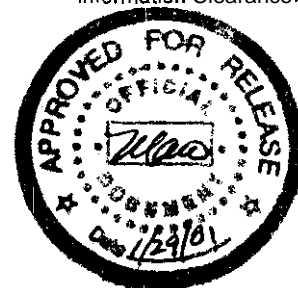


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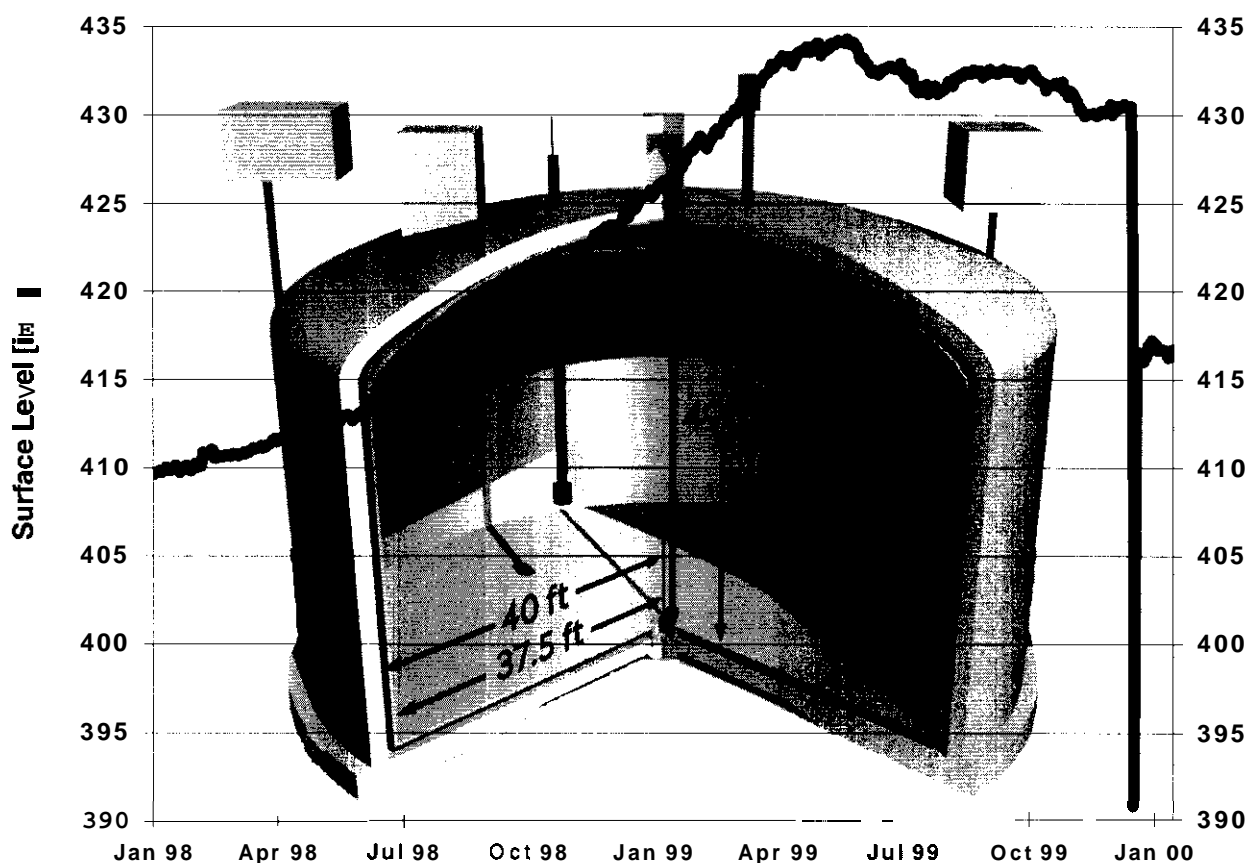


Submitted To:  
**Tri-Cities/  
 Columbia  
 Basin Chapter**  
 of the  
**Project  
 Management  
 Institute**

Submittal for:

# 2001 Project of the Year

## SY-101 SURFACE LEVEL RISE REMEDIATION PROJECT



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



**CH2MHILL**  
 Hanford Group, Inc.

Richland, Washington

Submitted by:  
**CH2M HILL Hanford Group, Inc**

Contractor for the U.S. Department of Energy  
 Office of River Protection Under Contract DE-AC27-99RL14047

Approved for Public Release; Further Distribution Unlimited

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## **CH2M HILL Hanford Group's Nomination for the PMI International Project of the Year – 2001 SY-101 Surface Level Rise Remediation Project**

CH2M HILL Hanford Group is pleased to nominate the SY-101 Surface Level Rise Remediation Project (SLRRP) for the Project Management Institute's consideration as International Project of the Year for 2001. We selected this project as being our best recent example of effective project management, having achieved and exceeded our client's expectations in resolving urgent safety issues related to the storage of high level nuclear waste.

In reflection, we consider the SY-101 SLRRP to be a prime example of safe and effective project delivery. The pages that follow present the tools and techniques employed to manage this complex and technically challenging project. Our objective in submitting this nomination is twofold - to share the lessons we have learned with other organizations, and to honor the men and women who contributed to this endeavor. It was by their diligent effort that the successes we relate here were accomplished 10 months ahead of schedule and one million dollars below the authorized budget.

### **The SY-101 SLRRP:**

#### ***Objective***

Safely mitigate an urgent hazard in DOE's "most dangerous" nuclear waste tank.

#### ***Result***

Immediate and long-term SY-101 safety issues are now resolved - 10 months ahead of schedule and \$1 million below cost.

## **I – GENERAL INFORMATION AND PROJECT TEAM**

### **I.A Project Specifics**

**I.A.a Project Name:** Tank 241-SY-101 Surface Level Rise Remediation Project  
**Location:** Hanford Site, Richland, WA 99352

**I.A.b Owner/Client:** Craig. A. Groendyke – ORP Flammable Gas Project Manager, MSIN H6-60  
U.S. Department of Energy – Office of River Protection (DOE-ORP)  
P.O. Box 450, Richland, WA 99352  
Ph. (509) 376-9811, E-mail Craig\_A\_Groendyke@rl.gov

### I.A.c The Project Team

The SY-101 SLRRP was a sub-project of Hanford's River Protection Project (RPP), which is managed on behalf of the owner – DOE's Office of River Protection (ORP) – by contractor CH2M HILL Hanford Group, Inc. (CHG). Support to CHG was provided by numerous organizations, most significantly COGEMA Engineering Corp. (COGEMA) and Pacific Northwest National Laboratory (PNNL), operated by the Battelle Memorial Institute. Mailing addresses for project team contacts in these organizations are:

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The table at right lists the SY-101 SLRRP's key personnel, their responsibility, and organizational affiliation. Mr. R.E. Raymond led the project team, and was directly responsible for overall project management and control in accordance with DOE Orders and company policies and procedures.

This responsibility was fulfilled by effectively using baseline and change control procedures to organize, plan, monitor, and direct the project's scope, schedule, and costs. However, there are many other factors that contributed to the basis for the project's success: having a clearly identified mission; seamless teaming of a broad array of technical and business expertise; being responsive to the client, oversight groups, and numerous stakeholders; and an appreciation by all contributors of the importance and urgency attached to project objectives.

Key		
Name	Responsibility	Organization
R.E. Raymond	Project Manager	CHG
K.N. Jordan	Deputy Project Manager	CHG
R.E. Bauer	Project Controls	CHG
C.E. Hanson	Design Engineering	COGEMA
J.W. Brothers	Science & Technology	PNNL
J.M. Grigsby	Nuclear Safety & Licensing	G&P Cons.
N.W. Kirch	Process Engineering	CHG
W.J. Powell	Design Authority	CHG
R.W. Reed	Facility Engineering Mgr	CHG
F.A. Schmorde	Facility Operations	
R.J. Brown		
B.H. Morrison	Scheduling	
M.L. McElroy	Quality Assurance	CHG
D.L. Dyekman	Environmental Compliance	CHG
L.J. Marquardt	Safety	CHG
R.M. Pierson	Radiological Safety	CHG
J.R. Ficklin	Maintenance	CHG
D.I. Allen	V.P., Operations	CHG
M.A. Payne	V.P., Technical Ops & Engr	CHG
M.P. DeLozier	President & General Manager	CHG

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## **I.B Supporting Documentation**

Included with this nomination is supporting documentation to aid in developing an understanding of the project management tools and techniques utilized, the project's objectives, and the degree of success attained in meeting these objectives. These documents include:

- an organization chart of the project's leadership team;
- the project's work breakdown structure;
- a diagram of the logical ties identified to establish the schedule;
- the project's baseline and actual performance schedule;
- a summary of the project's budgeted and actual costs;
- images of the system and equipment designed and installed to achieve the project's objective; and,
- newspaper clippings reflecting the public's awareness of the project, along with a testimonial from the owner/client.

## **II. PROJECT PERFORMANCE**

### **II.A A Summary of the SY-101 Surface Level Rise Remediation Project**

#### *Mitigating Hazards in DOE's "Most Dangerous" Nuclear Waste Tank*

Tank 241-SY-101 at the Department of Energy's Hanford Site in Washington State is an underground storage tank containing nearly a million gallons of high-level radioactive waste resulting from plutonium processing activities in the 1970's and '80's. In addition to the hazards posed by radioactive decay, the waste in SY-101 includes highly concentrated hazardous chemicals that react and continually generate flammable and toxic gases.



SY Farm tanks under construction

- *Waste behavior posed urgent safety risks.*

Since the end of Hanford's plutonium production mission, the contents of Double Shell Tanks like SY-101 have settled into layers of liquid above sludge and salt cake. In the 1990, the waste in SY-101 began retaining generated gases and releasing them in periodic rollovers. An immediate hazard was posed during these events, as the tank's dome space atmosphere reached conditions where fire or explosion could have occurred and caused an uncontrolled release of toxic gases and radioactive contamination.

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Tank rollovers were prevented by installation of a mixer pump in 1993. However, in 1996, without any additions to the tanks contents, the waste surface level in SY-101 started to rise in a manner inconsistent with previous behavior. Analysis showed the crust atop the waste was growing, retaining ammonia, nitrous oxide, and hydrogen at an increasing rate. In 1998, the growth in waste volume began accelerating; a trend that, if continued, would result in the waste surface rising above the elevation of the tanks outer shell - a secondary containment barrier intended to prevent leakage to the environment. Added to this concern was the risk of the tank suddenly releasing the large amounts of the gases being retained by the crust in a rollover or similar episodic event – with the consequent risk of explosion, failure of the tanks structure, and release of toxic waste and radioactive contamination.

- Safe storage and environmental clean-up missions drove remediation.

