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HANFORD ENVIRONMENTAL DOSE
RECONSTRUCTION PROJECT

Monthly Report

December 1990

Prepared for the Technical Steering Panel

Pacific Northwest Laboratory
Richland, Washington 99352

MASTER

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HANFORD ENVIRONMENTAL DOSE
RECONSTRUCTION PROJECT

Compiled By:
S. M. Finch, Project Coordinator
Hanford Environmental Dose Reconstruction Project

Approved By:
D. B. Shipler, Manager
Hanford Environmental Dose Reconstruction Project

Approved By:
W. L. Templeton, Manager
NEPA Implementation and Environmental Documentation

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)

		<u>Complete</u>	<u>Ongoing</u>	<u>Phase I</u>	<u>Phase II</u>
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 December 1990:

- estimated doses for the Kalispel and Coeur d'Alene tribes, the first two tribes to provide Battelle with food consumption, location, and lifestyle information. Battelle staff will discuss the estimates with the two tribal councils in February.
- declassified 56 Hanford Site-originated documents of potential interest and use to the project, most of which discussed tritium releases to the environment. Some of these documents were requested by TSP member M. Robkin.
- provided the DOE-RL Public Reading Room with 64 documents of potential interest and use in the project. These included the 56 declassified ones mentioned above and others that were already unclassified and were publicly released.
- cooperated with the appropriate authorities to facilitate their granting of need-to-know status to several TSP members and to the HEDR project manager to enable their review of certain documents containing Hanford release calculations from 1944 - 1960. The need-to-know briefing was necessary for access to documents of dual-agency sponsorship.
- received word that the Memorandum of Understanding to transfer funding for dose reconstruction work from the U.S. DOE to the Centers for Disease Control was signed on 12-24-90. An implementation plan for the transfer has yet to be developed by the participants.
- began revising the design criteria for the dose estimation computer code for use in remainder of project. The criteria enable greater flexibility and use of all available data, and avoid the imposition of artificial distributions on key parameters. The restructure will be presented to the TSP in January for their review.
- concluded that uncertainties in the air model outputs (air concentrations, depositions, and soil concentrations) should be determined within the model using Monte Carlo uncertainty analysis, rather than externally as was done in Phase I. This approach, which will be presented to the TSP at the January public meeting, will permit more scientifically defensible air concentration and deposition patterns in the Phase I time period and area.
- estimated atmospheric transport and diffusion for 17 release scenarios for December 1944 and January 1945. This work will be used to evaluate the uncertainty associated with imprecise knowledge of release times used in Phase I.
- discussed Phase II source term work with TSP member Maurice Robkin and provided him with 11 technical documents at his request.
- wrote a small FORTRAN code that will use the daily operating data for B, D, and F Reactors to calculate iodine-131 content in fuel at discharge from 1944 - 1947. This work is in support of documenting Phase I iodine-131 release data.
- received and began addressing TSP comments on the FY 1991 project plan and the Phase I reports.
- met with Dick Foster (retired Battelle scientist) to obtain additional historical information about river contamination since 1945.
- compiled information on Hanford wells used for drinking water, concentration of radionuclides in the water, and number of people affected. Also compiled riparian well data. A draft report is being prepared to document potential dose impacts from well water.
- drafted and began internal review of data quality objectives for Phase II technical tasks.
- prepared and provided for TSP review the initial draft of the video workplan. The video will be used by the TSP to introduce the dose reconstruction work to public audiences and other organizations. Video production options were discussed with the TSP.

- discussed a potential cooperative public opinion survey with representatives of the Tri-Party Agreement, Washington Department of Ecology, the Nuclear Waste Advisory Council and DOE. Developed a list of possible questions on HEDR to be included in the survey, which will be reviewed by the TSP Communications Subcommittee.
- coordinated and spoke at a Hanford visit by representatives of the Hanford Education Action League, the Oregonian, The Spokesman Review, and KPBS (Spokane Public Radio).

Major Problems or Changes and Action Taken

Several milestone reports were delayed this month. Milestone 0202A, Code Design Specifications, was delayed because of the unexpected, sweeping nature of the code revisions. Milestone 0202C, Model Correlations Analysis Report, was delayed over the holidays and is now in internal clearance. Milestone 0402B, MESOILT2 Version 2.0 Final Report, was delayed until restructure of the overall dose code is complete. Milestone 0402C, Report on Air Model Variability, was extended to provide time for including additional discussion in the report on the rationale for incorporating uncertainty directly into the air model. The TSP is monitoring the progress of work associated with these milestones.

Planned Work for the Next Three Months

Work planned for the next three months includes

- present dose estimates to the Kalispel and Coeur d'Alene tribal councils
- estimate doses for six remaining tribes, once food consumption, location, and lifestyle data are received
- finalize Phase I reports and FY 1991 Project Plan by addressing TSP comments
- submit to the TSP for review the following documents:
  - draft and final code design specifications for the restructured dose assessment code
  - model correlation analysis report
  - air model variability report
  - well report
  - washoff report
  - Phase I milk distribution report addendum
  - Phase II QA plan
- submit VAMP #1 results to the IAEA for use in code validation
- purchase computer for TSP database support for the State of Washington
- present information about project planning and status of work on code restructuring at the January TSP meeting as requested by the TSP.

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 and subtask, showing labor and non-labor dollars expended. Table 3 summarizes prior fiscal years' costs and budgets.

Capital Status

FY 1991 capital allocations have not yet been made.

