppenish, Washington
- held working sessions with members of the TSP and the Source Terms; Environmental Transport; Demographics, Agriculture, Food Habits; and Statistics Tasks
- participated in a media interview on the 1949 "green run". The Project Manager was one of several people who responded to questions by the media following the declassification of the document, *Dissolving of Twenty Day Metal at Hanford, HW-17381 DEL*.
- made arrangements for the Chairman of the TSP to review the classified version of the document, *Dissolving of Twenty Day Metal at Hanford, HW-17381 DEL*
- provided various historical documents to a member of the TSP to review regarding *Dissolving of Twenty Day Metal at Hanford, HW-17381 DEL*, for use in preparing a presentation for the TSP meeting in Toppenish
- provided TSP members copies of reports for Milestones 12, *Define Age Groups, Urbanization, and Subpopulation Categories* and 12, *Determine*

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^{*} All milestones are internal unless otherwise indicated. All internal milestones contribute to the Phase I summary report.

Use of I-129 as an Indicator of I-131 in the Environment for their review and approval

- continued revision of work plan to reflect phased approach
- prepared a summary of available information for the Columbia River between Priest Rapids Dam and McNary Dam for a poster presentation planned for the July TSP meeting
- assessed alternatives for the Phase I calculations for predicting air concentrations and surface contamination. The decision was made to use average meteorological conditions from data for 1983 through 1987.
- completed the Milk Market Workshop Report and forwarded it to the TSP
- continued development of an integrated computational scheme for the calculation of doses as a function of location and time
- issued the revised QA plan to reflect the current needs of the HEDR Project
- continued developing a strategy for conducting uncertainty analyses of Phase I doses
- continued declassifying early-day, Hanford-originated documents of potential interest/use in the HEDR Project.

MAJOR ISSUES AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- complete the following milestones in June:
  - 03 Dissolution Dates for Purex 1984-1986
  - 04 Atmospheric Model Development
  - 05 Develop Concentration Ratios
  - 06 Native American Traditional Diet Description (River Pathway)
  - 07 Bioassay Data-Tabulate Thyroid Data
  - 12 Native American Diet Sensitivity Study (River Pathway)
- submit revised work plan for the HEDR Project to the TSP for review and comment
- continue to add input to numerical data base and define the structure of the HEDR data base

- finalize the poster summarizing available information for the Columbia River between Priest Rapids Dam and McNary Dam for 1964 through 1966
- hold a workshop for tribal technical staff on methods and strategies of data collection
- continue contract negotiations with eight tribes
- continue to assess the use of historical bioassay data
- continue to declassify reports that address activities from reactor startup to about mid-year 1945
- issue remaining QA technical procedures
- continue developing a report identifying the strategy for conducting sensitivity/uncertainty analyses for Phase I work
- conduct sensitivity/uncertainty analyses on vegetation measurements .

BUDGET STATUS

Projected expenditures through May 1989	<u>\$ 1962K</u>
Actual expenditures through May 1989	<u>\$ 2124K</u>

VARIANCE EXPLANATION

The budget variance is less than 10 percent of planned expenditures and is likely to be corrected by July 1989.

Three May milestones show schedule deviations. Milestone 05, *Develop Concentration Ratios*, has been rescheduled for completion in July 1989 in order to use results from Milestone 05, *Final River and Sediment Monitoring Data*. Milestone 06, *Native American Traditional Diet Description - River Pathway*, has been delayed to June 1989 because new information sources were discovered and must be analyzed, which delays Milestone 12, *Native American Diet Sensitivity Study - River Pathway*, which cannot be completed without data from Milestone 06.

CAPITAL STATUS

No FY 1989 capital budget.

