PNL-6450-30-HEDR
UC-707

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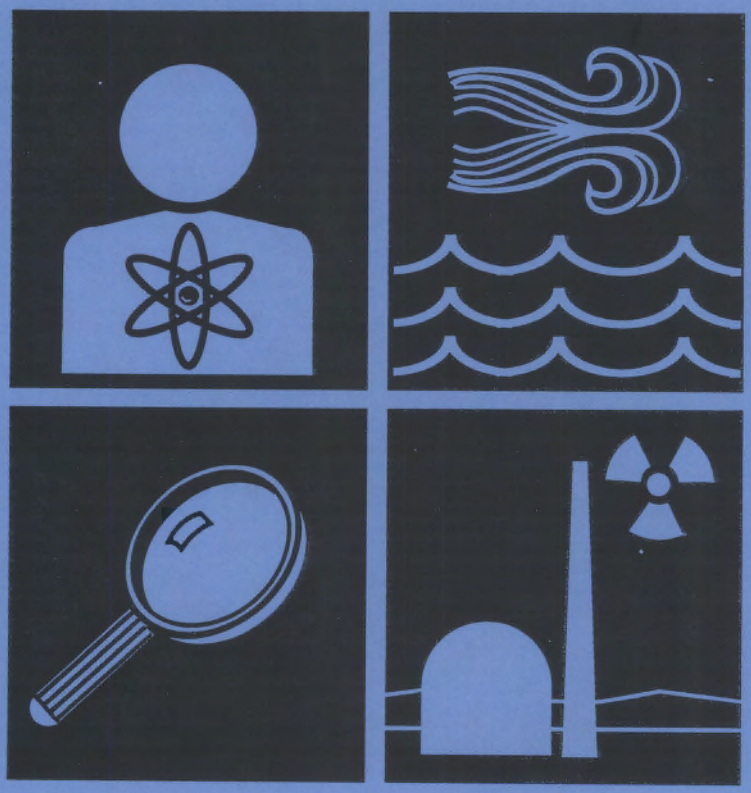
Hanford Environmental Dose Reconstruction Project

Monthly Report

April 1990



Prepared for the Technical Steering Panel

Battelle

PNL-6450-30-HEDR

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HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION PROJECT

Monthly Report

April 1990

Prepared for the Technical Steering Panel

Pacific Northwest Laboratory
Richland, Washington 99352

PNL-6450-30 HEDR
UC-707

HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION PROJECT

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Hanford Environmental Dose Reconstruction Project

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PREFACE

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

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

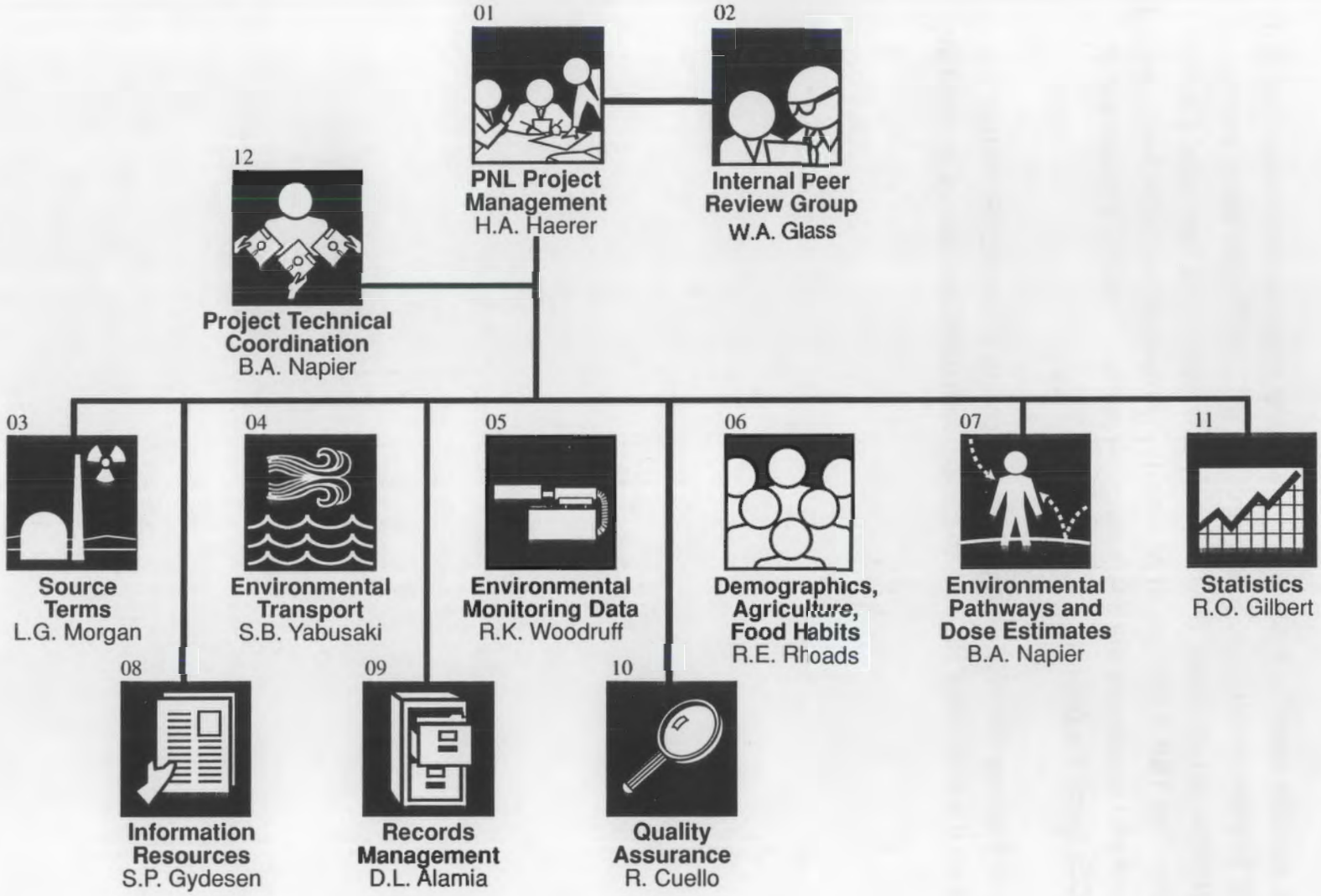
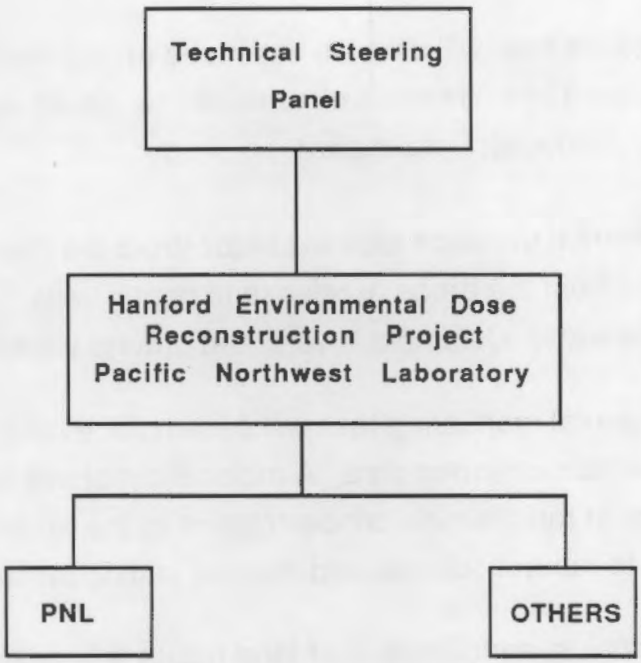


FIGURE 1. Organizational Structure of the Hanford Environmental Dose Reconstruction Project

EXECUTIVE SUMMARY*

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



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

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

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

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

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

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

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

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

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

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

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

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

MANAGEMENT SUMMARY

PROGRESS

This summary covers progress for the month of April 1990.