FIGURE 2. Project Summary Report - Pacific Northwest Laboratory

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

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

1. ID (Contract) Number: DE-ACO6-76RLO 1830		2. Program/Project Title: HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION - TSP						3. Reporting Period: DECEMBER 1990					
4a. Participant Name and Address Pacific Northwest Laboratory P.O. Box 999 Richland, WA 99352				4b. Client Name and Address DOE-RL Richland, Washington 99352						5. Start Date OCTOBER 1990			
										6. Completion Date SEPTEMBER 1991			

7. FY 90		8. Months		O	N	D	J	F	M	A	M	J	J	A	S	FY92
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. 209 (b)																
h. Total Funds Auth. 1,713 (c)																

Costs	i. Planned	66	66	66	66	67	67	67	67	67	67	67	67	
	j. Actual (d)	14	23	9										
	k. Variance	52	43	57										
	l. Cum Planned	66	132	198	264	331	398	465	532	599	666	733	800	
	m. Cum Actual (d)	14	37	46										
	n. Cum Variance	52	95	152										

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) Includes carryover and the TSP's share of current fiscal year funding that has been received. (c) FY88-91. (d) Actual costs are booked after invoices are received and processed. Therefore, current month costs may not reflect actual work performed.

11. Milestones:				O	N	D	J	F	M	A	M	J	J	A	S	FY92
				Empty grid for 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. Cost Summary (Dollars in Thousands)

		December 1990			FY 1991 to Date (October 1990 - September 1991)					TSP
		Labor \$	Non-Labor \$(a)	Total \$	Labor \$	Non-Labor \$(a)	Total \$	Cum Budget	Cum Variance	Approved FY Budget
HEDR Project Tasks										
Task 01 - Project Management (b)										
0101	Project Control	27	6	33	85	10	95	138	43	554
0102	Final Phase I Reports	9	0	9	9	0	9	33	24	114
0103	Records Control	8	0	8	16	0	16	17	1	70
0104	Peer Review	0	0	0	1	0	1	4	3	14
0105	Subcontract Administration	1	0	1	4	0	4	14	10	57
0106	Project Communication Sup	9	1	10	24	0	24	25	1	99
	Subtotal Task 01	54	7	61	139	10	149	231	82	908
Task 02 - Project Technical Integration										
0201	Task Mgmt/Proj Integration	6	12	18	37	21	58	24	-34	90
0202	Code Design Specification	8	0	8	27	1	28	41	13	119
0203	Model IAEA Intercompar.	1	0	1	3	0	3	20	17	51
	Subtotal Task 02	15	12	27	67	22	89	85	4	260
Task 03 - Source Terms										
0301	Task Management	-2	0	-2	8	1	9	8	-1	20
0302	Closure of Phase I Iodine Rel	3	0	3	3	0	3	4	1	29
0303	Airborne Isotopes not I-131	0	0	0	0	0	0	0	0	22
0304	Waterborne Isotopes (44-57)	0	0	0	0	0	0	0	0	22
	Subtotal Task 03	1	0	1	11	1	12	12	0	93

TABLE 2. Cost Summary (Dollars in Thousands)

	December 1990				FY 1991 to Date (October 1990 - September 1991)				TSP
	Labor \$	Non-Labor \$ (a)	Total \$	Labor \$	Non-Labor \$ (a)	Total \$	Cum Budget	Cum Variance	Approved FY Budget
Task 04 - Environmental Transport									
0401 Task Management	4	0	4	17	1	18	14	-4	43
0402 Atmospheric Transport	29	2	31	33	2	35	57	22	257
0403 Groundwater Transport	5	0	5	7	0	7	6	-1	59
0404 Surface Water Transport	6	0	6	10	0	10	16	6	92
Subtotal Task 04	44	2	46	67	3	70	93	23	451
Task 05 - Environmental Monitoring Data									
0501 Task Management	0	0	0	0	0	0	0	0	0
0502 Vegetation Data (c)	0	0	0	0	0	0	0	0	41
Subtotal Task 05	0	0	0	0	0	0	0	0	41
Task 06 - Demographics, Food Consumption, & Agriculture									
0601 Task Management	3	0	3	14	0	14	12	2	30
0602 Prelim Native American Data	8	0	8	11	-12	-1	45	46	169
0603 Milk Model Refinements	0	0	0	0	0	0	19	19	22
Subtotal Task 06	11	0	11	25	-12	13	76	63	221

TABLE 2. Cost Summary (Dollars in Thousands)

December 1990				FY 1991 to Date (October 1990 - September 1991)					TSP
Labor \$	Non-Labor \$ (a)	Total \$	Labor \$	Non-Labor \$ (a)	Total \$	Cum Budget	Cum Variance	Approved	FY Budget
Task 07 - Environmental Pathways & Dose Estimates									
0701 Task Management	3	0	3	8	0	8	8	0	26
0702 Code Restructure	14	1	15	21	1	22	15	-7	125
0703 HTDS Doses	0	0	0	0	0	0	0	0	39
0704 Model Parameters (c)	0	0	0	3	0	3	2	-1	33
Subtotal Task 07	17	1	18	32	1	33	25	-8	223
Task 08 - Statistics									
0801 Task Management	4	0	4	14	2	16	7	-9	25
0802 Task Assistance	2	0	2	3	0	3	6	3	23
Subtotal Task 08	6	0	6	17	2	19	13	-6	48
Task 09 - Records Management	1	0	1	4	0	4	18	14	75
Task 10 - Quality Assurance	3	0	3	2	0	2	18	2	59
Task 11 - Information Resources									
1101 Task Management	1	0	1	4	0	4	3	-1	16
1102 Declassification	4	0	4	11	0	11	16	5	87
1103 Resource Identification/Avail	5	0	5	12	0	12	16	4	61
Subtotal Task 11	10	0	10	27	0	27	35	8	164

TABLE 2. Cost Summary (Dollars in Thousands)

	December 1990			FY 1991 to Date (October 1990 - September 1991)					TSP
	Labor \$	Non-Labor \$ (a)	Total \$	Labor \$	Non-Labor \$ (a)	Total \$	Cum Budget	Cum Variance	Approved FY Budget
Task 12 - TSP Communications Support									
1201 Task Management	1	1	2	7	2	9	11	2	39
1202 Video	0	0	0	0	0	0	9	9	29
1203 Public Opinion Survey	1	0	1	1	1	2	23	21	44
1204 TSP Com Subcom Support	1	0	1	1	0	1	3	2	19
1205 Computer & AV Support	0	0	0	0	0	0	6	6	17
Subtotal - Task 12	3	1	4	2	3	12	52	40	148
Subtotal, HEDR Project Tasks	165	23	188	407	30	437	658	221	2,691
Contingency (d)									
Subtotal, Project Tasks Plus Contingency	165	23	188	407	30	437	658	221	3,091
Technical Steering Panel (e)									
TOTAL	165	32	197	407	76	483	856	373	3,891

(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) Delayed until April 1, 1991.