Hanford, the nation's first production facility for plutonium used in nuclear weapons, lies just south of the Columbia River. The last decade has seen a change in the site's mission from the production of "special nuclear materials" to environmental mitigation and remediation. At the site's 200 Area Tank Farms, this means safely storing and treating wastes that are the legacy left from 45 years of radiochemical processing. Hanford is often termed America's most difficult environmental cleanup effort, and its Tank Farms are considered to present the most pressing threat.

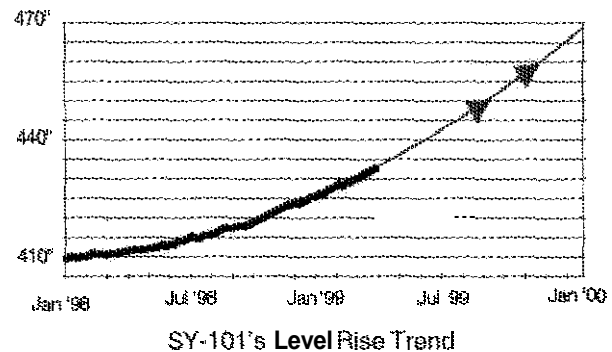


Hanford's deactivated U-Plant

To clean up Hanford's Tank Farms, DOE's Office of River Protection established the River Protection Project, with a mission to store, retrieve, treat and dispose of these wastes in an environmentally sound, safe, and cost-effective manner. In the complex managed on behalf of ORP by CH2M HILL Hanford Group, wastes are stored in large underground tanks with capacities up to 1.1 million gallons. Hanford's waste tanks include 149 older Single Shell Tanks (SST) that have the potential to leak or are known to have leaked to the environment, and 28 newer Double Shell Tanks (DST). DSTs are crucial to fulfilling RPP's mission, as these tanks are compliant with current regulatory requirements and receive the SST waste and ready it for processing into a stable form at a planned Waste Treatment and Immobilization Plant.

- *The SY-101 SLARP was created - the tank set the schedule.*

In October of 1998, a team was created to formulate a plan to mitigate the level rise in Tank SY-101. This plan consisted of implementing interim measures to halt the surface level rise and developing a system to transfer a portion of the waste to another tank, while back-diluting remaining waste to alter its behavior. The team determined the schedule for this effort - forecasts showed that, unless action was taken, the waste surface would rise above secondary containment by the end of September 1999. The project's initial objective was to prevent this breach at regulatory limits, reducing the risk to the public, site workers, and the environment.



- *Performance Agreements set the goals.*

A key element in ORP's guidance of CHG and the project team was their use of financial incentives to ensure project objectives were met on time and within an authorized budget. Multiple "Performance Agreements" were negotiated between ORP and CHG, providing clear and certain objectives to form the basis for project activities. For the SY-101 SLARP, these agreements were made at the outset of planning work, and when project execution was authorized. The specific goals of these agreements drove the planning, mitigation, evaluation, and documentation activities described in the following pages.

### *Challenges Faced*

- *Hazards were posed by the waste.*

The waste in SY-101 was extremely radioactive, requiring all operations be performed remotely. Direct exposure to a significant quantity of the waste for more than a few minutes could have resulted in a potentially lethal radiation dose. The tank's contents continuously generated extremely flammable hydrogen gas, and highly toxic ammonia gas at concentrations above levels identified as immediately dangerous to life and health.

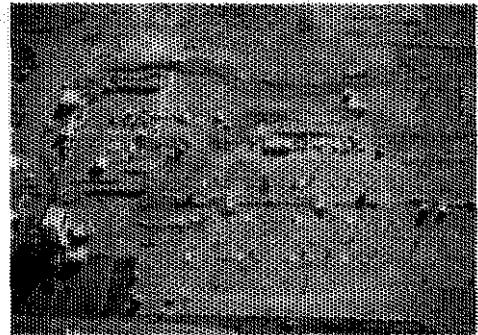


Photo of waste level before transfer



- Existing infrastructure was inadequate for the task.

Prior to the SLRRP, there was no existing capability for retrieving and transferring the waste out of SY-101, nor was an adequate structure available to house any new transfer equipment. Like the other high level waste tanks at Hanford, SY-101 had no permanently installed equipment for obtaining waste samples. Samples had to be obtained using a special, shielded truck designed to push or bore into the waste.



S, SX, and SY Tank Farms

- The waste **was** a difficult fluid to process.

The characteristics of the waste posed significant challenges in the design of transfer equipment. Undiluted SY-101 waste was highly caustic (pH exceeds 14), thick (viscosity above 3000 centipoise), had a high solids content (>35%), and would crystallize or gel and cause fouling of transfer lines if allowed to drop in temperature below 80 deg F.

- The project was closely monitored by oversight bodies, stakeholders, and the media.

Design, construction, and operations were conducted under rigorous procedural controls and close oversight at this operating nuclear facility. At Hanford, oversight is provided by numerous state and federal entities, including offices of the Department of Energy, the Environmental Protection Agency, and Washington State's Departments of Ecology and Health.

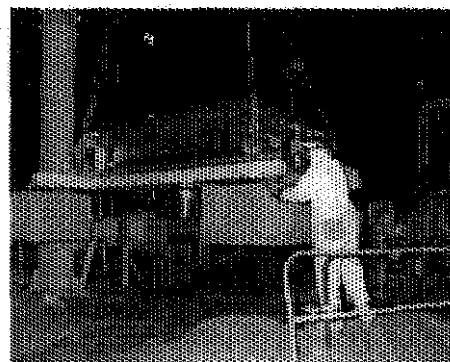
Congress monitors flammable gas-containing tanks like SY-101, whose contents have the potential for rapid rises in pressure and temperature, under federal legislation passed in 1991. The list of nuclear waste tanks subjected to this oversight is generally referred to as the *Wyden Watch List for Tank Safety Issues*, after the Oregon Representative sponsoring this legislation.

SY-101's reputation as the most dangerous tank in the DOE complex evolved as a result of the well-documented hazards posed by rollover events in the early 1990's. This reputation added the intense scrutiny of local and national media organizations and other stakeholders - Native American tribes and environmental watchdog groups - to the challenges faced by the project. Even the New York Times weighed in, terming the contents of SY-101 a "radioactive soufflé".

- *Attaining objectives required speedy development of innovations developed under rigorous controls.*

Configuration of plant equipment, design documentation, and safety documentation were tightly controlled by CHG and ORP policies and procedures to ensure their mutual consistency and to preclude unauthorized modifications or operations. To accomplish objectives within the **schedule** driven by the tank's behavior, the project developed and deployed several innovative solutions applied to nuclear waste processing for the first time. These innovations were developed on multiple parallel paths and in full compliance with the site's rigorous controls. Innovations included:

- the use of a submersible canned rotor transfer pump **based** on technology developed for cooling naval reactors;
- an above-ground containment structure qualified to house the pump and appurtenant equipment;
- a temporary at-grade safety-class transfer line comprised of a flexible hose within a hose, compliant with established technical and regulatory requirements;
- an in-line heated dilution system to facilitate transfer and prevent fouling of the transfer line by the chemically complex, high solids content waste; and,
- field application of new scientific models for predicting waste behavior.



Innovative equipment was deployed to pump the tank

### *Results Achieved*

In March 1999, ORP formally approved the baseLine of the SY-101 Surface Level Rise Remediation Project. This baseline had a total project cost of \$24.6M and execution schedule of 30 months.

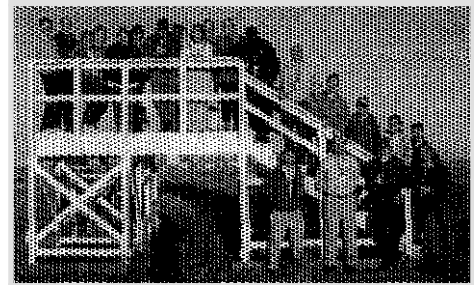
- *Interim mitigation equipment is deployed.*

In May 1999, equipment produced by the site under strictly controlled technology development procedures was deployed to temporarily halt the rising tank level. A mechanically operated arm was inserted into the waste under the crust and rotated - creating a path for slow release of trapped **gases**. The result was a fairly immediate halt in the rising level of the tank. The success of this interim measure removed the emergency conditions that loomed over the project and allowed activities directed towards a permanent solution to proceed in a safe and controlled manner.

- *Transfer and dilution campaigns are performed.*

By September 1999, all equipment necessary to perform transfer **and** hack dilution had been acquired, qualified, and installed. In December, after management self-assessment and a diligent review of readiness to proceed by assessment teams from independent contractors and the client, the first transfer and **back** dilution campaign was completed, starting the tank on the path to final resolution of safety issues.

Two additional transfer and **water** back-dilution campaigns in January and March of 2000 achieved the desired end **state** waste characteristic identified by consensus of the team's science and technology advisers and oversight bodies. With the conclusion of transfers and back dilution, the project began an evaluation period to ensure gas retention and surface level rise were no longer characteristic of the waste's behavior.

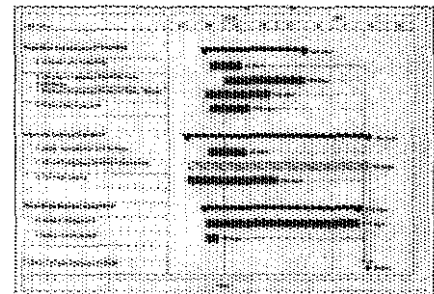


The SY-101 SLRRP Operations Team

- *Evaluation concludes.*

By July 2000, 16 months after authorization, the original **safety** issues of level rise and gas retention had been resolved, and the **project** began documenting results on a path to close concerns about these serious technical issues.

In November 2000, submittals **for** amending the authorization basis under which the tank **is** operated were submitted **to the** client, and the project achieved **its** final objective -- providing the **basis** necessary for DOE to close SY-101's flammable gas and surface level rise questions. The total incurred cost was \$23.6 million, \$1 million less than the authorized budget, and activities were concluded 10 months ahead of the scheduled completion date of September 30, 2001.

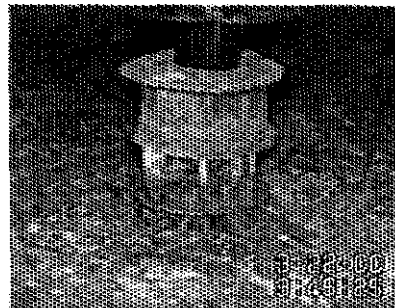


- *Lifecycle cost savings and other achievements.*

Today, SY-101 **is** being returned to normal service. According to DOE, the accomplishments of the SY-101 SLRRP will save the client as much as \$80 million in avoided life cycle cost, considering operating costs related to the mixer pump **and** capital expenses to replace the tank's storage capacity - a crucial element in **the** site's waste treatment plans.