- continued work to comply with TSP Directive 90-1, Project Direction. Extensive discussions were held with TSP members at the April TSP meeting on the implementation of Directive 90-1.
- participated in the TSP meeting held in Richland, April 26 through 28, 1990
- completed the extraction of information pertaining to production reactor operating parameters for 1944 through 1947. This information came from historical records found in March of this year.
- reviewed additional historical records to obtain more detailed information on fuel cooling times and separation plant operations
- made the MESOILT2 atmospheric code documentation publicly available
- met with J. D. Anderson and members of the TSP to conduct a comparison of original data Anderson used to calculate estimates of iodine-131 in fuel processed in the Phase I time period. Dr. Robkin of the TSP reported on this discussion on April 27 at the public session of the TSP meeting.
- continued work on the internal draft of the Phase I summary report
- continued investigating information on whole-body counts made in the 1960s of residents in the Hanford environs
- continued implementing the Phase I HEDR dose estimate model
- received and set up the project's Geographic Information System computers and software
- received signed subcontract from the Yakima Nation
- participated in a TSP Native American Workshop held April 25 in Richland
- met with members of the news media to discuss HEDR communications issues

- delivered to the TSP copies of a bibliographic database of currently classified Hanford-Site-originated reports created between 1944 and 1960. The database currently holds 9,145 titles; the remainder will be delivered in June.

- continued a computer study to quantify the effects of the modular construction of the Phase I Monte Carlo air pathway dose model on the distributions of dose estimates.

MAJOR ISSUES AND ACTION TAKEN

Progress was made in resolving the scope, schedule, and budget issues that were raised in the March monthly report.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- complete the following scheduled milestone* in May:

  07-C *Radionuclide Transfer Factors*

- complete the preliminary dose estimate implementation

- continue work on the Phase I summary report

- continue working with TSP members to develop statements of work for Phase II activities and identify members responsible for these activities, as directed in TSP Directive 90-1

- continue working with the tribes to collect population, diet, and lifestyle data

- address TSP comments on various draft HEDR reports

- continue working with the TSP to develop strategies for communicating HEDR results to the public

- continue work on a database of currently classified Hanford-Site-originated documents generated from 1944 through 1960

- complete computer study to evaluate the effects of using a modular structure in the Phase I Monte Carlo dose code

---

* Reports documenting these activities will be submitted to the TSP for review, comment, and approval in the month indicated and later referenced in the Phase I summary report.

- conduct statistical analyses of whole-body-counter data from the 1960s on school children and adults in the Tri-Cities area.

BUDGET STATUS

Projected expenditures through April 1990	$ 1720K
Actual expenditures through April 1990	$ 1940K

VARIANCE EXPLANATION

The current cumulative variance between planned and actual costs is approaching 10% of the total budget. As indicated in the March monthly report, discussions concerning scope, schedule, and budget adjustments were held with the TSP and a resolution is anticipated in early May.

CAPITAL STATUS

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

PROJECT SUMMARY REPORT

1. IDENTIFICATION NUMBER:	2. PROGRAM/PROJECT TITLE:	3. REPORTING PERIOD:
DE-AC06-76RLO 1830	HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION	APRIL 1990

4a. PARTICIPANT NAME AND ADDRESS:	4b. CLIENT NAME AND ADDRESS:	5. START DATE:
PACIFIC NORTHWEST LABORATORY P. O. BOX 999 RICHLAND, WA 99352	DOE/RL RICHLAND WA 99352	OCTOBER 1989 6. COMPLETION DATE: SEPTEMBER 1990

7. FY 90 | 8. MONTHS

9. COST STATUS:

a. $ EXPRESSED IN THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.
12578
GFO110060

c. FIN. NO.

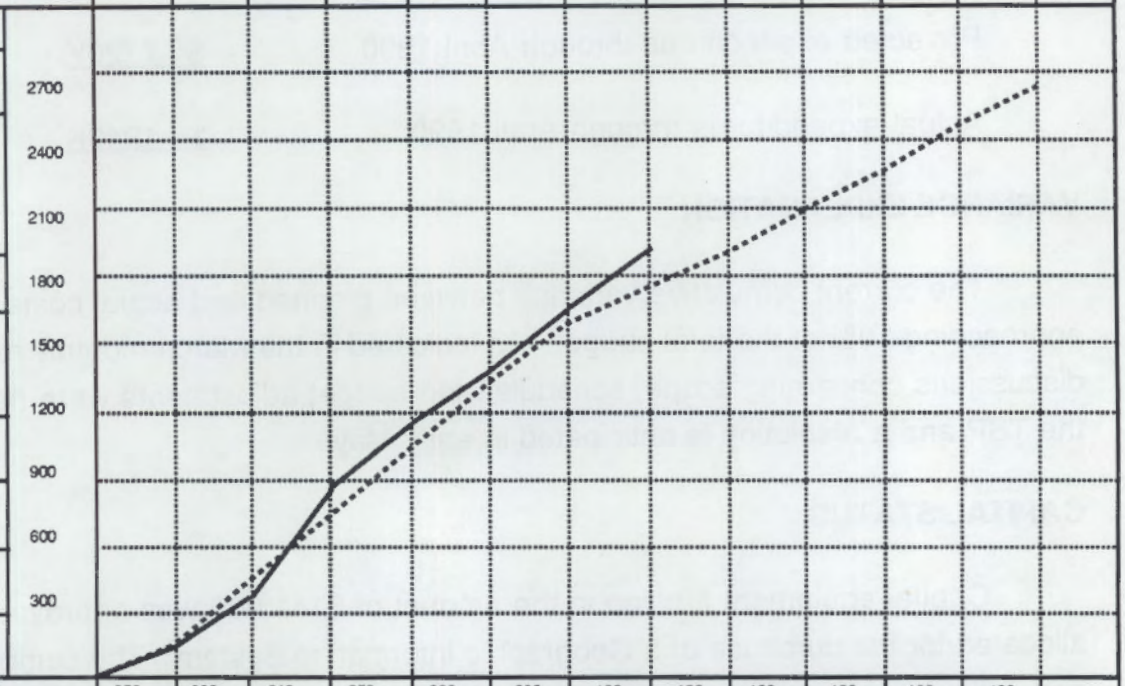
d. ACTUAL COSTS PRIOR YEARS
6332

e. FY BUDGET
2650 **

f. TOTAL BUDGET

g. FY FUNDS AUTH
3656 ***

h. TOTAL FUNDS AUTH
3656



COSTS	O	N	D	J	F	M	A	M	J	J	A	S	FY91
I. PLANNED	250	300	240	250	290	200	190	190	190	190	180	180	
J. ACTUAL	236	290	342	283	227	246	297						
K. VARIANCE	14	10	-102	-33	63	-46	-107						
L. CUM PLANNED	250	550	790	1040	1330	1530	1720	1910	2100	2290	2470	2650	
M. CUM ACTUAL	236	527	870	1152	1397	1643	1940						
N. CUM VARIANCE	14	23	-80	-112	-67	-113	-220						

10. LEGEND: PLANNED ------ ACTUAL ——— PROJECTED ..... 90% FUNDS SPENT ▷
** projected FY budget does not include TSP budget ***FY funds authorized include TSP funding