(d) Budget not yet allocated.

(e) 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

<u>Fiscal Year</u>	<u>Cost</u>	<u>Funding</u>	<u>Carryover(a)</u>	<u>Budget(b)</u>
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.

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Task 02 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

Milestone 0202A - Draft Code Design Specifications, due January 1991 and rescheduled to February 1991

- prepared a general structure for the computer code for Phase II and beyond. Intensive efforts resulted in a breakthrough in conceptual plans for data transfer and equation structure that will enable greater flexibility, enable use of all available data, and avoid the imposition of artificial distributions on key parameters. The design incorporates the needs identified in Milestone 0202C (below). The conceptual plans for code restructure will be presented to the TSP at the January meeting.

Milestone 0202C - Model Correlations Analysis Report, due November 1990 and rescheduled to January 1991

- completed the PNL peer review process and clearance for the subject report. The report is in final editing and production, which were delayed because of the year-end holidays. This study indicates that the Phase I dose code must be modified in Phase II so that correlations are fully accounted for.

Milestone 0203A - Submit VAMP Number One Results, due January 1991

- made minimal progress because of staff commitments to Milestones 0202A, 0202C, and 0602A. Delivery of the results is still anticipated for the January milestone.

Other Activities

- received a request from the Hanford Thyroid Disease Study (HTDS) staff at the Fred Hutchinson Cancer Research Center (FHCRC) for additional data. Data include deposition of iodine-131 by month in the Phase I study area, estimated thyroid doses for specific populations, additional deposition data for an expanded atmospheric grid, an estimate of ratios of thyroid doses expected in the expanded areas, and milk ratios/sources for specific counties. These data are being prepared, and will be used by FHCRC staff in selecting comparison subjects for their pilot study.

Major Problem Areas or Changes and Action Taken

A delay of up to one month in drafting Milestone 0202A, Code Design Specifications, was caused by the unexpected nature of the revisions. Generalized logic and equations have been derived, but accompanying text is not yet available. Results available at the end of Phase II will be a computer code directly applicable for expansion beyond FY 1992. This change from the original proposal is driven by the direction of the TSP to use Phase II not only to study, but also to advance, the computational ability of the project.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

Work planned for the next three months includes

- finalize Phase I reports
- prepare code design specifications for Phase II computational model
- continue coordinating efforts with HTDS personnel
- submit initial model data to the International Atomic Energy Agency coordinated research program on Validation of Model Predictions (VAMP) to validate portions of the HEDR model and to obtain independent estimates of certain doses
- submit Milestone 0202C, Model Correlations Analysis Report, to the TSP for review.

Task 03 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

Activities this reporting period included

Task Management (0301)

- discussed Phase II tasks with TSP Source Term Subcommittee Chairman Maurice Robkin during his visit to Richland on December 6, 1990
- met with the Statistics Task leader and the Project Technical Integrator regarding aspects of the Source Term Task dealing with uncertainty estimates and technical interactions with the other HEDR Tasks.

Milestones 0301A, B, C, D, and E - Phase I final reports, due March 1991

- reviewed and began addressing TSP comments on the Phase I reports

Milestone 0302A - Documented Phase I iodine-131 releases, due May 1991

- wrote and debugged a small FORTRAN code that will use the daily operating data for B, D, and F Reactors to calculate the iodine-131 content in fuel at discharge during the 1944-1947 Phase I time period

Major Problem Areas or Changes and Action Taken

None.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

Work planned for the next three months includes

- finalize Phase I reports
- continue to reconstruct iodine-131 release estimates, 1944-1947
- begin literature searches for significant airborne radionuclide releases other than iodine-131.

Task 04 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

Milestone 0401A, B, C, and D - Phase I Reports, due March 1991

- distributed four reports, with comments compiled by the TSP, to authors for revision and resolution.

Milestone 0402A - Wind Field Modeling White Paper, due April 1991

- continued literature review to identify alternative methods of estimating wind fields from wind observations. The three methods of modeling wind fields identified thus far are interpolation models, mass consistent models, and prognostic or dynamic models.

MESOILT2 uses an interpolation model that estimates the wind field by weighted averages of observed winds. Mass consistent models start with wind fields estimated using an interpolation model and then modify the fields using the continuity equation as a constraint. Prognostic models predict wind fields from the basic equations of motion.

Milestone 0402D - Report on Air Model Variability, due November 1990 and rescheduled to March 1991

- completed the draft report. The report was peer reviewed by a non-HEDR-Project PNL statistician; no technical deficiencies were found, but the reviewer recommended that the report be revised to make it more reader-friendly.

