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4, 1	1	Cog. Mgr. D. G. Norton	<i>D.G. Norton</i>	8/30/96	H6-06	RL TWRS Waste Disposal T. R. Hoertkorn	<i>T.R. Hoertkorn</i>	9/4/96	B4-55	4, 1	1
4, 1	1	QA (TWRS East Tank Farms Quality Support) M. N. Islam	<i>M.N. Islam</i>	9/5/96	R3-08	ICF KH Infrastructure/Land Use Planning E. T. Trost/E. F. Yancey	<i>E.T. Trost</i>	9/4/96	B3-10	4, 1	1
4, 1	1	Safety (TWRS East Tank Farms Safety) M. N. Islam	<i>M.N. Islam</i>	9/5/96	R3-08	RL Site Infrastructure Division W. A. Rutherford	<i>W.A. Rutherford</i>	9/4/96	B4-55	4, 1	1
4, 1	1	Env. (TWRS Envir. Compliance/Support Services) B. A. Williams	<i>B.A. Williams</i>	9/4/96	R1-51	W. R. Thackaberry	<i>W.R. Thackaberry</i>	9-3-96		4, 1	1
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TWRS PRIVATIZATION PHASE I MONITORING WELLS ENGINEERING STUDY

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Westinghouse Hanford Company, Richland, WA 99352

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DECOMMISSIONED WELLS IN GROUT FACILITY, WELL USE IN TWRS PHASE I
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Abstract: This engineering study evaluates all well owners and users, the status or intended use of each well, regulatory programs, and any future well needs or special purpose use for wells within the TWRS Privatization Phase I demonstration area. Based on the evaluation, the study recommends retaining 11 of the 21 total wells within the demonstration area and decommissioning four wells prior to construction activities per the Well Decommissioning Plan (WHC-SD-EN-AP-161, Rev. 0, Appendix I). Six wells were previously decommissioned.

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1.0 INTRODUCTION

This engineering study provides an evaluation of existing wells and boreholes within the selected location for the Tank Waste Remediation System (TWRS) Privatization Phase I demonstration site (Shord 1996). This evaluation is to determine which wells will remain active within the demonstration site based on regulatory, programmatic, and/or other beneficial use requirements. Wells that have no future or beneficial purpose will be decommissioned prior to TWRS Privatization Phase I construction activities to minimize liability to the U.S. Department of Energy (DOE) because of the land use changes. Twenty-one wells and boreholes (wells) exist within the identified boundary of the demonstration site (Appendix A). The wells identified for decommissioning will be abandoned according to the well decommissioning plan (Skoglie 1996). Future well requirements within the site include replacement wells for those wells impacted by construction activities, and/or replacements for *Resource Conservation and Recovery Act of 1976 (RCRA)* wells going dry.

2.0 CONCLUSIONS

The conclusions of this study of existing well needs within the TWRS Privatization Phase I Demonstration Site are as follows:

- Three Groundwater Programs rely on wells within the area to meet Federal, state, or U.S. Department of Energy (DOE), Richland Operations Office (RL) groundwater compliance requirements; Westinghouse Hanford Company (WHC) RCRA and Operational Monitoring (ROM), Pacific Northwest National Laboratory (PNNL) Sitewide Surveillance, Bechtel Hanford Inc. (BHI) *Comprehensive Environmental, Response, Compensation, and Liability Act of 1980 (CERCLA)*.
- There are a total of 21 wells within the site, 10 fulfill program compliance requirements. One other well will be retained to support a proposed new interim storage facility. Six wells have, previous to this study, been decommissioned, and four wells have been identified to be decommissioned.
- There are 9 out of the 10 program monitoring wells that meet required Washington Administrative Code (WAC), Chapter 173-160, well construction standards and do not currently pose a threat (pathway to the aquifer) to the public or the environment. Well 299-E25-25 will require either a state well construction waiver or additional surface remediation to bring it into compliance with the WAC requirements. This work will be performed by the Well Services Group.
- Decommissioning of the four orphan wells will commence after RL approval or privatization contractor turnaround of the wells, and when funding is identified. Decommissioning activities will proceed according to the decommissioning plan (Skoglie 1996).

- New well requirements within the demonstration area such as those that might support the RCRA (proposed Immobilized Low-Level Waste [ILLW] Storage Facility), site characterization (TWRs Phase II site assessment), and for replacement of wells impacted by planned privatization contractor construction activity will be addressed in separate plans, permits, as identified by the ROM Program.