11. MILESTONES

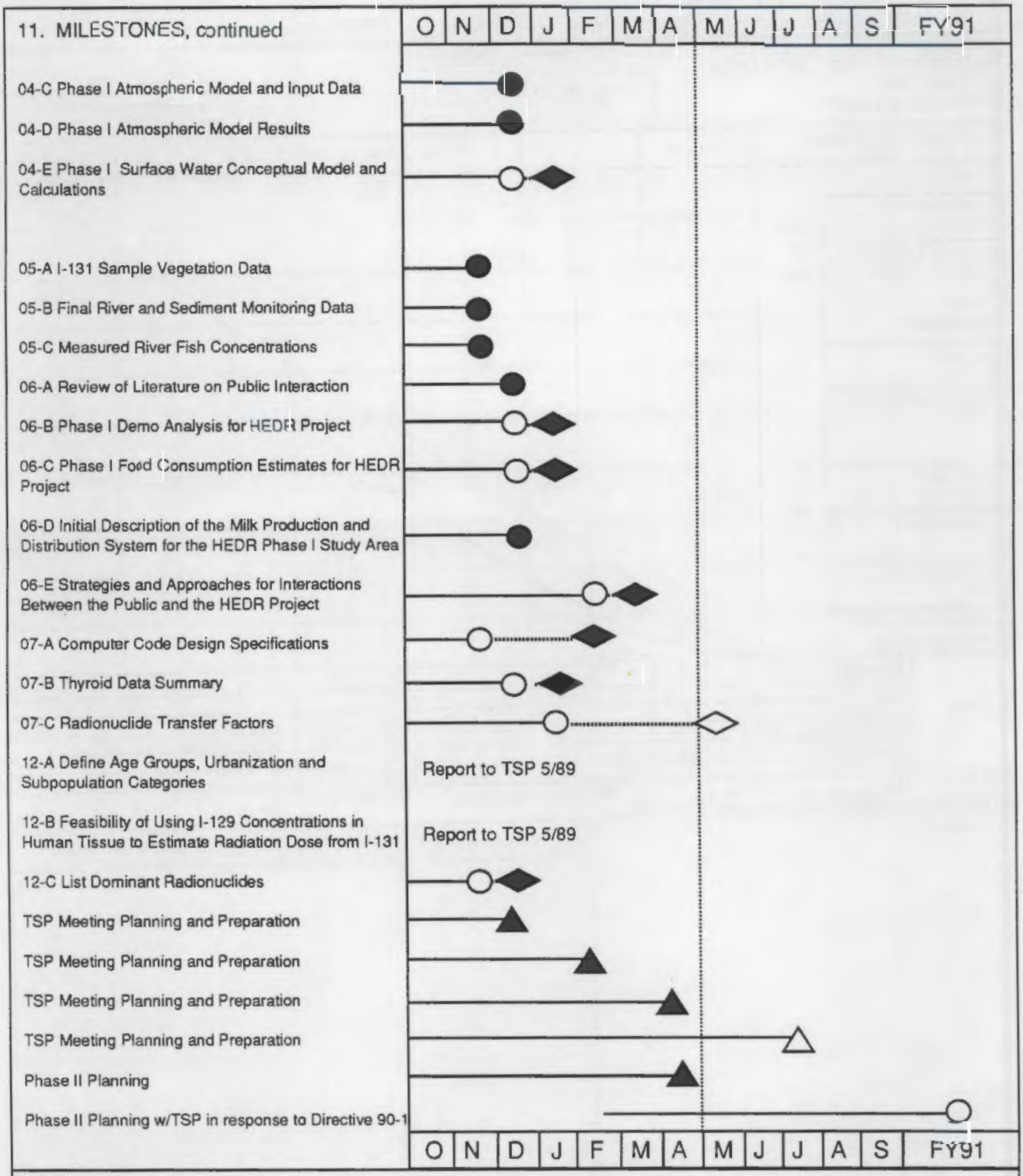
	O	N	D	J	F	M	A	M	J	J	A	S	FY91
01 Phase I Report*										○			
03-A Hanford Site Operations and Facilities													Report to TSP 6/89
03-B Radionuclide List Decay Schemes													●
03-C Recommendation Regarding Development of Libraries Specific to Hanford for ORIGEN Code													●
03-D Description of Chemical Form and Atmospheric Chemistry of Iodine Emissions													●
03-E I-131 in Irradiated Fuel at time of Processing from 12-44 Through 12-47													●
04-A Preliminary Response to Directive 88-4, Ground Water													Report to TSP 3/89
04-B Atmospheric Modeling Approach													●

LEGEND: SCHEDULED △ TO TSP ○ TIME LINE ——— DEVIATION - - - - - - - TIME NOW:
COMPLETED ▲ ● DEVIATION ◇ PROGRESS ———

12. NAME/SIGNATURE OF PARTICIPANTS PROG/PROJ MANAGER & DATE
H A Haerer

* TSP rescheduled milestone to July

PROJECT SUMMARY REPORT



PROJECT SUMMARY REPORT - TECHNICAL STEERING PANEL

1. IDENTIFICATION NUMBER:	2. PROGRAM/PROJECT TITLE:	3. REPORTING PERIOD:
DE-AC06-76RLO 1830	HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION - TSP	APRIL 1990

4a. PARTICIPANT NAME AND ADDRESS:	4b. CLIENT NAME AND ADDRESS:	5. START DATE:
PACIFIC NORTHWEST LABORATORY P. O. BOX 999 RICHLAND, WA 99352	DOE/RL RICHLAND WA 99352	OCTOBER 1989
		6. COMPLETION DATE: SEPTEMBER 1990

7. FY 90 | 8. MONTHS

9. COST STATUS:

a. $ EXPRESSED IN THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.
12578
GEO2210110

c. FIN. NO.

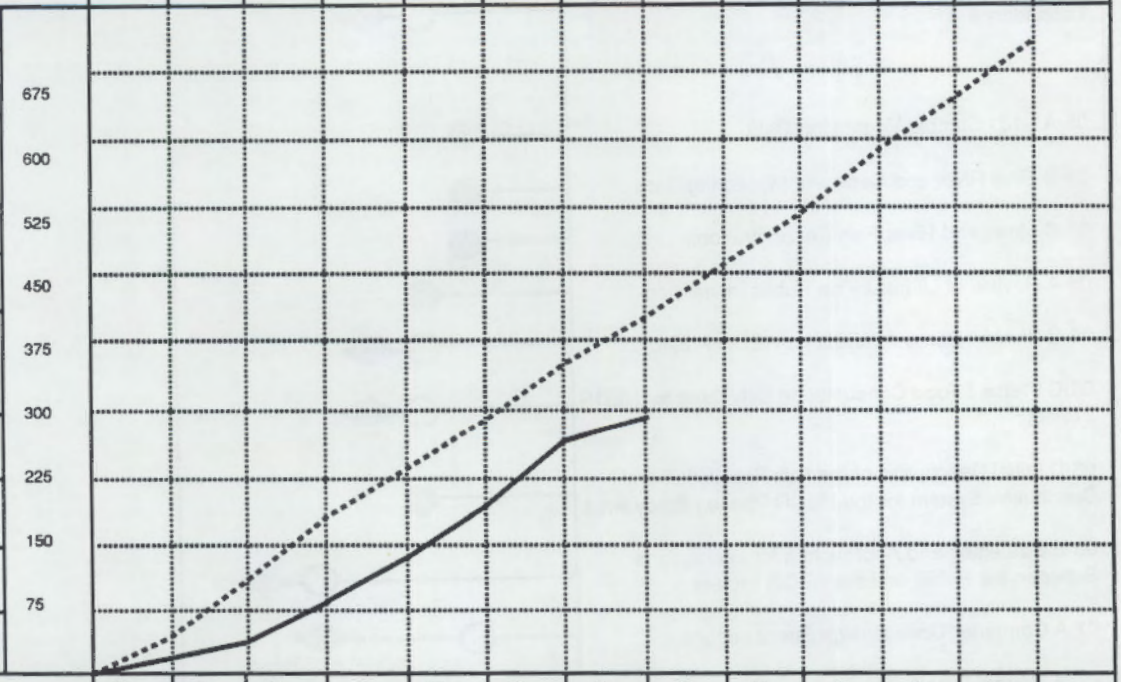
d. ACTUAL COSTS PRIOR YEARS

e. FY BUDGET 688

f. TOTAL BUDGET

g. FY FUNDS AUTH 688

h. TOTAL FUNDS AUTH 688 (unburdened)



COSTS	O	N	D	J	F	M	A	M	J	J	A	S	FY91
I. PLANNED	57	57	57	57	57	57	57	57	58	58	58	58	
J. ACTUAL	17	21	30	60	46	39	81*						
K. VARIANCE	40	36	27	-3	11	18	-24						
L. CUM PLANNED	57	114	171	228	285	342	399	456	514	572	630	688	
M. CUM ACTUAL	17	38	68	128	174	213	277						
N. CUM VARIANCE	40	76	103	100	111	129	122*						

10. LEGEND: PLANNED ------ ACTUAL ——— PROJECTED ..... 90% FUNDS SPENT ▷

* Variance due to change from manual to automated reporting system

11. MILESTONES

O	N	D	J	F	M	A	M	J	J	A	S	FY91

LEGEND: SCHEDULED △ TIME LINE ——— DEVIATION - - - - - - - TIME NOW:

COMPLETED ▲ DEVIATION ◇ PROGRESS ▬▬

12. NAME/SIGNATURE OF PARTICIPANTS PROG/PROJ MANAGER & DATE

H A Haerer

Table 1 Status of Directives

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

Table 1 Status of Directives, contd.

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

Table 1 Status of Directives, contd.

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

CONTENTS

TABLES

FIGURES

Source Terms

OBJECTIVE

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

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

PROGRESS

Activities for this reporting period included the following:

- completed the extraction, from recently discovered (March 1990) historical records, of information pertaining to the production reactor operating parameters for 1944 through 1947. This information would permit the exact calculation of the quantity of iodine-131 and other fission products present in the irradiated fuel at the date of fuel discharge.

- reviewed additional historical records to obtain more detailed information on fuel cooling times and separation plant operations that impact the quantity of iodine-131 available for release to the atmosphere at the time of fuel dissolution. Additional information was located for a portion of 1945. This additional information indicates that 1) batches of fuel

charged to the dissolvers were from different fuel batches discharged from the reactors; 2) fuel sorting to maximize the plutonium product processed was apparently practiced starting in the fall of 1945; and 3) specific information on fuel cooling times is generally absent.

