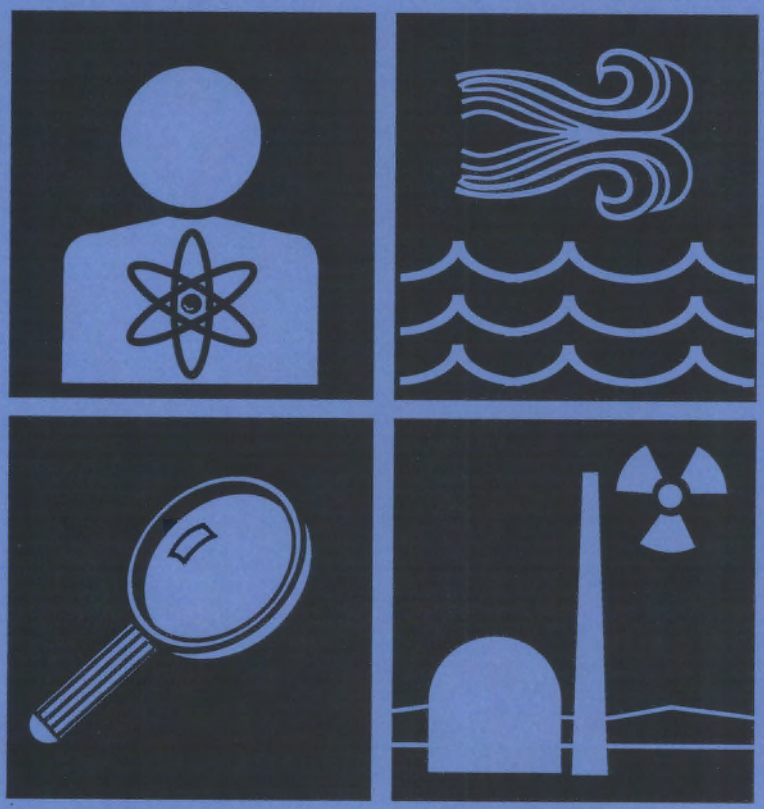
PNL-6450-36-HEDR
UC-707

6

Hanford Environmental Dose Reconstruction Project

Monthly Report

October 1990



Prepared for the Technical Steering Panel

Battelle

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PNL-6450-36-HEDR
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HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION PROJECT

Monthly Report

October 1990

Prepared for the Technical Steering Panel

Pacific Northwest Laboratory
Richland, Washington 99352

PNL-6450-36-HEDR
UC-707

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 the Pacific Northwest Laboratory (PNL)[a] 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.

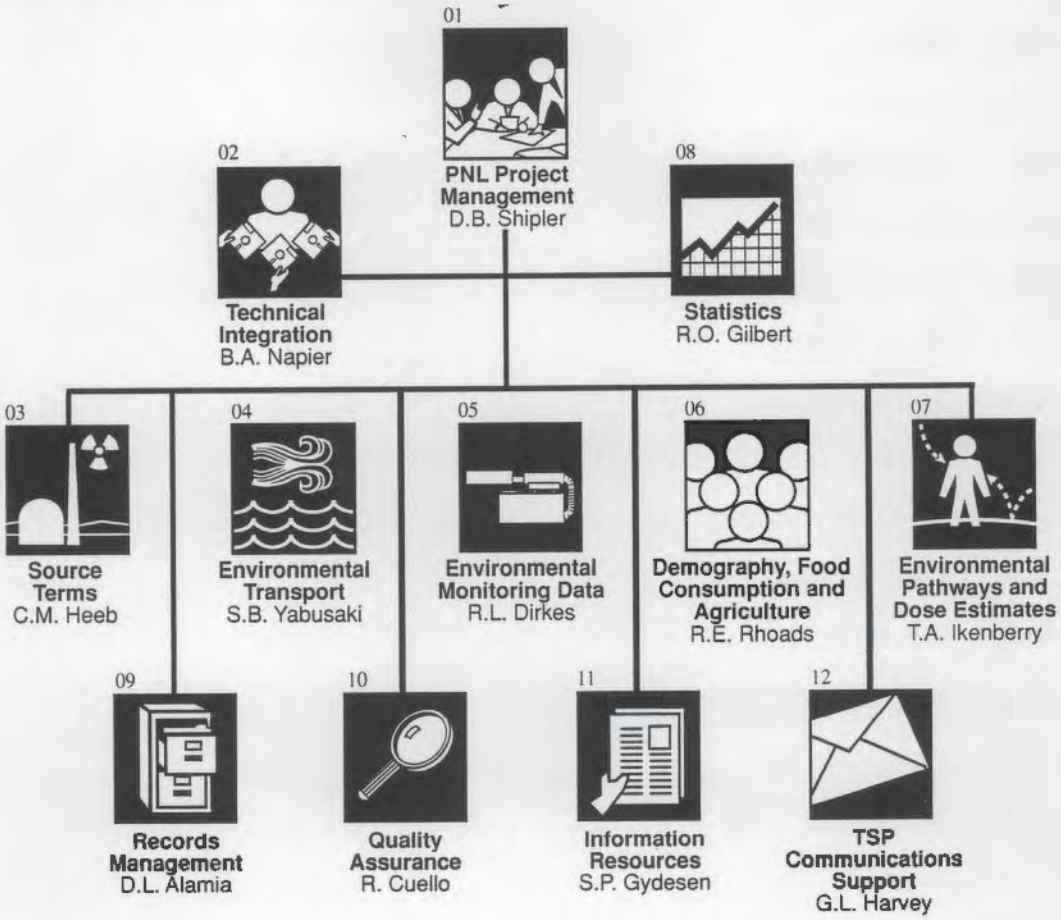


FIGURE 1. Organizational Structure of the Hanford Environmental Dose Reconstruction Project

[a] Battelle Memorial Institute operates the Pacific Northwest Laboratory.

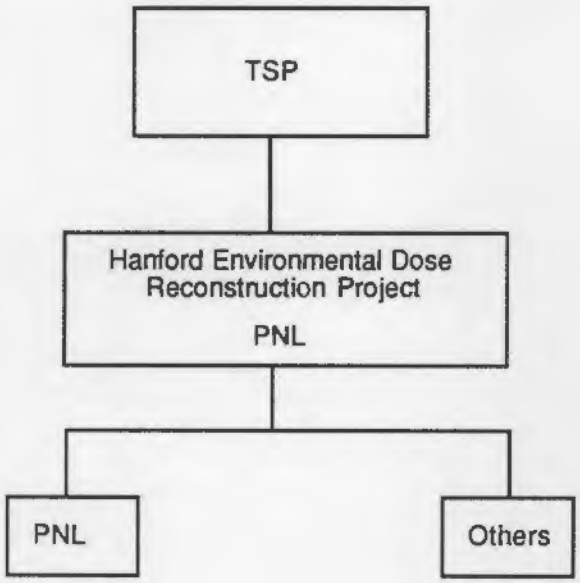
TABLE 1. Status of Directives[a]

		Complete	Ongoing	Phase I	Phase II
88-1	(a) Proposals		x		
	(b) Source Terms			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			
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		
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		

[a] Note: For simplicity, TSP directives are identified here using only key words. The complete directives are available from the TSP.

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 the Pacific Northwest Laboratory (PNL) under the direction of an independent Technical Steering Panel (TSP).



The TSP 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 are appointed technical members representing the states of Oregon and Washington, cultural and technical experts nominated by the regional Native American tribes, and an individual representing the public.

The project is divided into the following technical tasks. These tasks correspond to the path radionuclides followed, from release to impact on humans (dose estimates):

- Source Terms
- Environmental Transport
- Environmental Monitoring Data
- Demographics, Agriculture, Food Habits
- Environmental Pathways and Dose Estimates.

The Source Terms Task develops estimates of radioactive emissions from Hanford facilities since 1944. These estimates are based on historical measurements and production information.

The Environmental Transport Task reconstructs the movement of radioactive materials from the areas of release to populations. Movement via the atmosphere, surface water (Columbia River), and ground water is studied.

The Environmental Monitoring Data Task assembles, evaluates, and reports 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 caused by natural sources and nuclear testing fallout.

The Demographics, Agriculture, Food Habits Task develops the data needed to identify the populations that could have been affected by the releases. Population and demographic information are developed for the general population within the study area. This information will also be developed for several special population groups, including Native American tribes in the study area, Army personnel who were stationed at Hanford, Hanford construction workers, and migrant farm workers.

In addition to population and demographic data, the food and water sources and consumption patterns for populations are estimated because they provide a primary pathway for the intake of radionuclides. Historical dairy farming practices and milk distribution systems are 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 uses the information produced by the other tasks to estimate the radiation doses populations could have received from Hanford radiation.

