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ENGINEERING CHANGE NOTICE

Page 1 of 2

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RIVER PROTECTION PROJECT READINESS-TO-PROCEED 2 INTERNAL INDEPENDENT REVIEW FINAL REPORT

P.S. Schaus, CH2M HILL Hanford Group, Inc.

Richland, WA 99352

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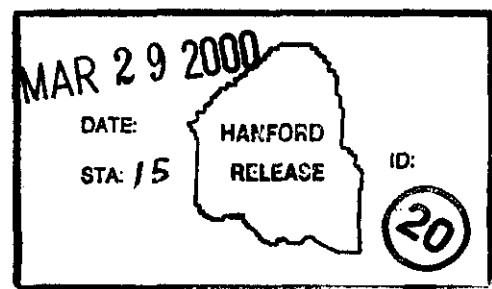
Abstract: This report describes the results of an independent review team brought in to assess CH2M HILL Hanford Group's readiness and ability to support the RPP's move into its next major phase - retrieval and delivery of tank waste to the Privatization Contractor. The team reviewed the documentation, interviewed appropriate CHG personnel, and assessed the status of the construction projects needed to ensure the program's success.

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River Protection Project Readiness-to-Proceed 2 Internal Independent Review Team Final Report

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

CH2MHILL

Hanford Group, Inc.

P. O. Box 1500
Richland, Washington

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC06-99RL14047

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River Protection Project Readiness-to-Proceed 2 Internal Independent Review Team Final Report

P. S. Schaus
CH2M Hill Hanford Group, Inc.

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EXECUTIVE SUMMARY

This report describes the results and conclusions of a team brought in to assess CH2M HILL Hanford Group, Inc.'s (CHG) readiness and ability to support the River Protection Project's move into its next major phase—retrieval and delivery of tank waste to the Privatization Contractor. The Internal Independent Review Team reviewed the Readiness-to-Proceed 2 (RTP-2) documentation, interviewed appropriate CHG personnel, and assessed the status of the construction projects needed to ensure the program's success. The Internal Independent Review Team concluded that CHG has a clear and complete understanding of the work to be accomplished and adequate planning is in place to support Phase 1b-2 of Privatization. CHG has the plans in place to provide the following:

- 1. the necessary infrastructure support to BNFL*
- 2. the high-level waste feed to BNFL when it is needed*
- 3. storage of the immobilized high-level waste and disposal of the immobilized low activity waste.*

The construction projects needed to support Phase 1b-2 are well planned and, with adequate funding, can be in place when needed. The Internal Independent Review Team found some areas of deficiency that CHG management should correct before the RTP-2 memorandum and deliverables are submitted and other areas that, while not crucial to the U.S. Department of Energy's decision on Readiness-to-Proceed, are weaknesses that should be corrected in a longer period to improve the overall program.

The recommendations from the Internal Independent Review Team are discussed in Section 2.0 of this report. Table 1 in Section 2.0 summarizes the 18 recommendations.

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TERMS

AB	Authorization Basis
AIG	Agreement in Principle
BCR	baseline change request
BNFL	British Nuclear Fuels Limited, Inc.
CCN	Change Control Notification
CHG	CH2M HILL Hanford Group, Inc.
CRAD	Criteria Review Assessment Document
DOE	U.S. Department of Energy
DST	double-shell tank
ES&H	environment, safety, and health
FH	Fluor Hanford, Inc.
FSAR	Final Safety Analysis Report
FY	Fiscal Year
HLW	high-level waste
ICD	Interface Control Document
IHLW	immobilized high level waste
ILAW	immobilized low activity waste
IPT	Integrated Product Team
ISMS	Integrated Safety Management System
LAW	low-activity waste
LCC	life cycle cost
LMHC	Lockheed Martin Hanford Corporation
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act of 1970
NS&L	Nuclear Safety and Licensing
ORP	Office of River Protection
RPP	River Protection Project
RTP	Readiness To Proceed
RTP-2	Readiness To Proceed Phase Ib-2
SEMP	System Engineering Management Plan
SST	single-shell tank
TBR	Technical Basis Review
TWRS	Tank Waste Remediation System
TWRS OUP	Tank Waste Remediation System Operation and Utilization Plan
WBS	work breakdown structure
WMH	Waste Management Federal Services of Hanford, Inc.

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RIVER PROTECTION PROJECT READINESS-TO-PROCEED 2 INDEPENDENT REVIEW TEAM FINAL REPORT

1.0 INTRODUCTION

As part of the River Protection Project's (RPP) assessment of contractor Readiness-to-Proceed (RTP), CH2M HILL Hanford Group, Inc. (CHG) conducted an independent review of the process and products it has in place to ensure the success of the overall River Protection Program. This report presents the results of that independent review.

The Internal Independent Review Team reviewed the Readiness-to-Proceed 2 (RTP-2) documentation, interviewed appropriate CHG personnel, and assessed the status of the CHG construction projects in support of the RPP waste feed delivery and privatization project. The goal of the RTP-2 Internal Independent Review Team was to determine that planning was in place such that if the plans were carried out, and with sufficient funding, there was "reasonable" chance for success. To accomplish this, the Internal Independent Review Team looked at the adequacy and completeness of planning; the risks associated with waste retrieval, waste feed delivery, and product storage; and the adequacy of the process to achieve RTP-2.

Overall, the Internal Independent Review Team addressed the question, "Has CHG demonstrated a clear and complete understanding and provided an adequate plan of what needs to be done to deliver waste to the Privatization Contractor (British Nuclear Fuels Limited, Inc. [BNFL]), to store the immobilized high level waste (IHLW) and dispose of the immobilized low activity waste (ILAW), and to provide the site infrastructure needed to support BNFL?"

1.1 BACKGROUND

The U.S. Department of Energy (DOE) has undertaken a major initiative at the Hanford Site to treat and dispose of the high-level waste (HLW) stored in Hanford's underground storage tanks. The program is being managed by DOE's Office of River Protection (ORP). Phase 1a of the initiative consisted of DOE selecting two private companies to develop an approach to treating and immobilizing the HLW, including conceptual design of the necessary facilities (see Appendix A for a description of the activities in the various phases). At the end of Phase 1a, DOE selected BNFL to proceed with Phase 1b-1, a 24-month phase for designing a plant to separate the HLW and low-activity waste (LAW) fractions and to immobilize each fraction by separate vitrification processes. At the end of the 24-month design phase, DOE will decide whether to proceed with the subsequent detailed design, construction, and operations portion (Phase 1b-2) or with another approach to complete Phase 1b-2.

A key element for the overall success of the tank waste treatment and disposal program is the timely delivery of the waste feed to BNFL, the storage of IHLW and disposal of ILAW, and the infrastructure support to the BNFL facilities. These will be accomplished by CHG, the onsite Hanford contractor responsible for managing the tank waste. CHG has established an RTP

Project to plan and track the many activities that must be accomplished to ensure successful waste feed delivery, the storage of the IHLW, and disposal of the ILAW.

In late 1997, Lockheed Martin Hanford Corporation (LMHC), the contractor responsible for managing the tank wastes at that time, performed a self-assessment of their RTP with support to the Privatization Contractor. As part of their self-assessment, LMHC commissioned an Internal Independent Review Team to assess the status of their process and provide recommendations on how it might be improved. That assessment became part of the LMHC Declaration of Readiness-to-Proceed to DOE. The LMHC Declaration, in turn, became part of the overall DOE Declaration of Readiness-to-Proceed in the *Report to Congress: Treatment and Immobilization of Hanford Radioactive Waste*, LIB-0961, in July 1998 (DOE-HQ 1998).

CHG has initiated a second independent assessment of contractor planning for RTP-2. This independent assessment reviewed progress made in three areas by the contractor responsible for RPP since the last independent assessment (December 1997): 1) providing the necessary infrastructure support for privatization, 2) preparing for delivery of waste to BNFL, and 3) storing IHLW and disposing of the ILAW products from BNFL.

1.2 SCOPE OF THE REVIEW

The scope of the RTP-2 review was to assess whether CHG, through the RTP-2 planning process, has demonstrated that they will have the necessary technical basis, management systems, baseline scope, schedule, and cost plans in place to support the RPP mission. The review addressed two aspects of CHG's preparations for RTP-2: 1) whether CHG has the necessary plans, organization, and resources identified to ensure readiness to accomplish the RPP goals; and 2) whether the plans and preparations are achievable.

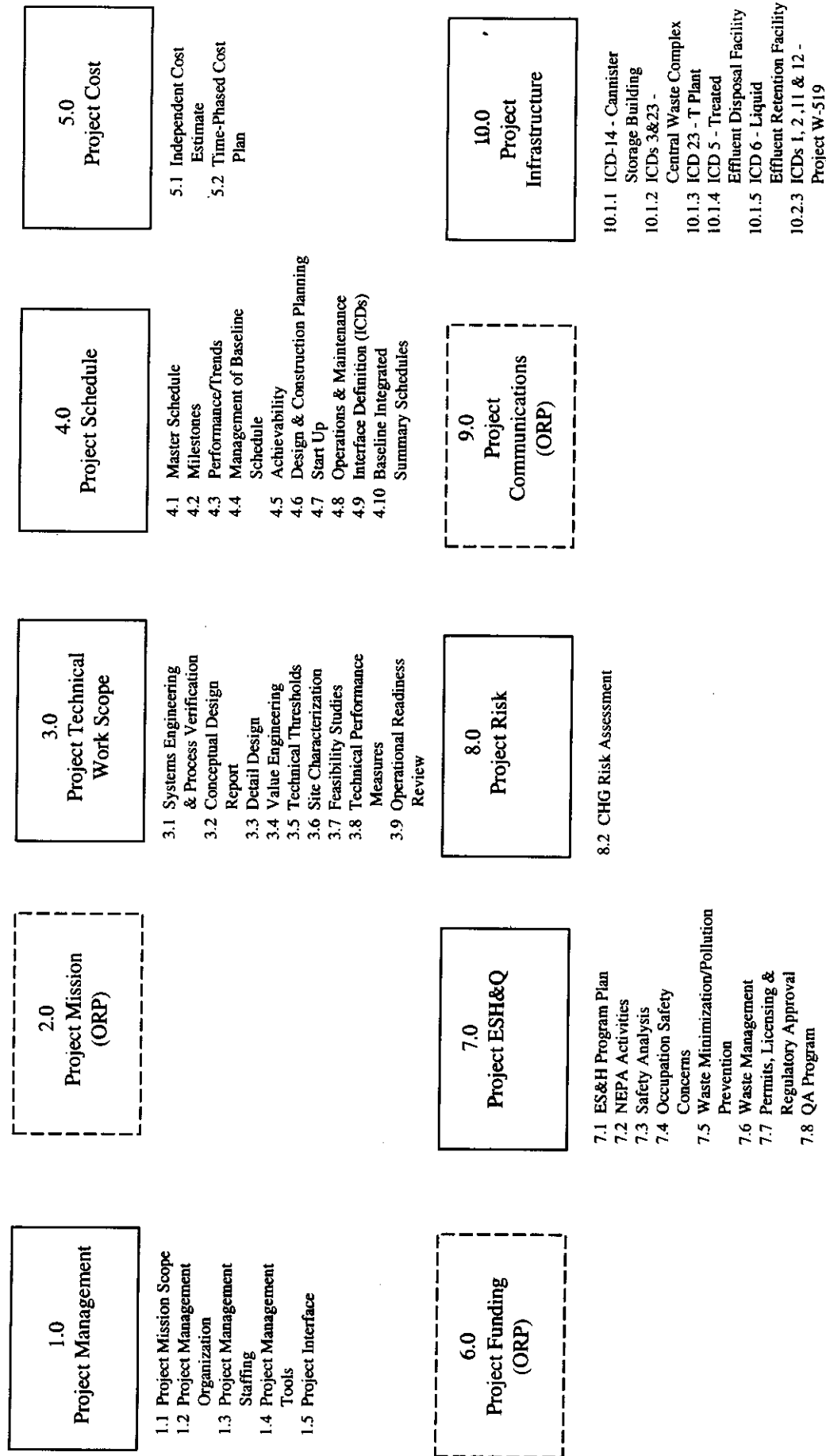
The RTP-2 scope for the review included the following Phase 1b-2 activities:

- Provide the infrastructure (e.g., electrical, water, and roads) needed for BNFL
- Safely retrieve and transfer tank waste to BNFL
- Provide final disposal of ILAW on site
- Provide interim storage of IHLW on site.