- attended portions of the TSP meeting held in Richland on April 26 - 28, 1990. Discussions of proposed Phase II activities for the Source Terms Task were conducted with the TSP's Subcommittee On Source Terms during public working sessions.

MAJOR PROBLEM AREAS AND ACTION TAKEN

Progress was made in resolving the scope, schedule, and budget issues that were raised in the March monthly report .

PLANNED WORK FOR SUBSEQUENT MONTHS

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

- determine the need to conduct sensitivity calculations using ORIGEN2[a]

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

Environmental Transport

OBJECTIVE

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

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

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

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

PROGRESS

Activities for this reporting period included the following:

- met with members of the TSP to discuss the role of groundwater transport in Phase I surface water analysis, surface-water transport activities, and details of the atmospheric transport workshop
- officially released MESOILT2* for publication. The code is accompanied by a user manual and example problems.
- continued internal review of the surface water conceptual model.

MAJOR PROBLEM AREAS AND ACTION TAKEN

Progress was made in resolving the scope, schedule, and budget issues that were raised in the March monthly report .

WORK PLANNED FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- continue to assist the TSP in preparing the atmospheric transport workshop.

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

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

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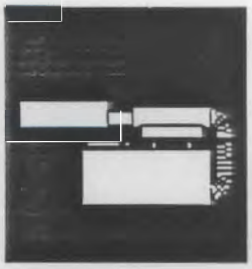
* Ramsdell, J. V. 1990. *MESOILT2, A Lagrangian Trajectory Climatological Dispersion Model.* PNL-7340 HEDR, Pacific Northwest Laboratory, Richland, Washington.



Environmental Monitoring Data

OBJECTIVE

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

PROGRESS

Activities this reporting period focused on continued Phase II planning.

- prepared a draft statement of work for Phase II subtasks. The draft is ready for discussion with the panel member assigned to this task as soon as that person is identified.
- a presentation entitled Reconstruction of Hanford Vegetation Monitoring Data for Dose Reconstruction, 1945-1947 was accepted for the 1990 Health Physics Society Meeting in June.

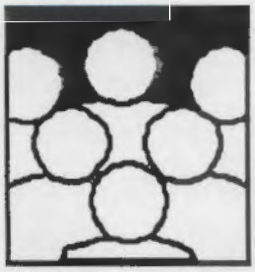
MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

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

- examine the magnitude of the effect of Phase I assumptions on 1945-1947 vegetation concentrations
- determine sensitivity of dose calculations to accuracy and precision in historical radionuclide measurements in fish and water
- determine necessary extent of terrestrial media data base
- determine the suitability of "green run" air data for use in later phases.



Demographics, Agriculture, Food Habits

OBJECTIVE

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

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

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

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

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

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

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

PROGRESS

Activities for this reporting period included the following:

- received signed subcontract from the Yakima Nation; seven tribal subcontracts are now in place
- participated in a TSP-hosted Native American Workshop on April 25
- visited the Kalispel Reservation to present an overview of the HEDR Project to new tribal technical staff
- collected and summarized sex- and age-specific 1950 data for county census divisions in Franklin, Benton, and Walla Walla counties
- met with TSP Demography Subcommittee to discuss Phase II work
- revised Benton and Franklin county milk sources per conversations with former Carnation and Connell dairy employees
- revised food consumption estimates to reflect the fact that during the winter months, no fresh vegetables were produced locally
- developed a draft communications evaluation program at the request of the TSP Communications Subcommittee. The program would help the TSP answer three questions: 1) what do people know about HEDR, 2) are communications messages impacting the public, and 3) are communications processes effective.
- met with Mike Pierce of KVEW, Wanda Briggs of the Tri-City Herald, and Kent Johnson of KONA radio to discuss HEDR communications issues.

MAJOR PROBLEM AREAS AND ACTION TAKEN

Progress was made in resolving the scope, schedule, and budget issues that were raised in the March monthly report .

PLANNED WORK FOR SUBSEQUENT MONTHS

- contact all focus groups members to determine whether they want a copy of the audience analysis report, part of which summarizes focus group comments
- continue to work with the TSP Communications Subcommittee to plan for the release of Phase I preliminary dose estimates
- continue planning Phase II activities with the TSP.

Environmental Pathways and Dose Estimates

OBJECTIVE

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

PROGRESS

Activities for this reporting period included the following:

- continued investigation of information on whole-body counts made in the 1960s of residents in the Hanford environs. Data are available on body burdens of zinc-65, cesium-137, potassium-40, and phosphorus-32 for many residents of the area. As an additional data set, the complete whole-body count records of all Hanford workers between 1959 and 1972 are being prepared on disks for the project. Over 40,000 individual records are available for this period. This data will allow a trending analysis to be made of background exposures over a long period of interest. This data is scheduled for receipt in May.

- added several enhancements and increases in efficiency to the air pathways portion of the Phase I HEDR dose model. Doses for all location/lifestyle/age groups for which input data are available will be calculated, rather than just a subset. These calculations will be performed in May.

- continued implementing the surface-water portion of the Phase I HEDR dose model. Some revisions to the planned structure of this portion of

the model are being made based on lessons learned in the air portion of the code. It will be written as a single module to minimize later difficulties with variable correlations. Much of the "fish data" is now being rearranged in an external data file.

- received and set up the project's Geographic Information System computers and software. Room 50 has been set aside in PNL's Research Technology Laboratory Building for the equipment. Training for the initial group of users is scheduled for early June. Training video tapes have been acquired for prior familiarization.

Milestone 07-C, *Radionuclide Transfer Factors*, due originally January 1990 and rescheduled for completion in May 1990:

- resubmitted the modified draft report for internal review; it will be issued in May.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for the subsequent months includes the following:

- complete the following scheduled milestone:

  07-C *Radionuclide Transfer Factors*

- complete the preliminary code implementation
- provide initial dose estimates
- incorporate TSP comments in several draft HEDR reports.

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

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

Information Resources

OBJECTIVE

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

PROGRESS

Activities for this reporting period included the following:

- delivered to the TSP copies of the bibliographic database of currently classified Hanford Site-originated documents created during the years 1944-1960. The database currently holds 9,145 titles and we expect to deliver the remainder in early June.
- received formal notification from E.I. du Pont deNemours and Company, Wilmington, Delaware that they no longer hold any of the documents created while they were the prime contractor at Hanford from 1943 - August 1946
- received from the Westinghouse Savannah River Company, Aiken, South Carolina a listing of their holdings of documents with a "HW" prefix. None are Hanford-related.
- reviewed nearly 20 cubic feet of classified documents created prior to 1950 and held at the Records Holding Area in Richland. A brief description of the contents of each box was recorded and those applicable to the HEDR Project are being processed.
- continued to search for documents that address silver reactor capabilities, performance, an incidents
- added new citations to the tracking system that now numbers nearly 3,400

- provided the DOE-RL Public Reading Room with 143 documents of potential interest/use in the HEDR Project. A title listing of these reports is attached in Appendix A.

- filled information requests from the TSP and HEDR Task members.

MAJOR PROBLEM AREAS AND ACTION TAKEN

Progress was made in resolving the scope, schedule, and budget issues that were raised in the March monthly report .

PLANNED WORK FOR SUBSEQUENT MONTHS

Planned work for subsequent months includes the following:

- make necessary arrangements to determine the existence or non-existence of Hanford Site-originated documents that were transferred to the corporate headquarters of du Pont and General Electric during the years 1944 through 1964

- create a database of currently classified Hanford Site originated documents generated between the years 1944-1960

- continue to add input to the information resources tracking data base

- continue to provide documents to the DOE-RL Public Reading Room in an orderly, timely fashion

- develop a list of Hanford-originated raw data logs/notes of potential interest/use to the HEDR Project

- continue to identify and collect significant documents that address silver reactor capabilities, performance, and incidents

- watch for information that may explain in detail, and support data in, "green run" document HW-17381 DEL

- identify significant documents that address fuel element failures that occurred in now decommissioned Hanford Production Reactors

- continue to identify and collect documents and/or data of potential interest/use to the HEDR Project that address activities during the years from reactor startup through 1949.