Project reports and references used in the reports are made available to the public in a public reading room. Project progress is documented in this monthly report, which is available to the public.

Project Summary

Progress

Figure 2 shows the status of project milestone activities. The following is a summary of activities conducted by HEDR staff in September 1990:

- developed draft task plans that were used as working documents at the TSP public meeting in Seattle, October 11 and 12. Reached agreement on FY 1991 activities and began preparing the FY 1991 project plan
- presented information at the TSP public meeting on the objectives, approach, and process for decision-making and its impacts on the project's scope and schedule
- began interpreting data from the International Atomic Energy Agency coordinated research project on Validation of Model Predictions (VAMP)
- met with TSP members concerning interactions with Native Americans
- extended the period of performance for Work Order No. 1 for the Yakima Nation to November 30, 1990
- reviewed code improvements and data structure modifications to be implemented in preparation for the Phase II code restructuring
- conducted bench-scale sensitivity analyses to determine the uncertainty in Phase I dose estimates for census divisions
- began entering estimated air concentration data from the Phase I air model for the Walla Walla region into the computer to conduct bench-scale sensitivity analyses
- scheduled a working session with key staff members and TSP staff to address data quality objectives for Phase II planning
- attended Communications Subcommittee meetings, October 11 and 23
- wrote an article about the project for the Profile, a PNL bi-monthly staff publication
- participated in interviews on HEDR issues with KING TV and Dallas Morning News reporters
- presented the Phase I results to a seminar of Washington State University graduate students and faculty in Pullman, Washington
- presented HEDR information to interested Battelle and Westinghouse staff.

Major Problems or Changes and Action Taken

- The TSP Native American Working Group is preparing a "process paper" outlining how data on food habits and life styles will be obtained for Phase I and how data needs for Phase II will be defined and obtained. PNL is following the Working Group's lead and no work has yet been initiated for FY 1991.
- A misinterpretation of the TSP Communications Subcommittee budget request resulted in a $53K shortfall for FY 1991 activities planning. The Subcommittee is reevaluating and reprioritizing its activities.
- Several new task leaders were appointed: Cal Heeb for the Source Terms Task, Roger Dirkes for the Environmental Monitoring Data Task, Tracy Ikenberry for the Environmental Pathways and Dose Estimates Task, and Geoff Harvey for a new task, TSP Communications Support.

Planned Work for Subsequent Months

Work planned for subsequent months includes

- finalize about 24 Phase I reports: summary reports on Phase I results and supporting reports on various aspects of Phase I work
- continue coordinating efforts with Hanford Thyroid Disease Study personnel
- close iodine-131 release estimates, 1944-1947
- upgrade atmospheric dispersion model
- collect additional Columbia River data from 1967-1989

- collect milk system information for Morrow, Umatilla, Franklin and Adams counties
- evaluate and restructure HEDR computational model to increase accuracy and reduce uncertainty
- continue Phase I dose estimation efforts for Native American tribes; complete dose estimates for tribes that provided data in FY 1990
- conduct bench-scale sensitivity analyses to identify areas for significant and cost effective improvements
- continue identification and declassification of HEDR-related and other Hanford documents.

Budget Status

Figures 2 and 3 show the budget status of the HEDR Project and TSP activities, respectively.

Table 2 outlines FY 1991 costs and budget by task showing labor and non-labor dollars expended. Table 3 summarizes prior fiscal year costs and budgets.

Variance Explanation

Planned HEDR expenditures (excluding TSP) for October 1990 were $163K. Actual HEDR expenditures (excluding TSP) for October, 1990 were $121K. This underrun resulted in part from new work packages not being entered into the financial system in time for month-end processing. Additionally, FY 1991 planning activities were under way, delaying in initiation of some technical activities.

Capital Status

$141K capital funds were authorized in FY 1990. Capital expenditures were $48K. FY 1991 capital allocations have not yet been made.

1. ID (Contract) Number:	2. Program/Project Title:	3. Reporting Period:
DE-AC06-76RLO 1830	HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION - PNL	OCTOBER 1990

4a. Participant Name and Adress	4b. Client Name and Address	5. Start Date / 6. Completion Date
Pacific Northwest Laboratory P.O. Box 999 Richland, WA 99352	DOE-RL Richland, Washington 99352	5. OCTOBER 1990 6. SEPTEMBER 1991

7. FY 90 | 8. Months

9. Cost Status

a. $ Expressed in: Thousands

b. B&R No./ Subaccount No.: 12578 EW7002

c. FIN No.:

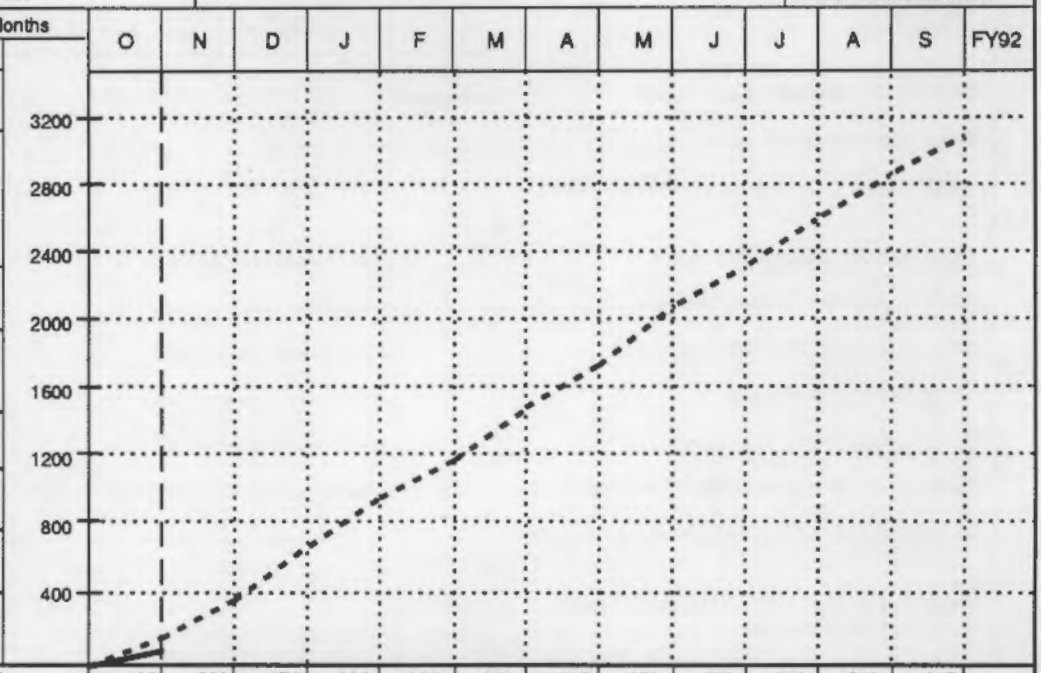
d. Actual Costs Prior Years: 7,676 (a)

e. FY Budget: 3,091 (b)

f. Total Budget:

g. FY Funds Auth.: 0 (c)

h. Total Funds Auth.: 8,022 (d)

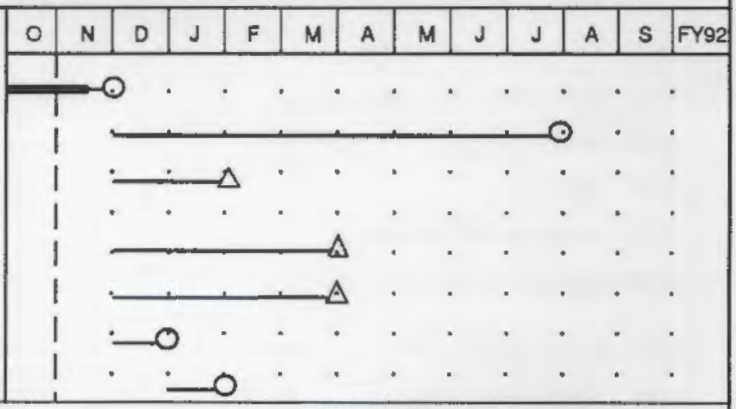


Costs		O	N	D	J	F	M	A	M	J	J	A	S	FY92
	i. Planned	163	223	273	265	256	289	315	279	273	268	240	247	
	j. Actual	121												
	k. Variance	42												
	l. Cum Planned	163	386	659	924	1180	1469	1784	2063	2336	2604	2844	3091	
	m. Cum Actual	121												
	n. Cum Variance	42												

10. Legend: Planned - - - - - Actual ——— Funds Auth. ═══ 90% Funds Spent ▷

(a) Actual cost prior years excludes TSP costs. (b) Projected FY budget excludes TSP budget. (c) October funding for PNL has been received from DOE-RL, but project specific funding has not yet been allocated. (d) FY88-90; excludes capital and TSP funding.