PROJECT SUMMARY REPORT

1. IDENTIFICATION NUMBER: DE-AC076RLO 1830		2. PROGRAM/PROJECT TITLE: HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION					3. REPORTING PERIOD: MAY 1989							
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 1988							
							6. COMPLETION DATE: SEPTEMBER 1989							
7. FY 89	8. MONTHS	O	N	D	J	F	M	A	M	J	J	A	S	FY90
9. COST STATUS:														
a. \$ EXPRESSED IN THOUSANDS														
b. BUDGET & REPORTING NO./SUB. ACCT NO.														
12578 GEO2210110														
c. FIN. NO.														
d. ACTUAL COSTS PRIOR YEARS														
3016														
e. FY BUDGET														
3289														
f. TOTAL BUDGET														
g. FY FUNDS AUTH														
3289														
h. TOTAL FUNDS AUTH														
5822														
COSTS		I. PLANNED	203	162	312	253	212	260	300	260	320	280	320	400
		J. ACTUAL	193	178	275	180	398	241	362	290				
		K. VARIANCE	10	-16	37	73	-186	19	-62	-30				
		L. CUM PLANNED	203	365	677	930	1142	1402	1702	1962	2282	2562	2882	3282
		M. CUM ACTUAL	193	371	646	834	1231	1472	1834	2124				
		N. CUM VARIANCE	10	-6	31	96	-89	-70	-132	-162				
10. LEGEND: PLANNED ..... ACTUAL _____ PROJECTED ..... FUNDS AUTH. _____ 90% FUNDS SPENT ▴														
11. MILESTONES		O	N	D	J	F	M	A	M	J	J	A	S	FY90
01 Phase I Report		▴ ○												
03 Radionuclide Source Terms from Fuel Processing 1944-1947		▴												
03 Dissolution Dates for Purex 1984-1986		▴												
03 Radionuclide List/Decay Schemes		▴ ▾												
03 Radionuclide Source Locations/Stacks/Stack Parameters		▴												
03 Radionuclide Release Fractions by Major Facility as Function of Time for Gases, Particulates, Volatiles		▴ ▾												
03 Focus Radionuclide Release Fractions on Dominant Radionuclides		▴												
LEGEND: SCHEDULED ▴ TO TSP ○ TIME LINE _____ PROPOSED DEVIATION ..... TIME NOW: ..... COMPLETED ▴ DEVIATION ▾ PROGRESS _____ APPROVED DEVIATION														
12. NAME/SIGNATURE OF PARTICIPANTS PROG/PROJ MANAGER & DATE H A Haerer														

PROJECT SUMMARY REPORT

PROJECT SUMMARY REPORT

PROJECT SUMMARY REPORT

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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, the from 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:

- conducted a working session with members of the TSP's Source Term Subcommittee on May 18. Task activities, status of activities, and schedule for completion of task activities were discussed
- met with M.A. Robkin, Chairman of the TSP's Source Term Subcommittee, to review the information contained in the recently released report, *Dissolving of Twenty Day Metal at Hanford, HW-17381 Del.* Additional reference materials were provided as background information on stack monitoring.

Milestone 03, *Recommendation Regarding Development of Libraries Specific to Hanford Reactors for ORIGEN Code*, due March 1989:

- completed revisions to the draft report originally completed in March 1989. The revised report incorporated informal review comments received from the TSP's Source Terms Subcommittee during the March working session.

Milestone 03, *Description of Major Hanford Site Operations and Facilities, 1944 - 1972*, due March 1989:

- continued the reviews necessary to obtain internal PNL clearance of the draft report completed in March 1989. The report will be released to the TSP for review after completing internal PNL clearance in June.

Milestone 03, *Radionuclide Source Terms from Fuel Processing, 1944-1947*, due May 1989 and complete:

- prepared a preliminary draft report of atmospheric emissions of iodine-131 from fuel processing from 1944 through 1947. The report presently contains only the data obtained from reviews of Hanford Site documents.

Milestone 03, *Description of Chemical Form and Atmospheric Chemistry of Iodine Emissions*, due May 1989 and complete:

- completed a preliminary draft report describing the chemical form and atmospheric chemistry of iodine emissions at the Hanford Site.

Milestone 03, *Best Estimate of Iodine-131 Contained in Irradiated Fuel at Time of Dissolution, 1944-1945*, due May 1989 and complete:

- calculated the estimates of iodine-131 contained in irradiated fuel at the time of its dissolution from 1944 through 1945.

Milestone 03, *Focus Radionuclide Release Fraction on Dominant Radionuclides*, due May 1989 and complete:

- The dominant radionuclide released to the atmosphere for the Phase I period is iodine-131; radionuclide release fractions used in Phase I calculations conducted in FY 1989 will be limited to iodine-131.