Records Management

OBJECTIVE

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

PROGRESS

Activities for this reporting period included the following:

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

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

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

Quality Assurance

OBJECTIVE

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

PROGRESS

Activities for this reporting period included the following:

- issued HEDR-TP-6, HEDR Review Process. This procedure addresses the review process for controlling and documenting internal and external reviews of all reports, presentations, and work plans.
- continued working on expanding existing QA plan to include project-specific data quality objectives that will be included as part of Phase II planning
- continued providing QA program implementation guidance to project staff in areas of computer software modeling, databases, and internal/external reviews of Phase I results

MAJOR PROBLEM AREAS AND ACTIONS TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- review Phase I report for adequate data traceability and to ensure that to the extent feasible, relevant QA/Quality Control data, assumptions, or value judgements are included
- issue remaining HEDR procedures: HEDR-TP-3, "HEDR Documentation of Critical Decisions" and "HEDR-TP-4, "HEDR Data Quality Objectives"
- work with HEDR staff to expand existing QA plan to include project-specific data quality objectives as directed by the TSP
- develop guidelines that set forth the minimum contents of the Phase II QA plan.

Statistics

OBJECTIVE

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

PROGRESS

Activities this reporting period included the following:

- continued a computer study to quantify the effects of the modular construction of the Phase I Monte Carlo air-pathway dose model on the distributions of dose estimates. This study will provide information needed to interpret the results of the Phase I preliminary estimates of dose and associated uncertainties that will be obtained using the modular computer code. The non-modular computer code that is being written to compare with the Phase I modular code is completed through the milk production stage. Results have been obtained for census subdivision 24 (Franklin County 5). These results indicate there are no significant differences between the results of the modular and non-modular computer codes. That is, the loss of structural correlation that occurs when the modular code is used appears to have minimal effect on the concentration of iodine-131 in cows' milk. The non-modular code will be expanded so that estimated doses to the thyroid from iodine-131 using the two codes can be compared

- met with the TSP contact to continue developing work plans for the Statistics Task for the remainder of Phase I and for Phase II

- attended the Workshop of Statistics of Human Exposure to Ionizing Radiation on April 2-4, 1990 in Oxford, United Kingdom, and presented the paper, *Statistical Aspects of Reconstructing the 131-Iodine Dose to the Thyroid of Individuals Living Near the Hanford Site in the Mid-1940s.* The written paper will appear in Radiation Protection Dosimetry.

MAJOR PROBLEM AREAS AND ACTION TAKEN

Progress was made in resolving the scope, schedule, and budget issues that were raised in the March monthly report .

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for subsequent months includes the following:

- complete the computer study that will evaluate the modular structure of the Phase I Monte Carlo dose code
- finalize work plans with the TSP for the remainder of Phase I and for Phase II
- develop and implement the strategy for Phase II sensitivity analyses
- conduct statistical analyses and summarizations of whole-body-counter data on school children and adults in the Richland-Pasco-Kennewick area that were obtained in the 1960s. These data may help to validate the HEDR dose model. Similar analyses and summarizations will be done for gross-beta thyroid counts of Hanford workers in the mid-1940s
- develop statistical procedures for use with the recently acquired Geographical Information System for the HEDR Project
- document multiplicative lognormal code development to date.

Project Technical Coordination

OBJECTIVE

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

PROGRESS

Activities this reporting period included the following:

- reviewed comments from an external consultant on statistical approaches
- participated in the Native American Workshop held in Richland on April 25
- met with the TSP contact for the Environmental Pathways and Dose Estimates and Project Technical Coordination Tasks to plan Phase II activities.

MAJOR PROBLEM AREAS AND ACTION TAKEN

None.

PLANNED WORK FOR SUBSEQUENT MONTHS

Work planned for the subsequent months includes the following:

- continue defining the overall structure of the needed HEDR data base and the type of data needed for smooth project integration
- continue coordinating efforts with thyroid morbidity study personnel

- work with the International Atomic Energy Agency Coordinated Research Program on Validation of Model Predictions (VAMP) to validate portions of the HEDR model and obtain independent estimates of certain doses.

APPENDIX A

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

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

BNWL-319	Review of Methyl Iodide Behavior in Systems Containing Airborne Radioiodine. 83 pp.	06/15/66
BNWL-495	Plutonium Air Concentrations & Particle Size Relationships in Hanford Facilities. 44 pp.	12/31/67
BNWL-643	Radionuclide Levels in Air Filter Samples from the PUREX Process Building. 12 pp.	12/15/67
BNWL-8-41	Use & Calibration of the Automatic Columbia River Monitoring Station Iodine Monitor. 25 pp.	12/31/70
BNWL-B-452	Studies of Columbia River Water Quality. 42 pp.	01/31/76
BNWL-CC-1056	The Environmental Effects of an Extended Hanford Plant Shutdown. 90 pp.	02/28/67
BNWL-CC-2048	The Reaction of Gaseous Iodoethane with Silver Nitrate. 30 pp.	03/14/69
BNWL-CC-2142	Release of Radioiodine During Processing of Irradiated Np-237 Targets. 17 pp.	06/01/69
BNWL-CC-2188	Analysis of Samples from the PUREX Vessel Vent Silver Reactor. 30 pp.	07/11/69
BNWL-CC-2378	Some Observations Concerning the Chemistry of the PUREX Vessel Vent Silver Reactor. 14 pp.	01/16/70
BNWL-CC-2403	Progress Report on the Columbia River Studies July-December 1969. 12 pp.	01/13/70
BNWL-SA-360	Periphyton Productivity & Radionuclide Accumulation in the Columbia River, Washington, USA. 23 pp.	10/14/65
BNWL-SA-572	Contamination of Soft Tissues of Infants & Children with Radioactive Fallout as Exemplified by Cs-137 and I-131. 25 pp.	03/07/66
BNWL-SA-601	Evaluation of the Exposure that Results from the Disposal of Radioactive Wastes into the Columbia River. 13 pp.	03/18/66
BNWL-SA-1293	The Partition Coefficient of Methyl Iodide between Vapor & Water. 13 pp.	07/21/67

BNWL-SA-1730	Accumulation of Radionuclides in Bed Sediments of McNary Reservoir of the Columbia River. 22 pp.	03/25/68
BNWL-SA-2429	A System for Continuous Monitoring of Potential Dose Rate to the G.I. Tract from Drinking Water. 12 pp.	03/31/69
BNWL-SA-2812	The Hanford Story & Its Contribution of Radionuclides to the Columbia River Waters. 28 pp.	09/15/69
BNWL-SA-3364	Cycling of Radionuclides in Columbia River Biota. 14 pp.	06/03/70
BNWL-SA-3828	Trace Element Analyses of Columbia River Water & Phytoplankton. 20 pp.	04/20/71
BNWL-SA-3973	Statistical Analysis of Factors Influencing Fall Chinook Redd Counts Near Hanford on the Columbia River: 1947-1969. 49 pp.	04/30/71
BNWL-SA-3980	Seasonal Changes in Particle Size Distribution, Chemical Composition, & Strontium Exchange Capacity of Particulate Matter Suspended in the Columbia River. 29 pp.	07/31/71
BNWL-SA-4023	In SITU Measurement of Radiation Dose in the Columbia River. 5 pp.	02/03/70
BNWL-SA-4718	Decline of Radioactivity in Biota Following Shutdown of Hanford Reactors. 2 pp.	05/31/73
BNWL-SA-4726	Detection Systems for the Low-Level Radiochemical Analysis of Iodine-131, Iodine-129 & Natural Iodine in Environmental Samples. 26 pp.	11/09/73
BNWL-SA-5050	Iodine Uptake Patterns & Water Use by Several Crop Plants. 15 pp.	06/30/74
BNWL-SA-5194	Seasonal Distribution of Mercury in Water, Suspended Matter & Sediments of the Lower Columbia River Watershed. 17 pp.	10/07/74
BNWL-SA-5411	Iodine-129 in Aquatic Organisms Near Nuclear Fuels Processing Plants. 14 pp.	04/30/75
BNWL-SA-5470	Determination of Low Concentrations of Iodine-129 and Iodine-131 in Milk Samples. 19 pp.	07/29/75

