HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION PROJECT

Quarterly Report

June-August 1993

**Prepared for the Technical Steering Panel
and the Centers for Disease Control and Prevention
under Contract 200-92-0503(CDC)/18620(BNW)**

**Battelle
Pacific Northwest Laboratories
Richland, Washington 99352**

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Compiled By:

S. D. Cannon, Communication Specialist
Hanford Environmental Dose Reconstruction Project

S. M. Finch, Project Administrator
Hanford Environmental Dose Reconstruction Project

Approved By:

D. B. Shieler, Manager
Hanford Environmental Dose Reconstruction Project

Preface

This quarterly report summarizes the technical progress and project status for the Hanford Environmental Dose Reconstruction (HEDR) Project being conducted by Battelle, Pacific Northwest Laboratories (BNW) under contract with the Centers for Disease Control and Prevention (CDC). The Technical Steering Panel (TSP), which is composed

of experts in numerous technical fields related to the project, provides technical direction of the project.

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

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Figure 1. Organizational Structure of the HEDR Project

Table 1. Status of Directives^(a)

		<u>Complete</u>	<u>Ongoing</u>
88-1-a	Classified Documents	x	
88-1-b	Proposals	x	
88-2	Vegetation	x	
88-3	Status Reports	x	
88-4	Ground Water	x	
88-5	Maps	x	
88-6	Resumes	x	
88-7	TSP Comments on Proposals	x	
89-1	Indian Tribes	x (work now directed by TSP)	
89-2	Bioassay Data	x	
89-3	Document Handling	x	
89-4	Reactor Purging	x	
89-5	Modeling Approach	x	
89-6	Meeting Materials	x	
89-7	Technical Communication	x	
89-8	Phase II Planning	x	
89-9	Project QA Plan		x
89-10	Contracts with Tribes		x
90-1	Project Direction (Task Plans)	x	
90-2	Dose Cut-Off Limit	x	
92-1	Demography, Food, and Agriculture Tasks		x
92-2	Dose Code Development		x
93-1	Sensitivity and Uncertainty Analyses		x
93-2	Milk Production and Distribution		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 (HEDR) Project is to estimate the radiation doses that individuals and populations could have received from nuclear operations at Hanford since 1944. The project is being managed and conducted by Battelle, Pacific Northwest Laboratories (BNW) under contract with the Centers for

Disease Control and Prevention (CDC). The independent Technical Steering Panel (TSP) provides technical direction.

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 members representing the states of Oregon, Washington, and Idaho, a representative of Native American tribes, and an individual representing the public.

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

- Source Terms
- Environmental Transport
- Environmental Monitoring Data

- Demography, Food Consumption, and Agriculture
- 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.

The Demography, Food Consumption, and Agriculture 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 is also expected to be developed for several special population groups, including Native American tribes in the study area.

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.

Lifestyle and food habit information will be developed by the Fred Hutchinson Cancer Research Center (FHCRC) for use in the Hanford Thyroid Disease Study (HTDS).

The Environmental Pathways and Dose Estimates Task uses the information produced by the other tasks and organizations to estimate the radiation doses individuals could have received from Hanford radiation.

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

Project Summary

Progress

Figure A.1 in Appendix A shows the status of HEDR Project milestone activities. The following is a summary of activities conducted by HEDR staff from June through August 1993:

- participated in the CDC review of the status of models, computer codes, and other calculational tools to be used for air and river pathway dose calculations. The CDC members involved were pleased with the calculational tool set, computer testing, and data file development (Task 01).
- initiated a new milestone, HEDR Model Validation Results, at the request of the TSP. The results of the validation tests will be reported in this document rather than in the Milestone 0803B model reliability report as originally planned (Milestone 0204C).
- attended the validation of model predictions program (VAMP) meeting at the International Atomic Energy Agency to present an overview of the HEDR Project, focusing on the model validation activities (Subtask 0204).
- published the *HEDR Model Validation Plan*, PNWD-2156 HEDR (Milestone 0205E).
- completed final internal development reviews for the AGGREGATE, SHUFFL, DESCARTES, and CIDER components of the environmental accumulation and dose codes for the air pathway. The air dose code was found to be sound. These reviews mark the official transition from development into configuration management for these components (Subtask 0205).
- completed production runs of hourly iodine-131 air releases from chemical separations plants T and B for the period 1944-1949 (Subtask 0303).
- completed monthly air release estimates for seven radionuclides for T, B, REDOX, and PUREX chemical separations plants from 1944-1972 (Subtask 0303).
- completed production runs of the source term river release model (Subtask 0304).
- published the report, *A Review of Wind Field Models for Atmospheric Transport*, PNWD-2148 HEDR (Milestone 0402A).
- completed formal testing of all RATCHET program elements and participated in an independent review of RATCHET code tests (Subtask 0402).
- completed the software test plan for the Columbia River model and the calibration and validation of the model for unsteady flow hydraulics (flood hydrograph) conditions (Subtask 0404).
- approved the assignment of M. E. Thiede as Environmental Monitoring Data Task Leader. He replaced D. H. Denham, whose work as task leader and author of the recent environmental monitoring data reports is greatly appreciated (Task 05).
- published the report, *Phase I Summaries of Radionuclide Concentration Data for Vegetation, River Water, Drinking Water, and Fish*, PNWD-2145 HEDR (Milestone 0501A).
- incorporated the TSP comments and published the final version of *Estimation of 1945 to 1957 Food Consumption*, PNWD-2113 HEDR (Milestone 0602C).
- completed face finding on the dairy industry in Whitman, Spokane, and Lincoln counties. The interviews were held to elicit information on commercial milk production and distribution (Subtask 0603).
- completed the Columbia River dosimetry (CRD) code development activities (Subtask 0702).
- received comments from the TSP on the previously issued parameter report. In addition, TSP members, G. S. Roessler and B. Shleien, met with HEDR staff and interested members of the public during the week of August 9 to review the iodine-131 ingestion dose factor as documented in the parameter report. The iodine-131 ingestion dose factor was found to contribute most to the uncertainty in air pathway doses. The review was positive, and the TSP members did not recommend changing the dose factor as documented (Milestone 0703B/C).
- prepared preliminary air pathway dose estimates for the Umatilla, Spokane, Colville, and Kalispel tribes (Subtask 0705).
- approved the assignment of P. W. Eslinger as Statistics Task Leader. He replaced R. O. Gilbert, whose work as task leader and whose statistical support is greatly appreciated. R. O. Gilbert will continue to review project documents and be available for consultation. In addition, J. C. Simpson, Analysis of Model Reliability Subtask Leader, will be leaving BNW effective October 12, 1993, but will complete her HEDR Project work with BNW on a subcontract. Her

work in developing PILOT and the sensitivity/uncertainty plan is also greatly appreciated (Task 08).

- terminated development of the PILOT code because its purpose is completed. The code is not a contract deliverable (Subtask 0803).
- revised the records inventory and disposition schedule (RIDS) to include configuration management records and file category changes identified during task file reviews. The configuration management category will have all the HEDR Project calculational tools. This "tool box" will form the basis of the technical turnover package to CDC (Task 09).
- trained the HEDR Project staff who are responsible for configuration management on the HEDR Configuration Management Plan (Task 10)
- declassified 116 Hanford-Site-originated documents, one of which was of potential interest/use to the HEDR Project (Subtask 1102)
- published the letter report, *Fuel-Element Failures in Hanford Single-Pass Reactors 1944-1971*, PNWD-2161 HEDR (Subtask 1103)
- drafted improved procedural guidelines, in support of the U.S. Department of Energy (DOE), which permit TSP members better access to documents of interest or potential use to the HEDR Project (Task 12)

Major Problem Areas or Changes and Action Taken

Because the fiscal year (FY) 1993 revised scope is challenging some subtask budgets, HEDR Project work will be reprioritized. Effective September 1, 1993, planned work on dose-code development, testing, and validation as well as milk model development activities will be reviewed weekly and controlled to contain costs. The tasks/subtasks affected are Technical Integration, Atmospheric Model, Milk Model, Environmental Pathways and Dose Estimates, and Analysis of Model Reliability.