Milestone 03, *Dissolution Dates for PUREX 1984-1986*, due June 1989:

- identified the sources of information necessary to determine the fuel dissolution dates at the PUREX Plant from 1984 through 1986. This information will be used to help calibrate the atmospheric transport model.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- complete PNL clearance of the draft report titled *A History of Major Hanford Operations Involving Radioactive Material*
- continue acquiring and documenting information regarding radioactive emissions to the atmosphere from fuel processing, 1944-1947
- continue obtaining information for determining fuel dissolution dates at the PUREX Plant, 1984-1986
- prepare the various existing preliminary draft reports as input to the Phase I summary report
- continue data input to task numerical data base.

• continue work subject to task assignments; date 1972

• future planning; date 1972

• discuss the various existing documents; date 1972

the ERMEX Plan 1964-1969

• continue existing information for determining the development stage of

business to the enterprise from the 1964-1969

• continue existing and developing information regarding the

national objectives through the 1964-1969

• continue ERMEX objectives of the 1964-1969 and a study of the

work required for development through the 1964-1969

PLANNED WORK FOR SUBSEQUENT MONTHS

1972

PLANNED WORK FOR SUBSEQUENT MONTHS

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:

- continued preparation of a summary of available information for the Columbia River between Priest Rapids Dam and McNary Dam for a

poster presentation. Source term, hydrologic, monitoring, demographic, recreational, water use, and dosimetry information for the 1964 to 1966 time period are displayed on the poster, which was shown to the TSP in draft form on May 18. The poster will be formally presented at the July 1989 TSP meeting.

Milestone 04, *Atmospheric Model Development*, due June 1989:

- continued development of a puff model for the transport and diffusion computations. Development of the atmospheric model was discussed with the TSP Transport Subcommittee of the TSP on May 18.
- completed PNL internal peer review of the report summarizing the selection of an approach to modeling the transport and diffusion of radionuclides released to the atmosphere from Hanford Site operations. The report is being revised and will be submitted to PNL clearance.
- continued studies on identification and representation of wind patterns at the Hanford Site based on regional wind patterns.

Milestone 04, *Development of Conceptual Model of Radionuclide Transport in the Columbia River/Phase I*, due August 1989:

- met with Environmental Pathways and Dose Estimates Task leader to discuss needs for dose modeling with respect to river data
- continued reviewing reports in preparation for summarizing the conceptual model of flow and radionuclide transport in the Columbia River.

Milestone 04, *Monthly Average Air Concentrations/Surface Contamination by Location and Radionuclide*, due August 1989:

- assessed alternatives for the Phase I calculations for predicting air concentrations and surface contamination. It was decided to use average meteorological conditions from data for 1983 through 1987, which are more complete than actual meteorological data for 1944 through 1947. Preparation of the 1944 through 1947 data will continue for later use.

Milestone 04, *Status Report on Meteorological Data Base Development*, due September, 1989:

- continued entry of meteorological data from the Hanford Site into the meteorological data base. Began entry of meteorological data received on microfiche from the National Climatic Data Center.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

WORK PLANNED FOR SUBSEQUENT MONTHS

Work planned for subsequent weeks includes the following:

- complete development of the atmospheric transport and diffusion model for the Phase I calculations
- continue entry of meteorological data into the data base
- revise the draft report on selection of the atmospheric modeling approach and submit to PNL clearance
- evaluate the data on the Columbia River for 1964 through 1966 and begin summarizing and preparing concentrations for the Phase I calculations
- finalize the poster summarizing available information for the Columbia River between Priest Rapids Dam and McNary Dam for the 1964 to 1966 time period.

- This report
under reviewed (1985-1986) data x 2, which data for the 1985 to 1986
periods the cost of maintaining a large population for the country

- calculations
per a statistical and biological concentration for the 1985 to 1986
periods the data on the country for the 1985 to 1986 period

- and then to find a solution
to the data on the country for the 1985 to 1986 period
- continue with the data on the country for the 1985 to 1986 period

- for the 1985 to 1986 period
continue with the data on the country for the 1985 to 1986 period

Work should be done on the data on the country for the 1985 to 1986 period

WORK BEING DONE FOR SUBSEQUENT MONTHS

None

WORK KNOWN ABOUT AND ACTION TAKEN

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 for this reporting period included the following:

Milestone 05, *Determine Fish Concentration Ratios*, due May 1989:

- collected and summarized measured data on radionuclide concentrations in Columbia River fish flesh; milestone has been rescheduled to July 1989, to incorporate results of Milestone 05, *Final River Water and Sediment Monitoring Data*.