1.3 REVIEW APPROACH

A plan was issued outlining the process to be used for the RTP-2 Internal Independent Review Team assessment; that plan is on file. A structured approach was used to assess CHG's preparations on RTP-2 based on DOE-generated Criteria Review Assessment Documents (CRADs). The CRADs identify the criteria area, subcriteria, specific assessment considerations, and DOE expectations for the subject being assessed. The CRADs are broad based and cover similar requirements to those found in DOE Order 430.1, *Life Cycle Capital Asset Management*, and DOE Order 425.1, *Startup and Restart of Nuclear Facilities*. The CRADs were grouped into ten subject areas, as shown in Figure 1.

Figure 1. Assessment Areas and Assigned CRADs.



Three of the ten subject areas (2.0 - Project Mission, 6.0 - Project Funding, and 9.0 - Project Communications) were not reviewed because they were not applicable to CHG. Additionally, specific subcriteria in other CRADs (e.g., 8.1 - DOE Risk Management) that are outside the scope of the team assignment were not reviewed.

The CRADs were used to assess specific CHG documentation related to the overall CHG mission or to the RTP-2 effort. This documentation will be part of the CHG Memorandum of Readiness-to-Proceed to be submitted to ORP on April 24, 2000. The documentation to be submitted as part of the RTP-2 memorandum and deliverables includes the following:

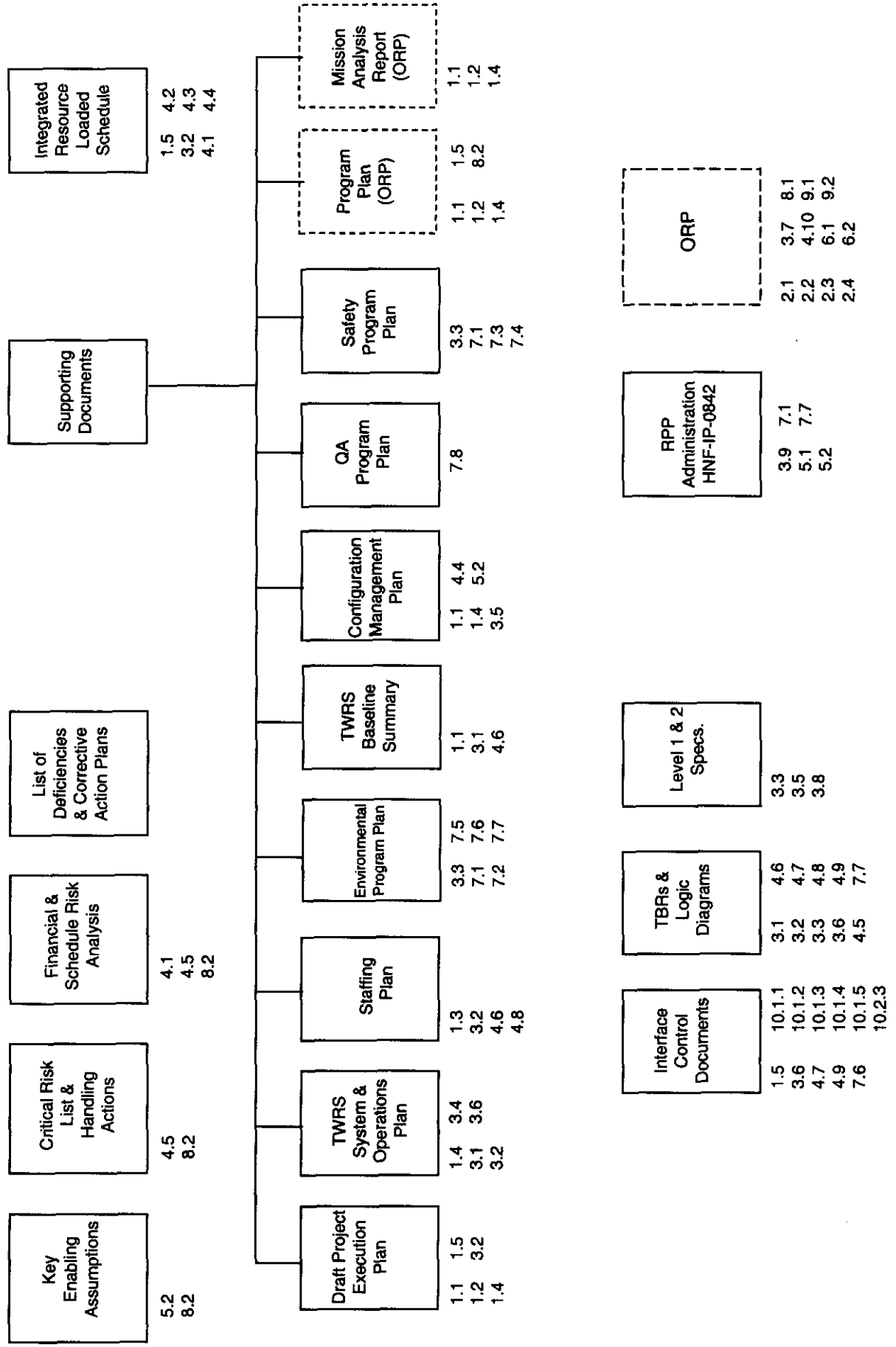
- Technical, schedule, and cost baseline documentation meeting the Readiness Criteria for Independent Evaluation, including the following:
 - Integrated Resource-Loaded Schedule
 - Key Enabling Assumptions
 - Critical Risk List and Handling Actions
 - Financial and Schedule Risk Analysis Demonstrating 80% Confidence Level
- Tank Waste Remediation System Operation and Utilization Plan
- Quality Assurance Plan
- Staffing Plan
- RPP Configuration Management Plan
- RPP Technical Baseline Summary Description
- RPP Environmental Program Plan
- Project Execution Plan (Draft)
- RPP Safety Program Plan
- RPP Mission Analysis Report (ORP document)
- RPP Program Plan (ORP document).

Two documents necessary to complete the program, the RPP Mission Analysis Report and the RPP Program Plan, are being written by ORP and were not reviewed in this independent assessment of RTP-2. In addition, the Staffing Plan, Configuration Management Plan, the Project Execution Plan, and the Financial and Schedule Risk Analysis are still being prepared by CHG and were not available for review.

The individual CRADs were matched with the documents to be provided as part of the submittal of the RTP-2 memorandum and deliverables, as shown in Figure 2. Figure 2 also shows the CRADs that are specific to the DOE ORP and therefore were not part of the review.

The RTP-2 Internal Independent Review Team reviewed the available documents against the criteria and expectations in the CRADs. The team recognized that this was a review of work-in-progress and, as such, the documentation to be reviewed was not always finalized. Document authors and CHG personnel were also interviewed, as appropriate, to assess their understanding of the plans and requirements necessary to support Phase 1b-2 Privatization. The personnel interviewed by the RTP-2 Internal Independent Review Team are listed in Appendix B. Results and recommendations are documented in the CRAD, "Basis for Assessment."

Figure 2. RTP-2 Internal Independent Review Team Criteria Mapping.



In addition to the reports listed above, the RTP-2 Internal Independent Review Team reviewed other selected CHG documents and a sampling of selected Technical Basis Reviews (TBRs) (logic activity packages) that were developed as part of the detailed planning process.

Conclusions and recommendations were compiled for each of the seven CHG areas shown in Figure 1 and were used to prepare the final report for CHG, summarizing the review, evaluating CHG's preparations for supporting Phase 1b-2 privatization, and providing recommendations on how their preparations could be strengthened. The conclusions and recommendations are discussed in Section 2.0.

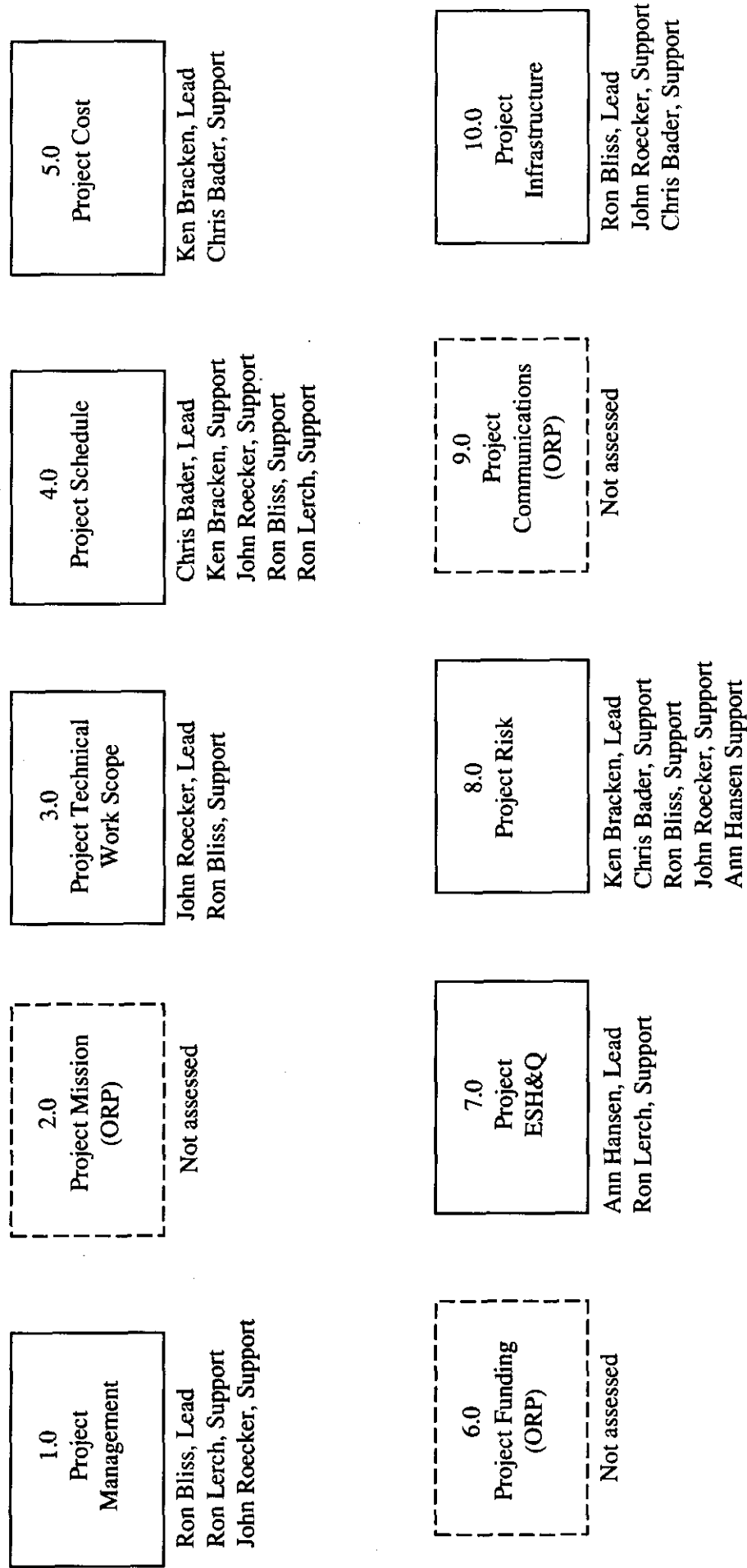
1.4 INTERNAL INDEPENDENT REVIEW TEAM

Members of the team were selected for their expertise in the review areas, as shown in Figure 3. All RTP-2 Internal Independent Review Team members were trained on the use of the CRADs and disposition of comments. Five of the six Internal Independent Review Team members had participated in the RTP-1 assessment of LMHC (December 1997). The team consisted of the following members:

- Dr. Ronald E. Lerch, Chairman – Dr. Lerch has over 30 years experience at Hanford and served as the Deputy Director for the Tank Waste Remediation System (TWRS) Project from 1994 to 1996.
- Mr. Chris Bader – Mr. Bader has over 15 years of directly related experience at Hanford and at the Rocky Flats Site, including serving as Deputy Assistant Manager of DOE's TWRS Project from 1994 to 1996.
- Mr. Ronald J. Bliss – Mr. Bliss has over 23 years experience at Hanford and at the Idaho Site, including serving as Vice President and Manager of Transition Projects at Hanford from 1992 to 1996.
- Mr. Kenneth W. Bracken – Mr. Bracken has over 10 years of related experience at Hanford, including serving as Deputy Assistant Manager for Disposal for DOE from 1991 to 1995.
- Dr. Ann H. Hansen – Dr. Hansen has over 25 years of related experience at various DOE facilities and played a key role in developing the TWRS Basis for Interim Operations in 1995 and 1996. She was also the mentor for the TWRS Final Safety Analysis Report (FSAR) and one of the interfaces with the DNFSB and DOE-RL on licensing issues.
- Mr. John H. Roecker – Mr. Roecker has over 39 years of related experience accumulated in private industry and at the Hanford and Rocky Flats Sites, including serving as Director of Research and Engineering and Director of Defense Waste Management and Decontamination and Decommissioning Operations at Hanford from 1977 to 1987.