Using a focused team effort, the project achieved the following results:

- Reduced risk to the public, the environment and to the workers by altering waste behavior, preventing the retention of significant quantities of flammable gas in a high level radioactive storage tank
- Utilized parallel paths to develop and implement interim measures to **halt** SY-101's level **rise**, while preparing for permanent remediation of the tank's safety **issues**.
- Led the integration of organizations outside the project in executing the work, significantly reducing **risks** to accomplishing objectives – the first time a fully integrated project team demonstrated clear success at ORP.
- Provided **the** technical basis for removal of SY-101 from Congressional oversight mandated by the *Wyden Watch List*.
- Provided empirical data on salt cake/salt slurry waste dissolution, supporting a path to resolution of the flammable gas **safety** issue at all of Hanford's nuclear **waste** tanks.
- Provided empirical data on solids suspension and settling, supporting future waste feed delivery for waste immobilization by vitrification in a planned treatment facility.
- Supported the Department of Energy's mission to eliminate urgent safety **risks** at Hanford.



Waste level after final transfer  
and hack-dilution

On January 11, 2001, Assistant Secretary of Energy for Environmental Management Carolyn Huntoon approved ORP's request to **close** on SY-101 safety issues and removed this formerly troublesome and dangerous tank from the *Wyden Watch List*.

### 11.13 Managing the SY-101 SLRRP

#### *Effective Tools / Effective Leadership*

ORP and CHG's program and project management systems apply best management practices to ensure that technical scope, schedule, and cost baselines are **met**. Successful completion of the SY-101 SLRRP safely, below cost, ahead of schedule, and with exceptional technical performance demonstrates the **merits** of these systems and the leadership shown in **their** application.

The close collaboration of contributing organizations DOE-Headquarters, ORP, CHG, PNNL, and COGEMA was another key to successful completion of this project. As owners, DOE-HQ and ORP responsibilities for defining issues, establishing objectives, and approving paths forward were fulfilled in a manner that **made** the project's goals clear to all. Project management and supervision were the responsibility of CHG. In fulfilling their responsibility as lead Tank Farms contractor, CHG also had responsibility as design authority, and for facility engineering, operations, training, maintenance, procurement, safety, and environmental compliance.

Supporting CHG's **effort**, PNNL led the project's science and technology team, providing national laboratory expertise to address unknowns posed by the waste's behavior. COGEMA led the project's design effort, providing focused engineers and designers who drove hard to provide tools for mitigation and remediation on a very aggressive schedule.

The SY-101 SLRRP clearly demonstrated that the synergy of a multi-disciplinary project **team** integrated with other responsible organizations provided the underlying basis for exceeding the original project objectives, schedule and budget targets in a safe manner. This project marks the first time a fully integrated project team demonstrated a clear success since 1999's formation of ORP, and the collaboration strongly supported DOE's Environmental Management goals

### *Building Consensus*

The programmatic risks associated with unknown issues resulted in the project's science and technology contributors forming a Technical Review Committee (TRC) staffed by CHG and national laboratory personnel. This committee guided and evaluated experiments centered on **crust** behavior and **gas** retention to develop consensus opinions. The TRC met weekly and produced reports to develop the technical basis for the project's efforts. The knowledge developed and captured by this group provided critical elements for amendments to the **safety** basis for operations, eventual closure of technical issues, and removal of SY-101 from the *Wyden Watch List*.



Workshops facilitated consensus building

Also, scientific, technical and safety oversight and **peer** reviews **were** conducted throughout the project by two separate external groups - the Tanks Advisory Panel (**TAP**) a panel of technical **experts** chartered by the Department of Energy to advise on nuclear waste tanks issues; and the Defense Nuclear Facility **Safety** Board (DNFSB), chartered by the executive branch of the U.S. Government to oversee and make recommendations on activities at nuclear weapons production facilities.

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## Team-building – Communicating Messages & Coordinating Activities

Successful early completion of **this** project below the authorized cost, **with** dramatic life cycle cost savings for the dent, was **the** culmination of an intensive initiative. From the beginning, the project required integration of many internal and external organizations. Within CHG, successful performance required contributions in all areas of responsibility - business management, project management and controls, process and design engineering, worker safety, radiological safety and engineering, nuclear safety and licensing, environmental compliance, procurement, quality assurance, operations, facilities, and maintenance.

Beyond the application of tools related to baseline and change control management, the SY-101 SLRRP's success was largely due to **the** team's clarity of purpose, empowerment of contributors, and effective communication. A requirements matrix was developed to guide team **members** during production of project deliverables. A logic diagram was prepared **to** focus and coordinate efforts and establish a disciplined approach to planning, scheduling, and estimating resource requirements. A technical options and evaluation study by team members during preliminary planning led to a project plan and baseline accepted by all internal and external organizations. From this plan, roles, responsibilities, and authority were clearly defined and communicated. The resulting mission objectives and self-determined responsibilities ensured **team** members had a sense of ownership and **were** empowered to achieve the desired results.

The project manager and all team members made internal communication a high priority. Effective communication was facilitated by co-locating virtually all the team's contributors. Daily meetings of **team** leads and weekly "all-hands" status meetings were also keys. These meetings communicated the status of the project's critical path schedule and identified contributors whose activity was crucial to maintaining and accelerating schedule performance. Importantly, identifying the individual responsible **for** the week's critical path activity in front of the entire team was made with a **bit** of levity - a traveling T-shirt was passed to each week's "Most Important Person" - and all team members were directed to make this individual's requests for information and assistance their highest priority. In the end, the deft handling of this sensitive **issue** - "***Do not struggle in silence***" - resulted in a **true** team effort - all members worked in concert to meet and exceed technical objectives and schedule requirements.



Weekly meetings foster team spirit

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Workshops with internal and external technical experts and regulators were used to great extent on **the SY-101 SLRRP**. In November 1998, early in the planning of the project, a DOE/Contractor/Advisory Panel/Scientific Community workshop was held using formal value engineering techniques to arrive at the technical path forward for mitigation and remediation of the surface level rise safety issue. In April 1999, a workshop utilizing the expertise of the TAP. DOE-HQ, Washington **State** Department of Ecology, Oregon Office of Energy and other interested stakeholders performed technical and operational reviews. These reviews identified required upgrades *to* the technical baseline, facility operations, and safety documentation, to ensure environmental compliance and safe performance of remediation activities. TAP and stakeholder involvement continued throughout the project with bi-weekly telephone conferences and periodic focused workshops.

## **II.C Owner's Satisfaction**

### *Performance Agreements Met*

As mentioned earlier, DOE and ORP used performance agreements to incentivize project accomplishments. Fulfilling the cost and schedule requirements of **these** agreements provides a clear indication that **the** project met its commitments.



SY-101 SLRRP is complete

Agreements made at the outset of the project set schedules for evaluating options and developing a project plan. Subsequent incentives were developed to drive project performance as defined by the approved plan, specifying **dates** to accomplish the first and additional transfer and back dilution efforts. Stretch goals were also established to provide incentives for the team to exceed minimum performance requirements. These stretch goals required planning, action, and documentation to evaluate the waste characteristics following transfer and dilution and provide basis for the determination that safety issues with SY-101 had **been** closed.

All agreements, incentives, and stretch goals related to SY-101 safety issues **were** achieved on or ahead of scheduled dates, save the performance of the first of three transfer campaigns, which was finished four days after the specified date.

### *Interim Reviews Noted Accomplishments and Predicted Success*

During early stages of the project's execution phase, an interim review conducted by a DOE Independent Review Team (IRT) comprised of subject matter experts reviewed the project time and cost baseline. The IRT report concluded the project baseline was aggressive but could **be** performed if effectively managed. It stated:

*"The CHG/DOE project team has accomplished a great deal of work in a short time to resolve the **safety** risks associated with this tank, ahead of schedule, below cost, with better than expected technical performance... .. in an operating nuclear facility."*

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Following the first transfer campaign, then manager of ORP Richard T. French called the project's achievement a "significant accomplishment" and praised the effective application of Integrated Safety Management principles and senior management involvement. Notably, Mr. French found the project's effort to be a good example for others, encouraging CHG to "apply lessons learned from this project to future operations."

### *SY-101* Safety Issues Resolved

In the January 2001 letter from Ms. Huntoon to ORP manager Dr. Harry Boston that approved closure of SY-101 safety issues, the Assistant Secretary stated, "I want to commend you for resolving what has been an extremely complex and challenging issue." Ms. Huntoon went on to express appreciation for the efforts of ORP and CHG staff, and closes with this note:

"Congratulations on this outstanding achievement in eliminating one **of** the most urgent risks **at** Hanford."

## **III - PROJECT INTEGRATION MANAGEMENT**

### Policies and Processes

Control and execution of the project baseline work scope was aided by a structured management approach. Business Operations, Technical Operations and Engineering, Integrated Safety Management, decision management, risk management, configuration management, interface management, and communication management constituted the concepts, policies, and processes used.

Business Operations included those principal activities necessary to establish and maintain the project baseline. The integrated baseline process included the physical configuration, operational requirements, and technical requirements, which drove the Work Breakdown Structure (WBS), work definition logic, critical-path analyses, and baseline schedules. Once the work was defined, detailed schedules were developed and activities loaded with resources. Adjustments were then made to level the resources while meeting schedule and budget constraints placed on the project. The final scope, schedule and supporting cost estimates constituted the project baseline. Project schedules were aligned with the Tank Waste Remediation System (TWRS) WBS and were subsequently integrated into the TWRS Multi-Year Work Plan.

Work on the SY-101 Project was authorized by an operations directive. CHG's Corporate Financial Officer and the responsible Project Baseline Summary director approved this directive.



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## Status Reviews and Performance *Metrics*

Status review meetings were held daily with the lead project personnel to track project action items including the critical path items for the day. Weekly status review meetings were held with the entire project team and the customer. Each month, a briefing was held with CHG's senior management to review the schedule, cost, work performance, variances, accomplishments, issues, concerns, impacts, corrective measures, and milestones. Each briefing concluded with a 3-month look-ahead.

Performance measures were developed at all management levels, aimed at achieving best-in-class performance in cost, schedule, quality, and workforce productivity. Performance was measured against the plan, and all variances were monitored and controlled. The responsible team-lead developed recovery plans for negative variances that exceeded identified thresholds. Performance measures were computed each month based on the actual costs incurred and status of activities reported. Performance was also evaluated by other metrics including budget/performance/cost profiling and full-time equivalent plan-versus-use profiling.

## Change Control

Project changes involving major revisions to the scope, schedule or budget required approval of the client. A few Baseline Change Requests were approved on the project. Two involved accelerating the schedule for pumping and diluting tank contents. The project's success at performing these planned activities ahead of schedule meant funds originally budgeted for 2001 were needed earlier. Another change added a third transfer and back dilution to achieve the final end state defined by the consensus efforts described in the project summary. Funding for this change was provided from efficiencies accrued during execution of previously planned efforts.