The discussion of sensitivity/uncertainty of the dose calculations, originally planned to appear in the model reliability report (Milestone 0803B), will be incorporated instead into the respective river and air dose reports (Milestones 0705B and 0705C). In agreement with the TSP and CDC, the publication dates for these Milestone 0705B and 0705C reports have both been rescheduled to February 1994. This timing allows the TSP more opportunity to review the validation test results prior to releasing final dose estimates to the public. These dose

estimates will be provided to the TSP for comment in conjunction with the TSP meeting presently scheduled for March 1994. Depending on the extent of the comments, a delay in that meeting could delay the final publication of these dose reports.

Planned Work for the Next Three Months

- contain HEDR Project costs while continuing to meet the scope of work in the contract with CDC (Task 01)
- publish revised integrated task plans (Milestone 0101G)
- write model validation report (Milestone 0204C)
- write key radionuclides released to air, 1944-1991, report (Milestone 0303D)
- write key reactor releases to the Columbia River, 1944-1991, report (Milestone 0304B)
- run RATCHET for HTDS dose calculations (Subtask 0402)
- complete technical work and turn over computed water concentrations to the Environmental Pathways and Dose Estimates Task (Subtask 0404)
- publish the letter report: atmospheric model database status (Milestone 0405B)
- publish the vegetation monitoring data report for 1948-1951 and the bias and data correction report for the same period (Milestone 0502B)
- publish the vegetation monitoring data summaries for 1952-1983 (Subtask 0502)
- write the milk production/distribution report (Milestone 0603D)
- review and evaluate the preliminary data submitted to BNW by Native American tribes (Subtask 0605)
- update the parameters report (Milestone 0703C)

Budget Status

Figure 2 shows the budget status of the HEDR Project. Table A.1 in Appendix A shows FY 1993 costs and budget by task and subtasks. Figure A.2 shows TSP budget status. Figure A.3 shows Native American research budget status.

Capital Status

Nothing new to report.

Figure 2. HEDR Project Budget Status - Battelle Pacific Northwest Laboratories

Acronyms and Abbreviations

AGGREGATE	component of DESCARTES	NFCS	National Food Consumption Survey
AP	Associated Press	NPT	Nez Perce Tribe
BNW	Battelle Pacific Northwest Laboratories	NTIS	National Technical Information Service
CAT	Coeur d'Alene Tribe	OMB	Office of Management and Budget
CDC	Centers for Disease Control and Prevention	PILOT	please iterate lots of times (computer code)
CIDER	calculation of individual doses from environmental radionuclides (computer code)	PNL	Pacific Northwest Laboratory (operated for DOE by Battelle Memorial Institute)
CRD	Columbia River dosimetry (computer code)	QA	quality assurance
CT	Colville Tribe	RATCHET	regional atmospheric transport code for Hanford emissions tracking (computer code)
CTUIR	Confederated Tribes of the Umatilla Indian Reservation	RECIPE	component of DESCARTES
DESCARTES	dynamic estimates of concentrations and accumulated radionuclides in terrestrial environments (computer code)	REDOX	reduction and oxydation (separations process)
DOE	U.S. Department of Energy	RFP	request for proposal
DOE-HQ	U.S. Department of Energy Headquarters	RIDS	records inventory and disposition schedule
DOI	"do" Iodine (computer code)	RL	U.S. Department of Energy Richland Operations
DQO	Data Quality Objective	RM	reactor model (computer code)
FHCRC	Fred Hutchinson Cancer Research Center	SESRC	Social and Economic Sciences Research Center (Washington State University)
FY	fiscal year	SHUFFL	component of DESCARTES
GENII-S	generation II-SUNS (computer code)	SOW	statement of work
HEDR	Hanford Environmental Dose Reconstruction	ST	Spokane Tribe
HEDRIC	Hanford Environmental Dose Reconstruction Integrated Codes	STRM	source term release model (computer code)
HHIN	Hanford Health Information Network	STRRM	source term river release model (computer code)
HNIS	Health and Nutrition Information Service	SUNS	sensitivity/uncertainty system
HTDS	Hanford Thyroid Disease Study	TSP	Technical Steering Panel
IAEA	International Atomic Energy Agency	USDA	U.S. Department of Agriculture
IHS	Indian Health Service	UT	Umatilla Tribe
KT	Kalispel Tribe	VAMP	validation of model predictions program
NAS	National Academy of Sciences	WST	Warm Springs Tribe
NAWG	TSP Native American Working Group	WSU	Washington State University
		YIN	Yakima Indian Nation

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Task 01 Battelle Project Management

Objective

The objective of the Battelle Project Management Task is to provide project planning, control, and management of Battelle dose reconstruction work in accordance with the Centers for Disease Control (CDC) contract and Technical Steering Panel (TSP) technical direction.

Progress

Milestone 0101G - Revised Integrated Task Plans, due April 1993 and rescheduled to September 1993

- revised each of the task's plans according to the new scope realignment agreed to by the TSP and CDC

Milestone 0101I - Project Final Report, due April 1994

- sent a letter to the TSP and CDC defining the content of this report

Other Activities

- participated in the CDC review of the status of models, computer codes, and other calculational tools to be used for air and river pathway dose calculations. The CDC members involved were pleased with the calculational tool set, computer testing, and data file development.
- received praise from DOE Headquarters (HQ) for BNW staffs' involvement in the DOE-HQ Classification Assessment Team review and for the draft document which defines document access procedures. This should help TSP members more readily gain access to documents pertinent to the HEDR Project.
- requested an administrative extension to the CDC contract for processing and shipping records after May 31, 1994. No budget increase is required.
- issued Document Preparation Plan internally to HEDR Staff. This plan streamlines the HEDR document preparation and review process.

- interviewed by Cable News Network (CNN) on the purpose and scope of the HEDR Project study

Major Problem Areas or Changes and Action Taken

Because FY 1993 scope is challenging some sub-task budgets, HEDR Project work will be reprioritized. Effective September 1, 1993, planned work on dose-code development, testing, and validation as well as milk model development activities will be reviewed weekly and controlled to contain costs. The tasks/subtasks affected are Technical Integration, Atmospheric Model, Milk Model, Environmental Pathways and Dose Estimates, and Analysis of Model Reliability.

Effective August 9, S. D. Cannon, who has been the HEDR Communication Specialist, is the new Publications Manager. J. A. Shaw, the former Publications Manager, resigned from BNW. Her work in developing the HEDR document publication plan is greatly appreciated.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

- contain HEDR Project costs while continuing to meet the scope of work in the contract with CDC
- publish the revised integrated task plans (Milestone 0101G) □

Task 02

Technical Integration

Objective

The objective of the 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 0204C - Letter Report: HEDR Model Validation Results, due December 1993

- initiated a new milestone at the behest of the TSP. The results of the validation tests will be reported in this document rather than in the Milestone 0803B model reliability report as originally planned.

Milestone 0205E - Letter Report: Project Model Validation Plan, due April 1993, rescheduled to June 1993 and completed (PNWD-2156 HEDR)

- published the *HEDR Model Validation Plan*. The plan presents a selection of 14 data sets and the calculations and evaluations required to validate the entire HEDR toolbox. A presentation on the validation plan was also given to the TSP at the meeting in Post Falls, Idaho.

Other Activities

- initiated validation efforts. Data sets for all validation tests have been assembled.
- participated in the TSP ad-hoc reviews of the validation plan and proposed dose code parameters. The TSP members involved were pleased with the validation plan and agreed with the parameter values developed for the computer codes. There was concern that the schedule will not allow enough time for the TSP to decide whether the validation work is sufficient for the project to proceed with dose calculations. The validation work schedule has, therefore, been accelerated by incorporating some validation runs in the code testing process, and the dose calculation schedule has been slipped. D. S. Barth, TSP, will submit a written report of the conclusions.

- held a management-level conference telephone call between the CDC, FHCRC/HTDS, and BNW. Agreement was reached on transfer of data between the projects. Exchanged test data files with HTDS three times. Minor incompatibilities were noted, and the files revised. The process for data interchange has been established and works well.
- held a working-level conference call between the CDC, FHCRC/HTDS, and BNW. Several more technical issues were resolved.
- completed code walk-throughs of the DESCARTES and CIDER computer codes. Minor revisions were required, but the major code structure and implementation were found to be adequate. The detailed walk-throughs on AGGREGATE were completed before June. Those for SHUFFL were completed June 16, those for DESCARTES on June 29, and for CIDER on July 7-8, during the CDC programmers' visit.
- completed final internal development reviews for the AGGREGATE, SHUFFL, DESCARTES, and CIDER components of the environmental accumulation and dose codes for the air pathway. The air dose code was found to be sound. These reviews mark the official transition from development into configuration management for these components. The reviews consist of review of the module development folders, review of the developer tests for completeness, and review of the design documentation and users' manuals for completeness and consistency.
- prepared integration test plans on the basis of lessons learned in the final internal development review process for the Hanford Environmental Dose Reconstruction Integrated Codes (HEDRIC) system up to CIDER, and prioritized the tests. Completed testing of the SHUFFL, DESCARTES,

and AGGREGATE codes. Initiated testing of the CIDER code. Participated in a review of the code development, test strategy, and test results.