Complete resumes of the Internal Independent Review Team members are on file.

Figure 3. RTP-2 Internal Independent Review Team Assignments.



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2.0 RESULTS AND CONCLUSIONS

The RTP-2 Internal Independent Review Team performed a review of the seven CHG areas shown in Figure 1. In addition, the team looked at the various documents to be submitted with the RTP-2 memorandum and deliverables (see Section 1.3). Two of the documents are still being prepared by ORP and therefore were not reviewed by the RTP-2 Internal Independent Review Team. In addition, the Staffing Plan, the RPP Configuration Management Plan, the Project Execution Plan, and the Financial and Schedule Risk Analysis were not available for review. In some cases, the products being reviewed were "works-in-progress." As such, some of the Internal Independent Review Team results and conclusions are based on an early state of production. The final documents are expected to be much more comprehensive and complete.

2.1 OVERALL SUMMARY

The Internal Independent Review Team concluded that CHG has a clear and complete understanding of the work to be accomplished and adequate planning is in place to support Phase 1b-2 of Privatization. CHG has the plans in place to do the following:

1. Provide the necessary infrastructure support to BNFL.
2. Provide the HLW feed to BNFL when it is needed.
3. Provide for storage of the IHLW and disposal of the ILAW.

The construction projects needed to support Phase 1b-2 are well planned and, with adequate funding, can be in place when needed. The Internal Independent Review Team found some areas of deficiency that CHG management should correct before the RTP-2 memorandum and deliverables are submitted and other areas that, while not crucial to the DOE decision on Readiness-to-Proceed, are weaknesses that should be corrected over a longer period to improve the overall program.

The Internal Independent Review Team found several areas that were commendable and exceeded expectations. These included the following areas:

1. The work being done by construction Project Management and Tank Waste Operations to integrate the construction and operating interfaces within the tank farms is highly commendable and should increase efficiency and reduce cost. Tying all activities involving elements of different projects (e.g., Projects W-314 and W-211) together to achieve a particular outcome, then doing one Operational Readiness Review for the entire activity, is commendable. Developing resource-loaded field execution schedules to accomplish the work should reduce the overall staffing requirements.
2. The recent operational successes provide confidence that waste retrieval and waste feed delivery can be accomplished on schedule to support Phase 1b-2 of RPP. Example successes include waste sluicing from high heat Tank C-106, pumping of waste from

flammable gas watch-list Tank SY-101, continued interim stabilization of the single-shell tanks (SSTs), and the cross-site transfer of waste from Tank SY-102 to Tank AP-107.

3. All tank farm construction projects are on schedule according to the Fiscal Year (FY) 2000 Multi-Year Work Plan (CHG 1999a).
4. Having a dedicated Retrieval Support Operations organization working directly with the Project Management organization to ensure that early operational considerations are factored into the projects is commendable. In addition, putting the Projects Management and Tank Waste Retrieval and Disposal Program under one organization responsible for product delivery should improve efficiency.
5. Identification of the CHG internal technical baseline has improved considerably since RTP-1. For example, HNF-SD-WM-SEMP-002, *Tank Waste Remediation System Systems Engineering Management Plan* (SEMP) (Peck 1998) has been issued, clearly defining the hierarchy of technical baseline documents. Also, the work flow-down process of ORP's technical requirements for use in waste feed alternative studies has been defined and is well understood by cognizant engineering personnel. The technical requirements ultimately result in Levels 1 and 2 system and subsystem specifications, project requirements, and tank specific flow sheets. In addition, CHG has issued a technical baseline summary description that defines all RPP areas and their associated technical baseline documents. This summary description provides an excellent roadmap for locating technical baseline documents for various aspects of the project.
6. The Nuclear Safety and Licensing (NS&L) function has made major strides since the RTP-1 review. At that time, TWRS was operating under an interim Authorization Basis (AB) with the FSAR (LMHC 1999a) completion being a very high priority. Since then, the order-compliant FSAR has received DOE approval and has been implemented. There is a disciplined methodology for modifying the AB to incorporate new projects as well as to make major basic improvements (e.g., using a source term that more accurately represents the tank wastes). If realized, the AB amendment schedule will ensure that appropriate approvals are received to support the storage and retrieval mission schedules. In addition, NS&L has implemented a hazard controls optimization program with substantial input from operations personnel that could enable operability improvements in HNF-SD-WM-TSR-006, *Technical Safety Requirements* (Noorani 1997).
7. Maintaining the traceability of the life cycle cost (LCC) estimate since the highly successful independent cost estimate validation of the tank farms in 1996 is highly commendable. Using "bridging" baseline change requests (BCRs) to keep the baseline current is a very effective tool for explaining the changes in the LCCs from year to year.
8. The scheduling system, methodology, level of planning detail, and the ability to roll up schedule and status information from the detail to summary levels are impressive. Most of the scheduled events have been developed using an engineered-activity-based methodology. The detail level used for planning has provided an excellent basis for estimating costs, evaluating project performance, and providing confidence that CHG will be able to accomplish the milestones on time.

The Internal Independent Review Team also identified several areas that need improvement and did not meet expectations. These need CHG attention and include the following:

1. The Level 1 system specification for double-shell tank (DST) waste feed retrieval and delivery, HNF-SD-WM-TRD-007, *System Specifications for the Double-Shell Tank System* (Grenard and Conrads 1998), has been issued as Rev. E, Draft, dated September 1998. The Internal Independent Review Team considers it unacceptable that such a critical technical baseline document is still in "draft" 18 months later. In addition, 11 subordinate Level 2 subsystem specifications have not even been issued in draft in the Hanford document system. This is considered a serious deficiency because the requirements contained in these Level 2 specifications may have to be applied retroactively to projects currently in design or construction. An example of this is the potential change in piping pressure from 400 to 450 psi, which could have serious cost and schedule implications on Project W-314. The Internal Independent Review Team recommends that CHG immediately address this area and resolve any technical issues delaying these specifications from being issued.
2. CHG lacks direct involvement in the interface integration product teams and in the development and approval of the Interface Control Documents (ICDs) (BNFL 1999). For example, the ORP issued several Revision 4 ICDs (BNFL 1999) (e.g., solid waste, infrastructure, and waste feed delivery) unilaterally without CHG personnel reviewing the final versions. The Internal Independent Review Team recommends that CHG play a role equivalent to that of BNFL in developing ICDs. The team recommends that CHG and BNFL jointly develop and approve ICDs and that ORP, as the contracting authority for both contractors, signify its agreement by a concurring signature. Consideration should also be given to adding the ICDs to the CHG contract in the same way they are included in the BNFL contract.
3. Tracking and managing ORP "what-if" requests and changes in technical requirements are not as timely or controlled as well as they could be, and this leads to confusion within CHG on actions required or authorized. The Internal Independent Review Team recommends that an upgraded process be put in place to compile and disseminate the documents, letters of direction, and other formal direction that specify programmatic and technical requirements and request "what-if" studies.
4. The CHG team has done a good job of identifying which LMHC and Fluor Hanford, Inc. (FH) procedures, plans, etc., are applicable to the new organization. However, many of these documents are out of date; and the hierarchical structure of the entire policy, management plan, management directive, and procedure system is ill-defined and difficult to understand. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.
5. The CHG Administrative Procedure, HNF-IP-0842, Volume IV, Rev 1a, Section 2.6, "Risk Management" (CHG 1999e), establishes the procedural steps for performing risk management as part of the systems engineering activities. The objectives are to reduce program and project risk to an acceptable level through the process steps of risk assessment, analysis, and handling and to communicate information to decision makers

about what risk-handling actions should be taken to ensure program success. This review found inconsistent compliance, both with the requirements for a risk assessment and with the depth and type of analyses, and found deviations in format, content, and methodologies. It appears that the risk assessment activities may be conducted at such a low level that they are cumbersome as a management tool. The Internal Independent Review Team believes in the importance of the risk assessment activity and recommends that CHG management review its degree and depth of application to the RPP.

6. CHG does not have a top-level Environmental, Safety & Health (ES&H) Program Plan. Rather, CHG has plans addressing the various aspects of the ES&H function. Under the current conditions, the interrelationship of these various programs cannot be determined and the manner in which they come together to form the foundation of the CHG Integrated Safety Management System (ISMS) is not described. The Internal Independent Review Team recommends that the ISMS Plan (RPP-MP-003, CHG 1999c) be revised to serve as the top-level programmatic document. The deficiencies in the ISMS description, such as failure to identify safety and health programs and measures necessary for the actual performance of the work, should be corrected before the RTP-2 memorandum and deliverables are submitted.

2.2 RTP-2 SUBJECT AREAS REVIEWED

The RPP is an ongoing project with an appropriate management system and an established project management structure. In assessing the progress of the project, various policies and procedures were reviewed, key program documents were reviewed, and many interviews were conducted to provide the basis for the assessment. Where key CHG documents were not available for review, such as the Staffing Plan, RPP Configuration Management Plan, the draft Project Execution Plan, and the Financial and Schedule Risk Analysis, the process for preparing the documents was reviewed.

2.2.1 Project Management

2.2.1.1 Progress Since RTP-1

The overall RPP organization has effectively transitioned through a very turbulent period in the last two years since RTP-1. In October 1999, LMHC became a prime contractor to DOE, reporting to a newly formed DOE Field Office, ORP, instead of a subcontractor reporting to FH. In December 1999, the LMHC contract was purchased by CH2M Hill, Inc., and a new management team began operation under CHG auspices. These transitions have occurred without major confusion to the overall tank waste management and waste feed delivery programs. One reason for this success is the continuing presence of many of the key managers and technical personnel assigned to this program.

The baseline planning and control system described in HNF-IP-0842, *RPP Administration*, Volume VII, Section 1.2, "Baseline Planning and Control" (CHG 1999e), has matured and provides an excellent basis for planning and controlling work at its execution level. The TBR

process has become a very detailed and effective way to capture all work required to carry out ongoing tank farm operations and the overall waste retrieval program. The TBRs also provide an effective mechanism for capturing resource needs for the entire project.

The bridge BCRs have become an excellent tool to capture and track changes in the program baseline from one fiscal year to the next.

An extensive system of policies, management directives, and procedures has been implemented and managed throughout the significant organizational changes described above, but additional work is required to establish an understandable hierarchy of procedures for the long term.

2.2.1.2 RTP-2 Assessment of Project Management

The top-level documents for the overall RPP have now become the ORP's responsibility to prepare and maintain. In particular, ORP is preparing a new Mission Analysis Report and a new Program Management Plan for the RPP. These documents are scheduled to be issued before the RTP-2 memorandum and deliverables are submitted but were unavailable for review by the Internal Independent Review Team.