3.0 EVALUATION CRITERIA AND DQOS

Well data quality objectives (DQOs) are defined by the individual user for the program they support and will not be reevaluated in this study. All active wells must meet the minimum WAC 173-160 construction requirements (or State Waiver) in order to maintain protection (minimize potential for contamination) to the environment and provide representative data. The RCRA program has the most restrictive data quality standards. Hanford Site programs that currently use wells in the TWRs Privatization Phase I area include; 1) the WHC ROM Program (this program also includes Site water level mapping and vadose monitoring), 2) The PNNL Sitewide Surveillance Program, and 3) the BHI CERCLA Program.

Table 1 provides a list of all wells located within the defined boundary of the TWRs Phase I demonstration siting (former Grout Treatment Facility [GTF]). Several well databases were queried for the compilation of this table including Hanford Wells (PNL-8800), Hanford Well Custodians (WHC-SD-EN-DP-071, Rev. 1), RCRA Borehole Data Packages for the GTF (WHC-SD-EN-DP-085, Rev. 0), and GeoDAT/Paradox (WHC proprietary electronic database). In addition to database queries, each program was contacted and provided input to the table.

Each well has an assigned custodian responsible for its maintenance and eventual decommissioning. The table identifies the current users of each well and summarizes the well type, location in Hanford Plant and Lambert coordinates, borehole total depth, well completion date, and perforations or screen interval and the approximate remaining saturated interval. Well as-built diagrams are attached as Appendix B. These diagrams provide useful information to various programs including the existing groundwater sampling intervals, subsurface geology, and potential contaminant pathways to the environment.

Each groundwater monitoring program has specific criteria and requirements for well use and this study assumes that the wells are suitable to meet those intended program requirements. Therefore, this study will not reevaluate this aspect of well use. Instead, this study will evaluate ways to reduce the number of wells required by integrating program needs and combining well use.

Existing wells are also evaluated to determine if they pose an obstacle or impact planned facility construction for the site study. Wells that pose potential construction obstacles will be evaluated to determine if other existing wells could fulfill the users DQOs or if new wells need to be installed.

Table 1. TMR Phase I Privatization Area - Well Data Table.

WELL NO.	Well ID	CUSTODIAN	WELL TYPE	USERS	EW (Plant)	NS (Plant)	EW (Lambert)	NS (Lambert)	DEPTH,ft	Drill date	PERFS	WTR COLUMN
299-E25-211	A6615	ERC 200PO-5	V,D	ABAND	45000	41075	576177	136005.9219	25	28-Feb-84	N/A	
299-E25-215	A6619	ERC 200BP-3	V,D	ABAND	45000	40750	576177.25	135906.9063	25	31-Jan-84	N/A	
299-E25-216	A6620	ERC 200BP-3	V,D	ABAND	45700	40500	575964.16	135830.17	40	31-Jan-84	N/A	
299-E25-219	A6623	ERC 200BP-3	V,D	ABAND	45000	39780	576178	135611.3594	25	28-Feb-84	N/A	
299-E25-220	A6624	ERC 200BP-3	V,D	ABAND	44300	40650	576390.5625	135877	40	28-Feb-84	N/A	
299-E25-235	A6639	WBC-ROM	V,D	ABAND	45185	40054	576121.4375	135694.7031	55	Mar/11/87	CSG PLD	
299-E25-25	A4770	WBC-ROM	U	S	43648	41002	576588.887	135984.406	288	10-Apr-85	269-289	>25'
299-E25-27	A4772	WBC-ROM	U	N	45136	39855	576136.46	135633.91	300	31-May-85	274-294	>50'
299-E25-29	A6034	WBC-ROM	P,R	S	45735	40170	575953.67	135729.16	336	07-Oct-87	N/A	N/A
299-E25-29P	A4774	WBC-ROM	P,U	S	45735	40170	575953.67	135729.16	336	07-Oct-87	256-276	5.5'
299-E25-29Q	A4775	WBC-ROM	P,L	S	45735	40170	575953.67	135729.16	336	07-Oct-87	325-330	>50'
299-E25-30	A6035	WBC-ROM	P,R	S	44900	39710	576208.4375	135590.2344	330	23-Sep-87	N/A	N/A
299-E25-30P	A4776	WBC-ROM	P,U	S	44900	39710	576208.4375	135590.2344	330	23-Sep-87	263-283	7'
299-E25-30Q	A4777	WBC-ROM	P,L	S	44900	39710	576208.4375	135590.2344	330	23-Sep-87	320-330	>50'
299-E25-31	A4778	WBC-ROM	R,U	R	45753	40311	575948.02	135772.25	298	16-Jul-87	259-279	9'
299-E25-32	A6036	WBC-ROM	P,R	R,S,W	44326	41200	576382.375	136044.5625	354	25-May-88	N/A	N/A
299-E25-32P	A4779	WBC-ROM	P,U	R,S,W	44326	41200	576382.375	136044.5625	354	25-May-88	260-280	14'
299-E25-32Q	A4780	WBC-ROM	P,L	R,S	44326	41200	576382.375	136044.5625	354	25-May-88	320-330	>50'
299-E25-33	A4781	WBC-ROM	R,U	O	45609	40116	575992.03	135713.01	400	31-Jan-88	262-282	15'
299-E25-37	A4785	WBC-ROM	R,U	O	45749	40462	575948.98	135818.07	280	13-Sep-89	260-280	12'
299-E25-38	A4786	WBC-ROM	R,U	R	45469	40056	576034.74	135694.87	283	18-Sep-89	259-280	11'
299-E25-39	A4787	WBC-ROM	R,U	O,S	43673	40518	576581.875	135837.2656	282	16-Oct-90	257-277	12'
299-E25-44	A5448	WBC-ROM	R,U	R,S	45223	39930	576109.94	135656.64	293	Apr/06/92	266-286	15'
299-E25-45	A5449	WBC-ROM	R,U	N	44973	39940	576185.96	135659.7	298	July/27/92	269-289	9'
299-E25-49	A6038	WBC-ROM	R,U	N	44626	39967	576291.697	135668.325	293	Aug/25/93	269-289	17'
299-E25-50	A6039	WBC-ROM	R,U	N	44274	40009	576399.049	135681.613	294	Sep/10/93	290-270	17'
299-E25-1000	A6536	WBC-ROM	R,U	S	44013	40258	576478.436	135757.654	392	Oct/23/93	263-293	25'