## **IV - PROJECT SCOPE MANAGEMENT**

### Scope Defined

The general scope of the project is described in the summary above. To quote document HNF-3824, Tank 241-SY-101 Surface Level Rise Remediation Project Plan, "The objective of the SY-101 Surface Level Rise Remediation Project is to remediate the SY-101 surface level rise by producing conditions in SY-101 (without creating adverse conditions in other tanks) that support safe storage within an approved Authorization Basis and thus close the SY-101 Crust Level Unreviewed Safety Question by September 30, 2001." Specific cost, schedule, and performance criteria were established by performance agreements negotiated at the start of planning and on commencing execution of project activities.

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## Scope Management

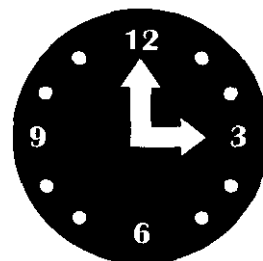
Work scope management for the project was performed by developing and controlling changes to project logic. This logic was developed using an established precedence diagramming method, developing relationships and dependencies for major activities as well as predecessor and successor activities. A diagram of this logic is included in the supporting documentation to this nomination, along with the project's WBS.

The logic was derived from Level 0 logic for the Tank Waste Remediation System Project (now known as the River Protection Project, or RPP) and was maintained in a computer-based project-planning system (Primavera Project Planner<sup>1</sup> or P3). Once established, project logic allowed translation of WBS activities into a working schedule with an identifiable critical path. Input to and modification of the P3 database were subject to configuration control, ensuring that the SY-101 project work could not be altered without appropriate approval.

## V - PROJECT TIME/SCHEDULE MANAGEMENT

### Schedule Defined

The project schedule was defined in the project plan as a result of WBS and logic development. However, the real schedule driver was the behavior of the waste in the tank. As mentioned in the summary, extrapolating the rate of rise into the future showed the waste would overtop its secondary containment by the end of September 1999. The main thrust of initial efforts was to prevent this from occurring. As the project worked its way through planned activities, individual successes allowed adherence to an aggressive schedule. In the end, tasks envisioned for out-year work could be performed ahead of the schedule, with the result being the cost and schedule achievements noted earlier.



### Critical Path Activities Closely Managed

A copy of the project schedule, with planned and actual performance dates, is included with supporting documentation. There was one notable characteristic of the detailed schedule managed by the project on a daily basis – all activities with duration of greater than two weeks were broken down into shorter duration sub-tasks. This allowed the project's management team to closely monitor critical path activities and make the aggressive schedule achievable.

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<sup>1</sup> Primavera Project Planner is a trademark of Primavera Systems, Inc.

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### *Operations Expertise Contributes to Design – Mock-up Testing Improves Procedures*

Two decisions early in the project's execution ensured equipment and procedures developed for the SY-101 SLRRP were responsive to the needs of operators. Including operational expertise on the design team from inception influenced this group in a positive way, focusing their efforts on practical, achievable solutions that met strict operational needs. Following development of equipment, a cold test facility was assembled to verify the integrated system's design and provide hands-on training for operators. This mock-up, using actual equipment intended to perform the work, provided operators and procedures writers the opportunity to collaborate in developing safe, effective, and efficient operating procedures. The success of these approaches was clearly demonstrated by the flawless operation of systems and equipment deployed for the project.

### *Delaying Work to Verify Safety*

As indicated in the attached schedule, closeout activities were completed well in advance of the plan. Indeed, all scheduled dates established by performance agreements were met, with one exception – the first transfer and back-dilute campaign was initiated **4** days behind schedule. This delay did not prevent meeting any other scheduled milestones.

As the nature of the planned transfer and dilution activity was very hazardous, the client required verification that transfer and dilution activities would be performed safely. In the fall of 1999, DOE and ORP conducted a thorough review to ensure the project was ready to proceed with the first pumping campaign. While reviewing conduct of operations, it was determined that improving communications among operators during transfer activities would enhance safety. After a period of retraining and demonstration, authorization to proceed was granted, and the first campaign was performed in December 1999.

### *Schedule Performance*

Important dates for the project, planned and actual, are summarized as follows:

<b>Milestone</b>	<b>Original Date</b>	<b>Actual Date</b>
Commencement Date	October 1, 1998	October 1, 1998
Project Defined	March 1, 1999	February 19, 1999
Transfers Completed	<b>April 28, 2000</b>	February 23, 2000
Project Completed	September 30, 2001	November 30, 2000

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## **VI - PROJECT COST/RESOURCE MANAGEMENT**

### *Basis of Cost Management*

Cost management for the SY-101 SLRRP required that cost estimates be based on approved plans and historical records of similar work performed. Further, the project plan required that these cost estimates be consistent with approved baselines. Periodic reviews were conducted on financial status and variance reports, and reports detailing results were issued to cognizant managers. Responsible managers then identified workarounds and other actions to mitigate the impact of negative variances. As noted in the information on project integration, this cost performance reporting was also a key element in the monthly reports to senior CHG management.

### *Cost Management Performance*

With an original baseline cost of \$24.6 million, and a final project cost of \$23.6 million, the SY-101 SLRRP demonstrated the efficacy of the cost controls put in place by the project plan. A graph and table showing planned and actual costs over the life of the project is attached in supporting documentation. It may be noted that accelerating performance of activities and achieving results in advance of the schedule caused quarterly expenditures to exceed planned levels until shortly before closeout. This accelerated rate of expenditure paid off in the end in that, while costs were 4% less than planned, objectives were achieved long in advance of the scheduled dates.

## **VII - PROJECT QUALITY MANAGEMENT**

Project quality management included developing and attaining environmental, safety, and health objectives and quality assurance requirements. Fulfilling requirements and meeting objectives resulted from the successful implementation of numerous policies and procedures.

### *Integrated Safety Management System*

CHG has developed an Integrated Safety Management System (ISMS) to control Tank Farms activities, and the SY-101 SLRRP served as a vehicle for external reviewers to verify successful implementation of this program. This system drives environmental, safety and health policies and practices, and includes five core values that guided all project activities. For each activity, implementing ISMS required the project to:

DEFINE the work	ANALYZE the hazards	DEVELOP controls
PERFORM the work within controls	FEEDBACK results and pursue continuous improvement	

---

The SY-101 SLRRP was conducting activities in the same period CHG was demonstrating it had effectively implemented ISMS company-wide. During this effort, an independent verification team selected the project for review. This review was performed in the summer of 1999, and Phase II verification of the implementation of ISMS across the CHG organization was completed in August of 1999. As to the effectiveness of the project's implementation of these important safety principles, then-manager of ORP Richard French stated in a letter to CHG dated January 25, 2000:

*"One of the significant contributors to the success of the first transfer from SY-101 was your team's application of the guiding principles of Integrated Safety Management."*

### *Quality Requirements*

The quality management system for this project was designed to meet the quality requirements specified in 10 CFR 830.120, *Quality Assurance*. Additional customer quality requirements were derived from the *Hanford Federal Facility Agreement and Consent Order* (termed the "Tri-Party Agreement"), an agreement negotiated among DOE, the Environmental Protection Administration, and the Washington State Department of Ecology. The interpretive authority for quality requirements was ORP's Quality Assurance Center of Expertise and CHG's Quality Assurance Department. Project quality assurance policies and requirements were described in HNF-IP-0842, Volume XI, Section 1.1, ***TWRS Quality Assurance Program Plan***.

Meeting the quality objectives established for this work resulted from the diligent application of quality principles and practices by all contributors. This outcome was assured by assigning a Quality Engineer to the team full-time. Co-locating this resource with the rest of the team allowed a skilled quality professional to become intimately involved in all phases of the project. The accurate and practical advice provided ensured all project activities met the strict quality requirements in place at this operating nuclear facility within the constraints of an aggressive schedule.

## **VIII - PROJECT HUMAN RESOURCE MANAGEMENT**

### *A Broad Array of Talent— Pulling Together*

353 individual contributors representing 15 different companies executed the SY-101 SLRRP. Seven Hanford Site contractors contributed to the team, including previously named CHG, COGEMA, and PNNL, along with architectural/engineering firm Fluor Federal Services (FFS), Hanford site integration contractor Fluor Hanford, Inc. (FH), site services provider DynCorp Tri-Cities Services, Inc. (DYN), and information services provider Lockheed Martin Services, Inc. (LMSI). The project's core team consisted of approximately 60 full-time assignees, with this number changing over time as activities were initiated and concluded.

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Dynamic project leadership pulled this diverse and talented set of individuals together and charged them with a common purpose. Ten team commandments were established:

- TEAM COMMANDMENTS

  1. Goals are understood, all are committed to completing them.
  2. Trust the team members.
  3. Open and honest communication among members.
  4. A sense of belonging and **pride** in accomplishments.
  5. Diversity of opinions **and ideas** is encouraged
  6. Creativity and risk-taking is encouraged.
  7. Team is constantly learning **and** improving itself.
  8. Procedures are developed to diagnose, analyze, and solve **problems**
  9. Participative leadership is practiced
  10. Decisions are supported and **made** together.

As previously discussed, daily meetings of team leads and weekly status meetings attended by all personnel fostered the sense of shared purpose enjoyed by the project. Ownership was infused in each area of project execution as individual contributors reported their status in front of the whole. Presenting the obstacles to concluding project activities in open session allowed the group as a whole to identify the best path forward, and gave the responsible individual the power to call on any other contributor to assist. Reporting an activity simply as “closed” gave each member a feeling of accomplishment that became contagious.

#### *Contributions From Outside the Core Team*

The sense of ownership and urgency shared by all permanent contributors was so deep it spread to outside organizations supporting the project. Each project team member responsible for interface with outside organizations had the knowledge and enthusiasm necessary to convince others to ensure their priorities supported the team effort.

CHG’s fellow Hanford site contractors provided crucial support to the project. For example, LMSI’s development and management of the Hanford Local Area Network (HLAN) and the services provided by that facility ensured rapid and effective communications among all team members, and provided the infrastructure to efficiently manage and control documentation. FFS contributed to technical aspects of the project in many ways, including engineering expertise and field services such as surveying. FH’s contributions included source and receipt inspection to ensure compliance with quality requirements, while DYN’s support included transportation services and crane services both inside and outside radiologically contaminated areas.

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## **IX - PROJECT COMMUNICATIONS MANAGEMENT**

### Communicating with Stakeholders

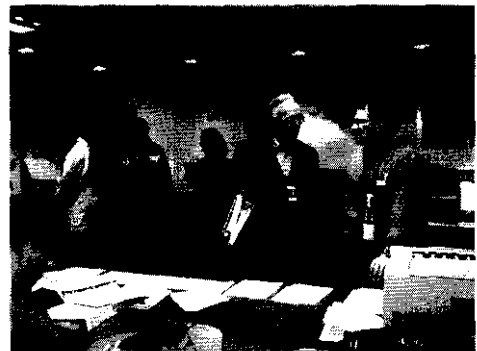
As discussed in the project summary, the SY-101 SLRRP operated under the scrutiny of numerous stakeholders – oversight and regulatory organizations, tribal nations, local and national media, and environmental watch-dog groups. Communicating plans and soliciting comments from inception through closeout ensured that all groups were well informed of project status and had the opportunity to provide guidance and input. The sense of urgency and clear purpose developed to lead the project team provided the project's management with a clear and unchanging message underlying all communications with outside groups.