CHG is presently preparing a Project Execution Plan to document how the Mission Analysis Report and Program Management Plan will be implemented by all organizations involved in carrying out the RPP mission. This document was unavailable for review by the Internal Independent Review Team.

A very effective baseline planning process is in place and carries detailed planning to the very lowest levels. This system provides an effective way for rolling up resource requirements, both manpower and funding, necessary for successfully completing the RPP mission. These individual TBR manpower resource requirements are then summarized at the project level in a Staffing Plan. This Staffing Plan is now being developed for the submittal of the RTP-2 memorandum and deliverables but was unavailable for review.

One concern in the area of staffing is BNFL's contract requirement for CHG to provide training to the initial cadre of operations personnel for operating the privatized facilities. This important area should become the subject of an ICD so that a specific understanding of the deliverable can be provided to CHG personnel assigned this responsibility.

The entire ICD process has matured substantially since the review for RTP-1. However, CHG is not yet as involved in the overall process as they should be. During the process to revise and issue updated ICDs last August, several Revision 4 ICDs (e.g., solid waste, infrastructure, and waste feed delivery) were issued without CHG personnel having the opportunity to review the final drafts. Lack of CHG involvement in the ICD process was an issue in the RTP-1 assessment two years ago. LMHC made the following response to that issue:

“Per current direction from FDH and LMHC contracts management, contract modifications, rather than MOU’s, will be used to formally document changing requirements imposed by the Privatization Contractors.”

This has not happened, and CHG is not yet a signatory to the individual ICDs. Instead, the ICDs are agreed to between ORP and BNFL. CHG senior management should attempt to reach agreement with ORP that CHG will approve each ICD along with BNFL. The Internal Independent Review Team also recommends that the ICDs become a part of the CHG contract in the same way they are a part of the BNFL contract and that the ICDs be placed under strict configuration management. At a minimum, revisions to ICDs should be subjected to the BCR process.

The next general update of the ICDs is occurring now for release in February 2000. CHG should be signing each of the final documents during this update process. As stated above, an ICD should also be initiated to cover the requirement for CHG to provide training to the initial cadre of BNFL operators, maintenance personnel, and operations engineers.

The Integrated Product Team (IPT) process is also an excellent way to enhance proper interface control between BNFL and CHG. To date, IPT teams exist in the following areas: interface, project management, ES&H, business and finance, and technical. Until recently, CHG personnel have not been routinely invited to the technical IPT meetings. Some late feedback during the review indicates that this involvement is improving at the working level. While there is CHG involvement in the IPTs, it needs to be strengthened.

In the area of project management tools, a large number of policies, management plans, management directives, and procedures were reviewed. The CHG team is to be commended for transitioning these documents through the two significant contract changes that occurred in the past few months. Two management directives, RPP-MD-033, *Transition of FH Procedures, Plans, Policies and Management Directives to LMHC* (LMHC 1999b), and RPP-MD-039, *Transition of FH Procedures, Plans, Policies and Management Directives to CHG* (CHG 1999f), describe how the PHMC procedures, plans, directives, and policies would transition to LMHC as a prime contractor and then to CHG. RPP-MD-033 (LMHC 1999b) also states that all RPP-PRO procedures would be mapped over into the administrative procedures manual, HNF-IP-0842, *RPP Administration* (CHG 1999e). This is an excellent idea that will help improve the overall procedure system. However, because of the rapid transition, a number of procedures are out of date, and the overall hierarchy of procedures is extremely hard to understand. A decision also needs to be made relative to what documents need to be updated before the RTP-2 memorandum and deliverables are submitted.

2.2.1.3 Recommendations

The Internal Independent Review Team has the following recommendations:

- R-1-1 CHG management should work to obtain agreement from ORP management that CHG will be signatory to all ICDs. Consideration also should be given to adding the ICDs to

the CHG contract in the same way they are included in the BNFL contract. This action should be completed before the RTP-2 memorandum and deliverables are submitted.

- R-1-2 An ICD should be developed as soon as possible to cover the requirement in the BNFL contract for CHG to train the initial cadre of BNFL operations personnel. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.
- R-1-3 The CHG involvement in the technical IPT needs to be strengthened. The informal discussions presently occurring between BNFL and CHG personnel are excellent but need to be formalized via the technical IPT. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.
- R-1-4 A hierarchical definition document should be established that defines the various types of documents (e.g., policies, management directives, plans, and procedures) and their hierarchical relationship to one another. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.
- R-1-5 An action needs to be taken to define which plans, policies, directives, and procedures should be updated before the RTP-2 memorandum and deliverables are submitted. Updating the plans is a post RTP-2 activity.

2.2.2 Project Mission Scope

This area was not assessed. The CRADs address ORP responsibilities.

2.2.3 Project Technical Work Scope

2.2.3.1 Progress Since RTP-1

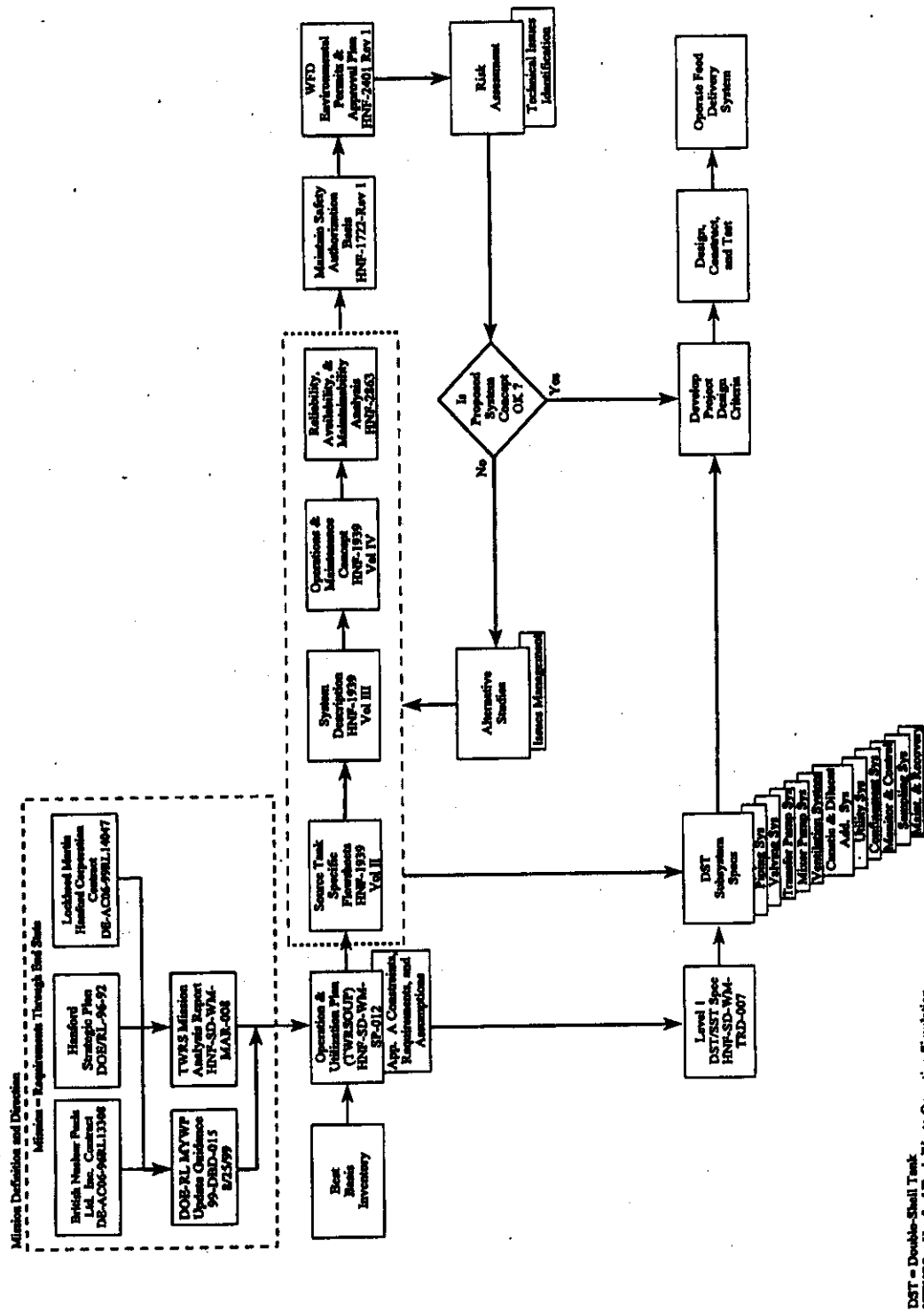
Since completion of RTP-1, CHG has made significant progress in the systems engineering and technical baseline development areas. CHG is to be commended for the progress made since RTP-1 when the systems engineering process and the establishment of a technical baseline were identified as areas of considerable concern and confusion.

CHG has prepared and issued a systems engineering management plan, *River Protection Project Systems Engineering Management Plan* (SEMP) (Peck 1998). The SEMP clearly describes the engineering process to be followed in developing the technical baseline and identifying documents required at the various levels to establish a technical baseline. The SEMP was last updated in January 1998.

In addition, CHG has developed a "Retrieval Engineering Work Flow for Waste Feed Delivery" diagram (Figure 4) showing the flow down of technical requirements from ORP to CHG for use in alternative generation analyses, trade studies, and technical baseline documents. This diagram is an excellent tool for explaining the system engineering process and its application to waste feed retrieval and delivery.

Figure 4. Retrieval Engineering Work Flow for Waste Feed Delivery.

Retrieval Engineering Work Flow for Waste Feed Delivery



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During RTP-1, LMHC used the *Tank Waste Remediation System Operation and Utilization Plan to Support Waste Feed Delivery* (TWRS OUP), HNF-SD-WM-SP-012 (Kirkbride et. al. 1999), as the document to collect all the waste feed alternative trade studies. It provided an engineering analysis for the planning baseline and presented alternative cases that could potentially improve the program baseline. The TWRS OUP has continued to be used and is considered an essential piece of the work required in establishing a technical baseline. The most recent update of the TWRS OUP (Kirkbride et. al. 1999) is Rev. 1, dated May 1999.

Following completion of the TWRS OUP, the engineering flow follows a dual path. The first path leads to the development of tank specific flow sheets; system descriptions; operation and maintenance concepts; and reliability, availability and maintainability analyses. These studies provide the technical basis for specific tank retrievals and transfers and are documented in HNF-1939, *Waste Feed Delivery Technical Basis* (Orme 1999), and HNF-2863, *Waste Feed Delivery System Phase I Preliminary Reliability, Availability, and Maintainability Analysis*, Rev. 1 (Carlson 1999). These documents provide a sound technical basis for planning and executing waste feed retrieval and delivery.

The second path out of the TWRS OUP (Kirkbride et. al. 1999) leads to establishing the technical baseline. Level 1 system specifications and Level 2 subsystem specifications document the technical baseline. The status of the Level 1 and 2 specifications is considered deficient and will be discussed in Section 2.2.3.2 of this report.

Considerable progress has also been made in developing construction project design criteria, completing definitive design, and initiating some construction. However, this progress may be negated if emerging Level 2 specification technical requirements need to be retroactively applied. This will be discussed further in Section 2.2.3.2.

Another area where CHG is to be commended is in developing the HNF-1901, *RPP Tank Waste Retrieval and Disposal Mission Technical Baseline Summary Description* (Dovalle 1999). This document identifies technical baseline documents for all areas, including infrastructure, and the waste retrieval and disposal mission. The document provides an excellent roadmap and resource for identifying the technical baseline documents for the program

2.2.3.2 RTP-2 Assessment of Project Technical Scope

As indicated in Section 2.2.3.1, the RPP SEMP (Peck 1998) has been issued and is under change control. The Internal Independent Review Team review indicates that the document is adequate for RTP-2 with some minor editing and updating. CHG should review and update the document to correct for the contractual and organizational changes that have occurred since RTP-1. In addition, HNF-3384, *Waste Feed Delivery Program Systems Engineering Implementation Plan* (O'Toole 1999), should be updated to describe the current retrieval engineering workflow shown in Figure 4, and Figure 4 should be incorporated into HNF-3384.