BNWL-SA-5630	"Filter-Resin" Sampling Method for Measurement of Radioactivity in Columbia River Water. 7 pp.	11/30/75
BNWL-SA-5682	Radioiodine Uptake by Wheat Plants with Time After Amendment to Soil. 14 pp.	06/01/76
BNWL-SA-6263	Sampling & Measurement of Longlived Radionuclides in Environmental Samples. 22 pp.	09/30/77
DUH-13548	Effluent Water - 105-B. 2 pp.	10/28/44
DUN-255	Monthly report Contamination Control - Columbia River November, 1965. 14 pp.	12/01/65
DUN-460	Monthly Report Contamination Control - Columbia River December, 1965. 13 pp.	01/03/66
DUN-615	Monthly Report Contamination Control - Columbia River January, 1966. 13 pp.	01/31/66
DUN-1248	Monthly Report Contamination Control - Columbia River June, 1966. 14 pp.	07/01/66
DUN-1972	Fuel & Target Failure Data May 1, 1966 - December 31, 1966. 8 pp.	01/20/67
DUN-2273	Reduction of Radioactivity & Thermal Energy Discharged to the Columbia River. 19 pp.	03/31/67
DUN-3857	Fuel & Target Failure Data January 1, 1967 - December 31, 1967. 13 pp.	02/23/68
DUN-5488	Fuel & Target Failure Data January 1, 1968 - December 31, 1968. 12 pp.	02/17/69
GEH-21328	Water Quality Studies on the Columbia River. 302 pp.	12/31/54
* HAN-45954 Pts 1-8	P Dept Daily Reports 10/05/44 through 12/31/48. approx. 1440 pp.	1944
* HW-3-839	Monthly Report for 105B for September 1944 through March 1945. 45 pp.	9/44-3/45
* HW-3-1406	Summary of 200 Area Plant Results 01/10/45 through 06/27/45. 159 pp.	01/10/45

*Declassified by new directive

HW-3-2225	100-B Unit Purge April 12, 1945 Part II - Activity Studies. 3 pp.	04/24/45
HW-3-3274	Results of Slug Sorting in 200 N Areas. 5 pp.	11/20/45
HW-7-668	Provisional Rules for the Handling of Metal. 2 pp.	09/19/44
HW-7-854	Responsibilities of Health Group for Radiation Safety. 3 pp.	11/04/44
HW-7-5145	H.I. Section Report for September 1946. 14 pp.	10/03/46
HW-7-5301	H.I. Section Report for October 1946. 15 pp.	11/04/46
HW-7-5351	H.I. Report on the 200 Areas & Associated Labs for Week Ending 11/13/46. 5 pp.	11/14/46
HW-7-5428	H.I. Section Report for November 1946. 18 pp.	12/03/46
HW-7-5498	H.I. Report on the 200 Areas Associated Labs for the Week Ending 12/11/46. 5 pp.	12/12/46
HW-7-5531	H.I. Report on the 200 Areas & Associated Labs for Week Ending 12/18/46. 5 pp.	12/19/46
HW-7-5580	H.I. Report on the 200 Areas & Associated Labs for Week Ending 01/01/47. 5 pp.	01/03/47
HW-7-5605	H.I. Section Report for December 1946. 15 pp.	01/03/47
HW-7-5665	H.I. Report on the 200 Areas & Associated Labs for Week Ending 01/15/47. 4 pp.	01/16/47
* HW-7-5760	H.I. Section Report for January 1947. 12 pp.	02/05/47
HW-7-5784	H.I. Report on the 200 Areas & Associated Labs for Week Ending 02/05/47. 4 pp.	02/07/47
HW-7-5815	H.I. Report on the 200 Areas & Associated Labs for Week Ending 02/12/47. 4 pp.	02/14/47
HW-7-5865	H.I. Report on the 200 Areas & Associated Labs for Week Ending 02/26/47. 5 pp.	02/27/47
HW-7-5955	H.I. Report on the 200 Areas & Associated Labs for Week Ending 03/12/47. 4 pp.	03/13/47

*Formerly declassified with deletions

HW-7-5980	H.I. Report on the 200 Areas & Associated Labs for Week Ending 03/19/47. 4 pp.	03/20/47
HW-9129	Evaluation of Filter Media for Removal of Airborne Plutonium. 12 pp.	03/09/48
* HW-10475-B	Hanford Technical Manual Section 8 - Pile. 375 pp.	04/01/44
* HW-10592	Summary of Hanford Works Radiation Hazards for the Reactor Safeguard Committee. 8 pp.	07/27/48
@ HW-13743	Radioactive Contamination in the Environs of the Hanford Works for the Period Oct-Dec 1948. 72 pp.	06/22/49
HW-18094	Filtration Efficiency of the T Plant Sand Filter. 11 pp.	06/15/50
HW-18266	Water Activity - 100 Areas. 1 pp.	05/03/50
HW-20564	Outlet Water Activity. 2 pp.	03/19/51
HW-21415-SUP	A Recomputation & Extension of Parameters Involved in Sutton's Diffusion Hypothesis. 9 pp.	11/16/53
HW-23178-DEL	Tritium Content of Reactor Water. 9 pp.	07/17/51
HW-25457-REV 2	Manual of Radiation Protection Standards. 87 pp.	03/01/60
HW-29319	The Determination of Cu-64 in Reactor Effluent Water by Electrodepostion. 14 pp.	09/16/53
HW-30280	Computations of the Environmental Effects of a Reactor Disaster. 85 pp.	12/13/53
* HW-33858-REV	The Calculation of Neutron Flux & Exposure in the Hanford Reactors. 31 pp.	02/14/56
* HW-35826	Ruptured Slug Data - February 1955. 7 pp.	03/01/55
HW-37207	Storage of High Activity Wastes. 28 pp.	07/08/55
HW-37935	An Evaluation of Monitoring Methods for NO and NO_2 . 15 pp.	05/16/55
HW-38483	Continuous Gamma Scintillation Monitor for Iodine-131 in Dissolver Off-Gas & Vessel Vent System. 8 pp.	08/04/55

*Declassified by new directive
@Formerly declassified with deletions, declassified by new directive

HW-45519	Reduction of Goal Exposure. 6 pp.	09/12/56
HW-45725	Reactor Effluent Monitoring. 29 pp.	10/12/56
HW-47559	A Portable Multi-Range No_2 Gas Monitor. 20 pp.	01/31/57
HW-48381	Contamination of River Organisms Grown in Retained & Nonretained Reactor Effluent. 34 pp.	11/21/57
HW-49485	The Origin of Certain Radioisotopes in Hanford Reactor Cooling Water. 24 pp.	04/24/57
HW-50311	Radiochemical Procedures for the Separation of Tracer Amounts of Na-24, Mn-56, Cu-64 and Np-239 from Reactor Effluent Water. 7 pp.	06/04/57
HW-51667	Nitrogen Oxides in the Environs of PUREX and REDOX Stacks. 9 pp.	07/25/57
HW-52789	PUREX Deep-bed Fiberglas Filter - Performance Study. 6 pp.	09/25/57
HW-54756	Predicted Effects on 100-D Area Water Supply from 100-K Area Dutfall Line Failure. 53 pp.	02/10/58
HW-55249	Effects of Direct Disposal of Reactor Effluent Water to the River. 5 pp.	03/06/58
HW-56390	The Determination of Gallium-72 in Reactor Effluent Water & Columbia River Water. 17 pp.	06/13/58
HW-56764	Meeting with Advisory Committee on Reactor Safeguards, Hanford, June 1958. 75 pp.	07/14/58
HW-58115-DEL	Technology of the HAPO Lead Dip Fuel Element Canning Process. 195 pp.	12/15/58
HW-61117	An Automatic Analyzing Monitor for Reactor Effluent Cooling Water. 69 pp.	05/01/59
HW-61326	Calibration of Rupture Monitors. 12 pp.	11/13/59
HW-62874	The Effect of Temperature & Flow Velocity on the Decontamination of Reactor Effluent Water with Aluminum. 19 pp.	12/01/59
HW-66415	Environmental Radiological Consequences of Increased Reactor Production. 10 pp.	08/12/60
HW-66689	Reactor Effluent Monitoring Devices. 23 pp.	09/30/60