Milestone 05, *I-131 Sample Vegetation Data*, due June 1989:

- created data files of measured radionuclide concentrations in vegetation for 1945 and 1946 identifying the sampling time, location and results. Some times periods show more than one source of results, which are being evaluated and compared to attempt to understand the relationships between the sources and to identify the most reliable source.

- resumed effort to evaluate and refine estimated bias in measured radionuclide concentrations in vegetation. Data from 1945 through 1947 will be investigated as a first priority. Efforts concentrated on obtaining more reliable estimates of biases due to assumptions about point source geometry and source size, revising the decay correction factor based on newly discovered information in the records, and on verifying the basic information concerning probable analytical biases in the 1945-1947 data.

Milestone 05, *Measured River Fish Concentrations*, due August 1989:

- completed a preliminary data compendium and statistical summary by year, season, river section and species for the years 1963 through 1966
- began reviewing the analytical methods used as the basis for determining potential biases and the uncertainties in measured results.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTH

Work planned for subsequent months includes the following:

- continue preparing vegetation data file for 1945 through 1946 and reassessing biases in data for 1945 through 1947, and revising draft report on biases in vegetation data
- begin creating a data file on river water and sediment
- continue to evaluate data on river water and fish for biases
- attempt to discriminate measured radionuclide concentrations in vegetation by vegetation type.

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:

Milestone 06, *Native American Traditional Diet Description (River Pathway)*, due May 1989. This milestone has been delayed to June 1989 because new information sources were discovered and further research was needed.

- met with representatives of the Colville, Spokane, Umatilla, Warm Springs and Yakima tribes during the TSP meeting on May 18-19
- sent a revised Request For Proposal to eight tribes (Colville, Coeur d'Alene, Nez Perce, Spokane, Kalispel, Umatilla, Warm Springs and Yakima) on May 1
- received revised proposals from the Yakima and Nez Perce tribes
- completed preliminary estimates of Native American traditional food consumption

Milestone 06, *Demographic Information for 1944-1947 by Age Group, Urbanization Category, and Subpopulation by Year and Demographic Information for 1964-1966 Number and Age/Urbanization/Subgroup for River Recreation, Drinking River Water*, due August 1989:

- completed review of ratio-correlation, vital rates, and component II county estimates by external experts
- prepared maps showing census sub-division boundaries for the Phase I counties
- transmitted first draft of report on county population estimates to the TSP Demographics sub-committee.

Milestone 06, *Milk Production/Distribution/Consumption for 1944-1947 by Census Sub-Division*, due August 1989:

- completed the report summarizing the milk market workshop and submitted it to PNL clearance
- met with retired workers of Carnation Milk Company in Yakima, Washington to discuss information on milk production and distribution
- scheduled working meeting with Jerry Ward to evaluate options for estimating uncertainties in various milk model parameters.

Milestone 06, *Food Consumption Parameters 1944-1947 for Each Food Type by Age, Sex, Urbanization, Category, Subpopulation, and Food Consumption Parameters 1964-1966 Kg/Mo Consumed for Each Food Type by Age, Sex, Urbanization Category, Subpopulation*, due August 1989:

- presented an overview of the progress made on the food consumption task to the TSP. The TSP provided guidance regarding the coding of specific foods.
- recoded the 1977 National Food Consumption Survey (NFCS) food codes into the HEDR categories
- continued processing NFCS data to identify individual food consumption patterns, broken down by food category, urbanization, age, and sex.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- hold a workshop for tribal technical staff on methods and strategies of data collection
- present an overview of the HEDR Project to the Warm Springs Tribal Council
- continue contract negotiations with eight tribes
- continue processing NFCS survey data

- submit final report on county population estimates to TSP
- submit draft report on milk production, processing, and distribution to the TSP.

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:

Milestone 07, *Create Fish Model*, due May 1989, and complete:

- accumulated measured fish data for the Columbia River between Priest Rapids and McNary Dam for the years 1963 through 1966, in cooperation with the Environmental Monitoring Data Task. A method was created to develop the mathematical relationship of concentrations in fish types at specified catch locations to concentrations in consumed fish. This method is similar to that used in the milk model, which relates milk production and distribution locations to milk consumption.

Milestone 07, *Agricultural Product Soil-to-Plant Transfer Factors*, due May 1989, and complete:

- developed preliminary transfer factors for leafy vegetables and forage, other vegetables, fruits, and grains; final values will be part of the final dose calculations.