Establishing the CHG technical baseline begins with identifying the ORP technical requirements. As of this review, the ORP technical requirements exist in many documents, some as formally issued and controlled technical or contractual documents and some as less formal and loosely

controlled letters and budget update guidance documents. Included in the list of documents that provide ORP technical baseline requirements are the following:

- *Hanford Strategic Plan* (DOE/RL-96-92)
- BNFL, Inc. Contract DE-AC06-96RL13308 (DOE-RL 1998)
- CHG Contract DE-AC06-99RL14047 (DOE-RL 1997)
- ORP Multi-Year Work Plan 2000 Budget Update Guidance documents, dated June 21, 1999 (French 1999), and August 25, 1999 (Erickson 1999)
- ORP Authorization to Proceed, dated November 17, 1999 (Short 1999)
- Baseline Change Request, BCR-RPP-00-003 (CHG 1999b)
- ORP/BNFL ICDs (BNFL 1999)
- DOE and State of Washington regulations and requirements.

As the preceding list demonstrates, the documents that identify the ORP technical requirements baseline are numerous, come in various forms, and are under varying degrees of configuration management.

Action is required by CHG in conjunction with ORP to remedy this situation. The ORP Project Integration Office has recently initiated a task to collect all ORP technical requirements into a computer database using a computer software system called Dynamic Object Oriented Requirements System. This appears to be a step in the right direction. However, it appears that the focus of the effort is collecting all requirements rather than the requirements that are meaningful to those that are managing and directing the RPP. If this effort continues in its current direction, it will result in a computer database containing considerably more than 10,000 requirements and will be of little use for managing the program. Alternatively, a tiered database could be considered such that one tier contains key and critical requirements that drive the overall program and are of use to management, and the second tier contains the thousands of requirements that the engineer writing a specification or the operator preparing a procedure need to consider.

Another area within the ORP technical requirement process requiring attention by both CHG and ORP is the ICD process. Currently, only BNFL and ORP approve BNFL ICDs containing technical requirements for CHG. CHG is not an approval participant. This has resulted in some interface requirements being changed unilaterally without agreement of affected CHG personnel. Clearly, the physical interfaces are between the two contractors, BNFL and CHG. Therefore, the approval signatures on the ICDs should be CHG and BNFL, with a concurrence signature by the ORP. This was previously identified as recommendation R-1-1.

The dissemination, tracking, and management of ORP technical study requests and technical requirement changes are not timely and are not well controlled within CHG. This leads to confusion within CHG. The current process appears to be oriented toward maintaining the work authorization paperwork rather than providing timely and clear direction to the operating and technical staff on actions required to implement and execute the request or direction.

As a possible approach, the following process could be used. Each time new written direction either changing a baseline requirement or requesting a study is received from the ORP, the affected program manager would issue a Change Control Notification (CCN) giving specific direction on what action CHG personnel should take to implement the change. This approach would clearly define the programmatic changes (i.e., policy, procedure, cost, and schedule) and the technical baseline changes. ORP would send all requirements and direction to the CHG Contracting Officer, who would assign a CCN form and would control the internal CHG implementation process. The CCN, along with the ORP document, would then be passed on to the affected CHG program managers, who would work with the Contracting Officer to develop an implementation action plan. Any verbal requests will be formalized by attaching a CCN. One CHG action that would be required of such a CCN would be to obtain ORP formal approval of that request. A log of CCNs could also be established and used by CHG management for tracking internal actions in response to ORP requests or directions.

The comparable Level 1 specification for SST waste feed has been issued (HNF-3912, Grenard 1999). However, it is incomplete with many "TBDs" ("to be determined") and incomplete sections. Also, because the SST system specification was issued after the latest revision of the *RPP Tank Waste Retrieval and Disposal Mission Technical Baseline Summary Description* (HNF-1901, Dovalle 1999), it is not included in HNF-1901 as a baseline document. Although this may seem like a minor deficiency, it means that the very document (i.e., HNF-1901) that is intended to be the "roadmap" for baselines documentation is incomplete and out of date. The baseline summary description document should be maintained current at all time to be useful.

In addition, 11 subordinate Level 2 subsystem specifications have not even been issued in draft form and put into the Hanford document system. CHG has an engineering process under way to evaluate the application of new requirements to existing systems and projects. However, the timing on releasing specifications is considered a serious deficiency because the requirements contained in these Level 2 specifications may have to be retroactively applied to projects currently in design or construction. An example of this is the potential change in piping pressure from 400 to 450 psi, which could have serious cost and schedule impacts on Project W-314. The Internal Independent Review Team recommends that CHG immediately address this area and resolve any technical issues delaying the release of the Level 2 specifications.

During the interviews conducted to assess CHG's RTP-2 status, it was observed that several individuals used drawing K216A, Rev E2, "200 E Tank Farm DOE-RL 4/1/99 Guidance Case 3 Waste Transfer Lines" (Galbraith 1999), to define the overall waste feed and delivery system scope and specific construction project work scopes. The drawing currently exists as an uncontrolled draft, yet it defines the Level 1 system specification technical baseline. The drawing should immediately be issued as a technical baseline drawing, put under change control, and incorporated in the DST Level 1 specification.

CHG is to be commended for working closely with BNFL to develop an RPP integrated flow sheet. CHG and BNFL have jointly agreed on a software system and a hardware platform for developing the integrated flow sheet and for performing associated calculations. Each contractor has procured identical software and hardware, and in the near future both will be able to run identical system flow sheet simulations. The ORP Project Integration Office has recently taken note of this work and has given incremental funding to CHG to assist BNFL in developing computer programs for their flow sheet unit processes. All individuals are to be commended for this effort, and its continuation is highly encouraged because it is vital to the success of the overall program.

2.2.3.3 Recommendations

The Internal Independent Review Team has the following recommendations:

- R-3-1 CHG should review and update the SEMP (Peck 1998) to make corrections for the contractual and organizational changes that have occurred since RTP-1. In addition, the Waste Feed Delivery Program System Engineering Implementation Plan, HNF-3384 (O'Toole 1999), should be updated to describe the current retrieval engineering workflow shown in Figure 4, and Figure 4 should be incorporated into the document. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.
- R-3-2 In conjunction with the ORP, CHG should work to streamline identification and control of the ORP technical requirements. A two-tiered technical requirements database should be considered, where key program and technical requirements that are important to managing and directing the project are listed in the first tier and those technical requirements that flow down to definitive designs and procurement specifications are developed as a second tier. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables but should not be delayed.
- R-3-3 To improve timeliness and clarity of management direction, CHG should review its current procedures for disseminating technical "what-if" requests and technical requirement changes to staff for execution and implementation. A suggested approach is contained in the body of this section. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.
- R-3-4 CHG engineering management should review the current overall status of the Level 1 and 2 specifications and develop an action plan to resolve remaining technical issues that will lead to the near-term release of all Level 1 and 2 specifications as baseline documents. The action plan should be developed and in place before the RTP-2 memorandum and deliverables are submitted. The actions themselves need to be completed as soon as possible after the RTP-2 memorandum and deliverables are submitted.
- R-3-5 CHG should put drawing K216A (Galbraith 1999) under configuration control and should incorporate it in the DST system specification, HNF-SD-WM-TRD-007

(Grenard and Conrads 1998). This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.

2.2.4 Project Schedule

2.2.4.1 Progress Since RTP-1

The planning and scheduling of the RPP have matured since the last review. The total program is planned on a rolling wave concept, whereby the first five years are planned and scheduled in considerable detail (11,000 tasks) and the balance of the program through year 2064 is defined but not planned to the same level of detail (7000 tasks). The scheduling system has the capability to roll up the detailed schedules to summary levels that are consistent with the work breakdown structure and to provide critical path analysis.

Within each area of the RPP, risk assessments have been performed to identify where potential issues may develop. Senior managers use the risk list to manage the project. Cost and schedule risk analyses have been performed for CHG's retrieval and disposal activities based on the FY 2000 Multi-Year Work Plan (CHG 1999a). Additional consistency is needed for the risk analysis.

2.2.4.2 RTP-2 Assessment of Project Schedule

CHG has developed a well-defined plan to accomplish the RPP's objectives. The level of planning and scheduling of project activities, combined with the Internal Independent Review Team's review of the elements of work with project and operations personnel, has provided confidence that CHG understands the task and has provided for the complexities involved. A review of the construction projects supporting retrieval, infrastructure, and the waste storage indicates that CHG is on schedule to support the project mission and that adequate float exists to handle most construction unknowns.

The RTP-2 Internal Independent Review Team identified several issues that could impact the RPP overall project schedule. The first issue is the technical requirements to support BNFL. These requirements are reflected in the ICD document (BNFL 1999). CHG does not always review the changes to the ICDs and is not in the approval process for those changes. The ICDs need to be placed under strict configuration management. All changes must be reviewed and approved by all parties to ensure that changes to the requirements are integrated and balanced to meet overall RPP program objectives. This was previously identified as recommendation R-1-1.

Several technical issues that could impact the construction projects were discussed with the Internal Independent Review Team. For example, changing requirements in transfer pipe pressure ratings and DST annulus space ventilation are two significant issues that need to be resolved because project design(s) are well along and may require rework if the current requirements are revised.

2.2.4.3 Recommendations

The Internal Independent Review Team has the following recommendation:

- R-4-1 CHG should resolve open technical issues, such as transfer pipe pressure ratings and DST annulus space ventilation, which can potentially impact construction projects. (See also recommendation R-3-4.) This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.

2.2.5 Project Cost

2.2.5.1 Progress Since RTP-1

At the time of the RTP-1 Internal Independent Review Team review, a financial analysis document was not available for review because it was in the development stage. However, much of the information that formed the basis for the financial analysis was available in draft form for review. A preliminary cost baseline for Phase 1b had been developed. In addition, integrated, logic-based, cost-loaded network schedules were developed. A preliminary Staffing Plan was in place by Common Occupational Code System, by project breakdown structure level, and by company for the duration of Phase 1b.

Shortly after the independent review was completed, HNF-2017, *RPP Retrieval and Disposal Mission Phase 1 Financial Analysis* (Wells 1998), was completed. Its purpose was to provide a quantitative and qualitative cost and schedule risk analysis for the TWRS Retrieval and Disposal Mission Initial Updated Baseline (Swita, Lewis, and O’Niell, 1998). CHG is commended for thoroughly evaluating the executability of the baseline and the path forward for risk mitigation.

In 1996 DOE-Headquarters, Field Management, completed an independent cost estimate review, which validated the TWRS Project. External reviews since then have concluded that CHG has maintained the integrity of the RPP LCC. Comments have been generic and administrative, and any LCC differences have been reconciled in the Multi-Year Work Plan. Many improvements have been recognized in the documentation, detail, and validation of the information supporting the cost and schedule baseline. A particular noteworthy accomplishment is the ability to maintain the LCCs current to the approved project scope and schedule by using a “bridge” BCR.

2.2.5.2 RTP-2 Assessment of Project Cost

If CHG continues the same level of performance as noted above, they should have little, if any, difficulty maintaining the integrity of the RPP LCC baseline. Consideration should be given to updating the Financial Analysis report (Wells 1998) completed in January 1998 as part of the Financial and Schedule Risk Analysis to be submitted to ORP as part of the submittal of the RTP-2 memorandum and deliverables.

2.2.6 Project Funding

This area is applicable to ORP and was not assessed by the Internal Independent Review Team.