USERS:
 R=RCRA
 C=CERCLA
 S=SITEWIDE
 V=VADOSE
 W=WATERLEVELS
 N=NO USERS
 O=OTHER, SPECIAL USE

CUSTODIANS:
 WHC=WESTINGHOUSE
 (Contact: BA Williams 372-3799)
 ERC=BECHTEL

TYPE:
 R=STATE COMPLIANT
 D=DECOMMISSIONED
 V=VADOSE
 U=UPPER UNCONFINED
 L=LOWER UNCONFINED
 C=CONFINED
 P=PIEZ.

3.1 FUTURE WELL REQUIREMENTS

This study evaluates all future well use options prior to decommissioning to ensure the most efficient use of resources. Groundwater well needs are based on two categories; 1) Supply, and 2) Resource Protection.

- 1) Water supply wells will not be required for this area because the upper unconfined groundwater already contains many contaminants and will not meet water quality standards. The installation of water supply wells into deeper noncontaminated aquifers increases the risk of cross contamination from the shallow aquifer and is not recommended in this area. Water is readily available from several existing sources within the 200 Area, which can be accessed via pipeline.
- 2) Resource protection wells are installed to detect contaminants from a facility that may pose a threat to the public and/or the environment. In addition, these wells are used to assess groundwater conditions and cleanup activities ongoing throughout the 200 Area Hanford Plateau.

Future groundwater well requirements within the TWRS Privatization Area fall into the resource protection well category and will be based on new and existing program needs.

3.1.1 New Program Needs

New facilities that treat, store, or dispose dangerous or hazardous waste must meet RCRA or state groundwater monitoring requirements. Identified new programs within the TWRS Privatization Phase I Demonstration Site are listed below:

- 1) Privatization Contractor (PC) Facility(ies) - New facility groundwater monitoring needs will be defined in the RCRA operating permit requirements, which must be negotiated between the regulators and the PC. Initially, based on planned activities, this facility is not expected to require groundwater monitoring for treatment, storage, or disposal under the RCRA. Prior to the abandonment of any existing wells in the construction area, the PC will be given the option to procure these wells to fulfill anticipated needs or requirements. The PC will be responsible for all its individual well needs within the area or it may rely on the preexisting well database accessed through the Hanford Environmental Information System (HEIS).
- 2) ILLW Interim Storage Facility - Groundwater monitoring may be required at the former Grout Facility (now called ILLW Interim Storage Facility), which is located on the west side of the Phase I Privatization area (Appendix A). This facility has been defined as the best alternative proposed for an interim storage facility. It is being evaluated to receive and store the PC's ILLW product starting in 2002. TWRS ILLW Interim Storage Facility (subproject OOL-EEW-465) is intended to provide storage under the direction of