- attended the VAMP meeting at the International Atomic Energy Agency to present an overview of the HEDR Project (focusing on the model validation activities) and to present the Hanford Scenario (an accidental release of Iodine-131 being used as a test scenario in VAMP). The Hanford Scenario will be used, with initialization, at the Multiple Pathways Working Group meeting the first week of October 1993. The Hanford Scenario will include the resulting data in a separate volume, which must be prepared before the meeting.
- participated in a meeting with TSP members to review parameters for the DESCARTES and CIDER codes in Richland, Washington
- transferred all Technical Integration Task records not in current use to the HEDR Project Office for processing

Major Problem Areas or Changes and Action Taken

As anticipated, the testing process has identified some errors in the implementation of the models in the computer codes. These continue to be corrected as they are identified. This requires continual interaction between the coders and the

testers. The acceleration of the validation efforts will require some reprioritization of funding. This is anticipated to be done by exchanging FY 1993 dose calculation funds with FY 1994 validation funds.

Variance

The cumulative cost overrun was caused largely as a result of the extended testing of the computer codes, as well as the acceleration of the validation activities. The budget deficit for FY 1993 will balance out in FY 1994.

Planned Work for the Next Three Months

- write model validation report (Milestone 0204C)
- coordinate activities with FHCRC
- complete testing of environmental accumulation and dose models □

Task 03 Source Terms

Objective

Source terms are the amount and type of radioactive materials released to the environment. The objective of the Source Terms Task is to 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.

Progress

Radioactive Releases to Air (Subtask 0303)

- completed production runs of hourly iodine-131 air releases from chemical separations plants T and B for the period 1944-1949. The production runs include running the reactor model (RM). The RM runs provide input files to the "do" iodine (DOI) (separations plant dissolver operations) and source term release model (STRM) (hourly iodine-131 release calculations) computer codes. The production runs provide the source term input to the atmospheric transport model RATCHET. RATCHET provides estimates of ground deposition of iodine-131 required for iodine-131 dose calculations. Provided 100 Monte Carlo realizations as well as the "best estimate" deterministic case. This fulfills an internal project milestone which is a prerequisite for completing dose estimates from this source.
- completed monthly air release estimates for seven radionuclides for T, B, REDOX, and PUREX chemical separations plants from 1944 through 1972

Surface Water Releases (Subtask 0304)

- completed production runs of the source term river release model (STRRM). These runs provide monthly release estimates of twelve radionuclides to the Columbia River throughout the operating history of the eight single-pass Hanford production reactors. The estimates

include the contribution to iodine-131 and neptunium-239 from nearly 2000 fuel-element failures that occurred during the operation of the eight production reactors. Provided 100 Monte Carlo realizations for seven key radionuclides as well as the "best estimate" deterministic case. These files form the source term input for the river transport model code CHARIMA. The production of these files fulfills an internal project milestone required to estimate doses from the Columbia River.

Major Problem Areas or Changes and Action Taken

None.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

- write key radionuclides released to air, 1944-1991, report (Milestone 0303D)
- write key reactor releases to the Columbia River, 1944-1991, report (Milestone 0304B)
- assemble information required to complete the Hanford historical releases report (Milestone 0306A) □

Task 04 Environmental Transport

Objective

The objective of the Environmental Transport Task is to 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 groundwater is studied.

Progress

Milestone 0402A - Wind Field Modeling White Paper, due FY 1991, rescheduled to June 1993 and completed (PNWD-2148 HEDR)

- published the report, *A Review of Wind Field Models for Atmospheric Transport*

Milestone 0404C + 0404B - Report on Columbia River Modeling Approach + Letter Report: Columbia River Conceptual Model, due June 1993 and rescheduled to December 1993

- completed the software test plan for the Columbia River model. The channel geometry data file for the Columbia River from Priest Rapids (above the reactors) to river Mile 100 just below Portland, Oregon was completed and checked for accuracy. Testing of the model under steady flow conditions was completed. The tests were conducted for all possible river development conditions for the 1950-1970 time span which involves the presence and absence of dams and the range of expected river discharges. These tests are used to confirm that the model can handle Columbia River hydraulics and to determine the proper river-channel roughness coefficient.
- completed the calibration and validation of the model for unsteady flow hydraulics (flood hydrograph) conditions
- began to modify the Columbia River model to compute decay for the radionuclides of interest and prepare the source-term input files for the eight reactor locations
- attended the July TSP meeting at Post Falls, Idaho. A summary of the work completed to

that time was presented to the TSP Environmental Transport Subcommittee on July 15.

- completed the data file for effluent plume corrections

Milestone 0405B - Letter Report: Atmospheric Model Database Status, due September 1993

- submitted this report to the HEDR Project Office for editing

Other Activities

- completed formal testing of all RATCHET program elements. Revised the RATCHET user's guide.
- participated in an independent review of RATCHET code tests
- continued studies of sensitivity of monthly output from RATCHET to changes in the code parameters.
- completed meteorological database review. Transferred final data to the SUN computer and reran data test and summary programs to confirm successful data transfer. Ran RATCHET with all data through 1949 as final check on the data.
- started model validation runs. Completed 100 realizations of transport and diffusion calculations for the 1949 Green Run. Completed 100 realizations of 1945 and 1946 for comparison of iodine deposition estimates with monitoring data. Began data preparation for modeling the 1983 through 1986 krypton-85 releases.
- participated with TSP members and other HEDR staff in a workshop on model validation

Major Problem Areas or Changes and Action Taken

There have been a few minor problems with the Columbia River software validation sequence work being conducted under Subtask 0404. The result is a slip of schedule by two weeks. This will not impact the TSP validation review scheduled for October.

Variance

The cumulative cost underrun in Subtask 0404 was caused by invoices not yet received and efforts to conserve funds for the experimental and production runs scheduled for September. The current balance of \$90K includes a subcontract commitment of \$47K to Washington State University (WSU).

Planned Work for the Next Three Months

- complete atmospheric model validation computer runs and analyze the results (Subtask 0402)
- complete documentation of the RATCHET tests (Subtask 0402)
- complete model sensitivity/uncertainty tests (Subtask 0402)
- complete supporting documentation for RATCHET input data (Subtask 0402)
- complete documentation of the RATCHET code (Subtask 0402)
- run RATCHET for HTDS dose calculations (Subtask 0402)
- complete technical work and turn over computed water concentrations to the Environmental Pathways and Dose Estimates Task (Subtask 0404)
- draft report on the Columbia River modeling approach (Milestones 0404B+C)
- publish the letter report: Atmospheric Model Database Status (Milestone 0405B) □

Task 05 Environmental Monitoring Data

Objective

The objective of the Environmental Monitoring Data Task is to search, retrieve, 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 the Environmental Pathways and Dose Estimates Task to estimate radiation doses and by the Environmental Transport Task to calibrate and validate computer models.

Progress

Milestone 0501A - Environmental Monitoring Data Final Report, due FY 1991, rescheduled to June 1993 and completed (PNWD-2145)

- published the report, *Phase I Summaries of Radionuclide Concentration Data for Vegetation, River Water, Drinking Water, and Fish*

Milestone 0502B - Letter Report: Vegetation Monitoring Data (1948- 1951), Bias and Data Correction, due February 1992 and rescheduled to September 1993

- separated the vegetation monitoring data and the bias and data correction factors into two reports. Both are presently in the clearance process and will be published in September. The data report will be issued as a background information report with the data itself available through the TSP on a diskette.

Milestone 0502C - Summary Report: Environmental Monitoring Data Located to Date, due September 1993 and rescheduled to December 1993

- submitted an outline of this final report to the TSP
- reviewed data files and tables of bioaccumulation factors to ensure that sample sizes are adequate for appropriate statistical comparisons

Surface Water Monitoring Data (Subtask 0504)

- presented an overview of the Columbia River data at the July TSP meeting in Post Falls, Idaho

Major Problem Areas or Changes and Action Taken

The two Milestone 0502B reports have been delayed by changes in direction as to whether to publish the reports or place them in the HEDR Project Office files to reduce cost. Now that the HEDR Project Office has decided to publish these reports, they will be completed in September.