11. Milestones:



Notes:
1. All Phase I reports are shown here as being completed in March, but some reports will be completed before then. Phase I report completion dates will be modified when a more specific schedule is prepared.
2. Completion dates for Phase II reports are for draft versions for TSP approval, not finalization.

Legend: Scheduled Final △ — Deviation — — ◇ — To TSP for Review ○ — Completed ▲ ● ◆ — Time Line ——— — Progress Line ═══ — Time Now |

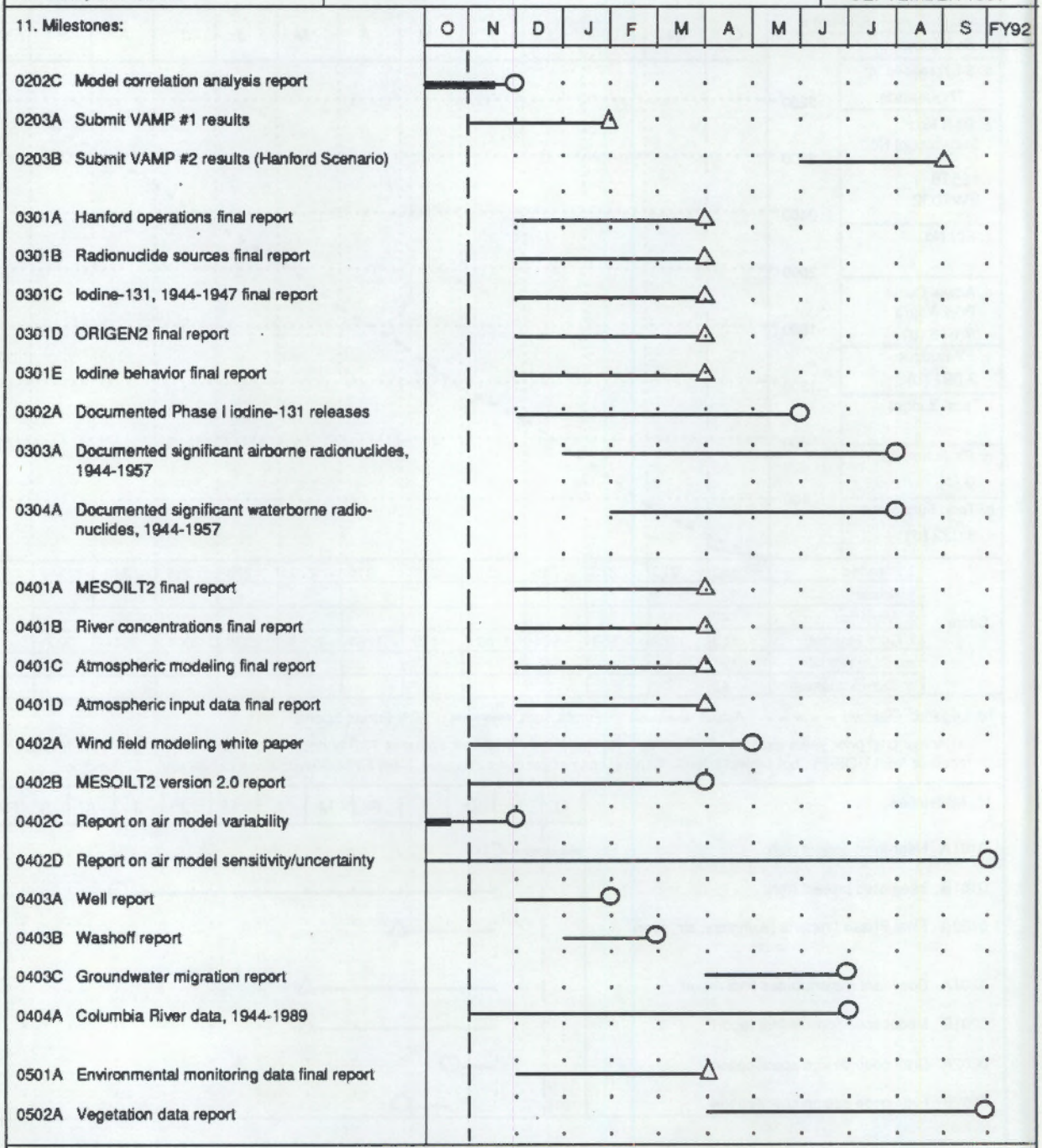
12. Name/Signature of Participants Prog/Proj Manager & Date

D. B. SHIPLER

FIGURE 2. Project Summary Report - Pacific Northwest Laboratory

1. ID (Contract) Number:	2. Program/Project Title:	3. Reporting Period:
DE-AC06-76RLO 1830	HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION - PNL	OCTOBER 1990

4a. Participant Name and Adress	4b. Client Name and Address	5. Start Date	6. Completion Date
Pacific Northwest Laboratory P.O. Box 999 Richland, WA 99352	DOE-RL Richland, Washington 99352	OCTOBER 1990	SEPTEMBER 1991



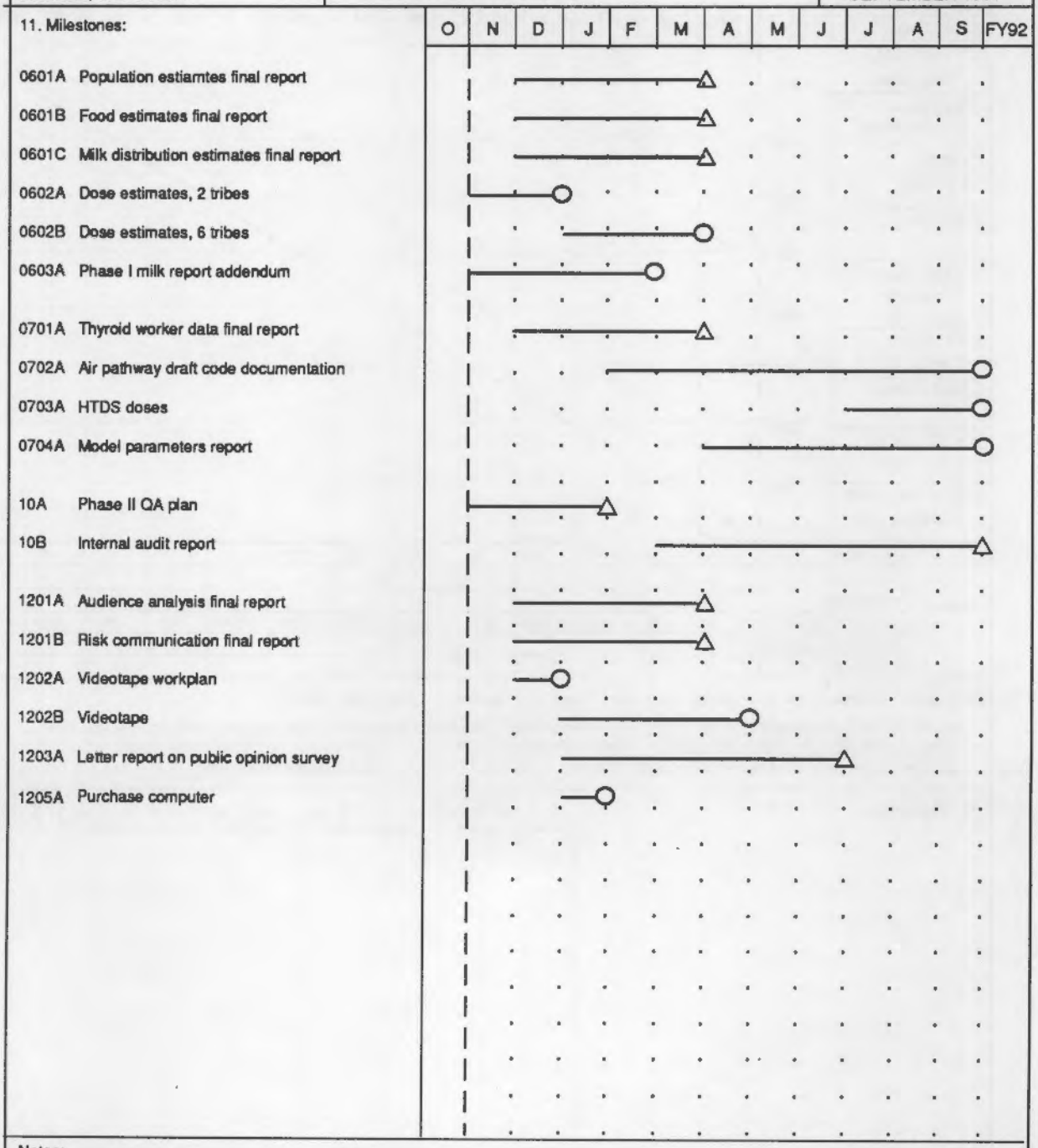
Notes:
1. All Phase I reports are shown here as being completed in March, but some reports will be completed before then. Phase I report completion dates will be modified when a more specific schedule is prepared.
2. Completion dates for Phase II reports are for draft versions for TSP approval, not finalization.