2.2.7 Project ES&H and Quality Assurance

2.2.7.1 Progress Since RTP-1

The NS&L function has made major strides since the RTP-1 review. At that time, the TWRS was operating under an interim AB, with the FSAR (LMHC 1999a) completion being a very high priority. Since then, the FSAR has received DOE approval and has been implemented. The disciplined methodology for modifying the AB that was not yet proven at the time of the RTP-1 assessment is now well tested and proven. This methodology permits new projects as well as major basic improvements (e.g., using a source term that more accurately represents the tank wastes) to be incorporated into the AB in a timely manner, which should ensure that the appropriate approvals are received to support the storage and retrieval mission schedules. In addition, NS&L has implemented a controls optimization program with substantial input from operations personnel that could enable operability improvements in the Technical Safety Requirements (Noorani 1997).

The overall quality of many of the ES&H documents has improved. Program compliance was demonstrated by assessing plans, descriptions, etc., against the appropriate DOE Order, regulation, etc. Programmatic quality improvements have also occurred. For example, the job hazard analysis effort is now automated and coupled to a lessons' learned database.

2.2.7.2 RTP-2 Assessment of ES&H and Quality Assurance

The CRADs in the area of ES&H and quality assurance required assessing the ES&H Program Plan; National Environmental Policy Act of 1970 (NEPA) activities; safety analysis; occupational safety concerns; waste minimization and pollution prevention; waste management; permits, licenses, and regulatory approval; and the quality assurance program.

The ES&H and quality assurance program is defined in the following documents:

- HNF-SD-WM-PLN-114, Rev. 4., *Description of TWRS ISM System to Meet Expectations of HNF-MP-003*, (Milliken 1999a)
- RPP-MP-003, Rev. 0, *Integrated Environment, Safety and Health Management System Plan* (CHG 1999c)
- HNF-IP-0842, Vol. IX, Rev. 2c, Section 1.1, "RPP Safety Services Program Plan" (CHG 1999e)
- HNF-SD-HSP-002, Rev. 3, *Tank Farms Health and Safety Plan* (Butler 1999)
- HNF-MP-5184, Rev. 1, *Radiation Protection Program* (Demers 1999)
- HNF-IP-0842, Volume XI, *Quality Assurance 1.1*, Rev. 2 (CHG 1999e)

- RPP-MP-0599, *Project Hanford Quality Assurance Program Description*, Rev. 0 (CHG 1999d).

These documents were reviewed for conformance to the appropriate regulations (e.g., 10 CFR 835 and DOE Acquisition Regulation 970.5204-2) and found to be compliant. However, the review was unable to determine the top-level document that provides a programmatic description of the CHG ES&H program.

Discussions with CHG staff produced the understanding that HNF-SD-WM-PLN-114, *Description of TWRS ISM System to Meet Expectations of HNF-MP-003* (Milliken 1999a), will serve the function of the top-level safety and health document once DOE has approved it. The current version, Rev. 4, contains some deficiencies that should be remedied if this document is to be the top-level document. For example, Section 4.4.3, "Perform Work Safely," discusses pre-job briefings, field prerequisite verification, maintenance of configuration, work area assessments (i.e., the Management Assessment Program), and work package closeout. The measures to support the actual performance of the work are not addressed. Furthermore, the radiation control program is not referenced in Section 4.4.4, which identifies the implementing mechanisms for actual work performance. These oversights need to be corrected before the RTP-2 memorandum and deliverables are submitted.

According to the ISMS, the necessary suite of standards, regulations, and DOE Orders have been identified in the DOE-approved *Tank Waste Remediation System Standards/Requirements Identification Document*, HNF-SD-MP-SRID-001 (Milliken 1999b). Furthermore, both the ES&H and ISMS programs have been implemented.

CHG now has an DOE Order-compliant, approved AB to support current tank farm operations. There is a well developed strategy for modifying the AB to accommodate the changes necessary to support waste feed delivery operations; the strategy relies on the Unreviewed Safety Question process to identify the needed changes. The AB program is well planned and adequately staffed to develop not only the necessary AB changes to support the evolving tank farms mission but also to improve the AB by incorporating the expanding state of knowledge and understanding of the tank wastes and tank farm operations.

In the area of occupational safety, CHG has implemented an occupational safety and health program that complies with the Occupational Safety and Health Act of 1970, the American Conference of Governmental Industrial Hygienists, and the National Institute of Occupational Safety and Health requirements. The job hazard analysis function is automated and takes advantage of lessons learned in assessing job hazards and developing ways to control, mitigate, or prevent those hazards.

DOE has retained responsibility for NEPA compliance. However, CHG has a system in place and trained staff to support DOE through at least an annual review of their activities for NEPA compliance. This system is adequate to ensure continued NEPA compliance even though CHG has chosen not to designate a NEPA compliance officer.

CHG maintains a listing of environmental permits in HNF-2401, *Waste Feed Delivery Environmental Permits and Approvals Plan* (Tollefson 2000), which is reviewed and updated

quarterly. In addition, detailed procedures require that the need for either additional permits or modifications to existing permits be assessed as part of the ongoing project management activities.

CHG has in place a waste management plan that applies to all CHG activities, including construction, start-up, and operations. The CHG waste management program has a defined process to ensure that wastes are handled appropriately.

Finally, the CHG quality assurance program was assessed for compliance with the items stated in the CRAD: 1) completion of a Quality Assurance Plan and a plan to amend it to address waste feed delivery, 2) implementation of the Quality Assurance Plan and development of auditable quality assurance programs and procedures, and 3) procedures for surveillance and audits in place. The Quality Assurance Plan is found in Volume XI, Section 1.1 of HNF-IP-0842 (CHG 1999e). The Quality Assurance Plan is augmented by the Quality Assurance Program Description found in RPP-MP-0599 (CHG 1999d). The Quality Assurance Program Description, which is an FH document, has been adopted by CHG and will be converted to a CHG document. Both documents were found to be compliant with 10 CFR 830.120, "Quality Assurance Requirements"; have DOE approval; and have been implemented. However, it is understood that the Quality Assurance Plan will be revised before the April 24 submittal. The revised document was unavailable for review. The CHG quality assurance program is in place, except for the required independent audit and assessment function. However, adequate plans and provisions have been made to establish this function and ensure that it complies with the statutory requirements.

2.2.7.3 Recommendations

The Internal Independent Review Team has the following recommendations:

- R-7-1 An ES&H Program Plan should be created that addresses all aspects of ES&H and defines the relationships between the various programs (e.g., occupational safety and radiation safety). This action should be completed before the RTP-2 memorandum and deliverables are submitted.
- R-7-2 The *Integrated Environment, Safety and Health Management System Plan* (CHG 1999c) should be revised to discuss the role of safety and health programs, particularly those applicable to the actual performance of work in the ISMS. This action should be completed before the RTP-2 memorandum and deliverables are submitted.

2.2.8 Project Risk

2.2.8.1 Progress Since RTP-1

The CHG risk-handling process has matured significantly since the 1997 RTP-1 review. A formal procedure is in place (CHG 1999e), which provides guidance on identifying risks, assessing probabilities (likelihood and consequences), and developing risk-handling actions.

RPP system engineering risk management data sheets have been developed to guide CHG personnel in implementing risk management and are available through CHG's system engineering web site. Key program and support personnel, who are members of performing organization planning teams, have been identified to receive risk management training. Risk identification begins at the TBR level of a project and rolls up to higher project/management level. A CHG RPP Critical Risk List is in place and managed by CHG. Key enabling assumptions have been reviewed for incorporation into the critical risk management list. Both key enabling assumptions and critical risks have been reviewed periodically for completeness.

2.2.8.2 RTP-2 Assessment of Project Risk

CHG has a defined and implemented risk-handling process in place. In the risk-handling procedure, the TBR instruction and guidelines for completing the technical basis review narrative form and the data sheets on the RPP system engineering Web page describe the requirements and methodology for identifying project/program risk. However, this review found inconsistent compliance to the requirements for a risk assessment and deviations in format, content, and methodologies. CHG did a good job in identifying the risk-handling action, the risk owner, and a TBR for funding risk-handling actions but did not consistently or fully quantify the likelihood or consequence of the event. (Also note comment in Section 2.2.4.1 in this report.) The Project W-519 risk list is a good example of compliance to procedures and process.

CHG has assessed the inherent risks of the RPP baseline and has risk-handling actions in place. A CHG RPP Critical Risk List is in place and an individual is clearly responsible for managing it. A number of individual critical risks, such as CR-027 (Plugged Transfer Lines), CR-047 (Mixer Pumps) and CR-070 (Increased Obsolescence/Deterioration of Tank Farm and its Infrastructure), were reviewed as representative examples to determine if critical risks were included in the LCCs. In each case, they were. Risk-handling/mitigation actions were assigned to TBRs for implementation.

An important action planned by CHG is to have each risk tied to a decision and assumption by April 24, 2000. The use of metrics to track the status of risk management list development and distribution of program risks by risk value was initiated in September 1999 with the plan to update quarterly. This is an effective management tool that indicates program implementation effectiveness. The update had not occurred in time for this review. While no formal mechanism is in place to take advantage of lessons learned, it is accomplished informally.

Risk management training requirements have been identified for key personnel involved in performing organization planning teams. However, 7 of 30 planning team leads had not completed the training. Subsequent to the review, all 7 were trained. Cost estimators and schedulers who were members of these planning teams were not required to have this training, but no rationale was given as to why.

2.2.8.3 Recommendations

The Internal Independent Review Team has the following recommendations:

- R-8-1 The risk-handling process should be conducted consistently across all elements of the RPP. In particular, quantitative analyzes should be performed on the likelihood and consequences of all identified risks. CHG should evaluate and review the level of application. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.
- R-8-2 A formal mechanism should be established to capture lessons learned. This action is not a pre-requisite to submittal of the RTP-2 memorandum and deliverables.
- R-8-3 The risk management training of key personnel should be completed as soon as possible. CHC should also determine if cost estimators and schedulers should take the training and document the determination. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.
- R-8-4 CHG should establish a CHG risk management manager who reports to a senior management position. The responsibility of this position would be to ensure consistent implementation and conduct of CHG risk-handling program. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.

2.2.9 Project Communications

This area is applicable to ORP and was not assessed by the Internal Independent Review Team.

2.2.10 Site Infrastructure and Services

2.2.10.1 Progress Since RTP-1

The interface control process has made good progress since RTP-1. The resulting ICDs are controlled and updated at least semi-annually. They also identify issues that must be tracked and resolved to fully define the interface demands and requirements. Selected ICDs are in place for the infrastructure and support services area. These ICDs identify the specific support that FH and its subcontractors will be asked to provide to BNFL to successfully accomplish the RPP mission.

A major issue related to CHG formal involvement in the ICD process was discussed in Section 2.2.1.2 of this report.

2.2.10.2 RTP-2 Assessment of Site Infrastructure and Services

A series of ICDs contained in the ICD document (BNFL 1999) identifies the specific interface requirements for the infrastructure and services area. In particular, these ICDs identify the site services that FH and its subcontractors will need to provide to BNFL to ensure success as they process Hanford's tank waste. Each ICD defines a specific set of site services to be provided by FH. Although these ICDs are presently only signed by ORP and BNFL, CHG is doing an

effective job in allocating the requirements identified in the ICDs to the appropriate site contractors through a variety of agreements. The listing below identifies how CHG presently assigns the various ICD requirements to FH and its subcontractors and how consistency could be improved:

- ICDs 3, 5, and 6: An Agreement in Principle (AIP) was issued in October 1999 between Waste Management Federal Services of Hanford, Inc. (WMH) and LMHC, but WMH did not sign the AIP because of contract issues raised by the new contract arrangement where LMHC had become a prime contractor with DOE. The AIP was then unilaterally sent to WMH for implementation by LMHC. Work is proceeding according to the AIP even though WMH still has not signed it.
- ICDs 1, 2, 10, and 12: An AIP was issued in October 1999 between DynCorp and LMHC that allocated specific requirements from the referenced ICDs to DynCorp Tri-Cities Services, Incorporated. Both DynCorp Tri-Cities Services, Incorporated, and LMHC signed this AIP.
- ICD 14: This ICD deals with IHLW, and the interfaces defined therein are being handled by CHG directly. Any requirements from this ICD that need to be allocated to FH (Spent Nuclear Fuel) are included in a Memorandum of Agreement (MOA) that has been established between Project W-464 in CHG and Spent Nuclear Fuel in FH. A revision to this MOA was submitted for review in September 1999 but has not yet been approved.
- ICD 23: This ICD deals with waste treatability samples needed by BNFL to test their vitrification process on real waste material. No AIP or MOA between CHG and FH covers the allocation of requirements from ICD 23 to FH. Instead, the interfaces are being handled by a close working relationship between the two organizations. FH personnel work with CHG by preparing the TBRs as required to support the ICD activities. This input is used directly in the CHG Multi-Year Work Plan.