M. E. Thiede was assigned Leader of the Environmental Monitoring Data Task, effective June 18. Because M. E. Thiede has been the Deputy Task Leader, performing the bulk of the technical work for over a year, he is in a good position to continue the critical work of preparing data files and developing parameter information for dose codes and validation activities. Former task leader, D. H. Denham, will support Thiede through the transition period and provide consultation and review through the end of the contract.

The remainder of the Environmental Monitoring Data Task budget is reserved for completion of the Milestone 0502C report.

This limited budget has delayed drafting the Milestone 0502C report. It is now scheduled to be published in December 1993.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

- publish the vegetation monitoring data report for 1948-1951 and the bias and data correction report for the same period (Milestone 0502B)
- publish the vegetation monitoring data summaries for 1952-1983 (Subtask 0502)
- prepare the environmental monitoring data summary report (Milestone 0502C)
- continue to evaluate the quality of the data for estimating bioaccumulation factors for fish in the Columbia River
- continue to supply environmental monitoring data needs to other HEDR tasks as requested ☐

Task 06 Demography, Food Consumption, and Agriculture

Objective

The objective of the task is to develop the population and agricultural data needed to estimate the population doses that may have resulted from historical releases of radioactive materials from operations at the Hanford Site.

Progress

Milestone 0602C - Food Consumption Report, General Population, due March 1993 and completed (PNWD-2113 HEDR)

- incorporated the TSP comments and published the final version of this report, *Estimation of 1945 to 1957 Food Consumption*

Milestone 0603D - Milk Production/Distribution Report, 1944-1991, due March 1993 and rescheduled to December 1993

- completed fact finding on the dairy industry in Whitman, Spokane, and Lincoln counties
- processed the information collected in the taped interviews for eventual presentation to three experts and ultimately for the TSP to review
- facilitated information collection from the three experts for review and analysis
- incorporated the suggestions of the three experts and D. W. Price of the TSP in the milk study. One of the recommendations involved follow-up interviews to clarify information from Kittitas, Yakima, and Benton counties.
- completed compilation of the RECIPE files to be used as input to DESCARTES

Native American Data (Subtask 0605)

- provided work planning guidance to the Warm Springs, Nez Perce, Coeur d'Alene, Spokane, and Yakima tribes
- met with representatives of the Spokane Tribe to discuss preliminary air pathway dose estimates

- met with representatives from the Agency for Toxic Substances and Disease Registry to brief them on tribal involvement in the HEDR Project
- met with TSP, CDC, and Hanford Thyroid Disease Study representatives to update the status of tribal involvement in HEDR and to plan the July meeting of the Native American Working Group (NAWG)
- attended a meeting of the NAWG in Post Falls, Idaho
- reviewed data summaries submitted by the Kalispel, Colville, Coeur d'Alene, and Nez Perce tribes

Major Problem Areas or Changes and Action Taken

Although the final milk report (Milestone 0603D) will be published later than originally planned, the milk distribution data are available. The delay in the report will, therefore, not impact the dose calculations.

Variance

The cumulative cost overrun was caused by a delay in receiving two invoices.

Planned Work for the Next Three Months

- attend TSP meeting in October on feeding regimes and collect data for the RECIPE component of DESCARTES (Subtask 0603)
- write the milk production/distribution report (Milestone 0603D)

- plan and participate in the training sessions for the NAWG regarding implementation of data collection protocol (Subtask 0605)
- review and evaluate the preliminary data submitted to BNW by Native American tribes (Subtask 0605)
- provide guidance to Native American tribal representatives who plan to come to Seattle, Washington to review unpublished materials stored at the Sand Point Federal Archives facility (Subtask 0605) ☐

Task 07 Environmental Pathways and Dose Estimates

Objective

The objective of the task is to 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 representative individuals, and specific individuals. These calculations include doses via direct transfer of radionuclides from concentrations in air and water to people (such as 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.

Progress

Milestone 0703C - Letter Report: Progressive Revision of Milestone 0703B Key Radionuclide Parameters, due December 1993

- continued work on this milestone. The collection of references and Hanford-specific data for the river environmental accumulation and dose models has been the focus of recent activities. Comments on the previously issued parameter report (Milestone 0703B) were received from the TSP. The TSP comments will be addressed in the re-issued parameter report. The parameters will be single deterministic values that will be used to support the river dose calculations. TSP members, C. S. Roessler and B. Shleien, met with HEDR staff and interested members of the public to review the Iodine-131 ingestion dose factor as documented in the parameter report. The Iodine-131 ingestion dose factor was found to contribute most to the uncertainty in air pathway doses. The review was positive, and the TSP members did not recommend changing the dose factor as documented.

Milestone 0705C + 0705A - Doses from key radionuclides released to air (excluding Iodine-131) 1944-1991 + Report on Iodine-131 doses, 1944-1991, due September 1993 and rescheduled to February 1994

- provided outline of this combined report to the TSP for review during the first week of August

Milestone 0705B - Doses from Key Radionuclide in Columbia River Water, 1950-1991, due September 1993 and rescheduled to February 1994

- provided outline to the TSP for review during the first week of August

Milestone 0705D - Native American Phase I Doses, no due date

- received data sets for tribal dose calculations from six tribes. Dose calculations have been completed for the Umatilla, Spokane, Colville, and Kalispel tribes. On July 26, preliminary dose results for the Spokane Tribe were presented, along with an oral report of the findings, to the tribal council.

Pathways and Dose Code Development and Documentation (Subtask 0702)

- completed the code development activities. Implementation of the DESCARTES and CIDER computer codes continued. Code developers continue to support the testing activities. All formal tests are being completed under the Technical Integration Task. The HEDR configuration management plan is complete and is being implemented. The CRD code has been written and submitted to the Technical Integration Task for the final internal development review and formal testing.

Major Problem Areas or Changes and Action Taken

The discussion of sensitivity/uncertainty of the dose calculations, originally planned to appear in the model reliability report (Milestone 0803B), will be incorporated instead into the respective river and air dose reports (Milestones 0705B and 0705C). In agreement with the TSP and CDC, the publication dates for these Milestone 0705B and 0705C reports have both been rescheduled to February 1994. This timing allows the TSP more opportunity to review the validation test results prior to releasing final dose estimates to the public. These dose estimates will be provided to the TSP for comment in conjunction with the TSP meeting presently scheduled for March 1994. Depending on the extent of the comments, a delay in that meeting could delay the final publication of these dose reports.

Variance

The cumulative cost underrun was caused by holding money in reserve for dose calculations. Preparation for those calculations will begin in September and the calculation work itself in October.

Planned Work for the Next Three Months

- continue environmental accumulation and dose computer coding activities related to code testing (Subtask 0702)
- continue independent testing of the environmental accumulation and dose computer codes (Subtask 0702)
- continue planning and tool development for the dose calculations (Subtask 0705)
- continue Native American interactions needed for dose calculations (Subtask 0705)
- begin preliminary dose calculations for representative individuals and sample HTDS individuals (Subtask 0705) □

Task 08 Statistics

Objective

The objective of the task is to provide statistical support to other 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. Sensitivity analyses results will be used to focus resources where the benefit in terms of accurate dose estimates is greatest. Uncertainty analyses enable the project 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

Milestone 0803A - Letter Report: Project Sensitivity/Uncertainty Analysis Plan, due August 1992, rescheduled to April 1993 and completed (PNWD-2124 HEDR)

- processed and sent to the TSP the report received from F. O. Hoffman, consultant from the Center for Risk Analysis, dated June 14, 1993, on the writings and deliberations of the peer review panel that met May 24-25, 1993 in Richland, Washington to evaluate the sensitivity/uncertainty analysis plan
- facilitated F. O. Hoffman's oral presentation of the peer review panel's report at the TSP meeting in Post Falls, Idaho, on July 16, 1993

General Statistics Support (Subtask 0802)

- provided support to the Source Terms Task staff to estimate releases of radionuclides from Hanford reactors into the Columbia River
- prepared quality assurance (QA) documentation on river data statistical analyses
- conducted analyses of Columbia River fish and water data to estimate fish-to-water concentration ratios
- provided statistical support to the Demography, Food Consumption and Agriculture Task staff to help plan the meeting with three milk distribution experts on July 12-14, 1993
- prepared computer file input to STRRM model

Analysis of Model Reliability (Subtask 0803)

- began conducting statistical analyses for model validation activities, including vegetation data and Green Run data
- met with members of the TSP and CDC to review and discuss validation activities
- conducted code verification testing of the STRRM, DESCARTES, and CIDER codes
- continued QA documentation of final computer runs of the RM code
- continued testing, verifying, and documenting the PILOT code. Effective the end of August, the PILOT code work stopped. PILOT will be used for verification but will not be part of the turn-over package to the CDC.