Milestone 0402D - Report on Air Model Sensitivity/ Uncertainty, due September 1991

- started review of early Hanford reports to identify realistic release scenarios. Information obtained gives the number of dissolution periods per month and minimum cycle times. This information, along with some dates and times in log books, can be used to generate realistic release scenarios for use with the atmospheric model. This activity is being conducted jointly by the Source Terms Task and the Environmental Transport Task.
- estimated atmospheric transport and diffusion for 17 release scenarios for December 1944 and January 1945. The results of these model runs are being used to explore the uncertainty associated with imprecise knowledge of release times. This activity is being conducted jointly by the Project Technical Integration Task, the Environmental Transport Task, and the Statistics Task.
- concluded that uncertainties in the air model outputs (air concentrations, depositions, and soil concentrations) should be determined internally within the air model using Monte Carlo uncertainty analysis, rather than externally as was done in Phase I. This approach will permit generating defensible alternative possible air concentration and deposition patterns that could have occurred in the 1944-1947 period for the HEDR Project 10-county study area. This change in approach is believed to be crucial to the defensibility of the HEDR Project dose estimates.

Milestone 0403A - Well Report, due January 1991

- compiled information on Hanford Site wells used for drinking water, the concentration of radionuclides in the water, and the number of people affected. Compilation of available riparian well data has been completed. A draft report is being prepared that will discuss the impact of riparian wells downstream from Hanford and wells on the Hanford Site used for drinking water.

Milestone 0404A - Columbia River Data, 1944-1989, due September 1991

- continued the inventory of available literature and data bases; began setting up a file system for the various documents by subject
- discussed the quality assurance filing system with the Quality Assurance (QA) Task leader to clarify QA needs for this task
- held discussions with Dr. Richard Foster of Battelle, (retired) regarding the historical information that is available on surface water contamination (including sediment and biota). Dr. Foster provided an excellent summary of historical events and the changing research directions concerning surface water contamination since 1945.

Major Problem Areas or Changes and Action Taken

Start of work on Milestone 0402B, MESOILT2 version 2.0 final report, was delayed pending decisions on the overall structure of the dose assessment code. Implications of the information in the Report on Air Model Variability (Milestone 0402C) and Model Correlation Analysis Report (Milestone 0202C) on the code structure are being evaluated jointly by staff from the Project Technical Integration Task, the Environment Transport Task, and the Statistics Task. Milestone 0402B must be revised when restructuring of the dose assessment code is complete.

The completion date for Milestone 0402C was extended to March 1991. This change will allow time for including additional discussion in the report on the rationale for incorporating uncertainty directly into calculations of the air model (see Milestone 0402D above), rather than on only the output of the model.

Variance

Cost underruns for December in the Atmospheric Transport subtask were caused by the delay in the start of work on MESOILT2 version 2.0 and by vacations during the holiday period. In addition, some charges still have not appeared on the current

accounts. A cost overrun in the Surface Water Transport subtask is partly a result of an increase in review activities.

Planned Work for the Next Three Months

Work planned for the next three months includes

- finalize Phase I reports
- continue literature search on wind field interpolation methods
- continue evaluation of atmospheric transport model uncertainty and sensitivity
- submit milestones 0402C, 0403A and 0403B (air model variability, well and washoff reports) to the TSP for review.

Task 05 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

Milestone 0501A - Environmental Monitoring Data Final Report, due March 1991

TSP comments on the Phase I Preliminary Environmental Data Summaries (vegetation, Columbia River water and sediment, and fish) were received and comments are being addressed.

Other Activities

Technical activities are in support of Task 04, Subtask 0404, and are reported under that section.

Major Problem Areas or Changes and Action Taken

None.

Variance

No significant variance.

Planned Work for the Next Three Months

Work planned for the next three months includes

- finalize Phase I reports on environmental monitoring data
- collect and inventory additional Columbia River monitoring data
- collect additional vegetation data for model validation.

Task 06 Demography, Food Consumption and Agriculture

Objective

Task members develop the demographic, food consumption, and food production information needed to estimate doses. Demographic information for populations that may have been exposed to radionuclides during the time period of interest is developed for the general population and for several special population groups that are not adequately represented by the U.S. Census. These groups include Native American tribes, Army personnel stationed at Hanford, some Hanford construction workers, and migrant workers.

Sources and quantities of food and water consumed by these populations must be estimated, because food and water provide pathways for the intake of radionuclides. In particular, 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.

Methods to collect data and to estimate population densities and food consumption have been proposed to the TSP for review, evaluation, and approval.

Progress

Milestone 0602A - Dose Estimates, Two Tribes, due December 1990, completed

- estimated doses for the Kalispel and Coeur d'Alene tribes
- rescheduled presentations of preliminary dose estimates to the Kalispel and Coeur d'Alene tribes: Kalispel Tribal Council on February 5, 1991 and Coeur d'Alene Tribal Council in mid to late February.

Milestone 0602B - Dose Estimates, Six Tribes, due March 1991

- progress from Milestone 0602A will serve as a foundation to facilitate calculation of dose estimates for remaining tribes.

Major Problem Areas or Changes and Action Taken

None.

Variance

The cost overrun was caused by a delay in tribal dose estimation pending completion of a process for data collection being developed by the Native American Working Group.

Planned Work for the Next Three Months

Work planned for the next three months includes

- finalize Phase I reports

- present preliminary dose calculations to the Kalispel and Coeur d'Alene Tribes
- estimate doses for remaining six tribes
- confirm and validate the milk source for Okanogan county and submit Milestone 0603A, Phase I milk report addendum, to the TSP for review.

Task 07 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

Activities for this month were in support of Milestone 0602A (Dose Estimates, Two Tribes) and are reported under Task 06.

Major Problem Areas or Changes and Action Taken

None.

Variance

The cost overrun was largely due to work on the tribal dose calculations (Task 0602) that was inadvertently charged to code restructuring (Task 0702). Transfer of these costs to the proper task will cause the variance to be minimal.

Planned Work for the Next Three Months

Work planned for the next three months includes

- finalize Phase I report on worker thyroid data
- support Task 02 in developing design specifications for Phase II code (Milestone 0202A)
- support Task 02 in restructuring the HEDR computational model to incorporate changes necessary for VAMP comparison (Milestone 0203A)
- support Task 06 with Phase I dose estimates for additional Native American tribes (Milestone 0602B).