Legend: Scheduled Final △ To TSP for Review ○ Time Line ——— Time Now
Deviation — — ◇ Completed ▲ ● ◆ Progress Line ▬▬

FIGURE 2. Project Summary Report - Pacific Northwest Laboratory (Contd)

1. ID (Contract) Number:	2. Program/Project Title:	3. Reporting Period:
DE-AC06-76RLO 1830	HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION - PNL	OCTOBER 1990

4a. Participant Name and Adress	4b. Client Name and Address	5. Start Date / 6. Completion Date
Pacific Northwest Laboratory P.O. Box 999 Richland, WA 99352	DOE-RL Richland, Washington 99352	5. Start Date OCTOBER 1990 6. Completion Date SEPTEMBER 1991



Notes:
1. All Phase I reports are shown here as being completed in March, but some reports will be completed before then. Phase I report completion dates will be modified when a more specific schedule is prepared.
2. Completion dates for Phase II reports are for draft versions for TSP approval, not finalization.

Legend: Scheduled Final △ Deviation — — ◇ To TSP for Review ○ Completed ▲ ● ◆ Time Line —— Progress Line ▬▬ Time Now |

FIGURE 2. Project Summary Report - Pacific Northwest Laboratory (Contd)

1. ID (Contract) Number:	2. Program/Project Title:	3. Reporting Period:
DE-AC06-76RLO 1830	HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION - TSP	OCTOBER 1990

4a. Participant Name and Adress	4b. Client Name and Address	5. Start Date / 6. Completion Date
Pacific Northwest Laboratory P.O. Box 999 Richland, WA 99352	DOE-RL Richland, Washington 99352	5. Start Date OCTOBER 1990 6. Completion Date SEPTEMBER 1991

7. FY 90 | 8. Months

9. Cost Status

a. $ Expressed in: Thousands

b. B&R No./ Subaccount No.
12578
EW7002

c. FIN No.

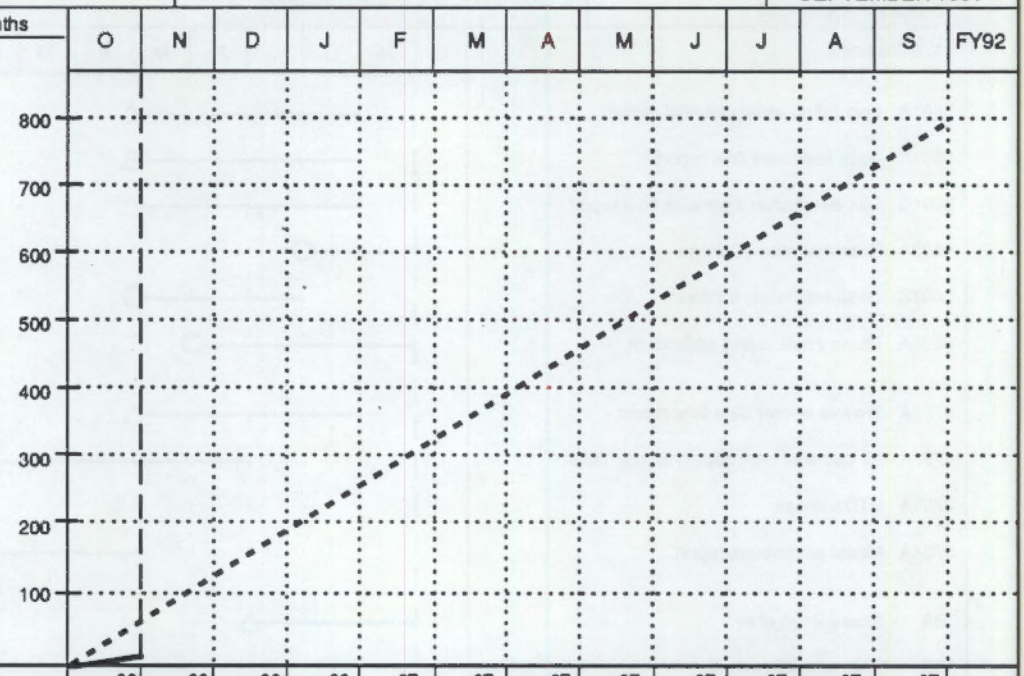
d. Actual Costs Prior Years
1504

e. FY Budget
800 (a)

f. Total Budget

g. FY Funds Auth.
0 (b)

h. Total Funds Auth.
1,544 (c)

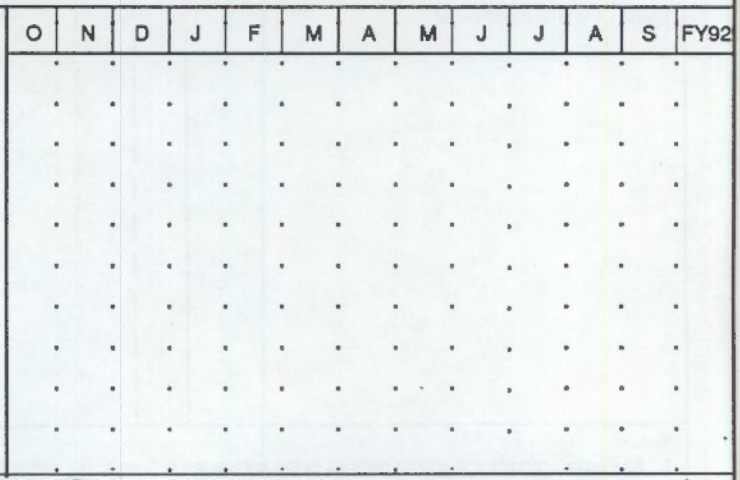


Costs	O	N	D	J	F	M	A	M	J	J	A	S	FY92
i. Planned	66	66	66	66	67	67	67	67	67	67	67	67	
j. Actual (d)	14												
k. Variance	52												
l. Cum Planned	66	132	198	264	331	398	465	532	599	666	733	800	
m. Cum Actual (d)	14												
n. Cum Variance	52												

10. Legend: Planned - - - - - Actual ——— Funds Auth. ═══ 90% Funds Spent ▷

(a) $800K = $725K for the TSP; $40K of TSP carryover; and $35K for service assessment. (b) October funding for PNL has been received from DOE-RL, but project specific funding has not yet been allocated. (c) FY88-90. (d) Actual costs are booked after invoices are received and processed. Therefore, current month costs may not reflect actual work performed.

11. Milestones:



Legend: Scheduled Final △ To TSP for Review ○ Time Line ——— Time Now |
Deviation — — ◇ Completed ▲ ● ◆ Progress Line ═══

12. Name/Signature of Participants Prog/Proj Manager & Date
D. B. SHIPLER

FIGURE 3. Project Summary Report - Technical Steering Panel

TABLE 2. Fiscal Year Costs through October 31, 1990
(Dollars in Thousands)

HEDR Project Tasks	October, 1990 Labor $	October, 1990 Non-Labor $ (a)	October, 1990 Total $	FY 1991 (October, 1990 - September, 1991) Labor $	FY 1991 Non-Labor $ (a)	FY 1991 Total $	Cum Budget	Cum Variance
Project Management (b)	44	4	48	44	4	48	62	14
Project Tech Integration	7	5	12	7	5	12	25	13
Source Terms	7	0	7	7	0	7	6	-1
Environmental Transport	11	1	12	11	1	12	15	3
Environ Monitoring Data	1	0	1	1	0	1	0	-1
Demo, Food, & Agriculture	7	1	8	7	1	8	8	0
Envir Pathways & Dose Est	3	0	3	3	0	3	11	8
Statistics	9	2	11	9	2	11	5	-6
Records Management	2	0	2	2	0	2	6	4
Quality Assurance	3	0	3	3	0	3	9	6
Information Resources	9	0	9	9	0	9	11	2
TSP Comm Support	4	1	5	4	1	5	5	0
Subtotal	**107**	**14**	**121**	**107**	**14**	**121**	**163**	**42**
Contingency							0	0
Subtotal HEDR Tasks	**107**	**14**	**121**	**107**	**14**	**121**	**163**	**42**
Technical Steering Panel (c)	0	14	14	0	14	14	66	52
TOTAL	**107**	**28**	**135**	**107**	**28**	**135**	**229**	**94**

(a) Non-labor dollars include expenses such as travel, publication production, procurements, and subcontracts.
(b) Project management includes activities such as project control and administration, project communications, subcontract administration, records control, and peer review.
(c) Technical Steering Panel (TSP) costs are administered through subcontracts which are reflected as non-labor costs. Actual TSP expenses include both labor and non-labor.