HW-69083	On the Origin of Radiophosphorus in Hanford Reactor Effluent Water. 21 pp.	04/20/61
HW-69266	Four Hour Purge. 9 pp.	04/14/61
HW-75782	Reduction of the Effluent Water Radionuclides by Addition of Sodium Silicate to Process Water. 17 pp.	12/10/62
HW-76153	Effect of a Reactor Fuel Element Failure on the Columbia River Radionuclide Concentrations at Pasco, Washington. 10 pp.	12/27/62
HW-77126	Radioiodine Sampling with Activated Charcoal Cartidges. 14 pp.	04/19/63
HW-79130	Radionuclide Distribution in Fuel Column Films. 18 pp.	10/01/63
HW-80759	Slug Rupture Reports - 1959. 176 pp.	02/05/64
HW-80764	Slug Rupture Reports - 1964. 205 pp.	02/05/64
HW-81306	Analysis of Waste Released by Seepage to the Columbia River from the 1301-N Crib. 34 pp.	04/30/64
HW-81413	The Effect of Deionized Water on Reactor Effluent Activities, Part 2. Zirconium & Aluminum Clad Fuel. 18 pp.	10/01/64
HW-84481	A Monitor for Radioiodine in Reactor Cooling Water. 13 pp.	11/05/64
HW-SA-1784	Radioisotopes in a Municipal Water System Near the Hanford Atomic Products Operation. 18 pp.	04/08/60
HW-SA-1809	Radiochemical Analysis of Reactor Effluent Waste Material at Hanford. 14 pp.	10/26/59
HW-SA-2171	Columbia River Continuous Monitoring System. 12 pp.	1961
HW-SA-2192	Reducing Radioisotope Concentrations in Reactor Effluent by High Coagulant Feed. 14 pp.	07/14/61
HW-SA-3071	Physical & Chemical Form of I-131 in Fallout. 18 pp.	06/14/63
HW-SA-3147	Variations in Elemental Concentrations in the Columbia River. 29 pp.	07/22/63

HW-SA-3562	Effect of Physical & Biological Conditions on Deposition & Retention of I-131 on Plants. 13 pp.	09/21/64
PNL-2080-9	Control of Radioiodine in the Excess Water Stream of a Nuclear Fuels Reprocessing Plant. 73 pp.	05/31/78
PNL-3359	Laboratory Studies on the Evolution of Iodine-129 during PUREX-Uranium Metal Dissolution. 35 pp.	03/31/80
PNL-3496	Determining Criteria for the Disposal of Iodine-129. 33 pp.	10/31/80
PNL-4489	Methyl Iodide Sorption by Reduced Silver Mordenite. 72 pp.	06/30/83
PNL-4689	Status of Radioiodine Control for Nuclear Fuel Reprocessing Plants. 51 pp.	07/01/83
PNL-5108	Adequacy of Radioiodine Control & Monitoring at Nuclear Fuels Reprocessing Plants. 38 pp.	06/30/84
PNL-SA-6575	Trace Elements in a Columbia River Food Web. 20 pp.	10/31/77
PNL-SA-14255	The Effects of Errors in the Measurement of Continuous Exposure Variables on the Assessment of Risks. 42 pp.	07/31/86
RHO-ST-2	Analysis of the Dissolver Silver Reactors from Hanford's PUREX Plant. 20 pp.	06/30/78
RL-REA-569	Contamination Control - Columbia River - January 1965. 15 pp.	01/29/65
RL-REA-683	Contamination Control - Columbia River - February 1965. 15 pp.	02/18/65
RL-REA-915	Contamination Control - Columbia River - March 1965. 17 pp.	03/26/65
RL-REA-1098	Contamination Control - Columbia River - April 1965. 18 pp.	04/28/65
RL-REA-2137	Contamination Control - Columbia River - May 1965. 16 pp.	05/24/65
RL-REA-2275	Contamination Control - Columbia River - June 1965. 15 pp.	07/07/65
RL-REA-2336	Contamination Control - Columbia River - July 1965. 16 pp.	07/21/65

RL-REA-2505	Contamination Control - Columbia River - August 1965. 15 pp.	09/02/65
RL-REA-2572	Contamination Control - Columbia River - September 1965. 17 pp.	09/24/65
RL-REA-2716	Contamination Control - Columbia River - October 1965. 14 pp.	10/29/65

APPENDIX B

HEDR Publications - to Date

HEDR PUBLICATIONS - TO DATE

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

HEDR PUBLICATIONS - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information	Status
Radionuclide Sources and Radioactive Decay Figures Pertinent to the HEDR Project	Heeb, CM	10/89	PNL-7177 HEDR		Sent to TSP 11/1/89
Uncertainties in Source Term Calculations Generated by the ORIGEN2 Computer Code for Hanford Production Reactors	Heeb, CM	12/89	PNL-7223 HEDR		To TSP for review 1/90
Selection of Dominant Radionuclides for Phase I of the HEDR Project	Napier, BA	12/89	PNL-7231 HEDR		To TSP for review 1/90
Atmospheric Transport and Dispersion Modeling for the Hanford Environmental Dose Reconstruction Project	Ramsdell, JV	12/89	PNL-7198 HEDR		To TSP for review 12/89
Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data (DRAFT)	Woodruff, RK	11/89	PNL-SA-17641 HEDR		To TSP for review 12/89
Atmospheric Transport Modeling and Input Data for Phase I of the Hanford Environmental Dose Reconstruction Project	Ramsdell, JV, and Burk, KW	12/89	PNL-7199 HEDR		To TSP for review 12/89
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		To TSP for review 12/89
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 To TSP for review 1/90
Summary of Literature Review of Risk Communication	Byram, SJ	12/89	PNL-7226 HEDR		To TSP for review 1/90
Milk Cow Feed Intake and Milk Production and Distribution Estimates for Phase I	Beck, DM	12/89	PNL-7227 HEDR		

HEDR PUBLICATIONS - TO DATE

Title	Author	Date Cleared	Clearance No.	Additional Information	Status
Estimates of Columbia River Radionuclide Concentrations: Data for Phase I Dose Calculations	Richmond, Walters	1/90	PNL-7248 HEDR		To TSP for review 2/90
Evaluation of Thyroid Radioactivity Measurement Data From Hanford Workers, 1944-1946	Ikenberry, T	1/90	PNL-7254 HEDR		To TSP for review 2/90
I-131 in Irradiated Fuel at Time of Processing From December 1944 Through December 1947	Morgan, LG	1/90	PNL-7253 HEDR		To TSP for review 2/90
Population Estimates for Phase I	Beck, DM	2/90	PNL-7263 HEDR		To TSP for review 2/90
Estimates of Food Consumption	Callaway	2/90	PNL-7260 HEDR		To TSP for review 2/90
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		To TSP for review 2/90
Estimations of Traditional Native American Diets in the Columbia Plateau	Hunn, E. S. and Bruneau, C. L.	8/89	PNL-SA-17296		
A Preliminary Examination of Audience-Related Communications Issues: Hanford Environmental Dose Reconstruction Project	Holmes, C. W.	4/90	PNL-7321 HEDR		To TSP for review 4/90
MESOILT2, A Lagrangian Trajectory Climatological Dispersion Model	Ramsdell, J. V.	4/90	PNL-7340 HEDR		To TSP for review 4/90

APPENDIX C

HEDR Presentation Handouts to the TSP - To Date

HEDR PRESENTATION HANDOUTS TO THE TSP - TO DATE

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

HEDR PRESENTATION HANDOUTS TO THE TSP - TO DATE

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

HEDR PRESENTATION HANDOUTS TO THE TSP - TO DATE

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

HEDR-RELATED PUBLICATIONS

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

HEDR-RELATED PUBLICATIONS

Title	Author	Date Cleared	Clearance No.	Audience	Status
Sensitivity and Uncertainty Analyses for Environmental Dose Reconstruction	Sagar et al.	11/89		Workshop on uncertainty, Nov 13-16, 1989, Santa Fe, NM	Presented 11/89
Reconstructing Food Consumption Habits: The Backcasting Method	Callaway and Carr			Journal of Health Physics	Planning for 1990
Statistical Aspects of Reconstructing the I-131 Dose to the Thyroid of Individuals Living Near the Hanford Site in the mid-1940s	Gilbert, RO	9/89	PNL-SA-17384	Workshop: Statistics of Human Radiation Exposure to Ionizing Radiation, April 2-4, 1990, Oxford, UK	Presented 4/90
Using the Ratio-Correlation Methods for Backcasting	Beck and Swanson	Spring/90		Chapter in applied demog book	To be published Spring '90
Experience in Collaborative Research with Native American Tribes *	Bruneau, CL, and Rhoads, RE			Journal (not yet determined)	Planning for 1990
Uncertainty in 64-66 Data on Fish, Water, and Sediment	Poston, TM			Health Physics Society Mtg,Anahiem, CA	Planning for 1990
Communicating Radiation Dose Estimates to Affected Populations	HEDR Staff			Journal of the Society for Risk Analysis	Planning for 1990
Reconstructing Demography of Native Americans*	Beck, DM, and Bruneau, CL			Journal of Rural Sociology	Planning for 1990
Fish Concentration Ratios	Poston, TM			Journal (not yet determined)	Planning for 1990
Uncertainty Analysis of the Conversion Factor for Historic Iodine-131 Gross Beta Vegetation Measurements	Strenge, DL, et al.	12/89	PNL-SA-17713 HEDR	To be presented at the Health Physics Soc. Mtg, June 24-28, 1990, Anahein, CA	To be presented 6/90