Task 08 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

Task Management (0801)

- participated in discussions of how to assess uncertainty in the air model
- coordinated PNL peer reviews of draft reports for Milestones 0202C (Model correlation analysis report) and 0402C (report on air model variability)

Task Assistance (0802)

- conducted sensitivity/uncertainty analyses in support of Milestones 0202C, 0402C, and 0402D. These activities are reported under Tasks 02 and 04
- met with the leaders of Task 02 (Project Technical Integration) and Task 07 (Environmental Pathways and Dose Estimates) to review food consumption data received from the Kalispel and Coeur d'Alene tribes and to identify the uncertainty distributions that are most appropriate for these data
- met with leaders of Tasks 02, 03 (Source Terms), 04 (Environmental Transport), and 05 (Environmental Monitoring Data) to discuss and plan FY 1991 activities that require assistance from Task 08. Activities discussed were

reviewing draft data summary reports, assessing uncertainties in source terms for Milestone 0302A (Documented Phase I iodine-131 releases), developing statistical summaries for Milestone 0404A (Columbia River data, 1944-1989), summarizing data sets containing data less than the detection limit, and revising the uncertainty analyses in the Phase I draft report, "Preliminary Uncertainty and Sensitivity Analysis of the Conversion Factor for Historic Iodine-131 Gross Beta Vegetation Measurements."

Major Problem Areas or Changes and Action Taken

None.

Variance

The cost overrun was caused by more time than expected to plan FY 1991 work.

Planned Work for the Next Three Months

Work planned for the next three months includes

- perform and document statistical analyses/assistance as required, specifically for Milestones 0202C, 0402C, and 0402D (model variability, and air model sensitivity/uncertainty).

Task 09 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 project records from the HEDR Project office (132 records/4718 pages)
- verified, processed, and stored project records (18 records/456 pages)
- transferred one package of records to the DOE-RL Public Reading Room (18 records/456 pages)
- met with the task leader of Task 12, TSP Communications Support, to convey information about Battelle's Records Inventory and Disposition Schedule system and to establish task document categories and their retention periods.

Major Problem Areas or Changes and Action Taken

None.

Variance

A cost underrun occurred because of a departmental staff shortage. This situation will be alleviated when new staff are hired and trained.

Planned Work for the Next Three Months

Work planned for the next three 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.

Task 10 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

Milestone 10A - Phase II QA Plan

- received first drafts of revised task plans from technical task leaders and performed initial review of those plans to determine whether adequate data quality objectives were addressed
- continued working on expanding existing QA plan and task plans to include project-specific data quality objectives that will be included as part of Phase II planning.

Major Problem Areas or Changes and Action Taken

None.

Variance

The cost underrun was caused primarily by minimal quality engineering assistance and surveillance because most of the work performed to date has been related to planning activities. This variance will be corrected within the next few months as the QA planning documents are finalized and the technical work increases.

Planned Work for the Next Three Months

Work planned for the next three months includes

- issue HEDR procedure: HEDR-TP-3, "HEDR Documentation of Critical Decisions"
- issue revised QA Plan and updated task plans to include project-specific data quality objectives.

Task 11 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

- declassified 56 Hanford Site-originated documents of potential interest/use to the project
- worked with a TSP member in review of classified documents of potential use to the project
- added new citations to the tracking system that now contains nearly 4000 publications
- provided the DOE-RL Public Reading Room with 64 documents of potential interest/use in the HEDR Project. These include the 56 declassified documents and unclassified documents made publicly available. A title listing of these reports is given in Appendix A.
- filled information requests from the TSP and HEDR task members.

Major Problem Areas or Changes and Action Taken

Appropriate need-to-know was granted to several Q-cleared TSP members so that they might review and evaluate certain documents recording currently classified Hanford Release Calculations from 1944-1960.

Variance

The cost underrun was caused by fewer declassification activities than planned pending receipt of a prioritized listing from the TSP of documents to be declassified, and by unplanned staff absences and vacations.

Planned Work for the Next Three Months

Planned work for the next three months includes

- with the assistance of the TSP, develop a prioritized list of Hanford Site-originated classified documents that may be of use to the HEDR Project
- from the prioritized list of Hanford Site-originated classified documents, declassify, with or without deletions, those documents reviewed by a TSP member and identified as being of use to the HEDR Project
- 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
- 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 that address radioactive materials released to the environment during the years from reactor startup through 1957
- continue to develop "packing lists" for boxes of retired Hanford records of potential interest/use to the HEDR Project.

Task 12 TSP Communications Support

Objective

The objective of this task is to assist the TSP in developing and implementing 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

Milestone 1202A - Videotape workplan, due December 1990, completed

- prepared and provided for TSP review the initial draft of the video workplan.

Milestone 1203A - Letter Report on Public Opinion Survey, Due June, 1991

- participated in a teleconference on surveys at Washington State University (WSU) - Tri-Cities to discuss a public opinion survey, possibly jointly conducted by several parties (Tri-Party Agreement, Washington Department of Ecology, Nuclear Waste Advisory Council and US DOE). We need to tell WSU by mid-January whether the TSP wants to include HEDR questions in the WSU survey and whether the TSP will join with others to sponsor the Hanford-related part of the survey.
- initiated a list of possible questions to be considered in a public opinion survey planned for second quarter FY 1991. This list will be reviewed by the TSP Communications Subcommittee. If the TSP decides to use the

WSU survey to gather HEDR information, the list of HEDR survey questions will then be given to WSU and the joint sponsors, if any, for review. We are also reviewing the list of survey questions the Tri-Party Agreement representatives intend to use.