### Involving and Informing the Client – No Surprises

In addition to the monthly senior management meetings within CHG, the project held monthly meetings with DOE and ORP personnel to ensure the client was always fully aware of the project's status. Beyond this periodic reporting, a crucial element to the project's success in keeping the client informed was the presence of the client's lead representative at the team's daily and weekly meetings. The guidance afforded the team by the ORP representative's intimate knowledge of the project's efforts and obstacles allowed steady and productive progress to be achieved. In the final analysis, the efficacy of project communications can be measured by the fact that there were no surprises for the client or other interested observers.

### Providing Public Access to *Information* During Hazardous Activities

During the actual transfer of waste and back-dilution from Tank SY-101, the project established a Visitors Center accessible by the public to ensure all stakeholders could monitor performance of this hazardous work. This facility provided video links showing in-tank cameras and operators in the field, and data on flow rate, waste level, and generated gases. A status board was maintained showing the level of the tank and amount of waste transferred, and technical staff manning the center were available to answer any questions posed by visiting stakeholders. In addition, the video links available at the Visitors Center were posted to a web page on Hanford's Intranet, allowing HLAN users continuous access to this information.



**SY-101 SLRRP Visitor's Center**

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## **X - PROJECT RISK MANAGEMENT**

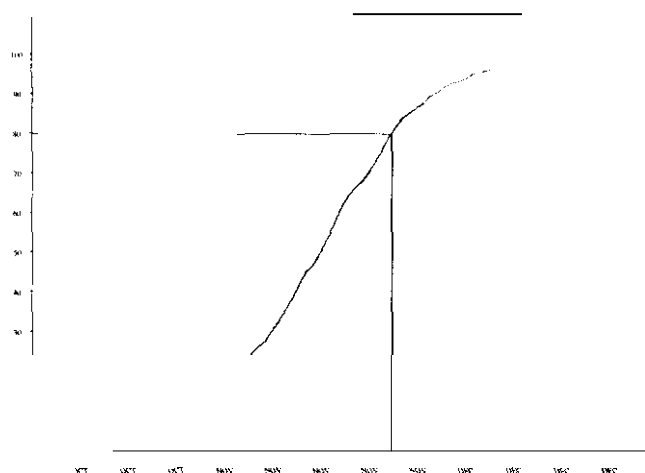
### *Identifying, Analyzing, Controlling, and Communicating Risks*

Quantitative risk management within the context of CHG operations is performed in a controlled and documented fashion. In the preparation of the project plan, the SY-101 SLRRP defined risks that could cause cost or schedule impacts and developed appropriate mitigation measures. This analysis included capturing variability on budgeted and scheduled activities, and identifying risks tied to enabling assumptions or other risks outside the direct cognizance of the project. A Project Risk Management List was developed to communicate risks and mitigation measures to team members, oversight bodies, and other stakeholders. This list allowed the project to track risks, mitigation efforts, and related issues.

### *Mitigating Technical, Cost, and Schedule Risks*

As previously discussed, the primary risks of uncertainties about waste behavior and remediation activities were mitigated by chartering the Technical Review Committee of science and technology contributors, under the peer review of the Tanks Advisory Panel.

During planning, a review of baseline cost identified and quantified specific and variable cost risks associated with planned activities, and a probability of occurrence of risks with uncertain occurrence. A cost curve analyzing the risk of attaining project objectives at an unescalated project budget of **\$21.4** million indicated a near zero probability of success. Including contingency funding of nearly **\$3.2** million (raising the project budget to an escalated value of **\$24.6** million) increased this probability to a 70% confidence level.



Probability of completing 1<sup>st</sup> transfer on-time

In developing the baseline schedule and negotiating performance agreements, a completion date of the first transfer on or before September 24, 1999 was found to have a low probability of success. Adding 2 months for the completion of this activity, moving the date of the first transfer into November 1999, increased this probability to 80%.



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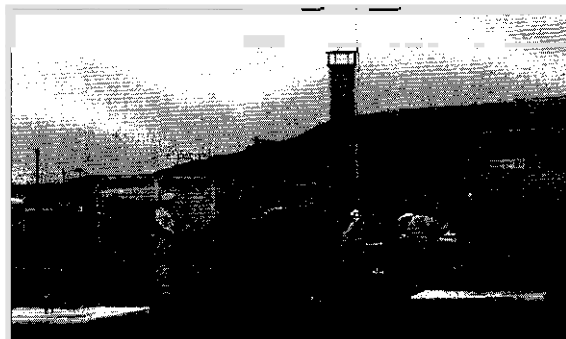
Analyzing the probability of success of the entire scope of work prior to the end of August 2001 also had a low probability. While this probability could be increased to 80% by moving the scheduled completion date to January 2002, crust growth presented safety and environmental impact drivers for immediate action. As a result of the necessity to complete transfers to ameliorate these drivers, project management committed to a project completion date of September 2001 and managed individual tasks and activities on a week-by-week basis to achieve completion within this constraint.

### Other Risk Mitigation Actions

Beyond adjusting the project cost and schedule to allow for variability, the project took significant steps to mitigate risks associated with equipment failures and the safe performance of field activities during transfer campaigns.

As much of the equipment developed to accomplish objectives was designed and built specifically to support the SY-101 SLRRP, procuring one set would leave the project with no ready spares in the event of equipment failure. To mitigate this eventuality, the project manager directed the team to purchase two copies of all major components – one to be used in the field, and the second to act as a readily available and fully qualified spare.

Further, the project manager directed that unless and until needed in the field, spare equipment be used to assemble a mock-up of the transfer system. The availability of this mock-up to provide cold testing for equipment design verification and hands-on training of operators outside the contaminated area allowed practice and proofing of procedures prior to their actual performance in the SY tank farm.



Training on actual equipment ensured field activities were performed safely

### *Risk* Mitigation Results

Accomplishment of project objectives ahead of schedule and under budget is a strong indicator that risk mitigation measures had their intended effect. However, one mitigated risk – that an Independent Contractor Readiness Assessment would not be sufficient, mitigated by baseline plans to simplify the transfer system design and proactively communicate with the client – failed to prevent occurrence of an undesired impact. The client's judgment that a DOE-led Operational Readiness Review was necessary, and the time required to fulfill that requirement, resulted in the first transfer commencing four days after the scheduled date.

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## **XI - PROJECT CONTRACT / PROCUREMENT MANAGEMENT**

### Negotiating Performance Agreements

While management of the contract between CHG and ORP was outside the cognizance of the project, the SY-101 SLRRP team had direct input in identifying scope and schedule for the performance agreements that incentivized activities. Helping to create these drivers gave the team the ownership it needed to drive the project to completion.

### Contracting for Services

As a Hanford Site contractor, CHG had access to resources from all other site contractors through provisions established by the integration contractor – Fluor Hanford, Inc. This provided the contracting mechanism for support from PNNL, DYN, and LMSI.

Technical services were acquired through existing agreements these organizations had with FH. Technical services were provided to the project by COGEMA, FFS, and other consultants under the auspices of the Fluor Hanford-managed Project Hanford Management Contract. This contract established a pool of prequalified technical service providers, of which COGEMA and FFS were members.

### Managing Procurements

All materials and services procured to support the SY-101 SLRRP were subjected to quality assurance provisions established by CHG policy. By management directive, no material or services were purchased by verbal or other uncontrolled means (as with CHG's "P-card" system of company issued credit cards). This provided added assurance that all material utilized on the project met quality requirements and was subjected to the site's rigorous configuration control processes.

Major components of the transfer and back dilution system developed to achieve remediation objectives were acquired by placement of design-build contracts with selected suppliers. The functional requirements and technical criteria for these components were established by CHG procurement specifications subjected to intensive design review. To ensure these procurements were cost-effective, a competitive bidding process was used to select the lowest cost technically acceptable bid. Prospective bidders were selected from a pool of vendors previously evaluated by Fluor Hanford's Acquisition Verification Services (FH's "Evaluated Suppliers List") to ensure compliance with CHG quality assurance policies and quality provisions established by procurement specifications. This allowed the project to ensure vendors met minimally acceptable criteria, such as quality control programs in accordance with ASME Standard NQA-1.

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## **SY-101 SURFACE LEVEL RISE REMEDIATION PROJECT**

Supporting Documentation for PMI 2001 Project of the Year Nomination

**Organization Chart ..... A-2**

*This chart shows the project's leadership team.*

**Work Breakdown Structure (WBS) ..... A-3**

*The chart on this page presents the WBS established in the project plan.*

**Logical Relationship Diagram ..... A-4**

*This image shows the logic established to translate WBS activities into a coordinated project schedule.*

**Project Schedule..... A-5**

*The project's schedule includes baseline planning and actual schedule performance.*

**Cost Performance..... A-7**

*This graph and table shows the project's actual expenditures over time vs. budgeted costs.*