The CHG procedure, HNF-IP-0842, *RPP Administration*, Volume X, Section 3.3, "Memorandum of Agreement" (CHG 1999e), states that agreements between contractors should be handled with an MOA and that "each MOA shall have its own unique identification scheme assigned by Contracts; i.e., MOA-XXXX, Revision X." As noted above, this process is not being used uniformly.

It is important to note that FH personnel routinely attend ICD team meetings to stay current with issues and how they will be resolved. In this way, FH can have immediate and direct input to the overall process. This is viewed as a very effective practice.

2.2.10.3 Recommendation

The Internal Independent Review Team has the following recommendation:

- R-10-1 CHG management should decide whether a standard approach (contract change, MOA, AIP, or Letter of Instruction) should be used to allocate ICD requirements to FH and its subcontractors. A decision should be made concerning the use of HNF-IP-0842, Volume X, Section 3.3, "Memorandum of Agreement" (CHG 1999e), for this process. This action is not a pre-requisite to the submittal of the RTP-2 memorandum and deliverables.

2.3 RTP-2 DOCUMENT REVIEWS

The review conducted by the Internal Independent Review Team focused on the seven CHG areas defined in the CRADs (see Figure 1). During review of the CRADs, many of the documents that will be part of CHG's RTP-2 submittal were also reviewed. Comments on the documents are presented here for CHG's use.

Integrated Resource-Loaded Schedule – An integrated resource-loaded schedule has been prepared containing over 11,000 schedule and cost-estimated activities for the next five years. An additional 7,000 scheduled and cost-estimated activities have been identified for the balance of the program. The schedules are developed within the program work breakdown structure (WBS), and all program milestones are supported. Each element is resource-loaded by skill type and duration. The system has the capability to roll up all of the requirements to intermediate and summary levels and reflects the staffing resource requirements over the life of the program. A high level of confidence exists in the integrated resource-loaded schedule because of the detailed activity-based planning; the project independent cost evaluation by DOE in 1996, which validated the cost; and independent cost-estimating teams performing annual reviews.

Key Enabling Assumptions – The key enabling assumptions list for the unconstrained case was reviewed by The Internal Independent Review Team and appeared to be complete. Discussions with individuals from the Project Integration Office indicated that the Project Integration Office is also preparing a key planning assumptions document. By their definition, their "key planning assumptions" appear to be the same as CHG's "enabling assumptions." Therefore, it is recommended that CHG coordinate/integrate its key assumptions with the Project Integration Office's key planning assumptions.

Critical Risk List and Handling Actions – The Critical Risk List identified key enabling assumptions to individual critical risk events where appropriate. However, when the key enabling assumptions list was reviewed and compared with the key enabling assumptions that were integrated into the Critical Risk List, anomalies were noted in the number used to identify certain key assumptions. A quality check of both documents to correct these types of anomalies would enhance their credibility. The lack of quantitative analysis for the majority of critical risks identified on the CHG Critical Risk List raises questions as to why they are not complete or why this was a required step in the risk management procedures. At a minimum, CHG should analyze the likelihood and consequences of those risks identified as "critical risks."

The waste feed delivery handling actions selected as examples to review were complete and tracked easily to the TBR level.

Financial and Schedule Risk Analysis – The *RPP Retrieval and Disposal Mission Phase 1 Financial Analysis* (Wells 1998), which was completed in January 1998, provided a quantitative and qualitative cost and schedule risk analysis of HNF-1946, *TWRS Retrieval and Disposal Mission Initial Updated Baseline* (Swita, Lewis, and O’Niell 1998). The updated baseline was compared with the TWRS Multi-Year Work Plan for FY 1998 and target budgets for FY 1999 through FY 2011. It evaluated the executability of HNF-1946 and recommended a path forward for risk mitigation. This document was well prepared and should be updated to reflect the current RTP-2 LCC baseline.

Tank Waste Remediation System Operation and Utilization Plan – During RTP-1, LMHC used TWRS OUP (Kirkbride et. al. 1999) as the document to collect all the waste feed alternative trade studies. The document provided an engineering analysis for the planning baseline as well as alternative case studies that could potentially improve the program baseline. The TWRS OUP provides the technical input for developing the detailed technical basis documents and the Level 1 and 2 technical baseline specifications.

The TWRS OUP (Kirkbride et. al. 1999) continues to be used and is considered an essential piece of the work required in establishing a technical baseline. The most recent update of the TWRS OUP is Rev. 1, dated May 1999. This document is now being updated as part of the RTP-2 submission. Because the same technical personnel are developing this updated document, the same high caliber document is expected to result again.

Quality Assurance Plan – The CHG Quality Assurance Plan is found in HNF-IP-0842, Volume XI, Section 1.1, Rev 2 (CHG 1999e). The Plan is compliant with 10 CFR 830.120 and DOE Order 414.1. However, it is understood that CHG plans to submit a revised Quality Assurance Plan as part of the April 24 submittal. This document was not available for review by the Internal Independent Review Team.

Staffing Plan – The Staffing Plan was not available for review. However, the Internal Independent Review Team was told that CHG is currently developing the Staffing Plan, which will consist of two components. The first component will determine requirements, and the second will evaluate CHG’s ability to acquire the necessary resources within the context of the Hanford Site’s demand for personnel.

CHG’s Project Control organization is currently in the process of evaluating the TWR project staffing requirements. CHG’s Project Management organization is assisting in determining the requirements for subcontractor personnel. Analysis of onsite CHG requirements is expected to be completed within the next three to five weeks.

CHG’s Human Resources organization will integrate the information from the project control and Project Management organizations into an overall Staffing Plan. Human Resources will provide a labor market hiring/recruiting analysis to assess feasibility of successfully obtaining the anticipated increase in staff. This analysis will take about four weeks and will be completed to support the RTP-2 deliverable.

RPP Configuration Management Plan – The existing RPP Configuration Management Plan, HNF-1900 (Vann 1998), was reviewed and found to be substantially out of date. A new

Configuration Management Plan is being prepared to support the RTP-2 deliverable but was not available for review. Several other existing documents (e.g., policies, management plans, RPP-PRO procedures, and the CHG administrative manual (HNF-IP-0842, CHG 1999e) also discuss configuration management. Once the revised Configuration Management Plan is in place, these other documents need to be reviewed for consistency, or a determination will need to be made on whether they are still needed.

RPP Technical Baseline Summary Description – The CHG document, *RPP Tank Waste Retrieval and Disposal Mission Tech Baseline Summary Description*, HNF-1901 (Dovale 1999), was reviewed and found to be an excellent document. The document identifies the technical baseline documents for all areas, including infrastructure, waste retrieval, and the disposal mission. The document provides an excellent roadmap and resource for identifying the technical baseline documents for the RPP programs. This document should continue to be used because it summarizes all technical baseline documents in one place.

RPP Environmental Program Plan – The CHG Environmental Program Plan, *Tank Waste Remediation System Environmental Program Plan*, HNF-1773 (Borneman and Raven 1998), was reviewed and found to be an excellent document. The Plan is structured to be consistent with the six core functions of the ISMS Program. It identifies the permits associated with all applicable environmental requirements and provides cross-references to the procedures and other mechanisms through which the environmental protection program is executed. This document is a good top-level program description and provides a good understanding of the hierarchy of documents associated with the environmental protection program.

Project Execution Plan (Draft) – The Project Execution Plan is intended to provide the structure for implementing the requirements that will be identified in the RPP Mission Analysis Report and the RPP Program Plan. Because the latter two documents (both the responsibility of ORP) will not be available for review before the RTP-2 memorandum and deliverables are submitted, the CHG commitment is to prepare a “draft” Project Execution Plan. The draft plan will be finalized once the Mission Analysis Report and RPP Program Plan have been issued and approved. This draft plan has not been completed, so the plan was not reviewed by the Internal Independent Review Team.

RPP Safety Program Plan – The expectation is that the Safety Program Plan submitted for the April 24 deliverable would address all aspects of safety and health (e.g., occupational health and safety, radiation protection, and integrated safety management). The Safety Services Program Plan discusses only the industrial (occupational) safety and health aspects of the overall safety program. Currently, the CHG safety program is found in a number of documents, including the *Description of TWRS ISM System to Meet Expectations of HNF-MP-003* (Milliken 1999a); the *Integrated Environment, Safety and Health Management System Plan* (CHG 1999c); the “RPP Safety Services Program Plan” (CHG 1999e); *Tank Farms Health and Safety Plan* (Butler 1999); and *Radiation Protection Program* (Demers 1999).

With the exception of the CHG *Description of TWRS ISM System to Meet Expectations of HNF-MP-003* (Milliken 1999a), the programs described in the documents cited above are compliant with the applicable DOE regulations and Orders. The CHG *Integrated Safety Management System Description* (Milliken 1999a) is intended to be the top-level document for the CHG safety

and health program. However, this document contains deficiencies that could render a negative outcome if this document were submitted in its current form. Examples of these deficiencies include its failure to discuss the role of the radiation protection program in the context of integrated safety management and the implementing mechanisms to ensure that the actual performance of work is conducted using the appropriate health and safety measures. Furthermore, the document does not reflect the relationship of the various safety programs (e.g., industrial, fire protection, radiation protection, and nuclear) to each other or to the top-level document. HNF-MP-003 (Milliken 1999a) should be revised to correct these deficiencies.

RPP Mission Analysis Report (ORP) – The RPP Mission Analysis Report is ORP's responsibility and was not available for review by the Internal Independent Review Team.

RPP Program Plan (ORP) – The RPP Program Plan is ORP's responsibility and was not available for review by the Internal Independent Review Team.

2.4 OTHER INDEPENDENT REVIEW TEAM OBSERVATIONS

While reviewing the seven CHG areas (see Figure 1) and the various documents to be submitted with the RTP-2 memorandum and deliverables, the Internal Independent Review Team had several other observations that are directly related to the assessment but were beyond the individual CRADs. These are presented here for CHG's use.

Fragility of Tank Farms – Continued priority needs to be applied to the walk-down and evaluation of infrastructure for each of the tank farms that are required to accomplish Phase 1b-2. The recent failure of a transfer line undergoing a pressure test is an example of the fragility of the tank farm system. Although the walk-downs and assessments are currently underway, the fragility of the systems and unknown nature of the level of repairs require the activity to continue to be supported on a priority basis so that problems are identified in sufficient time to avoid jeopardizing any startup milestones. If major deficiencies are found in the condition of the current tank farm systems, repairing or replacing the piping and equipment could result in significant cost or schedule delays.

Feed Specification Envelopes – The BNFL contract calls for waste to be sent to BNFL in specified "envelopes." During its assessment, the RTP-2 Internal Independent Review Team was told that BNFL had requested the waste to be sent to them on a tank-by-tank basis since they are performing their waste treatability studies on a specific tank-by-tank basis. Because BNFL now performs all pretreatment activities and is defining waste feed on a tank-by-tank basis, they want to receive the waste from individual tanks. This severely limits CHG's flexibility and is contrary to the current contract.

If both a tank-by-tank sequence and an envelope specification are imposed on CHG, it appears that BNFL is attempting to negotiate a very restrictive feed specification, which may unduly constrain the CHG's ability to satisfy the BNFL contract feed specification. If CHG is unable to meet the feed specification in terms of composition, quantity, or delivery time, then DOE becomes subject to unnecessary performance penalties.