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

HEDR-RELATED PUBLICATIONS

Title	Author	Date Cleared	Clearance No.	Audience	Status
Biases in Measurements of I-131 in Vegetation Sampled from 1945 through 1947 and Reconstructed Conversion Factors	Mart, El and Woodruff, RK	1/90	PNL-SA-17761 A HEDR	Abstract for Health Physics Society Meeting , 1990	Abstract submitted to Society
Reconstruction of Hanford Vegetation Monitoring Data for Dose Reconstruction for 1945-1947	Woodruff, Mart and Hanf	1/90	PNL-SA-17760 A HEDR	Abstract for Health Physics Society Meeting, 1990	Abstract submitted to Society
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

APPENDIX E

Communications Log

COMMUNICATIONS LOG - April 1990

INITIATED BY	CONTACT	AFFILIATION	TYPE	SUBJECT
PNL/W. Haerer	John Till	TSP, Chairman	Telephone	Ongoing discussions re:HEDR Project
PNL/W. Haerer	Bernard Shleien	TSP, Executive Secretary	Telephone	Ongoing discussions re:HEDR Project
TSP/J. Stohr	Bonnie Dennis	PNL	Telephone	Ongoing discussions re: meeting planning
PNL/A. Erickson	Mike Ladd	Umatilla Water Office	Telephone	Cisterns in the late 1940s
PNL/S. Grover	Mrs. Smith	Chinook Water District	Telephone	Chinook Water Supply
PNL/M. Freshley	Stan Davis	TSP	Telephone	Upcoming TSP meeting
PNL/S. Grover	Mrs. Smith	Umatilla Water Office	Telephone	Chinook Water Supply (WA)
PNL/S. Grover	Roselyn Mallory	St. Helens Water Dept.	Telephone	Water Supply for Goble, Deer Island, Warren (OR)
PNL/S. Grover	Marvin Baker	Longview Water Dept.	Telephone	Longview Water Supply
PNL/S. Grover	Doug Rowe	Carrolls County Store	Telephone	Carrolls Water Supply (WA)
PNL/S. Grover	Pat Carlson	City of Kalama	Telephone	Kalama Water Supply (WA)
PNL/S. Grover	Walt Conners	Res. of Westport, OR	Telephone	Westport, OR water supply
PNL/S. Grover	Cindy Howe	Sec., Astoria Pub. Works	Telephone	Svensen, OR water supply
PNL/S. Grover	Mary Jo Rudat	Knappa Water Assn.	Telephone	Knappa, OR and Brownsmead, OR Water supplies
PNL/S. Grover	Jennifer Emery	Cuthlamet Deputy Clerk	Telephone	Cathlamet, WA water supply
PNL/S. Grover	Donna Gedlich	City of Scappoose	Telephone	Scappoose, OR water supply
PNL/S. Grover	Mrs. Carl Nielsen	Res. near Cook, WA	Telephone	Cook, WA water supply
PNL/S. Grover	Dennis Gale	Skamania County PUD	Telephone	Underwood, WA water supply

INITIATED BY	CONTACT	AFFILIATION	TYPE	SUBJECT
PNL/S. Grover	Gerald Payne	"Water Master"/Skamania	Telephone	Skamania, WA water supply
PNL/S. Grover	Darlees Hyke	She & husband own Mayger Dock	Telephone	Mayger, OR water supply
PNL/S. Grover	Kay West	Arlington City Recorders Office	Telephone	1960 population of Arlington, OR
PNL/S. Grover	Craig Riley	Dept. of Health (Spokane)	Telephone	Plymouth, WA water supply
PNL/S. Grover	Becky Johnson	Dept. of Ecology	Telephone	Plymouth, WA water supply
PNL/A. Erickson	Bertha Lincoln	Sec., Granger Irrigation Dist.	Telephone	Cisterns
PNL/A. Erickson	Warren Dickman	Yakima/Fiatan Irrigation Dist.	Telephone	Cisterns used in the late '40s?
PNL/A. Erickson	Richard Haapala	Irrigation Consultant	Telephone	Cisterns used in the late '40s?
PNL/A. Erickson	George Thompson & Freda	Thompson Dairy/Connell	Personal interview	History of Connel Dairy
PNL/C. Bruneau	Dave Bonga	Kalispel Tribe	Telephone	Meeting to introduce new staff
PNL/C. Bruneau	Dick Morrill	TSP	Telephone	Native American/TSP meeting
HARC/E. Liebow	Carol Bruneau	PNL	Telephone	Meeting with Kingsley Palmer
PNL/C. Bruneau	David Ernst	Spokane Tribe	Telephone	Visit to Reservation
Coeur d'Alene Tribe/ Dusty Seyler	Carol Bruneau	PNL	Telephone	Pay ments status
CDC/Mike Sage	Carol Bruneau	PNL	Telephone	Work with Tribes
PNL/C. Bruneau	Donna Powaukee	Nez Perce Tribe	Telephone	Setting up meeting & W.O. #3

INITIATED BY	CONTACT	AFFILIATION	TYPE	SUBJECT
PNL/C. Bruneau	Cara Carroll	Colville Tribe	Telephone	Work Plan
PNL/C. Bruneau	Madeline Queahpama	Warm Springs Tribe	Telephone	HEDR Contract
TSP/Dick Morrill	Carol Bruneau	PNL	Telephone	Native American Update & 4/25 TSP Workshop
PNL/C. Bruneau	Dave Bonga	Kalispel Tribe	Telephone	Meeting on 4/10/90
PNL/C. Bruneau	Delano Saluskin	Yakima Nation	Telephone	HEDR Contract
PNL/C. Bruneau	Dave Bonga, Michael Cardwell	Kalispel Tribe	Meeting	Overview of HEDR PRoject
PNL/C. Bruneau	Bill Burke	Umatilla Tribe	Telephone	Meeting of tribal council
PNL/C. Bruneau	Dick Morrill	TSP	Telephone	Native American Workshop
PNL/C. Bruneau	David Ernst	Spokane Tribe	Telephone	Work Order #3
PNL/C. Bruneau	Alfreda	Yakima Nation	Telephone	HEDR Contract
PNL/C. Bruneau	Dave Bonga	Kalispel Tribe	Telephone	How long to keep HEDR records
CDC/M. Sage	Carol Bruneau	PNL	Telephone	CDC's study w/Native Americans
PNL/ C. Bruneau	Dusty Seyler	Coeur d'Alene Tribe	Telephone	Receipt of payment & proposal for WO #2
PNL/C. Bruneau	Cara Carroll	Colville Tribe	Telephone	Update on Work Order #1
PNL/C. Bruneau	Delano Saluskin	Yakima Nation	Telephone	HEDR Contract
CDC/M. Sage	Carol Bruneau	PNL	Telephone	Meetings with tribes
TSP/D. Morrill	Carol Bruneau	PNL	Telephone	TSP Native American Workshop
PNL/C. Bruneau	Bill Burke	Umatilla Tribe	Telephone	Meeting with Tribal Council

INITIATED BY	CONTACT	AFFILIATION	TYPE	SUBJECT
PNL/C. Bruneau	Dave Bonga	Kalispel Tribe	Telephone	Meeting to introduce new staff
HARC/E. Liebow	Carol Bruneau	PNL	Telephone	Meeting with Kingsley Palmer
PNL/A. McMakin	Mary Lou Blazek	TSP	Telephone	Communications planning
PNL/A. McMakin	Ken Niles	TSP staff	Telephone	Communications planning

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	G. H. Cunningham	K1-59
	J. W. Falco	K6-78
	M. D. Freshley	K6-96
	R. O. Gilbert	K1-85
	W.A. Glass	K1-40
	G.L. Gray	K1-30
	S. P. Gydesen	P8-55
	H. A. Haerer	K6-89
	G.L. Harvey	K1-55
	T.A. Ikenberry	K3-54
	R. C. Liikala	K1-57
	A.H. McMakin	K6-86
	L.G. Morgan	K2-35
	B. A. Napier	K3-54
	T. A. Nelson	K1-55
	R. E. Rhoads	K6-64
	R. L. Skaggs	K6-77
	R. G. Stevens	K6-45
	W. L. Templeton	K1-30
	S. B. Yabusaski	K6-77
	W. R. Wiley	K1-46
	R. K. Woodruff (2)	K5-09
	H.E. Wyer	K1-11
	Project Office Files (5)	K6-89
	Public Reading Room (5)	A1-65
	Records Center	K3-70
	Technical Library (2)	