**Miscellaneous Technical Information..... A-8**

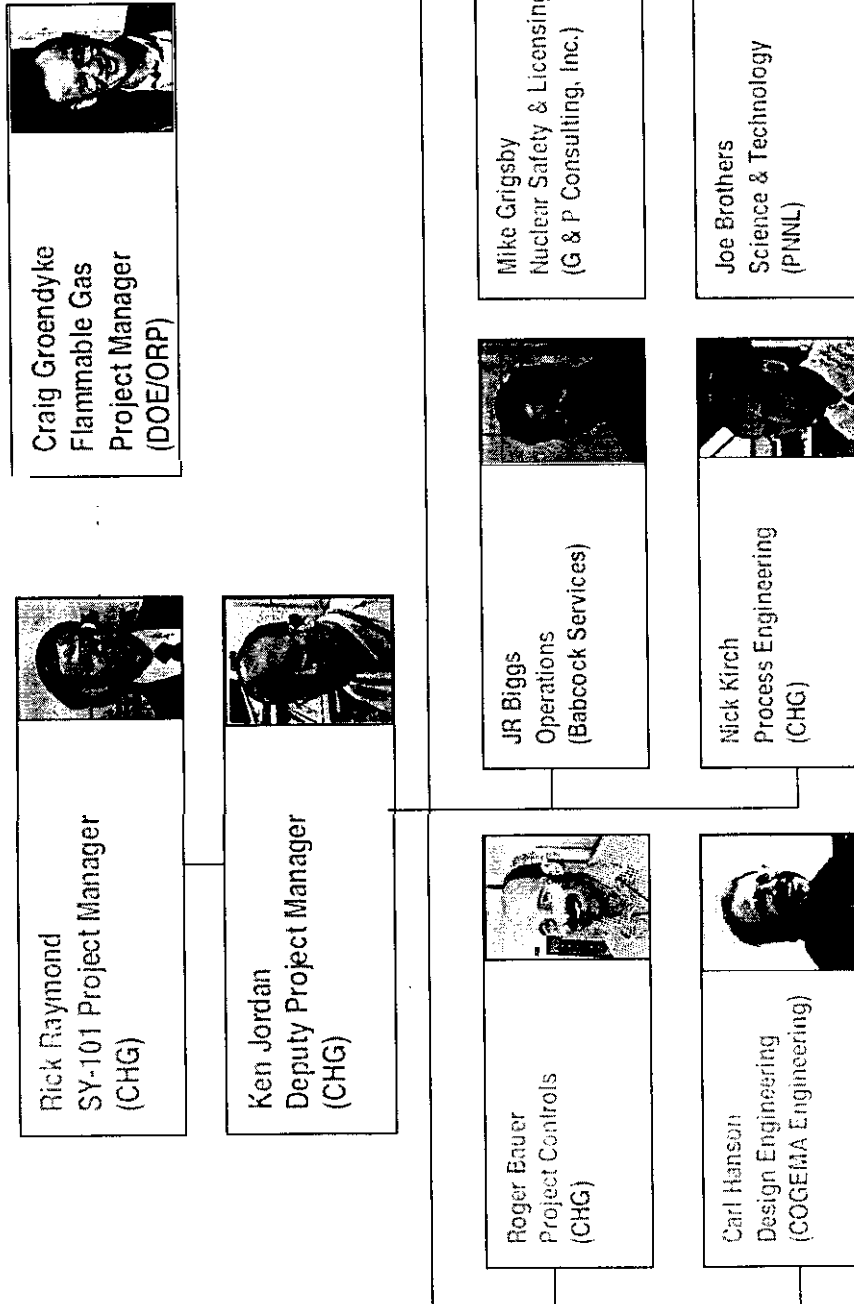
*These pages include an aerial view of the SY-101 transfer system, a chart showing the tank's waste level over time.*

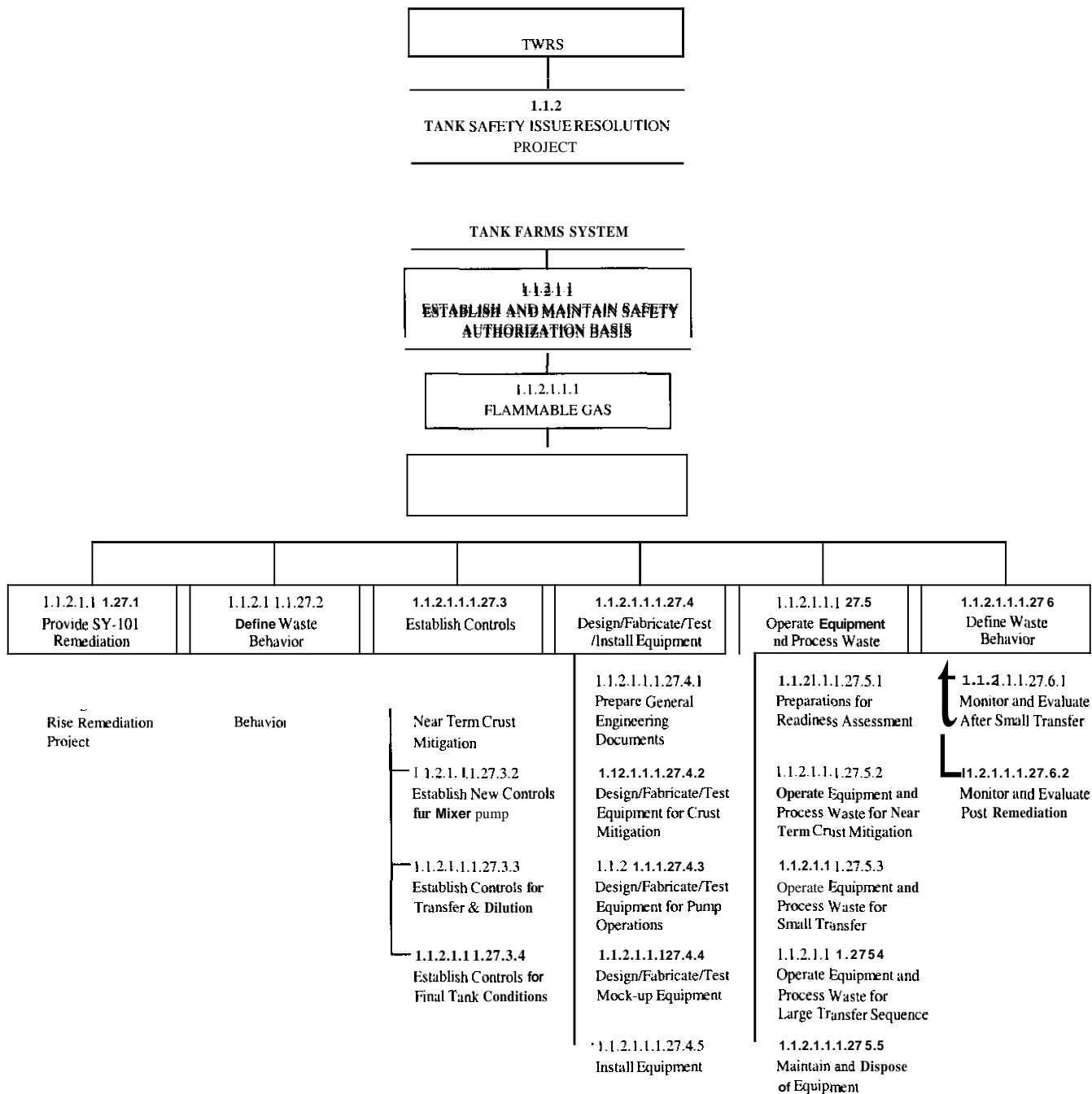
**Communications..... A-10**

*A montage of media articles and a letter from the client regarding project performance*

# SY-101 Surface Level Rise Remediation Project

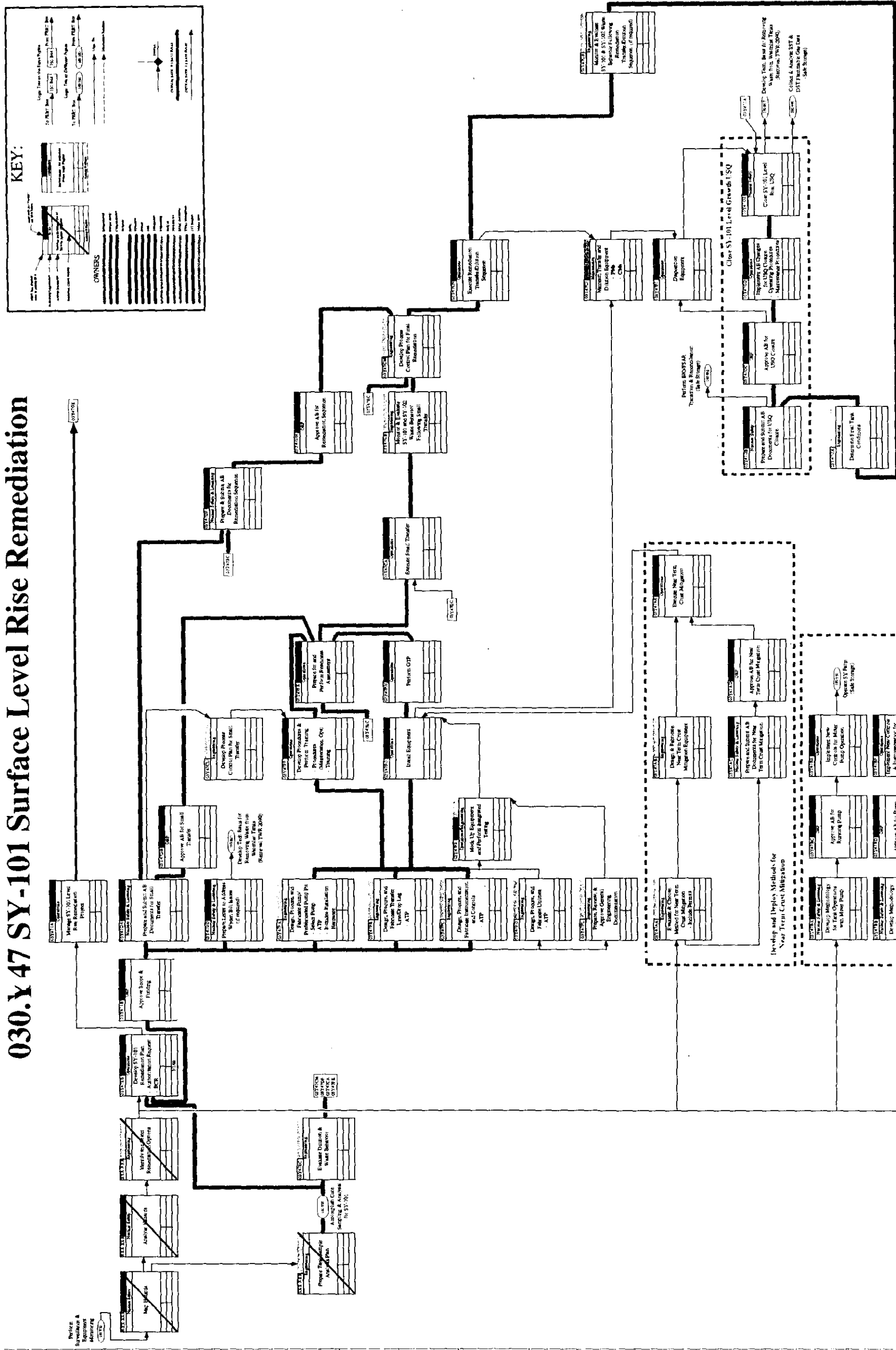
## Leadership Team





## Work Breakdown Structure for SY-101 Surface Level Rise Remediation Project

# 030.Y 47 SY-101 Surface Level Rise Remediation



## Constrained Resource & Time

[illegible]