Roles and Responsibilities – The review team noted some confusion in the roles and responsibilities for several organizational entities and the potential for overlap in responsibilities. An example of this is the planning being done in the RTP Project versus the planning being done in waste feed delivery and by the Project Integration Office. This may be due to the recent contractor changes. The team noted that Gary Cusack, Vice President of Project Delivery, was given the charter to define the roles and responsibilities between the program and project organizations and to recommend a long-term organizational structure that will ensure quality product delivery.

Risk Management – The Internal Independent Review Team noted an inconsistency in the way risk management was being done and had a concern about the depth and type of analysis being performed. This raised the following four questions:

1. Should the risk management process be implemented using a graded approach, depending on the severity of the risk? This should be considered.
2. Is the risk management process being applied at the appropriate WBS level? As currently implemented, the system requirement is to the lowest WBS level. The inconsistencies previously mentioned may be the direct result of applying risk management to too low of a WBS level.
3. What value is a process with partial compliance in communicating information to decisionmakers? Risk assessments are being done but not universally analyzed. A review of the CHG RPP Critical Risk List for compliance to the requirements indicated that 15 out of the 24 critical risk events identified did not have likelihood or consequence analyzed.
4. Is the risk management process a management tool actively used? A CHG Monthly Performance Review of the RPP, dated December 1999, did not have any information on the status of CHG Critical Risk mitigation actions.

The team believes in the importance of the risk assessment activity and recommends that CHG management review its degree and depth of application to the RPP.

Tank AZ-101 Mixer Test – The mixer pump test in Tank AZ-101 is an extremely important risk mitigation activity planned for FY 2000 and should not be delayed. The design and procurement of the large mixer pumps necessary to retrieve the waste from the DSTs have proceeded at risk because of the continued delay in the test.

While the mixer pump concept proposed for Tank AZ-101 is similar to that being applied at Savannah River, no full-scale testing or demonstration using Hanford waste tank conditions has been performed. The purpose of the test is to gather mobilization and suspension data on the HLW solids in Tank AZ-101. The test should provide information on the adequacy of the current Hanford mixer pump design, the sufficiency of the two-pump concept to mobilize all of the tank waste, and various parameter settings for mixer pumps operation. Types of data to be obtained include time to achieve mobilization, percent of mobilization, particle settling rates, and waste temperature profiles. The test can help to reduce the current level of uncertainty regarding

retrieval efficiency by providing 1) direct measurement in Tank 241-AZ-101 of the expected retrieval efficiency for that specific tank and 2) data to enhance estimated retrieval efficiencies for other high-level wastes that are currently based on scale model testing.

2.5 RECOMMENDATIONS

Table 1 summarizes the 18 recommendations from the Internal Independent Review Team by subject area and indicates whether the recommendation should be accomplished before or after the RTP-2 is submitted.

Table 1. RTP-2 Internal Independent Review Team Recommendations.

Recommendation #	Recommendation	Pre/Post RTP-2 Submission
1.0 Project Management		
R-1-1	CHG management should work to obtain agreement from ORP management that CHG will be signatory to ICDs. Consideration should be given to adding the ICDs to the CHG contract in the same way they are included in the BNFL contract. The ICDs should also be placed under strict configuration management.	Pre
R-1-2	An ICD should be developed as soon as possible to cover the requirement in the BNFL contract for CHG to train the initial cadre of BNFL operations personnel.	Post
R-1-3	The CHG involvement in the technical IPT needs to be strengthened. The informal discussions presently occurring between BNFL and CHG personnel are excellent but need to be formalized via the technical IPT.	Post
R-1-4	A hierarchical definition document should be established that defines the various types of documents (e.g., policies, management directives, plans, and procedures) and their hierarchical relationship to one another.	Post
R-1-5	An action needs to be taken to define which plans, policies, directives, and procedures should be updated before the RTP-2 memorandum and deliverables are submitted. Updating the plans is a post RTP-2 activity.	Pre/Post
3.0 Project Technical Work Scope		
R-3-1	CHG should review and update the SEMP to make corrections for the contractual and organizational changes that have occurred since RTP-1. In addition, the Waste Feed Delivery Program System Engineering Implementation Plan, HNF-3384 (O'Toole 1999), should be updated to describe the current retrieval engineering workflow shown in Figure 4, and Figure 4 should be incorporated into the document.	Post

Recommendation #	Recommendation	Pre/Post RTP-2 Submission
R-3-2	In conjunction with ORP, CHG should work to streamline control of the ORP technical requirements identification process. A two-tiered technical requirements database should be considered, where key program and technical requirements that are important to managing and directing the project are listed in the first tier and those technical requirements that flow down to definitive design and procurement specifications are developed as a second tier. This action is not a pre-requisite to the submittal of the RPT-2 memorandum and deliverables but should not be delayed.	Post
R-3-3	To improve timeliness and clarity of management direction, CHG should review its current procedures for disseminating technical "what-if" requests and technical requirement changes to staff for execution and implementation. A suggested approach is contained in the body of the report.	Post
R-3-4	CHG engineering management should review the current overall status of the Level 1 and 2 specifications and develop an action plan to resolve remaining technical issues that will lead to the near-term release of all Level 1 and 2 specifications as baseline documents. The action plan should be developed and in place before the RTP-2 memorandum and deliverables are submitted. The actions themselves need to be completed as soon as possible after the RTP-2 has been submitted.	Pre/Post
R-3-5	CHG should put drawing K216A under configuration control and should incorporate it in the DST system specification found in HNF-SD-WM-TRD-007, Draft E, <i>System Specifications for the Double-Shell Tank System</i> (Grenard and Conrads 1998).	Post
4.0 Project Schedule		
R-4-1	CHG should resolve open technical issues, such as transfer pipe pressure ratings and DST annulus space ventilation, which can potentially impact construction projects.	Post
7.0 ES&H		
R-7-1	An ES&H Program Plan should be created that addresses all aspects of ES&H and defines the relationships between the various programs (e.g., occupational safety and radiation safety).	Pre

Recommendation #	Recommendation	Pre/Post RTP-2 Submission
R-7-2	The <i>Integrated Environment, Safety and Health Management System Plan</i> (CHG 1999c) should be revised to discuss the role of safety and health programs, particularly those applicable to the actual performance of work in the ISMS.	Pre
8.0 Project Risk		
R-8-1	The risk-handling process should be conducted consistently across all elements of the RPP. In particular, quantitative analyses should be performed on the likelihood and consequences of all identified risks. CHG should evaluate and review the level of application.	Post
R-8-2	A formal mechanism should be established to capture lessons learned.	Post
R-8-3	The risk management training of key personnel should be completed as soon as possible. CHG should also determine if cost estimators and schedulers should also take the training and document the determination.	Post
R-8-4	CHG should establish a CHG risk management manager that reports to a senior management position. The responsibility of this position would be to ensure consistent implementation and conduct of CHG risk-handling program.	Post
10.0 Site Infrastructure and Services		
R-10-1	CHG management should decide whether a standard approach (MOA, AIP, or Letter of Instruction) should be used to allocate ICD requirements to FH and its subcontractors. A decision should be made concerning the use of HNF-IP-0842, Volume X, Section 3.3, "Memorandum of Agreement" (CHG 1999e), for this process.	Post

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APPENDIX A
PHASES OF WASTE IMMOBILIZATION

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PHASES OF WASTE IMMOBILIZATION

Waste Immobilization - Phase 1

Phase 1a	Design, Permit, and Downselect
Phase 1b-1	Design Facilities
Phase 1b-2	Construct Pretreatment Facility
Phase 1b-2	Pretreat Waste
Phase 1b-2	Construct LAW Immobilization Facility
Phase 1b-2	Immobilize LAW
Phase 1b-2	Construct HLW Immobilization Facility
Phase 1b-2	Immobilize HLW
Phase 1b-2	Construct ILAW Disposal Facility (Project W-520)
Phase 1b-2	Dispose ILAW
Phase 1b-2	Construct IHLW Storage in Canister Storage Building (Project W-464)
Phase 1b-2	Construct IHLW Storage Module (Project W-TBD)
Phase 1b-2	Store IHLW
Phase 1b-2	Provide Phase 1 Infrastructure Support Systems (Project W-519)
Phase 1b-2	Deactivate Phase 1 Waste Processing Facilities

Waste Immobilization and Disposal Completion - Phase 2

Phase 2	Provide Private Vendor Phase 2 Infrastructure
Phase 2	Retrieve Remaining SSTs and Miscellaneous Underground Storage Tanks
Phase 2	Retrieve Waste from DSTs
Phase 2	Separate/Pretreat/Immobilize LAW
Phase 2	Immobilize HLW
Phase 2	Decontamination and Decommissioning Privatization Facilities
Phase 2	Dispose Phase 2 ILAW
Phase 2	Store Phase 2 IHLW
Phase 2	Ship IHLW

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APPENDIX B

PERSONNEL INTERVIEWED DURING THE RTP-2 INDEPENDENT ASSESSMENT

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PERSONNEL INTERVIEWED DURING RTP-2 INDEPENDENT ASSESSMENT

Name	Organization
S. K. Alexander	Integration Services
A. D. Basche	Project Integration Office
D. G. Black	Systems Engineering
J. F. Bores	Quality Assurance
C. B. Bryan	Project Management
L. F. Burdge	Project Integration Office
D. L. Burt	Retrieval Business Management
A. F. Choho	TWRD Retrieval Engineering
J. W. Comer	Procedures, Training and Operations Support
T. J. Conrads	Project Definition
W. H. Dalton	Human Resources
R. E. Debusk	Safety Services
W. T. Dehn	RPP Executive Vice President and Deputy General Manager
M. P. DeLozier	RPP President and General Manager
G. C. DeWeese	Waste Feed Project Definition
R. A. Dodd	Retrieval Support Operations
B. G. Erlandson	RCRA and TSCA Services
J. S. Garfield	Process Development
K. A. Gasper	Interface Product Team Coordination
E. R. Gibson	Procedures, Training and Operations Support
S. H. Gilmore	PAAA Compliance
T. G. Goetz	Nuclear Safety and Licensing
K. M. Hall	Procedures/Training & Operations Support
T. G. Halvorson	Systems Engineering Projects
E. R. Hamm	Engineering Configuration & Processes
D. M. Hammond	Nuclear Safety and Licensing
J. P. Harris	Nuclear Safety and Licensing
J. S. Hill	RCRA & TSCA Services
K. L. Hladek	Waste Management (FH)
C. E. Hutchins	Project Management
R. A. Kirkbride	Process Development
C. E. Leach	Nuclear Safety and Licensing
S. L. Leckband	RPP Project Definition
D. L. Lenseigne	Financial Control Integration/Reporting
J. W. Lentsch	Project W-314 Manager
M. R. Lewis	Financial Control Integration/Reporting
K. E. McKinney	Retrieval Business Management
G. W. McLellan	Project W-521 Manager
R. L. Moller	Retrieval Business Management

Name	Organization
S. M. O'Toole	Systems Engineering Projects (matrixed to TWRD)
J. D. Panasiti	Strategic Steering Group (FH)
G. L. Parsons	Project W-464
T. R. Pauly	Program Support for Characterization
J. B. Payne	Project W-519
M. A. Payne	Technical Operations
R. W. Powell	Waste Feed Delivery
C. J. Rice	Tank Waste Retrieval and Disposal Program
R. W. Root	Infrastructure Support
M. W. Rosenberry	Financial Control Integration/Reporting
P. S. Schaus	Readiness To Proceed Project
C. M. Seidel	Hanford Analytical Services Program
O. M. Serrano	CSB Operations (FH)
G. A. Stanton	Characterization Project Operations
R. M. Suyama	Sludge, Debris, Water Cleanup (FH)
R. L. Treat	Waste Feed System Definition
J. E. Van Beek	Project W-211 Manager
J. A. Voogd	Interface Implementation
M. W. Wells	Project Control
J. L. Westcott	Technical Operations (FH)
R. D. Wojtasek	Readiness To Proceed Project
R. F. Wood	Contracts Administration