TABLE 3. Summary of Prior Fiscal Year Costs

Fiscal Year	Cost	Funding	Carryover(a)	Budget(b)
1988	2,323	2,433	0	2433
1989	3,301	3,400	110	3510
1990	3,558	3,733	209	3942
TOTAL	**9,182**	**9,566**		

(a) Carryover equals unspent budget from prior year.
(b) Budget equals current fiscal year funding plus carryover.

Contents

Figures

Tables

Project Technical Integration

Objective

The objective of the Project Technical Integration Task is to provide technical overview of the project to ensure that appropriate technical activities are planned, that appropriate information is generated, and that technical task work is integrated effectively for performing the final dose calculations.

Progress

Activities this reporting period included

- began interpreting data from the International Atomic Energy Agency coordinated research project on Validation of Model Predictions (VAMP). These data will be entered into a database with structure similar to that used for the Phase I calculations
- presented the Phase I results to a seminar of Washington State University graduate students and faculty in Pullman, Washington, on October 4
- presented HEDR information to Battelle and Westinghouse staff in Richland on October 29 and 30

Major Problem Areas or Changes and Action Taken

Formal training scheduled for October was cancelled for staff working on the Geographic Information System (GIS) because of TSP direction away from GIS use this fiscal year. Some internal training is planned to prepare a small GIS demonstration for the January TSP meeting in Richland.

Planned Work for Subsequent Months

Work planned for the subsequent months includes

- finalize Phase I reports
- prepare code design specifications for Phase II computational model
- continue coordinating efforts with Hanford Thyroid Disease Study personnel
- work with the VAMP program to validate portions of the HEDR model and to obtain independent estimates of certain doses.

Source Terms

Objective

Source terms are the amount and type of radioactive materials released to the environment. Members of the Source Terms Task develop estimates of radioactive emissions since 1944 from Hanford facilities based on historical measurements and production information. Source term estimates are 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, uncertainties may result from the differences in published variables that are used to perform calculations. By comparing the uncertainty in the available data, Source Term Task staff determine the most accurate method for developing source terms. For time periods where measured values do not exist, source terms are calculated from available information. The proposed methods and results of this task are reviewed, evaluated, and approved by the TSP.

Progress

No technical activities occurred this month.

Major Problem Areas or Changes and Action Taken

Because of the reassignment of the previous task leader to another Laboratory program, Cal Heeb has been appointed task leader. Cal has been a Source Terms Task contributor since the project began.

Planned Work for Subsequent Months

Work planned for the subsequent months includes

- finalize Phase I reports
- close iodine-131 release estimates, 1944-1947
- collect data on significant airborne isotopes other than iodine-131 and on waterborne isotopes from 1944-1957.

Environmental Transport

Objective

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

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

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

The movement of radionuclides in the ground water is reconstructed initially by using ground-water monitoring data to estimate the contribution to the Columbia River exposure pathway. Modeling will be used where previously published data are lacking.

Progress

No technical activities occurred this month.

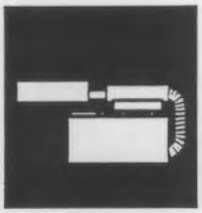
Major Problem Areas or Changes and Action Taken

None.

Planned Work for Subsequent Months

Work planned for the subsequent months includes

- finalize Phase I reports
- upgrade atmospheric dispersion model
- collect and evaluate information that can be used to determine the potential contribution of groundwater to dose
- collect information on Columbia River radionuclides from 1944-1989.



Environmental Monitoring Data

Objective

Members of the Environmental Monitoring Data Task assemble, evaluate, and summarize key historical measurements of the concentrations of radionuclides in the environment around the Hanford Site. Radionuclide concentrations have been measured at various times in air, drinking water, foods, fish, the Columbia River, soil, and in other materials. These measurements are 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 are proposed to the TSP for review, evaluation, and approval.

Progress

No technical activities occurred this month.

Major Problem Areas or Changes and Action Taken

Because of the reassignment of the previous task leader to another Laboratory project, Roger Dirkes has been appointed task leader. Roger has been a long-time contributor to the Environmental Monitoring Data Task.

Planned Work for Subsequent Months

Work planned for the subsequent months includes

- finalize Phase I reports
- collect additional vegetation data for model validation
- collect additional Columbia River data from 1967-1989.

Demography, Food Consumption, and Agriculture

Objective

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

Demographic information is 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 exposure pathways are studied. In addition, milk produced from cows represents a significant food pathway for iodine-131 if the cows ate vegetation contaminated with radionuclides. Dairy farming practices and milk distribution systems are studied to identify 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 are 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 use downstream from Hanford is also studied because radioactive materials in the river water could have been deposited on crops consumed by people or animals. Recreational users of the river also could 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

- met with TSP members concerning interactions with Native Americans
- extended the period of performance for Work Order No. 1 for the Yakima Nation to November 30, 1990.
- presented HEDR information to Battelle and Westinghouse staff in Richland on October 29 and 30

Major Problem Areas or Changes and Action Taken

PNL has been waiting for actions to be taken by the TSP Native American Working Group. PNL will follow the lead and process being developed by the TSP. Work will be initiated when the "process paper" is approved. Until then, only preparatory work is being conducted.

Planned Work for Subsequent Months

Work planned for the subsequent months includes

- finalize Phase I reports
- work with the working group and tribes to collect data for use in dose estimation
- use additional experts to confirm estimates of market shares and distribution patterns
- collect milk system information for Morrow, Umatilla, Franklin and Adams counties.

Environmental Pathways and Dose Estimates

Objective

Task members 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 include doses via direct transfer of radionuclides from concentrations in air and water to people (such as via breathing, drinking, and immersion). The calculations also include doses from 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 are presented to the TSP for review, evaluation, and approval.

Progress

- reviewed code improvements and data structure modifications to be implemented in preparation for the Phase II code restructuring
- began initial review and compilation of iodine transfer factor data before being informed of the TSP decision to delay work in this area for six months
- analyzed data of Hanford worker whole-body count results for a number of different radionuclides. Because this work is funded independently of the HEDR project, this work is continuing. A large amount of raw data has been sorted; a number of graphs have been prepared that allow us to see correlations between river fiow, river concentration and whole body count results. To date, most ofthe work has concentrated on the Phase I period of 1964 to 1966, and on the radionuclides Zn-65 and Na-24, as well as Cs-137 and K-40.

  The work needs some statistical support from the Statistics Task, but we hope to continue this work and prepare a Phase I report on potential doses from the river pathway for Zn-65 and Na-24 for presentation in the spring of 1991.

Major Problem Areas or Changes and Action Taken

Bruce Napier, past task leader, is now focusing his efforts on leading the Technical Integration Task. Tracy Ikenberry was appointed task leader for the Environmental Pathways and Dose Estimates Task; he has been a major contributor to the task for several months.

Planned Work for Subsequent Months

Work planned for the subsequent months includes

- finalize Phase I reports

- provide input to develop design specifications for Phase II code
- restructure HEDR computational model to incorporate changes identified during model analysis
- continue Phase I dose estimation efforts for Native American tribes; complete dose estimates for tribes that provided data in FY 1990
- estimate doses for 450 individuals in the pilot-scale phase of the thyroid disease study.

Statistics

Objective

Task members provide statistical support to members of technical tasks and 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

- conducted bench-scale sensitivity analyses to determine the uncertainty in Phase I dose estimates for census divisions; the uncertainty arises from the rapid drop in modeled air concentrations from east to west in some census divisions west of Hanford. These analyses are being conducted to help define the magnitude of the problem and how the air and dose codes should be changed for Phase II. This information will become part of a report that is being prepared by the Statistics Task on sensitivity analyses conducted on the Phase I model during FY 1990.
- began entering estimated air concentration data from the Phase I air model for the Walla Walla region into the computer to conduct bench-scale sensitivity anlyses. These analyses will estimate the effect of spatial correlation in the air model output (dose code input) on iodine-131 concentrations of grocery store milk accumulated over several census tracts
- met with a TSP member on October 10, 1990 to discuss work plans for FY 1991 and to report on bench-scale computer studies being conducted to develop the Phase II dose code.

Major Problem Areas or Changes and Action Taken

None.