Major Problem Areas or Changes and Action Taken

As the result of a TSP decision, the more appropriate publication of the model reliability report information (Milestone 0803B) will be for the validation results to be published in a separate validation report (Milestone 0204C) and the discussion of sensitivity/uncertainty to be incorporated into the river and air dose reports (Milestones 0705B and 0705C).

Effective August 26, P. W. Eslinger is the new Statistics Task Leader. P. W. Eslinger is a statistician and computer code developer who joined the HEDR Project last year to lead the air

pathways dose code recovery effort. R. O. Gilbert, the former Statistics Task Leader, will continue to review project documents and be available for consultation. In addition, J. C. Simpson, Analysis of Model Reliability Subtask Leader, will be leaving BNW effective October 12, 1993 but will complete her HEDR Project work with BNW on a subcontract.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

- provide project-wide statistical support for data and information gathering, analysis, interpretation, and reporting
- assist with validation studies
- assist with conducting uncertainty and sensitivity analyses
- assist in the writing of the dose reports (Milestones 0705B and 0705C), including uncertainty and sensitivity analyses, and the validation report (Milestone 0204C)
- finish verification testing of computer codes
- finish QA documentation on Columbia River data statistical analyses
- finish analyses of Columbia River fish and water data to estimate fish-to-water concentration ratios
- finish documenting statistical analyses of diet information
- revise the Iodine-131 Conversion Factor Report (0802A) in response to CDC and TSP comments, if such comments are received □

Task 09 Records Management

Objective

The objective of the Records Management Task is to 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

- received project records from the HEDR Project Office - 587 records totalling 25,051 pages
- verified, processed, and stored project records - 352 records totalling 16,420 pages
- transferred four packages of records to the U.S. Department of Energy Richland Operations (RL) Public Reading Room - 20 records totalling 839 pages
- completed review and collection of the Demography, Food Consumption, and Agriculture Task's records
- revised the RIDS to include configuration management records and file category changes identified during task file reviews. The configuration management category will have all the HEDR Project calculational tools. This "tool box" will form the basis of the technical turnover package to CDC.
- met with C. W. Miller, CDC, to discuss the records turnover package
- met with task leaders and other project staff to review task files for compliance and collect completed records. Collected 35 boxes of records to be included in the project files as a result of this activity.

Major Problem Areas or Changes and Action Taken

None.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

- continue to process incoming project records
- continue to transfer processed HEDR Project records to the RL Public Reading Room
- complete changes to file classifications as identified in the *Quality Assurance Audit Report of the Hanford Environmental Dose Reconstruction Project*, OHE-3, Audit A-92-20 (PNWD-2049 HEDR) □

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

- reviewed and provided comments on the following reports:
 - HEDR Software Configuration Management Plan (HEDR-TP-9)
 - *HEDR Model Validation Plan* (PNWD-2156 HEDR)
 - HEDR Technical Review Process (HEDR-TP-5)
 - *Document Preparation Plan* (PNWD-2170 HEDR)
 - *Fuel Element Failures in Hanford Single-Pass Reactors, 1944-1971* (PNWD-2161 HEDR)
 - *Iodine-131 in Vegetation Collected Near the Hanford Site: Concentration and Count Data for 1948-1951* (Milestone 0502B)
 - *Conversion and Correction Factors for Historical Measurement of Iodine-131 in Hanford-Area Vegetation, 1948-1951* (Milestone 0502B)
- documented progress on the HEDR Project records control issues identified during the 1992 annual audit of the HEDR Project. Developed an action plan to address these records issues, including a schedule for processing Phase I records. Provided monthly progress reports to the audit team.
- trained the HEDR Project staff who are responsible for configuration management on the HEDR Software Configuration Management Plan. The plan includes the procedures for maintaining and documenting all project software and data. Several modifications are being suggested to streamline the approval process. Also provided a one-day workshop on the Software Configuration Management Plan to members of CDC.
- attended the Technical Steering Panel meeting in Post Falls, Idaho, and updated the Technical Integration/Quality Assurance Subcommittee on the recent QA activities
- prepared the HEDR Quarterly Surveillance Plan for the fourth quarter of FY 1993 and submitted the results of the surveillances completed in the third quarter
- completed drafting the HEDR-TP-8, the HEDR Action Tracking System Procedure, and received Project Office review comments
- provided Software QA support in the following areas:
 - continued final internal development reviews of the SHUFFL, AGGREGATE, DESCARTES, and CIDER computer codes
 - developed the Software Requirements Form and Independent Technical Review for testing STRM
 - revised the Software Requirements Form for RATCHET
 - developed the Software Requirements Form and Independent Technical Review for the Source Terms Task
- participated in the review of the dose codes

Major Problem Areas or Changes and Action Taken

None.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

- continue performing oversight activities to check for compliance to HEDR Project technical, QA, and data quality objectives (DQO) requirements.

- finalize the decision plan (HEDR-TP-3) and implement the technical procedure.
- distribute HEDR Conference Record (HEDR-TP-7) and begin utilizing the procedure to document decisions and actions resulting from HEDR meetings
- finalize HEDR Action Tracking System (ATS--HEDR-TP-8) and begin utilizing the system to track the results of the HEDR Project technical staff meetings □

Task 11 Information Resources

Objective

The objective of the Information Resources Task is to work with other tasks to meet information needs, including ensuring that all data referenced in the reports are publicly available and establishing a micro-computer-based tracking system for ready retrieval of historical information.

Progress

- published the letter report, *Fuel-Element Failures in Hanford Single-Pass Reactors 1944-1971* (PNWD-2161 HEDR)
- arranged review of classified documents by TSP members, G. G. Caldwell, M. L. Blazek, and P. D. McGavran, and a review of unclassified documents by TSP member, N. J. Germond, at the Records Holding Area in Richland, Washington. These reviews are part of the TSP Document Review Plan.
- responded to questions from the CDC regarding the denial of a TSP member's access to certain classified documents
- assisted in arranging a review of unclassified documents by N. J. Germond, TSP, at the Records Holding Area in Richland, Washington
- pulled and provided for review several hundred documents for TSP members B. Shleien and M. A. Robkin. Copies of documents of interest were duplicated and provided.
- declassified 116 Hanford Site originated documents, one of which was of potential interest/use to the HEDR Project. Table 11.1 shows the status of declassification to date.
- verified bibliographic references in HEDR reports
- provided the RL Public Reading Room with 19 documents (1,172 pages) of potential interest/use in the HEDR Project. A title listing of these reports is given in Appendix B.

RL Public Reading Room Activity

During June, July, and August, the RL Public Reading Room had 16 HEDR patrons and distributed 63 HEDR reports.

Major Problem Areas or Changes and Action Taken

None.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

- assist M. A. Robkin, TSP member, with information development of radionuclide releases from facilities other than chemical separations plants and reactors located on the Hanford Site
- support visiting TSP members during document search and review efforts
- attend the TSP Public and Communications Subcommittee meetings in October in Pasco, Washington □

Table 11.1. Declassification of Hanford-Site-Originated Documents

<u>Documents Declassified</u>	<u>Hanford Historical</u>	<u>HEDR- Related^(a)</u>
March 1987 - September 1987 (FY 1987)	35	27
October 1987 - September 1988 (FY 1988)	52	37
October 1988 - September 1989 (FY 1989)	186	177
October 1989 - September 1990 (FY 1990)	455	236
October 1990 - September 1991 (FY 1991)	1323	599
October 1991 - September 1992 (FY 1992)	2862	554
October 1992 - August 1993 (FY 1993)	<u>860</u>	<u>86</u>
TOTAL (March 1987 - August 1993)	5773	1716

(a) Reported in HEDR quarterly reports and included in a HEDR master listing in the RL Public Reading Room. Some of these are from the list requested by the TSP and the public.