Task Management (1201)

- coordinated and attended a Hanford visit by the executive director, researchers, and board members of the Hanford Education Action League on December 14. A HEDR presentation was given by the HEDR Project Manager and program manager. Attending media represented the *Oregonian*, the *Spokesman Review* (Spokane), and KPBX, Spokane Public Radio.
- provided 11 technical documents to Maurice Robkin (TSP) at his request. Also, reviewed and clarified subcommittee task activities for FY 1991, funding, and various options for the production of a TSP videotape.
- met with the leader of Task 09 (Records Management) regarding the Records Inventory and Disposition Schedule system, which identifies the required retention periods for key project documents. Document categories specific to Task 12 were established.

Major Problem Areas or Changes and Action Taken

Decisions are pending on various activities that resulted in significant variances in December.

Variance

A cost underrun resulted from delays in various activities. These activities and their status include the following:

- The purchase of a computer to support the Washington Department of Ecology (WDOE) is pending receipt of equipment specifications from WDOE. Purchase is expected to be made in January (Milestone 1205A).
- Progress on the TSP/HEDR Project videotape is anticipated following review of the draft video workplan submitted to the Communications Subcommittee Chairman in December (Milestones 1202A and B).

- Discussions continue regarding the conduct of a public opinion survey, possibly conducted jointly with other agencies to reduce costs (Milestone 1203A). A contract is expected to be awarded in January.

Planned Work for the Next Three Months

Planned work for the next three months includes

- finalize Phase I reports
- provide computer for the WDOE'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 December 1990**

Appendix A

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

* CO-31	Use of I&E in C Reactor. 1 p.	08/12/57
* CO-37	Re: Large Scale I&E Loading of C Reactor. 1 p.	08/29/57
* HAN-45802	Materials 200 Area Monthly Reports July-December 1947. 87 p.	12/31/47
* HAN-51086	Tritium Released to Atmosphere. 1 p.	07/10/53
* HAN-51270	Tritium Released to Atmosphere. 1 p.	07/23/53
* HAN-51808	Tritium Released to Atmosphere. 1 p.	08/31/53
* HAN-52165	Tritium Released to Atmosphere. 2 p.	09/29/53
* HAN-53113	Tritium Released to Atmosphere. 1 p.	12/22/53
* HAN-53178	Tritium Released to Atmosphere. 1 p.	12/28/53
* HAN-53327	Tritium Released to Atmosphere. 1 p.	01/11/54
* HAN-53349	Tritium Released to Atmosphere. 1 p.	01/13/54
* HAN-53450	Tritium Released to Atmosphere. 1 p.	01/19/54
* HAN-53887	Inadvertent Tritium Releases. 1 p.	02/17/54
* HAN-53978-DEL	Tritium Released to Atmosphere. 2 p.	03/03/54
* HAN-54002-DEL	Tritium Released to Atmosphere. 2 p.	03/04/54
* HAN-54114-DEL	Tritium Released to Atmosphere. 1 p.	03/10/54
* HAN-54172-DEL	Tritium Release. 1 p.	03/15/54
* HAN-54282-DEL	Tritium Releases at Hanford. 2 p.	03/22/54
* HAN-54289-DEL	February 1954 Release of Tritium at Hanford. 3 p.	03/25/54
* HAN-54344	Tritium Release at Hanford. 2 p.	03/29/54
* HAN-54514	Tritium Released to Atmosphere. 2 p.	04/09/54
* HAN-54549	Tritium Releases. 1 p.	04/14/54

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

* HAN-54644	Tritium Released to Atmosphere. 1 p.	04/20/54
* HAN-54892-DEL	Tritium Release. 2 p.	05/07/54
* HAN-54956	Tritium Releases at Hanford. 1 p.	05/13/54
* HAN-55656-DEL	Tritium Released to Atmosphere. 2 p.	07/12/54
* HAN-55694-DEL	Tritium Released to Atmosphere. 1 p.	07/15/54
* HAN-56028	Tritium Released to Atmosphere. 1 p.	08/12/54
* HAN-56157	Tritium Released to Atmosphere. 1 p.	08/25/54
* HAN-60373	Tritium Releases from Hanford. 1 p.	09/26/54
* HAN-60517	Tritium Releases from Hanford. 1 p.	10/12/54
* HAN-64513	Neutron & Gamma Flux Values at Specific Points in & about the Hanford C Reactor. 1 p.	01/10/57
* HAN-64513-1	Table - Radiation Levels in & about C Reactor for a Power Level of 1000 MW. 1 p.	01/10/57
* HAN-65192	Request for Report of Incident. 1 p.	04/01/57
* HAN-65461	Slug Ruptures at C Reactor. 2 p.	04/24/57
* HAN-65658	Slug Ruptures at C Reactor. 2 p.	05/20/57
* HAN-65781	Slug Ruptures at Pile C. 1 p.	05/28/57
* HAN-66611	First Rupture in the 112 Ball Valve Tube Continuous Charge-Discharge Demonstration Unit of C Reactor. 1 p.	08/20/57
* HAN-67243	Limitation to C Reactor Power Level. 1 p.	10/30/57
* HAN-67327	Limitation to C Reactor Power Level. 1 p.	11/07/57
* HW-7-384	Hanford Engineer Works Monthly Report for July 1944. 62 p.	08/08/44
• HW-7-870-DEL	Hanford Engineer Works Monthly Report for October 1944. 90 p.	11/10/44