Planned Work for Subsequent Months

Work planned for the subsequent months includes

- conduct bench-scale sensitivity analyses to obtain the knowledge needed to develop a defendable Phase II dose code
- work with other staff to restructure the Phase I dose code to produce individual doses and to ensure that correlations among model pathways and parameters are not lost

- work with other staff to revise the parameterization of the atmospheric model output for input to the dose code to assure that doses/uncertainties are estimated and reported on sufficiently small temporal/spatial scales to avoid biased dose/uncertainty estimates for individuals

- provide assistance to other HEDR Project tasks to identify when statistical and sensitivity analyses are needed and how to conduct them

- conduct statistical analyses for other tasks when appropriate.

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

- received and processed project records
- transferred one package of records to the DOE-RL Public Reading Room (four documents totalling 80 pages).

Major Problem Areas or Changes and Action Taken

None.

Planned Work for Subsequent Months

Work planned for subsequent months includes

- continue processing incoming project records
- continue transferring processed project records to the DOE-RL Public Reading Room
- revise Records Inventory and Disposition Schedule to include new task leaders and additional file categories
- review technical procedures RMP-1 and RMP-2 and update if necessary.

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

- continued working on expanding existing QA plan to include project-specific data quality objectives that will be included as part of Phase II planning
- scheduled a working session with key staff members and TSP staff that will address data quality objectives for Phase II planning.

Major Problem Areas or Changes and Action Taken

None.

Planned Work for Subsequent Months

Work planned for subsequent months includes

- issue remaining HEDR procedures: HEDR-TP-3, "HEDR Documentation of Critical Decisions" and "HEDR-TP-4, "HEDR Data Quality Objectives"
- issue revised QA Plan or other document to include project-specific data quality objectives.

Information Resources

Objective

Members of the Information Resources Task 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

- added new citations to the tracking system that now contains more than 3,800 publications
- provided the DOE-RL Public Reading Room with 84 documents of potential interest/use in the HEDR Project. A title listing of these reports is given in Appendix A
- filled information requests from the TSP and HEDR task members.
- worked with TSP members to identify and review Hanford documents of potential interest to HEDR.

Major Problem Areas or Changes and Action Taken

None.

Planned Work for Subsequent Months

Planned work for subsequent months includes

- 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.

TSP Communications Support

Objective

The objective of this task is to assist the TSP in developing competent communications strategies to further establish an effective, informative dialogue with interested audiences, provide public and media relations support, and manage activities that foster a better understanding of the HEDR process and its progress.

Progress

Activities this reporting period included

- established this new task, at TSP direction, and assigned task leadership to Geoff Harvey. Geoff has been working closely with the TSP Communications Subcommittee over the past year
- attended Communications Subcommittee meetings, October 11 and 23
- attended Tri-Party Agreement meeting in Richland, October 23
- responded to nine requests for information
- arranged HEDR presentations for the Washington State Federation of Women's Clubs (M. L. Blazek); and for Battelle staff, Information Forum (D. B. Shipler)
- arranged HEDR coverage by KING TV (James Compton interviewed D. B. Shipler, October 3) and by Dallas Morning News (Delia Rios interviewed D. B. Shipler, October 25)
- wrote an article about the project for the Profile, a PNL bi-monthly staff publication

Major Problem Areas or Changes and Action Taken

A misinterpretation of the TSP Communications Subcommittee budget request resulted in a $53K shortfall for FY 1991 activities planning. The Subcommittee is currently reevaluating and reprioritizing each activity. The Subcommittee is also discussing potential avenues for additional funding, which include having Battelle provide additional support to the State of Washington. These issues are being addressed with the Subcommittee.

Planned Work for Subsequent Months

Planned work for subsequent months includes

- finalize Phase I reports
- investigate options for conducting a public opinion survey
- purchase a computer for the Washington Department of Ecology's use on HEDR communications
- provide audiovisual support for January TSP meeting.

Appendix A

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

Appendix A

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

BNWL-B-378	Solubility of Elements in U.S. Western Desert Ground Water & Comparison with Chemical & Radiological Concentration Limits for Drinking Water. 53 p.	02/28/75
BNWL-CC-1352	Ground Disposal of Reactor Coolant Effluent. 18 p.	09/17/67
BNWL-SA-0686	Hydrologic Inter-Area Relationships as Indicated by Rising Heads in Confined Aquifers, Pasco Basin, Washington. 13 p.	05/04/66
BNWL-SA-3860-SUP	Systems Approach to Management of the Hanford Groundwater Basin - Questions & Answers. 7 p.	08/01/77
BNWL-SA-5786	Reconcentration Phenomenon of Radionuclide Chain Migration. 31 p.	04/30/77
CPD-059-1-DEL	Spread of Contamination from a Burial of Equipment at the 200 West Area Industrial Burial Garden. 4 p.	01/14/59
HW-3-899	Characteristics of a Standard Tube. 15 p.	09/30/44
HW-3-2074	Determination of Possibility of Film Removal by Increased Water Flow. 2 p.	03/29/45
HW-3-2157	Power Output of 32 - Slug Tests. 4 p.	04/19/45 •
HW-3-2801	Source of High Activity Levels Recently Observed from Shipping Containers & Transfer Cans. 10 p.	07/04/45
HW-9240	Review of Stuck Slugs. 9 p.	03/15/48 •
HW-20270	Removal of Ruptured Slugs from Tube #2562-H. 4 p.	02/12/51
HW-21404	Removal of Ruptured Slug from Tube #2278-H. 3 p.	06/15/51
HW-21413	Removal of Ruptured Slug from Tube #1174-D. 3 p.	06/20/51

• Declassified by new directive

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

HW-21461	Removal of Ruptured P-10 Target Slug from Tube #1584-H. 2 p.	06/27/51
HW-21523	Removal of Ruptured Slug from Tube #1476-D. 2 p.	07/16/51
HW-21560	Removal of Ruptured Slug from Tube #3486-H. 3 p.	07/06/51
HW-21746	Removal of Ruptured P-10 Target Slugs from Tubes #0879-H #1072-H. 3 p.	07/24/51
HW-21784	Removal of Ruptured P-10 Target Slug from Tube #3874-H & Ruptured Regular Metal Slug from Tube #0679-H. 2 p.	07/30/51
HW-21787	Removal of Ruptured Slug from Tube #1961-D. 2 p.	07/24/51
HW-21788	Removal of Ruptured Slug from Tube #1768-D. 2 p.	07/18/51
HW-21789	Removal of Ruptured Slug from Tube #4086-B. 3 p.	08/03/51
HW-21791	Removal of Ruptured Heavy Metal Slug from Tube #1874-F. 2 p.	08/01/51
HW-21925	Removal of Ruptured Slug from Tube #1963-D. 2 p.	08/02/51
HW-21961	Removal of Ruptured P-10 Target Slug from Tube #3782-H. 2 p.	08/17/51
HW-22064	Removal of Ruptured Slug from Tube #2068-H. 2 p.	09/10/51
HW-22119	Removal of Ruptured Slug from Tube #1475-DR. 2 p.	09/07/51
HW-22153	Removal of Ruptured Slugs from Two Tubes #2584-B & #1861-B. 3 p.	09/13/51
HW-22176	Removal of Ruptured Slug from Tube #0970-B. 2 p.	09/19/51
HW-22265	Removal of Ruptured Uranium Slug from Tube #1288-B. 2 p.	10/28/51

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

HW-22296	Removal of Ruptured P-10 Target Slug from Tube #2964-H & Ruptured Regular Slug from Tube #3684-H. 4 p.	10/15/51
HW-22305	Removal of Ruptured Slug from Tubes #1860-D, #1479-D & #1776-D. 2 p.	10/15/51
HW-22358	Removal of Ruptured Uranium Slug from Tube #3964-B. 2 p.	10/09/51
HW-22395	Removal of Ruptured Uranium Slug from Tube #4374-B. 2 p.	10/15/51
HW-22430	Removal of Ruptured Slug from Tube #3276-DR. 2 p.	10/29/51
HW-22454	Removal of Ruptured Slug from Tube #2465-D. 2 p.	10/15/51
HW-22499	Removal of Ruptured Heavy Metal Slug from Tube #2867-F. 2 p.	10/23/51
HW-22567	Removal of Ruptured Uranium Slug from Tube #3491-H. 2p.	10/30/51
HW-22570	Removal of Ruptured Slug from Tube #3465-B. 2 p.	11/09/51
HW-22571	Removal of Ruptured Heavy Metal Slug from Tube #2959-F. 2 p.	11/08/51
HW-22592	Removal of Ruptured Slug from Tube #3467-B. 2 p.	11/20/51
HW-22762	Summary of Results to Date of Statistical Investigation of Slug Failures. 3 p.	11/19/51
HW-24602	Process Tube Purging During Pile Operation. 2 p.	05/28/52
HW-25937	Laundered Protective Clothing Survey. 4 p.	10/15/52
HW-30430	Use of Reactor Effluent Water as Steam Plant Boiler Feed. 26 p.	12/08/53
HW-31794	Sampling SX-Tank Farm Condensate. 3 p.	05/07/54