Task 12 TSP Communications Support

Objective

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

Progress

- drafted improved procedural guidelines, in support of DOE, which permit TSP members better access to documents of interest or potential use to the HEDR Project
- coordinated planning with Cable News Network (CNN) reporters, TSP Communications Subcommittee members, and BNW staff to videotape various HEDR Project activities in the development of a story about Hanford past, present, and currently conducted studies
- provided graphics materials to TSP Communications Subcommittee staff which specifies the HEDR Project study area for use in development of information materials
- provided photo portraits of six TSP members for use in the upcoming quarterly newsletters
- provided review comments to TSP Communications Subcommittee staff for development of a computer modeling fact sheet
- provided reports of interest to the HEDR Project to M. A. Robkin at his request
- attended the TSP Public and Communications Subcommittee meeting in Post Falls, Idaho
- provided information and contact numbers for the HEDR Project and HTDS to N. Rob, Spokane, Washington, and M. Turley, Pasco, Washington.

Major Problem Areas or Changes and Action Taken

None.

Variance

No significant cumulative variance.

Planned Work for the Next Three Months

- attend the TSP Public and Communications Subcommittee meetings in October in Pasco, Washington
- assist the TSP Communications Subcommittee staff in reviewing materials being developed for public distribution □

Appendix A

Milestones, Schedule, and Costs

Figure A.1. HEDR Project Milestones (cont'd)

Figure A.1. HEDR Project Milestones (cont'd)

Table A.1. Cost Summary (Dollars in Thousands)

		June - August 1993		FY 1993 to Date (October 1992 - August 1993)				CDC/TSP		Budgeted	
		Non-		Non-		Cum		Cum Approved FY		Funds FY Labor	
		Labor \$	Labor \$ (a)	Total \$	Labor \$	Labor \$ (a)	Total \$	Planned (b)	Variance	Budget (c)	Remaining
											Hours
HEDR Project Tasks											
Task 01 - Project Management (d)											
0101	Project Planning & Control	105	9	114	497	60	557	540	-17	586	29
0103	Project Administration	85	11	96	309	36	345	359	14	402	57
0104	Project Peer Review	4	-1	3	10	0	10	20	10	24	14
	Subtotal Task 01	194	19	213	816	96	912	919	7	1,012	100
											8,005
Task 02 - Technical Integration											
0201	Tech Planning/Control/Rep	23	0	23	82	1	83	66	-17	68	-15
0204	Proj Tech Cord /Analysis	167	-17	150	195	8	203	139	-64	168	-35
0205	Path & Dose Model Require	9	4	13	133	9	142	142	0	144	2
	Subtotal Task 02	199	-13	186	410	18	428	347	-81	380	-48
											3,146
Task 03 - Source Terms											
0301	Tech Planning/Control/Rep	4	0	4	21	0	21	33	12	37	16
0303	Rad Releases to Air	50	-1	49	155	0	155	148	-7	155	0
0304	Rad Releases to Water	16	4	20	149	27	176	196	20	203	27
0305	Source Term Release Model	0	25	25	0	52	52	39	-13	41	-11
0307	Rad Release Data Avail/Rev	1	0	1	11	0	11	11	0	11	0
	Subtotal Task 03	71	28	99	336	79	415	427	12	447	32
											2,699

Table A.1. Cost Summary (Dollars in Thousands) (cont'd)

FY 1993 to Date (October 1992 - August 1993)											
June - August 1993		Non-				Non-		CDC/TSP		Budgeted	
Labor \$		Labor \$ (a)		Total \$		Labor \$		Total \$		Funds FY Labor	
										Hours	

June - August 1993

FY 1993 to Date (October 1992 - August 1993)

A8

Table A.1. Cost Summary (Dollars in Thousands) (contd)

FY 1993 to Date (October 1992 - August 1993)												
June - August 1993		Non-		Non-		Cum		CDC/TSP		Budgeted		
Labor \$	Labor \$ (a)	Total \$	Labor \$	Labor \$ (a)	Total \$	Planned (b)	Variance	Cum Approved FY	Budget (c)	Funds FY	Remaining	Hours
Task 11 - Information Resources												
1101	4	1	5	17	1	18	16	-2	17	-1	232	
1102	3	0	3	25	1	26	27	1	28	2	691	
1103	8	0	8	41	0	41	37	-4	38	-3	366	
1104	1	0	1	17	2	19	20	1	20	1	54	
Subtotal Task 11	16	1	17	100	4	104	100	-4	103	-1	1,343	
Task 12 - TSP Communications Support												
1201	3	-1	2	8	5	13	13	0	13	0	93	
1203	1	0	1	8	0	8	9	1	11	3	163	
1204	0	1	1	6	2	8	15	7	17	5	246	
Subtotal - Task 12	4	0	4	22	7	29	37	8	41	12	502	
Subtotal, HEDR Project Tasks	881	109	990	3,356	489	3,845	3,941	96	4,278	433	34,058	

Table A.1. Cost Summary (Dollars in Thousands) (contd)

June - August 1993		FY 1993 to Date (October 1992 - August 1993)					
	Non-		Non-		CDC/TSP		Budgeted FY Labor Hours
	Labor \$	(a) Total \$	Labor \$	(a) Total \$	Cum Planned (b)	Cum Approved FY Budget (c)	
					Variance	Remaining	
<u>Technical Steering Panel (e)</u>	0	-1	0	-2	0	0	2
<u>Native American Research (f)</u>	0	36	0	72	176	176	104
TOTAL	<u>881</u>	<u>1,025</u>	<u>3,356</u>	<u>3,915</u>	<u>4,117</u>	<u>4,454</u>	<u>34,058</u>

(a) Non-labor dollars include expenses such as travel, publication production, procurements, and subcontracts.

(b) The monthly planned amounts are given in the cost section of Figures 2, A.2, and A.3.

(c) "CDC/TSP Approved FY Budget" is the FY 1993 realigned budget agreed to in a meeting with the TSP and CDC (Letters from TSP and CDC dated April 22, 1993 and May 27, 1993, respectively).

(d) Project management includes activities such as project control and administration, project communications, subcontract administration, records control, and peer review.

(e) The FY 1993 Technical Steering Panel budget was allocated for the dose code effort.

(f) The FY 1993 Native American Research budget is carryover from FY 1992 and will be used to complete the FY 1992 scopes of work. The FY 1993 contracts for Native American Research will be administered by the CDC and that budget is not reflected here.

1. ID (Contract) Number: DE-AC06-76RLO 1830		2. Program/Project Title: HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION - TSP					3. Reporting Period: June-August 1993			
4a. Participant Name and Address Pacific Northwest Laboratory P.O. Box 999 Richland, WA 99352		4b. Client Name and Address RL Richland, Washington 99352					5. Start Date October 1992			
							6. Completion Date September 1993			

7. FY 93	8. Months	O	N	D	J	F	M	A	M	J	J	A	S	FY94
9. Cost Status														
a. \$ Expressed in Thousands														
b. B&R No. / Subaccount No. 12578 HR0120														
c. FIN No.														
d. Actual Costs Prior Years 3052														
e. FY Budget 0 (a)														
f. Total Budget														
g. FY Funds Auth. 0														
h. Total Funds Auth. 3052 (b)														
		100 50												
Costs	i. Planned	0	0	0	0	0	0	0	0	0	0	0		
	j. Actual (c)	0	0	0	0	4	8	-13	0	0	-1	0		
	k. Variance	0	0	0	0	-4	-8	13	0	0	1	0		
	l. Cum Planned	0	0	0	0	0	0	0	0	0	0	0		
	m. Cum Actual (c)	0	0	0	0	4	12	-1	-1	-1	-2	-2		
	n. Cum Variance	0	0	0	0	-4	-12	1	1	1	2	2		

10. Legend: Planned - - - - - Actual ——— Funds Auth. ——— 90% Funds Spent ▴ Time Now

(a) "FY Budget" reallocated to dose code effort. (b) FY 1988-1993. (c) Actual costs are recorded after invoices are received and processed. Therefore, current month costs may not reflect actual work performed.