Milestone 07, *GIS and Data Base Recommendation*, due September 1989:

- identified a staff member as the initial code development custodian and data base steward. Prepared first drafts of the system design requirements (what the code must do) and the code design specification (how the code will do it).
- continued to refine the strategy for developing calculations to estimate uncertainties associated with dose results. A Monte Carlo technique, performed in stages will be used. Output data distributions from one stage will be the input distributions for the next stage.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for the subsequent months includes the following:

- continue defining the overall structure of the needed HEDR data base and the type of data processing equipment needed for smooth project integration
- complete code design requirements and code design specification documents
- establish a subtask on use of historical bioassay data.

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:

- declassified 12 early-day, Hanford-originated documents of potential interest/use in the HEDR Project and provided them to appropriate task leaders and the public domain
- provided the DOE-RL Public Reading Room with approximately 85 Hanford-Site originated documents of potential interest/use in the HEDR Project. Approximately 115 remain to be sent.
- prepared a table giving annual total beta of the Columbia River at Pasco from 1945 through 1963
- provided copies of the "green run" report HW-17831 DEL, *Dissolving of Twenty Day Metal at Hanford* (5/1/50) to HEDR task leaders and each TSP member
- identified documents that address specific isotope releases to the Columbia River during 1964 through 1966. Reactor downtime dates in 1966 were noted.
- added new citations to the tracking system.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Planned work for subsequent months includes the following:

- 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
- declassify, with or without deletions, duPont operating history volumes that address activities from startup to about mid-year 1946
- identify and collect significant documents that address silver reactor capabilities, performance, and incidents, especially at the Redox Plant
- 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
- identify documents that present information on stack filter samples and scrubber samples for 1946 through 1949
- watch for information that may explain in detail, and support data in, green run document HW-17381 DEL.

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 2 documents totaling 126 pages 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.

Background

- The DOE is currently reviewing the DOE-NE program
- The DOE is currently reviewing the DOE-NE program
- The DOE is currently reviewing the DOE-NE program

DOE-NE Program Review and Action Taken

Background

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DOE-NE Program Review and Action Taken

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:

- performed a surveillance on the supporting documentation for the 1965 preliminary adult dose analysis for phosphorus-32 for ingestion of fish from the Columbia River. Documentation checked included input and output of the application of the computer software and hand calculations and verification of the FISH Program. Compliance to applicable QA requirements was found to be adequate.
- issued training assignments to the HEDR staff in the Environmental Transport Task
- issued revised QA Plan to meet the current needs of the HEDR Project.

MAJOR PROBLEM AREAS AND ACTIONS TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- assist in implementing QA program requirements for HEDR staff training and software control requirement identification

- perform surveillance of software control requirements and records control
- issue remaining HEDR procedures: HEDR-TP-3, *HEDR Documentation of Critical Decisions* and HEDR-TP-4, *HEDR Data Quality Objectives*.

OBJECTIVE

The objective of this task is to ensure continuous quality assurance (CQA) 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:

- performed surveillance on the supporting documentation for the test procedure, about does analysis for discrepancies for ingestion of fish from the Colorado River. Documentation checked included input and output of the application of the code, for software and hardware calculations and verification of the ESH Program. Compliance to applicable QA requirements was found to be adequate.
- issued pending statements to the HEDR staff in the Environmental Transport Task.

Issued revised QA Plan to meet the current needs of the HEDR Project.

MAJOR PROBLEM AREAS AND ACTIONS TAKEN

None

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- assist in implementing QA program requirements for HEDR staff training and software control requirement verification.

Statistics

OBJECTIVE

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

PROGRESS

Activities this reporting period included the following:

- prepared for and attended a meeting with two TSP members on May 17 in Richland to discuss progress on developing the strategy for dose estimation and uncertainty analysis
- assisted Environmental Monitoring Task staff in assessing the uncertainty in the correction factor being developed to correct historical vegetation measurements of iodine-131 from during 1945 through 1947
- attended a meeting at the Environmental Measurements Laboratory in New York City of the National Cancer Institute (NCI) Task Group on Exposure of American People to Iodine-131 from Nevada Test Site Fallout. The purpose of the meeting was to review the latest draft of the final report to NCI and to provide technical direction. Many of the modeling and uncertainty-analysis procedures being used in that study are related to those used in the HEDR Project.