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

HW-32033	Reduced Neutralization of 231, 234-5 Crib Wastes. 3 p.	06/02/54
HW-32319	Ventilation for Radiation Protection at REDOX. 13 p.	01/07/54
HW-32762	300 Area Radioactive Liquid Waste Streams Disposal. 14 p.	08/20/54
HW-33305	Tabulation of Radioactive Liquid Waste Disposal Facilities. 14 p.	10/08/54
HW-33324	Disposal of Irradiated Waste "Ink" Solution. 12 p.	07/20/54
HW-33591	Summary of Liquid Radioactive Wastes Discharged to the Ground - 200 Areas July 1952 through June 1954. 28 p.	10/01/54
HW-37478	Sampling of Scavenged Waste. 4 p.	06/23/55
HW-38282-RD-DEL	Biological Half-life Experience with Tritium at Hanford Works. 25 p.	09/05/51
HW-38283-RD	Permissible Limits for Reactor Cooling Water Assimilated by Humans. 15 p.	05/28/53
HW-38284-RD	Hazards to Humans by Wildfowl on REDOX Contaminated Swamp. 11 p.	12/23/52
HW-38562	Radioactive Contamination in Liquid Wastes Discharged to Ground at Separation Facilities through June 1955. 44 p.	08/08/55
HW-42670	Silver Salts to REDOX Cribs. 1 p.	02/26/56
HW-43121	Tabulation of Radioactive Liquid Waste Disposal Facilities. 20 p.	05/10/56
HW-55377	Analyses & Correlations of HAPO Rupture Experience with Natural Uranium Material. 31 p.	04/23/58
HW-60880	Scintillator Correlation & Columbia River Radiation Survey March-April, 1959. 15 p.	09/15/59
HW-68224	Reactor Test Program for Columbia River Radioisotope Reduction Studies. 8 p.	01/20/61

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

HW-68425	Specific Activity of the NPR Primary Coolant Loop. 25 p.	02/16/61
HW-82779-RD	Estimates of River Dilution Factors from Upstream Reactors. 3 p.	06/15/64
HW-SA-41	Observational & Field Aspects of Ground-Water Flow at Hanford. 14 p.	07/31/59
HW-SA-1747	Movement of Radioactive Effluents in Natural Waters at Hanford. 18 p.	11/21/59
HW-SA-2739	Analog Simulation of Hanford Ground Water Flow. 15 p.	08/15/62
PNL-2635	Well Maintenance Evaluation. 52 p.	10/31/78
PNL-5585	UNSAT-H, An Unsaturated Soil Water Flow Code for Use at the Hanford Site: Code Documentation. 117 p.	10/31/85
PNL-6907	Hanford Wells. 410 p.	06/30/89
PNL-6952	Hanford Radiological Protection Support Services Annual Report for 1988. 81 p.	06/30/89
PNL-6980	Historical Review of Portable Health Physics Instruments & Their Use in Radiation Protection Programs at Hanford, 1944-1988. 104 p.	09/30/89
PNL-7200-Pt2	PNL Annual Rpt for 1989 to the DOE Office of Energy Research: Environmental Sciences. 101 p.	03/31/90
PNL-7200-Pt3	PNL Annual Rpt for 1989 to the DOE Office of Energy Research: Atmospheric Sciences. 85 p.	06/30/90
PNL-7200-Pt4	PNL Annual Rpt for 1989 to the DOE Office of Energy Research: Physical Sciences. 73 p.	04/30/90
PNL-7417	Hanford Radiological Protection Support Services Annual Report for 1989. 104 p.	07/31/90
PNL-SA-7394	Vertical Contamination in the Unconfined Groundwater at the Hanford Site, WA. 3 p.	03/01/79

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

PNL-SA-8570	Overview of Requirements & Analysis Methods for Evaluating the Environmental Consequences of Groundwater Contamination. 18 p.	05/01/80
PNL-SA-9923	Subsurface Hydrologic Monitoring to Evaluate Contaminant Migration - Requirements & Solutions. 18 p.	09/30/81
PNL-SA-10599	Hydrologic Modeling of the Columbia Plateau Basalts. 13 p.	09/01/82
PNL-SA-10904	Ground-Water Monitoring Programs at the Hanford Site, Washington State. 17 p.	12/31/82
PNL-SA-11629	Measurement of Unsaturated Flow Below the Root Zone at an Arid Site. 27 p.	12/01/83
PNL-SA-15156	Environmental Monitoring at Hanford, WA, USA: A Brief Site History & Summary of Recent Results. 10 p.	07/01/90
PNL-SA-17438	Natural Radionuclides in Groundwaters. 15 p.	01/01/90

Appendix B

HEDR Publications - To Date

Appendix B

HEDR Publications - To Date

Title	Author	Date Issued	Publication No.	Additional Information	Status
Hanford Environmental Dose Reconstruction Project Monthly Report	HEDR Project Office	Ongoing	PNL-6450 HEDR	Monthly report; cleared one time for documentation	Periodic report; TSP approval not necessary
HEDR Project Plan - Pre-Decisional Draft	Shipler, DB	10/90	PNL-7515 HEDR	Distributed at TSP Public Meeting	
Draft Summary Report	HEDR Staff	7/90	PNL-7410 HEDR	Available from TSP	Released 7/12/90 by the TSP (draft)
Draft Air Pathway Report	HEDR Staff	7/90	PNL-7412 HEDR	Available from TSP	Released 7/12/90 by the TSP (draft)
Draft Water Pathway Report	HEDR Staff	7/90	PNL-7411 HEDR	Available from TSP	Released 7/12/90 by the TSP (draft)
Initial Communication Survey Results for the HEDR Project	Beck, DM	7/90	PNL-7423 HEDR	WSU omnibus survey of WA State residents; HEDR questions	To TSP for review 7/90
QA Audit Report of the HEDR Project-Data Traceability, A-90-15	Pratt, RC	7/90	PNL-7428 HEDR		To TSP for review 7/90
A Preliminary Examination of Audience-Related Communications Issues: Hanford Environmental Dose Reconstruction Project	Holmes, CW	4/90	PNL-7231 HEDR		PNL addressing TSP comments
MESOILT2, A Lagrangian Trajectory Climatological Dispersion Model	Ramsdell, JV	4/90	PNL-7340 HEDR		PNL addressing TSP comments
Population Estimates for Phase I	Beck, DM	2/90	PNL-7263 HEDR		PNL addressing TSP comments

HEDR Publications - To Date

Title	Author	Date Issued	Publication No.	Additional Information	Status
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
Estimates of Columbia River Radionuclide Concentrations: Data for Phase I Dose Calculations	Richmond, MC; Walters, WH	1/90	PNL-7248 HEDR		PNL addressing TSP comments
Evaluation of Thyroid Radioactivity Measurement Data From Hanford Workers, 1944-1946	Ikenberry, R	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
Work Plan for the Hanford Environmental Dose Reconstruction Project	Haerer, HA	12/89	PNL-6696 HEDR REV 1		TSP approved; published 12/89
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

HEDR Publications - To Date

Title	Author	Date Issued	Publication No.	Additional Information	Status
Atmospheric Transport Modeling and Input Data for Phase I of the Hanford Environmental Dose Reconstruction Project	Ramsdell, JV; 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
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
Radionuclide Sources and Radioactive Decay Figures Pertinent to the HEDR Project	Heeb, CM	10/89	PNL-7177 HEDR		PNL addressing TSP comments
Estimations of Traditional Native American Diets in the Columbia Plateau	Hunn, ES; Bruneau, CL	8/89	PNL-SA-17296		Reviewed by tribes
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
A History of Major Hanford Operations Involving Radioactive Material	Ballinger, MY; Hall, RA	6/89	PNL-6964 HEDR		TSP reviewed; PNL addressing comments

HEDR Publications - To Date

Title	Author	Date Issued	Publication No.	Additional Information	Status
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
Summary Report of HEDR Workshop on Sensitivity and Uncertainty Analysis	Sagar, B; 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
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
Demographic, Agricultural, Food Consumption, and Lifestyle Research for the Hanford Environmental Dose Reconstruction Project	Beck, DM, et al.	2/89	PNL-6834 HEDR	Incorporates earlier TSP comments	TSP received 3/89; no written response provided to PNL
Proposed Approach for Developing Information on Population Food Consumption and Lifestyles of Native Americans in the HEDR Study Area	Rhoads, RE; Bruneau, CL	1/89	PNL-6803 HEDR	Working document	TSP comments were incorporated into PNL-6834 HEDR
Hanford Environmental Dose Reconstruction	Bruneau, CL	1/89	PNWD-1323 HEDR	Informational brochure used in PNL's work with Tribes	TSP approval not required
Hanford Environmental Dose Reconstruction Project - Work Plan	Haerer, HA	9/88	PNL-6696 HEDR	Superseded by new work plan	TSP approved