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

• HW-7-4004-DEL	Hanford Engineer Works Monthly Report for April 1946. 92 p.	05/09/46
* HW-7-5194-DEL	Hanford Engineer Works Monthly Report for September 1946.	10/16/46
* HW-8438-A-DEL	P Dept. Monthly Report for December, 1947. 10 p.	01/02/48
* HW-9595-A-DEL	P Dept. Monthly Report for March, 1948. 14 p.	04/23/48
* HW-9922-A	P Div. Monthly Report for April, 1948. 13 p.	05/28/48
* HW-10378-A-DEL	P Div. Monthly Report for June, 1948. 12 p.	07/19/48
* HW-10714-A-DEL	P Div. Monthly Report for July, 1948. 12 p.	08/20/48
* HW-11835-A	P Div. Monthly Report for November, 1948. 13 p.	12/20/48
* HW-12086-A	P Div. Monthly Report for December, 1948. 12 p.	01/14/49
* HW-12391-A-DEL	P Div. Monthly Report for January, 1949. 12 p.	02/17/49
* HW-12666-A-DEL	P Div. Monthly Report for February, 1949. 10 p.	03/15/49
* HW-12937-A	P Div. Monthly Report for March, 1949. 10 p.	04/14/49
* HW-13190-A-DEL	P Div. Monthly Report for April, 1949. 8 p.	05/12/49
* HW-13561-A	P Div. Monthly Report for May, 1949. 11 p.	06/15/49
* HW-13793-A-DEL	P Div. Monthly Report for June, 1949. 10 p.	07/07/49
* HW-14043-A	P Div. Monthly Report for July, 1949. 11 p.	08/05/49

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

* HW-14596-A	P Div. Monthly Report for September, 1949. 12 p.	10/06/49
* HW-14916-A-DEL	P Div. Monthly Report for October, 1949. 11 p.	11/07/49
* HW-15267-A-DEL	P Div. Monthly Report for November, 1949. 10 p.	12/07/49
* HW-15843-A	P Div. Monthly Report for January, 1950. 12 p.	02/06/50
* TT-7120	Re: Incident at C Reactor, March 15-17, 1957. 1 p.	03/19/57
* TT-7126	Re: Preparation of Incident Report on Slug Failures at C Reactor, March 15-17, 1957. 1 p.	03/29/57

- Declassified in 1990 by Secretary of Energy Watkins' directive
- * Declassified in 1990 by earlier guidance

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
Assessment of FY 1991 Scope Limitations on Out-Year Activities	Shipler, DB	12/90	PNL-7588 HEDR		To TSP 12/90
FY 1991 Project Plan for the HEDR Project, Phase II	HEDR Staff	11/90	PNL-7563 HEDR	Supersedes PNL-7515 HEDR (HEDR Project Plan, Pre-Decisional Draft)	PNL addressing TSP comments
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	No TSP comments
QA Audit Report of the HEDR Project-Data Traceability, A-90-15	Pratt, RC	7/90	PNL-7428 HEDR		No TSP comments
A Preliminary Examination of Audience-Related Communications Issues: Hanford Environmental Dose Reconstruction Project	Holmes, CW	4/90	PNL-7231 HEDR		PNL addressing TSP comments

HEDR Publications - To Date

Title	Author	Date Issued	Publication No.	Additional Information	Status
MESOLIT2, 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
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
1-131 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

HEDR Publications - To Date

Title	Author	Date Issued	Publication No.	Additional Information	Status
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
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

HEDR Publications - To Date

Title	Author	Date Issued	Publication No.	Additional Information	Status
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
Feasibility of Using 129I Concentrations in Human Tissue to Estimate Radiation Dose from 131I	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
Long-Range Project Plan	Shipler, DB	1/91	PNL-SA-18949 S HEDR	Presented at the TSP mtg. Jan 11, 1991, Pasco, WA
Application of a Geographical Information System to the HEDR Project	Stephan, JG	1/91	PNL-SA-18958 S HEDR	Presented at the TSP mtg. Jan 11, 1991, Pasco, WA
Dose Model and Parameter Restructuring	Ikenberry, TA	1/91	PNL-SA-18957 S HEDR	Presented at the TSP mtg. Jan 11, 1991, Pasco, WA
Status of TSP Directive 89-9	Cuello, R.	1/91	PNL-SA-18962 S HEDR	Presented at the TSP mtg. Jan 11, 1991, Pasco, WA
Atmospheric Model Restructuring	Ramsdell, JV	1/91	PNL-SA-18956 S HEDR	Presented at the TSP mtg. Jan 11, 1991, Pasco, WA
Uncertainty Analysis	Simpson, JC	1/91	PNL-SA-18948 S HEDR	Presented at the TSP mtg. Jan 11, 1991, Pasco, WA
Project Model Analysis and Restructuring	Napier, BA	1/91	PNL-SA-18955 S HEDR	Presented at the TSP mtg. Jan 11, 1991 Pasco, WA
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-27904 S HEDR	Presented at the TSP mtg. Feb 15-17, 1990, Richland, WA

HEDR Presentation Handouts to the TSP - to Date

Title	Author	Date Issued	Publication No.	Additional Information
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
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

HEDR Presentation Handouts to the TSP - to Date

Title	Author	Date Issued	Publication No.	Additional Information
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
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

HEDR Presentation Handouts to the TSP - to Date

Title	Author	Date Issued	Publication No.	Additional Information
Hanford Environmental Dose Reconstruction Project - Report to the Technical Steering Panel	Haerer, H.A.	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-15573 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 Uncertainty Analysis, January 16-18, 1989, Pasco, WA
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

HEDR Presentation Handouts to the TSP - to Date

Title	Author	Date Issued	Publication No.	Additional Information
Estimated Quantity of 131I 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
<u>Completed Materials</u>					
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
GENII - Hanford Environmental Dosimetry Package	Napier, BA et al	7/90	PNL-SA-18478	American Nuclear Society 1990 Winter Meeting	Presented 11/90
Atmospheric Modeling for Dose Reconstruction at Hanford	Ramsdell, V; Burk, K.	7/90	PNL-SA-18487A	American Nuclear Society 1990 Winter Meeting	Presented 11/90
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	Streng, 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

HEDR-Related Publications

Title	Author	Date Issued	Publication No.	Audience	Status
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 Dispersion at Hanford	Ramsdell, JV	9/89	PNL-SA-17375 HEDR	Hanford Symposium on Health and the Environment, Oct 16-19, 1989, Richland, WA	Presented 10/89
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