Milestone 07, *Preliminary Dose Estimates, Air Pathway 1944-1947*, due September 1989:

- continued working with Environmental Pathways and Dose Estimates Task staff to help 1) develop a strategy for estimating doses and conducting uncertainty analyses of estimated doses for Phase I, 2) prepare a report that describes the rationale and requirements of the dose estimation strategy and uncertainty analyses, and 3) write the computer code that will estimate doses and their uncertainties.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- prepare for an all-day PNL working meeting with TSP members in Richland on July 19 to present in detail the proposed strategy for dose estimation and uncertainty analysis
- continue to help develop the proposed strategy for dose estimation and uncertainty analysis and to help write a computer code to perform these analyses
- complete the report that describes the rationale and requirements of the dose estimation strategy and uncertainty analyses
- help develop estimates of uncertainties in parameters as input to uncertainty analysis for Phase I. Explore the use of probability encoding for this purpose for milk distribution parameters.
- conduct uncertainty analysis to approximate the uncertainty in correction factors being developed to obtain corrected iodine-131 measurements of vegetation for 1945 through 1947.

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:

- received an unsolicited proposal to the project concerning use of carbon-14 as a tracer for atmospheric releases from the Site. The use of dendrochronology (a form of tree-ring dating) was proposed. It was requested that this proposal be revised and resubmitted for further evaluation.
- met with Dr. Ruttenber of the Centers for Disease Control to discuss the wording of their proposed questionnaire, which will be used as a basis for initial health effects studies. General agreement was reached concerning questions of potential benefit to their project and ours.

Milestone 06, *Census District Boundaries Plotted on Map*, due May 1989:

- established a working agreement between staff of the Environmental Monitoring Data, Demographics, Agriculture, Food Habits, and Project Technical Coordination Tasks on minor adjustments to the census tract divisions to simplify data needs.

Milestone 12, *Define Age Groups, Urbanization, and Subpopulation Categories*, due May 1989, complete pending consultation with individual TSP members:

- presented definitions of the recommended age groups, urbanization categories, and subpopulation categories to the TSP on May 19. Recommended age groups are prenatal, 0-1 years, 2-4 years, 5-9 years, 10-14 years, 15-20 years, and 20+ years. A TSP member has

recently suggested adding several additional groups to this list. For Phase I, the project direction continues to be to prove feasibility of the system with two groups - infant and adult. We will discuss the possible revisions/additions at greater length.

The recommended urbanizations -- urban, rural non-farm, and rural farm -- were accepted by the TSP, as were the recommended subpopulation categories -- general population, Native American, onsite workers, onsite military, and migrant workers. Phase I direction is to emphasize data collection on the first two subpopulation groups.

Milestone 12, *Determine Use of I-129 as an Indicator of I-131 in the Environment*, due May 1989, now complete:

- presented "white paper" to the TSP prior to the Toppenish meeting for their review and approval.

Milestone 12, *List Dominant Radionuclides*, due May 1989, now complete:

- prepared a memo to project staff indicating the radionuclides of greatest interest for Phase I work. Final documentation of this selection process will be provided to the TSP prior to the July meeting.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for the subsequent months includes the following:

- continue defining the overall structure of the needed HEDR data base and the type of data needed for smooth project integration.

APPENDIX A

Communications Log

COMMUNICATIONS LOG - MAY 1989

<u>INITIATED BY</u>	<u>CONTACT</u>	<u>AFFILIATION</u>	<u>TYPE</u>	<u>SUBJECT</u>
PNL/W. Haerer	John Till	TSP, Chairman	Telephone	Ongoing discussions re:HEDR Project
PNL/W. Haerer	Mary Lou Blazek	TSP, Vice Chairperson	Telephone	Ongoing discussions re:HEDR Project
PNL/W. Haerer	Bernard Shleien	TSP, Secretary	Telephone	Ongoing discussions re:HEDR Project
TSP/J. Till	Larry Morgan	PNL	Telephone	Information request re: quantities of I-131 released during the "Green Run" as given in HW-17381-DEL
TSP/M. Robkin	Shirley Gydesen	PNL	Telephone	Requested documents that might give information on details of calculations related to HW-178381 DEL
JS Stohr	Patti Cleavenger	PNL	Telephone	HEDR lists and documents in DOE Public Reading Room
PNL/A. Liebetrau	Ken Kopecky	TSP	Telephone	May 17 meeting with HEDR Statistics Task
TSP/D. Price	Bruce Napier	PNL	Letter	Age group structure

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