Appendix C

HEDR Presentation Handouts to the TSP - To Date

Appendix C

HEDR Presentation Handouts to the TSP - to Date

Title	Author	Date Issued	Publication 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
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-27904S HEDR	Presented at the TSP mtg, Feb 15-17, 1990, Richland, WA
Hanford Environmental Dose Reconstruction Project	Haerer, HA	12/89	PNL-SA-17661S HEDR	Presented at the TSP mtg, December 11-13, 1989, Richland, 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; 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

HEDR Presentation Handouts to the TSP - to Date

Title	Author	Date Issued	Publication No.	Additional Information
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-17649 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
Environmental Measurements - Columbia River	Poston, TM; 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
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; Poston, TM	10/89	PNL-SA-17502 S HEDR	Presented at the TSP meeting, October 12-14, 1989, Portland, OR
HEDR Project Report to the TSP	Haerer, HA	10/89	PNL-SA-17501 HEDR	Presented at the TSP mtg, Oct 12-14, 1989, Portland, OR
Methods for Presenting Results to the Public	Rhoads, RE	8/89	PNL-SA-17368 HEDR	Presented at the TSP meeting, September 6, 1989, Portland, OR
HEDR Project Report to the TSP July 21, 1989	Haerer, HA	7/89	PNL-SA-17218 HEDR	Presented at the TSP mtg, July 21, 1989, Richland, WA
Radionuclides Transported by the Columbia River	Freshley, MD	7/89	PNL-SA-17235 HEDR	Presented at the TSP mtg, July 21, 1989, Richland, WA

HEDR Presentation Handouts to the TSP - to Date

Title	Author	Date Issued	Publication No.	Additional Information
Defining Demographic Categories for Phase I	Napier, BA; Beck, DM	5/89	PNL-SA-17035 HEDR	Presentation handout for the TSP mtg, May 18-20, 1989, Toppenish, WA
HEDR Project Report to the TSP for May 1989 Public Meeting	Haerer, HA	5/89	PNL-SA-17032 HEDR	Presented at the TSP mtg, May 18-20, 1989, Toppenish, 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 HEDR	PNL-SA-16794	Presented at the TSP meeting, March 17, 1989, Spokane, WA
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, JV	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
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 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
Surface Water Transport Uncertainty	Walters, W.	1/89	PNL-SA-16572 HEDR	Presented at the HEDR Workshop on Sensitivity and Analysis, January 16-18, 1989, Pasco, WA

HEDR Presentation Handouts to the TSP - to Date

Title	Author	Date Issued	Publication No.	Additional Information
Source Terms	Morgan, LG	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, MG	1/89	PNL-SA-16567 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, 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
Example of Sensitivity/Uncertainty Analysis	Strenge, DL	1/89	PNL-SA-16570 HEDR	Presented at the HEDR Workshop on Sensitivity and Uncertainty Analysis, January 16-18, 1989, Pasco, WA
Estimated Quantity of 1311 Contained in Irradiated Fuel at Time of Fuel Processing, CY 1944-1945	Jackson, PO; Morgan, LG	11/88	PNL-SA-16398 HEDR	Presented at the TSP mtg, November 11-12, 1988, Olympia, WA

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.

Appendix D

HEDR-Related Publications

Title	Author	Date Issued	Publication No.	Audience	Status
Planned Materials					
Demographic Forecasting Using Trends from Radio Correlation Variables	Beck and Pitlinger			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
Reconstructing Food consumption Habits: The Backcasting Method	Callaway, M; Carr, D.			Journal of Health Physics	Planning for 1990
Experience in Collaborative Research with Native American Tribes*	Bruneau, CL; 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; Bruneau, CL			Journal of Rural Sociology	Planning for 1990
Fish Concentration Ratios	Poston, TM			Journal (not yet determined)	Planning for 1990
Using the Ratio-Correlation Methods for Backcasting	Beck, DM; Swanson	Spring/91		Chapter in applied demog book	To be published Spring 1991
Completed Materials					
A Multi-Method Approach to Audience Analyses in Developing Comprehensive Public Communications Programs	Homes, CW; Byram, S. J.; VonWinterfeldt, D	10/90	PNL-SA-18676 HEDR	Society for Risk Analysis 1990 Annual Meeting, October 7-10, 1990, New Orleans, LA	Presented 10/90

HEDR-Related Publications

Title	Author	Date Issued	Publication No.	Audience	Status
Atmospheric Modeling for Dose Reconstruction at Hanford	Ramsdell, V	7/90		American Nuclear Society 1990 Winter Meeting	Abstract Submitted 7/90
Statistical Aspects of the Hanford Environmental Dose Reconstruction Project and the Hanford Thyroid Disease Study	Gilbert, RO et al.		PNL-SA-18396 HEDR	American Statistical Association Conference on Radiation and Health, July 8-12, 1990, Copper Mountain, CO	Presented 7/90
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
Reconstruction of Hanford Vegetation Monitoring Data for Dose Reconstruction for 1945-1947	Woodruff, RK; Mart, E; Hanf, RW	1/90	PNL-SA-17760 A HEDR	1990 Health Physics Society Meeting, June 24-28, 1990, Anaheim, CA	Presented 6/90
Uncertainty Analysis of the Conversion Factor for Historic Iodine-131 Gross Beta Vegetation Measurements	Strenge, DL et al.	12/89	PNL-SA-17713 HEDR	1990 Health Physics Soc. Mtg, June 24-28, 1990, Anaheim, CA	Presented 6/90
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
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
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
Temporal Variations in Atmospheric	Ramsdell, JV	9/89	PNL-SA-17375	Hanford Symposium on Health and the	Presented 10/89

HEDR-Related Publications

Title	Author	Date Issued	Publication No.	Audience	Status
Dispersion at Hanford			HEDR	Environment, Oct 16-19, 1989, Richland, WA	
The Hanford Environmental Dose Reconstruction Project: Overview	Haerer, HA et al.	9/89	PNL-SA-16859 HEDR	Hanford Symposium on Health and 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 and the Environment, October 16-19, 1989 Richland, WA	Presented 10/89
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
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
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

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

Appendix E

Communications Log

Appendix E

Communications Log - October, 1990

Initiated By/Affiliation	Contact/Affiliation	Type	Subject
ML Blazek/TSP	DB Shipler/PNL	Phone	Agenda for January 1991 TSP meeting
B Shleien/TSP	DB Shipler/PNL	Phone	Provide subcontract status
ML Blazek/TSP	DB Shipler/PNL	Phone	Information on GIS demonstration
B Shleien/TSP	DB Shipler/PNL	Phone	Discuss subcontracts
DB Shipler/PNL	J Thomas/HEAL	Phone	Introduce and answers to letter
MA Robkin/TSP	SM Finch/PNL	Phone	FY 1991 PNL Security Badge
JS Stohr/TSP Staff	SM Finch/PNL	Phone	Workshop agreement for speakers at October TSP meeting
SM Finch/PNL	MA Robkin/TSP	Phone	Arrangements for picking up security badge
B Shleien/TSP	SM Finch/PNL	Phone	Request for financial information
AP Slickpoo/TSP	SM Finch/PNL	Phone	Status of invoices
JM Daer/PNL	WJ Roberds/Golder Associates	Phone	Notification of meeting
A Beers/TSP Staff	AH McMakin/PNL	Phone	Number of Phase I reports were made for first printing
RL Morrill/TSP	CL Bruneau/PNL	Phone	Update on Native Americans
D Saluskin/Yakima Nation	CL Bruneau/PNL	Phone	Extension of Work Order # 1
B Burke/Umatilla Tribe	CL Bruneau/PNL	Phone	Invoices
RO Gilbert/PNL	KJ Kopecky/TSP	Phone	Arrange statistics meeting for HEDR and TSP staff
R Cuello/PNL	DS Barth/TSP	Phone	Arrange QA data quality objective meeting
R Cuello/PNL	GG Caldwell/TSP	Phone	Arrange QA data quality objective meeting
GL Harvey/PNL	J Compton/KING TV	Phone	Verify October 3 visit for KING TV interview
GL Harvey/PNL	D Rios/Dallas Morning News	Phone	Verify visit for Dallas Morning News interview

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