11. Name of Project Manager
D. B. SHIPLER

Figure A.2. Technical Steering Panel Budget Status

Figure A.3. Native American Research Budget Status

Appendix B

**Hanford-Site-Originated Documents of
Potential Interest/Use to the HEDR Project -
Placed in the RL Public Reading Room
During June-August 1993**

Appendix B

Hanford-Site-Originated Documents of Potential Interest/Use to the HEDR Project - Placed in the RL Public Reading Room During June-August 1993

HW-73838	FPD Facilities - Radiological Status. 5 p.	05/10/82
HW-75045	Calculated Fission Product Release from PRTR Rupture. 12 p.	09/28/82
HW-89093	Vegetation Corrections for I-131. 2 p.	12/07/49
HW-SA-2730	Dosimetry Investigation of the Recuplex Accident. 32 p.	08/22/82
PNL-8308	Characterization of Radiation Environments at Selected Pacific Northwest Laboratory Facilities. 57 p.	10/05/92
PNL-8397	Cover Sheet for a Hanford Historical Document Released for Public Availability. 2 p.	05/08/88
PNWD-1980-11 HEDR	Hanford Environmental Dose Reconstruction Project Quarterly Report April-May 1993. 50 p.	05/31/93
PNWD-2145 HEDR	Phase I, Summaries of Radionuclide Concentration Data for Vegetation, River Water, Drinking Water, and Fish. 128 p.	06/14/93
PNWD-2148 HEDR	A Review of Wind Field Models for Atmospheric Transport. 30 p.	06/01/93
PNWD-2156 HEDR	HEDR Model Validation Plan. 54 p.	06/01/93
PNWD-2161 HEDR	Fuel-Element Failures in Hanford Single-Pass Reactors 1944-1971. 300 p.	07/01/93
BN-SA-3799 HEDR	Software Requirements Specifications for Columbia River Pathway: Source Term, River Transport Environmental Accumulation and Dose Models. 8 p.	05/01/93
PWM-542	Power Level History of Single-Pass Richland Reactors. 4 p.	01/30/73
RL-SEP-855	Historical Events of the Chemical Processing Department. 20 p.	11/12/65
WHC-EP-0475-1	Facility Effluent Monitoring Plan for the Fast Flux Test Facility. 105 p.	11/01/92
WHC-MR-0388	Compilation of Historical Information of 300 Area Facilities and Activities. 309 p.	12/04/92
WHC-SP-0665-2	Environmental Radiological Survey Summary 100, 200, 300, and 600 Areas. 28 p.	10/16/91
WHC-SP-0665-3	Quarterly Environmental Radiological Survey Summary. 32. p.	01/01/92
UNI-0960	Radionuclide Discharge to the Environment Following January 1978 Fuel Cladding Failure. 4 p.	02/20/78

Appendix C

HEDR Documents to the TSP - June-August 1993

A complete listing will appear in the September-November quarterly report.

Appendix C

HEDR Documents to the TSP - June-August 1993

Title	Author	Date Issued	Publication No.	Additional Information	Status
Phase I Summaries of Radionuclide Concentration Data for Vegetation, River Water, Drinking Water, and Fish	DH Denham et al.	6/93	PNWD-2145 HEDR	Milestone 0501A	Published final
A Review of Wind Field Models for Atmospheric Transport	JV Ramsdell, Jr. ED Skyllingstad	6/93	PNWD-2148 HEDR	Milestone 0402A	Published final
HEDR Model Validation Plan	BA Napier et al.	6/93	PNWD-2156 HEDR	Milestone 0205E	Published final
Fuel-Element Failures in Hanford Single-Pass Reactors, 1944-1971	SP Gydesen	7/93	PNWD-2161 HEDR	Not a milestone	Published final

Appendix D

HEDR Presentation Handouts to the TSP - June-August 1993

A complete listing will appear in the September-November quarterly report.

Appendix D

HEDR Presentation Handouts to the TSP - June-August 1993

Title	Author	Date Issued	Publication No	Additional Information
Status of Technical Work - Hanford Environmental Dose Reconstruction Project	DB Shipley et al.	7/93	BN-SA-3834 S HEDR	Presented at the TSP meeting, July 15-17, 1993, Post Falls, ID
Discussion Items at Technical Steering Panel Subcommittee Meetings	DB Shipley et al.	7/93	BA-SA-3835 A HEDR	Presented at the TSP meeting, July 15-17, 1993, Post Falls, ID

Appendix E

HEDR Open-Literature Publications and Presentations - June-August 1993

This appendix lists publications that present aspects of dose reconstruction in the open scientific literature. TSP approval is not required. A complete listing will appear in the September-November quarterly report.

Appendix E

HEDR Open-Literature Publications and Presentations - June-August 1993

Title	Author	Date Issued	Publication No.	Audience	Status
Environmental Modeling for the Hanford Environmental Dose Reconstruction Project	BA Napier et al.	6/93	BN-SA-3832 HEDR	Fourth Research Coordination Meeting for Validation of Model Predictions Program (VAMP)	Presented July 1993, Vienna, Austria
Science in a Fishbowl: Public Involvement in the Hanford Environmental Dose Reconstruction Project	DB Shipley	7/93	BN-SA-3840 S HEDR	American Nuclear Society Paper Review	Presented July 1993, San Francisco, CA

Appendix F
Communications Log - June-August 1993

Appendix F

Communications Log - June-August 1993

Initiated By/ Affiliation	Contact/ Affiliation	Type	Subject
June 1993			
B Aripa/CT	EB Liebow/BNW	Phone	Data summary
WA Bishop/TSP	SM Finch/BNW	Phone	No cost time extensions for NP, WS, and Yakima tribes
WA Bishop/TSP	EB Liebow/BNW	Phone	Status update on tribal work; meeting scheduled for 6/15
ML Blazek/TSP	OL Harvey/BNW	Phone	Review of classified documents and boxes in early July
K CharLee/TSP Staff	SM Finch/BNW	Phone	Tapes from uncertainty/sensitivity peer review
K CharLee/TSP Staff	OL Harvey/BNW	Phone	Unclassified documents at Records Holding Area; arrangements required to prepare for unclassified and classified documents review in early July; list of classified documents requested for review and TSP's preferred method
G Combs/TSP Staff	SM Finch/BNW	Phone	List of work completed; tapes and notes from uncertainty/sensitivity peer review
G Combs/TSP Staff	OL Harvey/BNW	Phone	Portraits for use in the quarterly newsletter
SM Finch/BNW	K CharLee/TSP Staff	Phone	Tapes from uncertainty/sensitivity peer review
R Haber/Attorney	SP Oydesen/BNW	Phone	Documents and materials regarding the Project
OL Harvey/BNW	ML Blazek/TSP	Phone	CNN's interest in reporting on HEDR activities in early July; involvement in CNN television network reporting of the HEDR Project
P Houck/CDC	EB Liebow/BNW	Phone, Fax	Colville population data and sample size
TA Ikenberry/BNW	B Aripa/CT	Phone	Tribal food consumption data

Initiated By/ Affiliation	Contact/ Affiliation	Type	Subject
TA Ikenberry/BNW	WA Bishop/TSP	Phone	Tribal dose estimates; general population reference individual dose calculations
TA Ikenberry/BNW	MD Sequoachs/YIN	Fax	Tribal food consumption data
TA Ikenberry/BNW	D Ernst/ST	Phone	Tribal dose estimates; initial dose calculations
TA Ikenberry/BNW	JR Wilkinson/UT	Phone, Fax	Tribal dose estimates
EB Liebow/BNW	B Amundson/HTDS	Fax	Summary of 6/9 meeting
EB Liebow/BNW	B Amundson/HTDS H Schuster/Consultant DE Walker/TSP	Fax	Summary of 6/15 meeting
EB Liebow/BNW	B Baker/KT	Phone	Need clarification on data submittal
EB Liebow/BNW	WA Bishop/TSP	Phone	Status update on tribal work; agenda for July NAWG meeting
EB Liebow/BNW	V Bowman/KT	Phone	Questions regarding data summary
EB Liebow/BNW	D Powaukee/NP	Phone	Status update on tribal work
EB Liebow/BNW	M Queahpama/WS	Phone	Appointment to review work status; status update on data collection
EB Liebow/BNW	M Squeochs/YIN	Phone	Appointment to review work status
EB Liebow/BNW	DE Walker/TSP	E-Mail	Additional data on river pathway
D Mayo/HHIN	SM Finch/BNW	Phone	Information on available HEDR documents
PD McGavran/TSP	SM Finch/BNW	Phone	Request for a document; document review; whole body count
K Niles/TSP Staff	GL Harvey/BNW	Phone	Canadian Broadcasting Corporation news team to use TSP videotape in documentary on Hanford; graphics materials of study area; potential support required in the development of information materials leading up to the first of the calendar year
D Powaukee/NP	EB Liebow/BNW	Phone	Tribal data summary
B Shleien/TSP	DB Shipler/BNW	Phone	Vegetation reports; validation sets; visit in August