HEDR-Related Publications

Title	Author	Date Issued	Publication No.	Audience	Status
Estimating Atmospheric Dispersion for Reconstruction of Doses from Hanford Operations	Ramsdell, JV	4/88	PNL-SA-15818 HEDR	69th Annual Meeting of the Pacific Division of the American Association for the Advancement of Science, June 19- 23, 1988, Corvallis, OR	Presented 6/88

Appendix E

Communications Log

Appendix E
Communications Log - December, 1990

Initiated By/Affiliation	Contact/Affiliation	Type	Subject
D Shieler/PNL	J Till/TSP Chairman	Phone	Project plan, Nguyen status
A Slickpoo/TSP, D Powaukee and H Ruben/Nez Perce Tribe	D Shieler/PNL	Phone	FY 1990 funds, status of work order, FY 1991 funds
D Shieler/PNL	J Till/TSP Chairman	Phone	Presentations, planning, security briefings, Nguyen status
J Till/TSP Chairman	D Shieler/PNL	Phone	Nguyen status, communication budget
D Shieler, PNL	A Slickpoo/TSP, D Powaukee and H Ruben/Nez Perce Tribe	Phone	Status of work, contract process, funding
J Till/TSP Chairman	D Shieler/PNL	Phone	Nguyen status, FHCRC scope, project plan comments, document declassification
J Till/TSP Chairman	D Shieler/PNL	Phone	Society meeting support, project plan
B Shleien/TSP	D Shieler/PNL	Phone	Monthly reports, vegetation data
C Maletskos/Kirkland Ellis	D Shieler/PNL	Phone	Possible technical expert visit to PNL
D Shieler/PNL	C Maletskos/Kirkland Ellis	Phone	Future visit to PNL
W Bishop/TSP	D Shieler/PNL	Phone	Native American Working Group (NAWG) meeting summary
B Shleien/TSP	DB Shieler/PNL	Phone	Comments on monthly report, cost to date information
W Bishop/TSP	D Shieler/PNL	Phone	NAWG status, meeting date at PNL
D Shieler/PNL	W Haerer/NUS	Phone	Contract status, planning, meeting with C Maletskos
D Shieler/PNL	J Till/TSP Chairman	Phone	Proposed budget management process
K Niles/TSP	A McMakin/PNL	Phone	Groundwater fact sheet, Stan Davis comments

Appendix E
Communications Log - December, 1990

Initiated By/Affiliation	Contact/Affiliation	Type	Subject
M Blazek/TSP	A McMakin/PNL	Phone	TSP booklet on Phase I results
A McMakin/PNL	M Blazek/TSP	Phone, Fax	Phase I TSP booklet, TSP comments
A McMakin/PNL	J Till/TSP Chairman	Phone	Phase I TSP booklet
M Neel/NRC library	A McMakin	Phone	Request for three Phase I reports
L Sohappay/Yakima Indian Nation	S Finch/PNL	Phone	Procedures for travel reimbursement
E Zwick/Garvey, Schubert, & Barer	S Finch/PNL	Phone	Request for two documents
B Shleien/TSP	S Finch/PNL	Phone	TSP communication budget for FY 1991 and amount spent in FY 1990
B Shleien/TSP	S Finch/PNL	Phone	Request for financial information before monthly report issuance
A Slickpoo/TSP	J Daer/PNL	Phone	Invoices and payment, request for additional forms
B Shleien/TSP	J Daer/PNL	Phone	Information from Dill Shipler
B Shleien/TSP	B Napier/PNL	Phone	Meeting on 1/8/91
M Robkin/TSP	C Heeb/PNL	Phone	Visit to PNL on 12/6-7/90
S Yabusaki/PNL	P Klingemar/TSP	Phone	Participation for Environmental Transport Subcommittee meeting
C Bruneau/PNL	D Price/TSP	Phone	Meeting with Coeur d'Alene and Kalispel Tribal Councils
C Bruneau/PNL	D Morrill/TSP	Phone	Meeting with Coeur d'Alene and Kalispel Tribal Councils
C Bruneau/PNL	M Blazek/TSP	Phone	Communications with tribes
R Givens, Coeur d'Alene tribe	C Bruneau/PNL	Phone	Status of HEDR research
C Bruneau/PNL	K McGinnes/WHC	Phone	Native American relationships
C Bruneau/PNL	E Clark/Coeur d'Alene Tribe	Phone	Presentation to tribal council

Appendix E
Communications Log - December, 1990

Initiated By/Affiliation	Contact/Affiliation	Type	Subject
C Bruneau/PNL	D Bonga/Kalispel Tribe	Phone	Presentation to tribal council
C Bruneau/PNL	D Price/TSP	Phone	Rescheduling of tribal council presentations
C Bruneau/PNL	M Blazek/TSP	Phone	Rescheduling of tribal council presentations
C Hall/Colville Tribe	C Bruneau/PNL	Phone	Revision to work order
M Robkin/TSP	S Gydesen/PNL	Phone	Two documents to be reviewed for declassification; logistics for visit on 1/9/91
N Germond/TSP	S Gydesen/PNL	Phone	Update on Task 11 activities; prioritized list of documents to be reviewed for declassification
S Gydesen/PNL	M Robkin/TSP	Phone	Subfile of classified documents requested for review; logistics for visit on 1/9/91; references for "green run" paper
G Harvey/PNL	K Niles/TSP staff	Phone	Draft video workplan and public opinion survey progress
G Harvey/PNL	K Niles/TSP staff	Phone	Draft TSP video workplan
K Niles/TSP staff	G Harvey/PNL	Phone	Potential survey; TSP Communications staff meeting
M Robkin/TSP	G Harvey/PNL	Phone	Meeting on Task 12 activities

END

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