Activity ID	Early Start	Early Finish	Target 1 Early Start	Target 1 Early Finish	Orig Dur	Rem Dur	% Comp	Total Float
<b>+ 03Y47EB Develop SY-101 Remediation Plan</b>								
	01OCT98A	26FEB99A	01OCT98	26FEB99	101	0	100	
<b>+ 03Y471B Approve Scope and Funding</b>								
	11JAN99A	04JUN99A	11JAN99	09APR99	103	0	100	
<b>+ 03Y47EC Evaluate Dilution and Waste Behavior</b>								
	12OCT98A	30SEP99A	18NOV98	23SEP99	238	0	100	
<b>+ 03Y47FL Prep/Review/Approve General Engineering Documents</b>								
	02DEC98A	15DEC99A	22FEB99	19MAY99	249	0	100	
<b>+ 03Y47AA Eval/Choose Method for Near Term Crust Mitigatn</b>								
	18JAN99A	17FEB99A	18JAN99	17FEB99	22	0	100	
<b>+ 03Y47AB Design/Fab Near Term Crust Mitigation Eqpt</b>								
	01FEB99A	03JUN99A	18FEB99	21APR99	87	0	100	
<b>+ 03Y47AC Prep/Submit AB Docs for Near Term Crust Mitigatn</b>								
	18JAN99A	12APR99A	18JAN99	17FEB99	60	0	100	
<b>+ 03Y47AD Approve AB for Near Term Crust Mitigation</b>								
	13APR99A	27APR99A	29APR99	03JUN99	11	0	100	
<b>+ 03Y47AE Execute Near Term Crust Mitigation</b>								
	10MAR99A	15DEC99A	01APR99	30JUN99	183	0	100	
<b>+ 03Y47CL Develop Process Control Plan for Small Transfer</b>								
	18JAN99A	01NOV99A	18JAN99	10MAY99	192	0	100	
<b>+ 03Y47CM Develop Process Control Plan for Final Remediatn</b>								
	27JUL99A	08DEC99A	17JUN99	30JUL99	85	0	100	
<b>+ 03Y47DA Prepare/Submit AB Documents for Small Transfer</b>								
	04JAN99A	19JUL99A	07JUN99	03AUG99	136	0	100	
<b>+ 03Y47DC NOC Development for Near Term Crust Mit.</b>								
	18MAR99A	03MAY99A			33	0	100	
<b>+ 03Y47DD Prepare Letter to Address Wyden Bill Issues</b>								
	27JAN99A	20MAY99A	18JAN99	22FEB99	81	0	100	
<b>+ 03Y47DF Prep/Submit AB Documents for Remediatn Sequence</b>								
	26JUL99A	13MAR00A	16FEB99	14MAR00	148	0	100	

Start Date: 01OCT97

Finish Date: 28FEB01

Data Date: 02JAN01

Run Date: 17JAN01 07:59

SY06

CH2M Hill Hanford Group

SY-101 LEVEL RISE

REMEDICATION PROJECT

Sheet 1 of 2

Date: \_\_\_\_\_

Revision: \_\_\_\_\_

Checked: \_\_\_\_\_

Approved: \_\_\_\_\_

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CH2MHILL

SY-101 SURFACE LEVEL RISE REMEDIATION PROJECT

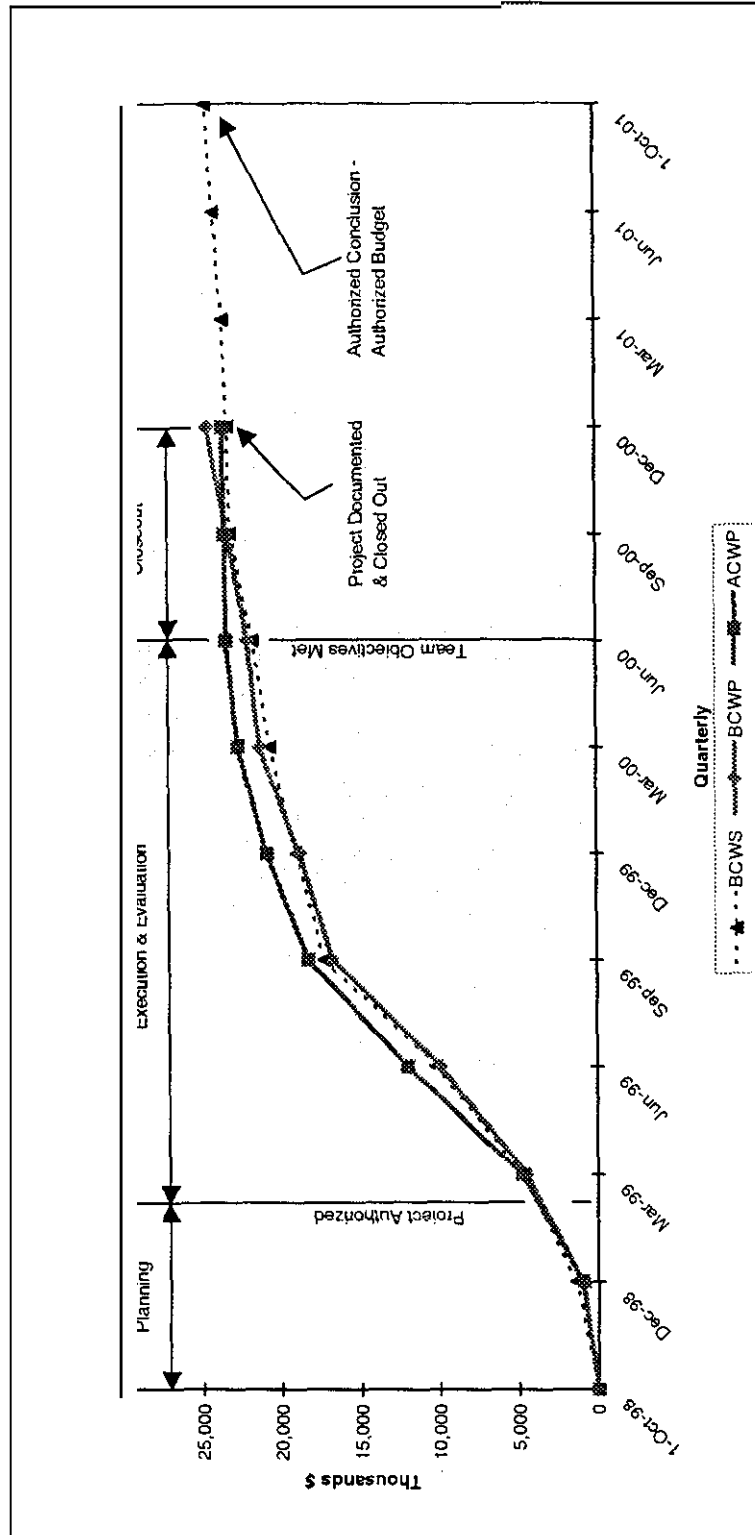


Activity ID	Early Start	Early Finish	Target 1 Early Start	Target 1 Early Finish	Orig Dur	Rem Dur	% Comp	Total Float
<div> <div>1999</div> <div>S O N D J J F M A M J J A S O N D</div> <div>1999</div> <div>J J F M A M J J A S O N D</div> <div>2000</div> <div>J J A S O N D</div> </div>								
+ 03Y47DH Approve AB for Remediation Sequence	13APR99A	27APR99A	07JAN00	15MAR00	11	0	100	
+ 03Y47FA Design/Procure/Fab Pump/Pre-Fabricated Pump Pilt	04JAN99A	17NOV99A	18JAN99	19FEB99	213	0	100	
+ 03Y47FB Design/Procure/Fab Transfer Line/Drop Leg	18JAN99A	15NOV99A	18JAN99	19FEB99	201	0	100	
+ 03Y47FC Design/Procure/Fab Instrumentation and Control	18NOV98A	04OCT99A	18NOV98	30SEP99	212	0	100	
+ 03Y47FD Design/Procure/Fabricate Utilities	18JAN99A	15NOV99A	18JAN99	05FEB99	201	0	100	
+ 03Y47FE Mock-Up Equipment and Perform Integrated Test	19APR99A	29SEP99A	02FEB99	16JUL99	108	0	100	
+ 03Y47FF Develop Procedures and Perform Training	01APR99A	08DEC99A	04MAR99	07SEP99	163	0	100	
+ 03Y47FG Install Equipment	09MAR99A	03DEC99A	05MAR99	28JUL99	177	0	100	
+ 03Y47FH Perform OTP								
+ 03Y47CJ Maintain Transfer and Dilution Equipment	10MAR99A	17DEC99A	18JAN99	21SEP99	181	0	100	
+ 03Y47CA Execute Small Transfer	06MAY99A	01SEP00A	15APR99	29SEP00	321	0	100	
+ 03Y47CB Monitor/Eval SY-101/102 After Small Transfer	19OCT99A	22DEC99A	11NOV99	10DEC99	41	0	100	
+ 03Y47CN Execute Large Transfer Sequence	20DEC99A	06SEP00A	29NOV99	04OCT00	179	0	100	
+ 03Y47CH Monitor/Evaluate SY-101 Post Remediation	05OCT99A	23MAR00A	20MAR00	23JUN00	111	0	100	
+ 03Y47GA Determine Final Tank Conditions	21DEC99A	02JUN00A	05OCT00	22MAR01	113	0	100	
+ 03Y47GB Prep/Submit AB Documents for USQ Closure	10FEB00A	13NOV00A	06NOV00	15JUN01	193	0	100	
+ 03Y47GC Approve AB for USQ Closure	26OCT99A	30NOV00A	16FEB01	16JUL01	271	0	100	
	20SEP00A	30NOV00A	18JUN01	09JUL01	60	0	100	



# SY-101 Surface Level Rise Remediation Project

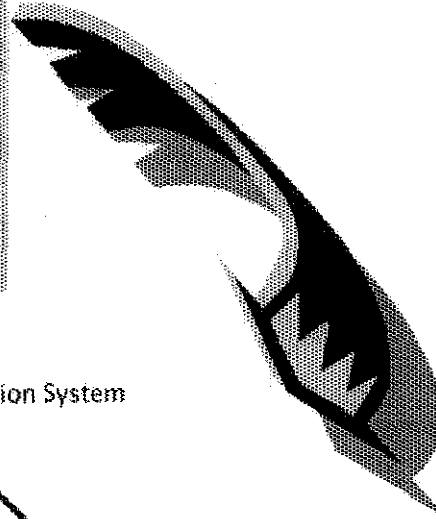
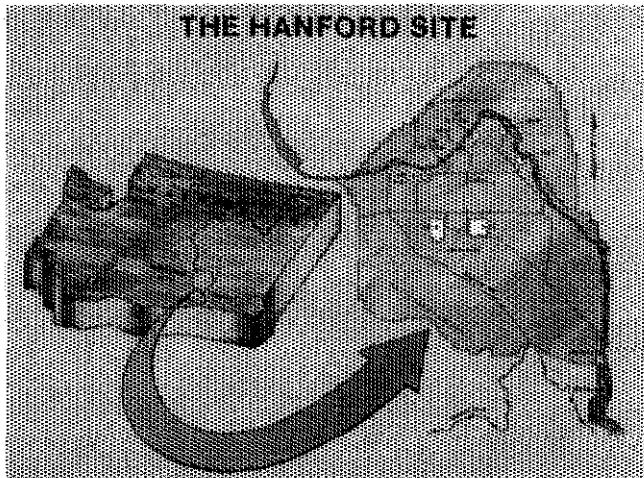
## Cost Performance As of FY 2001 Performance