Initiated By/ Affiliation	Contact/ Affiliation	Type	Subject
JE Till/TSP	DB Shieler/BNW	Phone	B Shleien letter on monitoring data; key air nuclides/majority ok; access records; u/s workshop; releasing information
DE Walker/TSP July 1993	EB Liebow/BNW	Phone	July NAWG meeting; schedule for work under CDC contracts
WA Bishop/TSP	EB Liebow/BNW	Phone	Follow-up from TSP meeting
K CharLee/TSP Staff	GL Harvey/BNW	Phone	Arranging for document reviews
G Combs/TSP Staff	SM Finch/BNW	Phone	Record holder for Fruitland Elementary School students who had whole body counts during 1963-1968
G Combs/TSP Staff	GL Harvey/BNW	Phone	Resumes of members participating in milk distribution meeting; actions and assignments resulting from the recent TSP Communications Subcommittee meeting in Post Falls, ID
SM Finch/BNW	B Shleien/TSP	Phone	Support for the TSP Budget/Fiscal Subcommittee meeting
P Houck/CDC	EB Liebow/BNW	Phone	Invitation to take part in FY 1994 Training
EB Liebow/BNW	WA Bishop/TSP	Phone	YIN work status; presentation at NAWG meeting; comments on "Calendar of Events" memory prompt; Colville work status; presentation at NAWG meeting; presentation at Emergency Training Course
EB Liebow/BNW	D Ernst/ST	Phone	Preliminary air pathway dose estimates
EB Liebow/BNW	DE Walker/TSP	Phone	Follow-up from TSP meeting
EB Liebow/BNW	JR Wilkinson/ CTUIR	Phone	Preliminary air pathway dose estimates
PG McGavran/TSP	SM Finch/BNW	Phone	Whole body count/badge with correct security clearance level
AH Murphy/TSP	JV Ramsdell/BNW	Phone	Sensitivity/uncertainty analysis
K Niles/TSP Staff	GL Harvey/BNW	Phone	Printout of graphic depicting the study area for fact sheet usage

Initiated By/ Affiliation	Contact/ Affiliation	Type	Subject
MA Robkin/TSP	GL Harvey/BNW	Phone	Hard copies of various Hanford documents for review; continue to assist MA Robkin in requesting and receiving documents of interest to the HEDR Project
DB Shipler/BNW	B Shleien/TSP	Phone	Visit to BNW; fax copy of recent list of documents to Reading Room
DB Shipler/BNW	JE Till/TSP	Phone	Tribal doses; Nugyen allegation - air model-IG inquiry; status of codes and source terms; document access
B Shleien/TSP	SM Finch/BNW	Phone	Date to review card catalog in August; revised schedule for August visit
August 1993			
B Aripa/CT	TA Ikenberry/BNW	Phone	Initial dose estimates to Colville Natural Resources Council
DS Barth/BNW	DB Shipler/BNW	Phone	TSP meeting arrangements; update review; compliments on staff support for TSP meetings
WA Bishop/TSP	EB Liebow/BNW	Phone	Summary of ATSDR meeting; status of CDC contracting process with tribes; long-term work plans
K CharLee/TSP Staff	SM Finch/BNW	Phone	Validation schedule
PR Chevalier/BNW and FP Brauer/BNW	BNW/Sequim	Phone	Set up meeting with B Shleien/TSP
PR Chevalier/BNW	CDC/Atlanta	Phone	Badges for CW Miller, CM Wood, and R Whitcomb of CDC for visit to BNW
G Combs/TSP Staff	GL Harvey/BNW	Phone	Data for development of public information materials; access to site photos for HHIN use; photos of two TSP members for use in upcoming TSP communications publications
K CharLee/TSP Staff	GL Harvey/BNW	Phone	Discussed TSP's tracking of specific boxes and documents and efforts to establish a comprehensive list of all TSP reviewed materials
NJ Germond/TSP	GL Harvey/BNW	Phone	Information on litigation review of unclassified documents at the Federal Building
R Heusser/DOE-HQ	SM Finch/BNW	Phone	Document access process

Initiated By/ Affiliation	Contact/ Affiliation	Type	Subject
TA Ikenberry/BNW	B Aripa/CT	Phone	Food consumption data
L Kaplan/HHIN	BA Napier/BNW	Phone	Dominant radionuclides, including sources for Ar-41 to air and Cs-137 to river; pathways of exposure for various radionuclides
EB Liebow/BNW	B Aripa/CT	Phone	Agency for Toxic Substances and Disease Registry meeting in Richland, WA
EB Liebow/BNW	WA Bishop/TSP	Phone	Update on tribes' river pathways input and preliminary dose estimates based on tribal data summaries
EB Liebow/BNW	H Rueben/NPT	Phone	BNW needs instructions from Tribe regarding disposition of data; clarification of age cohorts including in food summaries; copies of letter samples with alternative instructions to BNW
EB Liebow/BNW	DE Walker/TSP	Phone	Update on tribes' river pathways input and preliminary dose estimates based on tribal data summaries; tribal demographic distribution data sources
K Niles/TSP Staff	GL Harvey/BNW	Phone	Maps and information regarding ML Blazek's clearance update
M Power/TSP Staff	GL Harvey/BNW	Phone	Meeting to evaluate BNW's assistance with developing public information materials that complement forthcoming technical documents
MA Robkin/TSP	GL Harvey/BNW	Phone	Fact sheet development on other Hanford releases
GS Roessler/TSP	BA Napier/BNW	Fax	Comments on TSP review of dose parameters
M Saporito/HTDS	BA Napier/BNW	Phone	Procedure for assigning consumption rates of unknown brands of milk from surveys; numerical codes for dairies and creameries
DB Shipler/BNW	DS Barth/TSP	Phone	DS Barth, GS Roessler, and B Shlelen here 8/19 & 20; briefed on HQ document accessibility

Initiated By/ Affiliation	Contact/ Affiliation	Type	Subject
DB Shipler/BNW	B Shleien/TSP	Phone	Set up meeting with JK Soldat to talk about I-129
DB Shipler/BNW	JE Till/TSP	Phone	DS Barth to lead review of validation; tentative meeting date for release of dose reports; TSP/CDC to gather feeding regime information; HQ meeting on document access
B Shleien/TSP	GL Harvey/BNW	Phone	Support for an upcoming visit to review documents/materials
B Shleien/TSP	DB Shipler/BNW	Phone	FP Brauer/BNW gathered Iodine-129 information and other entities and will meet with B Shleien
B Shleien/TSP	ME Thiede/BNW	Phone	Outline of Milestone 0502C report
J Thomas/HEAL	BA Napier/BNW	Phone	Badging for 8/19 TSP validation review
JE Till/TSP	DB Shipler/BNW	Phone	TSP review of validation results
M Turley/Pasco	GL Harvey/BNW	Phone	Provided HEDR and HTDS information and contact numbers for questions and mailing lists

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Corvallis, OR 97330

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Washington State University
Pullman, WA 99164-6210

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Seattle, WA 98195

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J. E. Till
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Chicago, IL 60601

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Washington State Dept. of Health
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Olympia, WA 98504

D. Bonga
Klallam Tribe
P.O. Box 39
Ukiah, WA 99180

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San Jose, CA 95125

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Safety & Environmental
Protection Division
Building 535A
Brookhaven National Laboratory
Upton, NY 11973

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Information
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D. B. Manders
Chronic Disease Epidemiology
Washington State Dept. of Health
M.S. EY-12
1408 State Street
Olympia, WA 98504

L. E. Denham
Centers for Disease Control and Prevention
4770 Buford Highway, N.E.
M.S. F35
Atlanta, GA 30341-3724

R. Mathias, S-1
Department of Energy
Forrestal Bldg. Room 7A-257
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Washington, DC 20585

M. R. Donnelly
Public Health Service
Centers for Disease Control and Prevention
2201 6th Avenue, M.S. RX-22
Seattle, WA 98121

N. Morin
Rocky Flats Program Unit
Environmental Epidemiology Division
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Confederated Tribes of the
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P.O. Box C
Warm Springs, OR 97761

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Confederated Tribes of the
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S. Vendetter
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