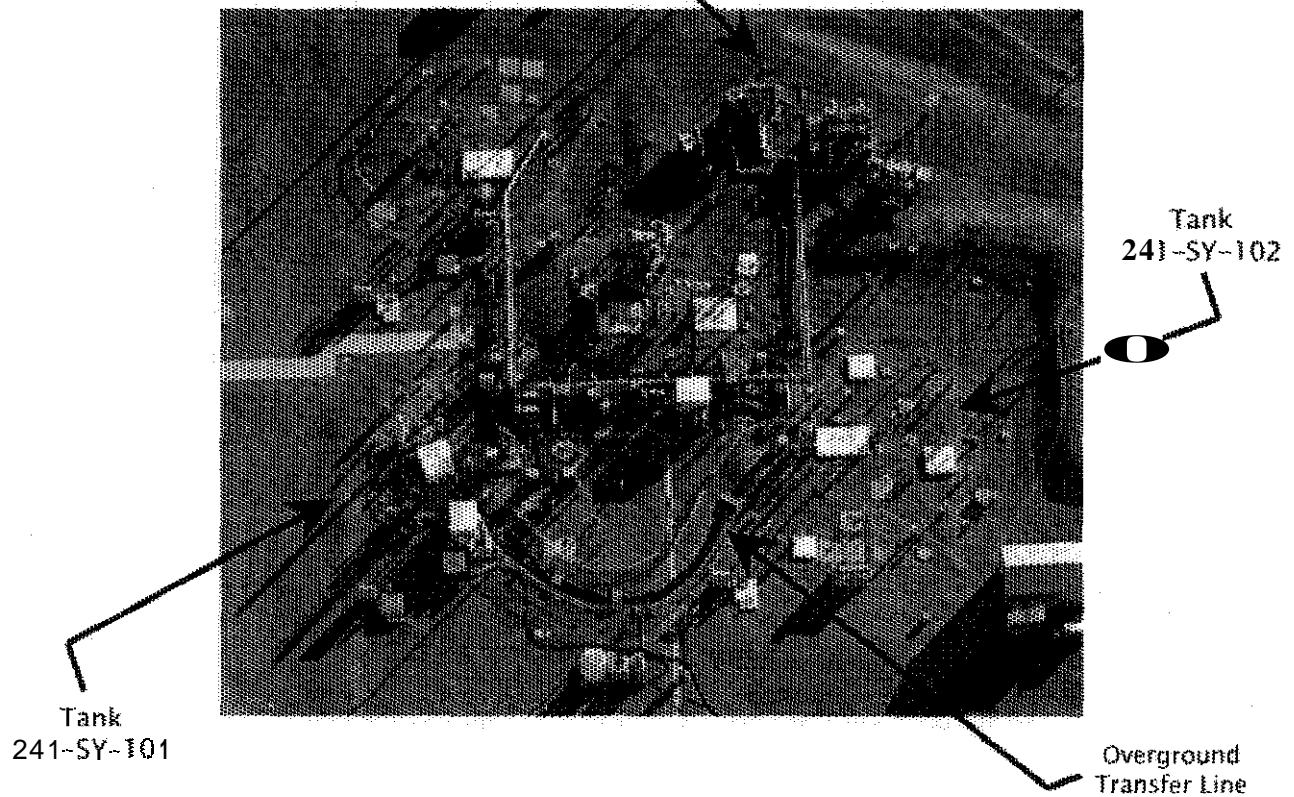
	Fiscal Year 1999				Fiscal Year 2000				Fiscal Year 2001			
	1-Oct-98	Dec-98	Mar-99	Jun-99	Sep-99	Dec-99	Mar-00	Jun-00	Sep-00	Dec-00	Mar-01	Jun-01
BCWS	0	1,392	4,664	10,225	17,255	18,971	20,634	21,722	23,079	23,253	23,562	24,094
BCWP	0	986	4,456	9,918	16,737	18,791	21,289	22,059	23,261	24,559		
ACWP	0	923	4,751	12,012	18,240	20,843	22,691	23,385	23,446	23,589		
SV		(406)	(208)	(307)	(518)	(180)	655	337	182	1,306		
CV		63	(295)	(2,094)	(1,503)	(2,052)	(1,402)	(1,326)	(185)	971		
SV %		-29.2%	-4.5%	-3.0%	-3.0%	-0.9%	3.2%	1.6%	0.8%	5.6%		
CV %		6.4%	-6.6%	-21.1%	-9.0%	-10.9%	-6.6%	-6.0%	-0.8%	4.0%		

CV % = CV/BCWP

SV % = SV/BCWS

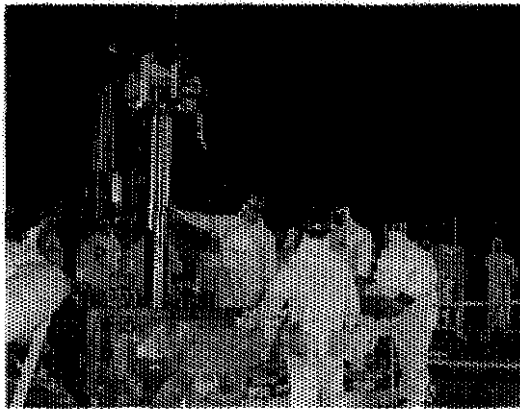
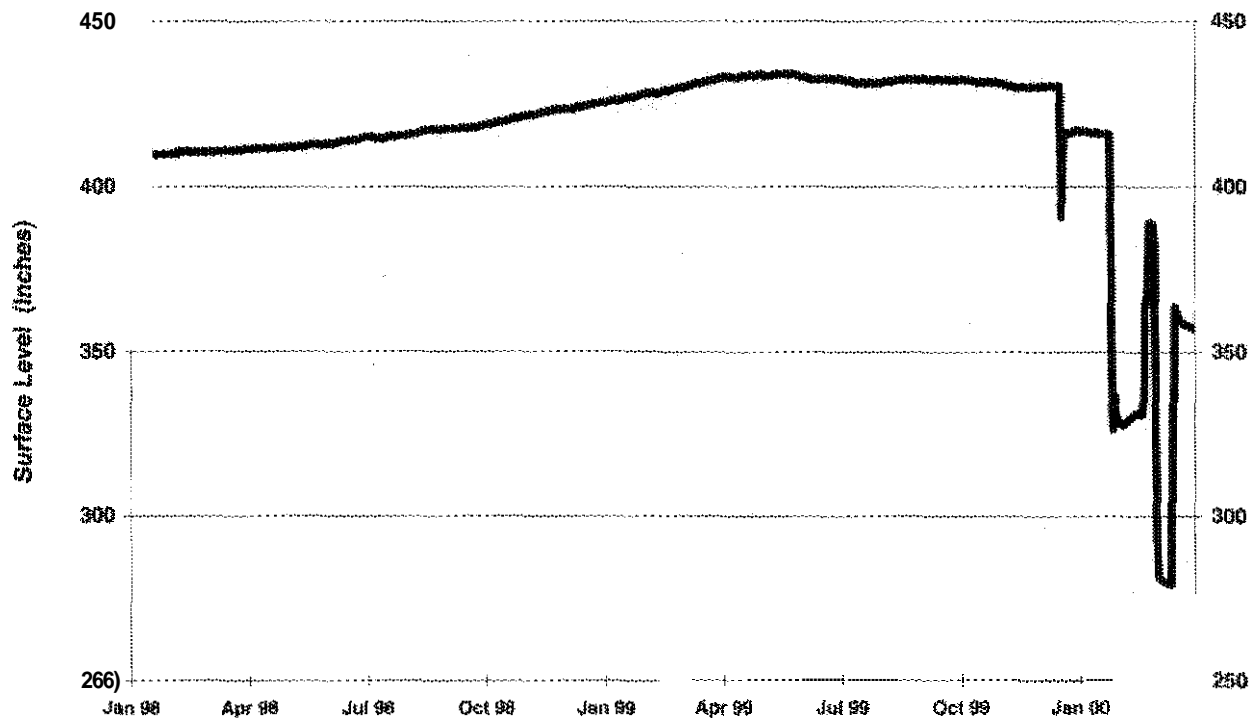


Tank Ventilation System



Aerial View of SY Tank Farm

## Tank SY-101 Surface Level



Transfer Pump Installation



Equipment Installation Team

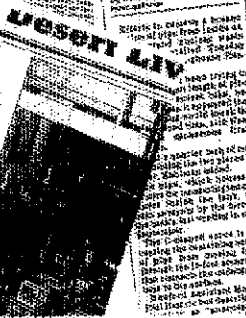
THURSDAY

# Tri-City Herald

**Cleanup budget grows with tank fear**  
New 5-year plan could give Hanford extra \$1.3 billion

**101-SY efforts stuck**

**A Cure for Burps**



## United States Government memorandum

DATE: January 11, 2001  
TO: Harry Rosam, Manager  
Office of River Protection

**Approval to Close the Flammable Gas Safety Issue for Tank 241-SY-101 and Remove the Tank from the Watch List**

Your memorandum to me dated December 7, 2000, requested approval to close the flammable gas safety issue for Tank 241-SY-101 and remove the tank from the Watch List. Both requests are approved.

Your memorandum transmitted the technical rationale for concluding that this tank no longer retains significant quantities of flammable gas. My staff has worked closely with your staff during the development of this technical report. Also, this issue has received extensive peer review as well as continuing review by the Tank Advisory Panel (TAP). In view of the results of these reviews, I concur with your conclusion that this tank has been remediated and no longer represents a serious potential for the release of high-level waste due to uncontrolled increases in either temperature or pressure.

I want to commend you for resolving what has been an extremely complex and challenging issue. This effort opens the way to restoring Tank 241-SY-101 to normal service which provides an additional badly needed operational waste storage tank. It also eliminates the need for continued operation of the older pumps to mitigate the release of flammable gas. The collective life cycle cost avoidance to the government is estimated to be in excess of \$20 million dollars.

Please extend my sincere appreciation to your staff and the staff of CH2M Hill Hanford Group for their contributions to the success of this project.

Congratulations on this outstanding achievement in eliminating one of the most urgent risks at Hanford.

*Carolyn L. Hunter*  
Carolyn L. Hunter  
Assistant Secretary for  
Environmental Management

**RECEIVED**  
JAN 11 2001  
DOE-ORP/OPPC

## Tri-City Herald

Transfer Waste from the tanks at Hanford

**Tank waste transfer finished**

**Worries over Hanford 'burping' tank appear to be at end**

**'Burping tank' in fall**



SY-101 SURFACE LEVEL RISE REMEDIATION PROJECT