DOE, as proposed in Burbank (1996) a predecisional draft that outlines alternatives for ILLW interim storage architecture. Currently, the existing wells surrounding the ILLW Interim Storage Facility meet groundwater compliance requirements with the RCRA regulation for a land disposal facility (DOE-RL 1990). Facility groundwater monitoring is adequate for the current groundwater flow direction and provides a >95% coverage for leak detection based on Monitoring Efficiency Model (MEMO)(Appendix C) results. Wells identified in this engineering study for decommissioning will not compromise RCRA groundwater compliance at the ILLW Interim Storage Facility. Long-range monitoring requirements may require future replacement wells for some wells going dry as the water table declines (e.g., 299-E25-38). This evaluation will be detailed in the appropriate RCRA groundwater monitoring plan as required by the regulations, and the Site Part-B Permit and is not a part of this study.

- 3) TWRS Phase II Performance Assessment - Disposal of the PC's ILLW product in the TWRS ILLW Interim Storage Facility (former GTF) will require subsurface characterization. This data will be used to support the performance assessment of the facility. To support this assessment, one new groundwater monitoring well will be installed to characterize the vadose and aquifer system. Planning for this borehole, including the location, are forthcoming (Reidel 1995) and not a subject of this engineering study.

3.1.2 Existing Program Needs

Individual groundwater monitoring programs must maintain groundwater compliance for specific groundwater conditions. Known changes occurring within the hydrogeologic system (aquifer) include declining water levels, changing flow directions, and changing contaminant plume concentrations and migration pathways. The Hanford Sitewide Groundwater Remediation Strategy/Groundwater Contaminant Predictions (BHI-00469) provides a Site groundwater and contaminant flow model, which has been used to evaluate these changes and determine, as practicable, the magnitude and extent of the change. Based on these model predictions an assessment of network well requirements has been completed for outer years. These changes could require additional new well installations to provide adequate monitoring coverage.

Out of 21 total wells within the Phase I area, 10 have been identified as active wells, which should be retained to support State or DOE groundwater monitoring requirements. With the exception of well 299-E25-25 all the wells meet current State requirements for resource protection wells. This well requires surface protection (pad, posts, and a permanent well identification number) to bring it into compliance with State well requirements. Well remediation (or a request for a State well construction waiver) will be scheduled and performed by WHC Well Services.

The WHC ROM program utilizes six wells within the area to ascertain groundwater flow, detect and assess groundwater contamination, and monitor declining water levels in the upper unconfined aquifer. Under the RCRA, there are four facilities with two separate groundwater networks, the 216-A-29

Ditch, and the combined 216-A36-B, 216-A10, and 216-A37-1 Cribs (Plutonium-Uranium Extraction [PUREX] Cribs) network, which are located proximal to the area and rely on three wells within the privatization area (Appendix A). In addition, the Operational program relies on three different wells to monitor groundwater at the 216-A-30 and 216-A37-2 Cribs.

The PNNL Sitewide Surveillance program provides regional groundwater plume mapping for the entire Hanford Site (e.g., PNL-10698) in support of DOE-RL Order 5400.1. This program relies on six wells within the study area, two of which are ROM wells, to fulfill its program requirements (Appendix A). No additional well requirements are anticipated for this area in the future.

The BHI CERCLA program is responsible for groundwater remediation/cleanup under the PO-1 Operable Unit (OU), which encompasses the study area and currently utilizes data results from the ROM and Sitewide Programs to supplement CERCLA program monitoring and provide groundwater quality determinations. BHI has indicated no additional future well requirements within the study area.

Review of modeled and expected changes to the aquifer system does not indicate any immediate or future needs for additional wells within the area to maintain RCRA compliance. Modeled results indicate that the maximum water table decline in the area will be approximately 3 m (9 ft) over the next 20 years. Based on this information the wells selected for monitoring have an adequate water column for sampling through this time period. If any of the wells do go dry they will be evaluated for replacement by the appropriate well custodian and documented in the programs groundwater monitoring plan. Groundwater flow over the next 20 years is predicted to change only slightly from the current flow direction, toward the southwest, to a more southeast flow. Existing wells are adequately located to account for this change and no new well requirements are anticipated. The plume simulation model indicates that the groundwater contaminant plumes preferential flow path does not significantly change direction over the next 20 years. If contaminants do begin to migrate toward the southeast they will be monitored by existing wells located on the eastern side of the area.

Based on the preceding evaluation of the existing wells, only one new well has been identified. This well is in support of the ILLW Storage Facility performance assessment. The location, drilling and construction of this well will be completed per the requirements of the characterization documentation (Reidel 1995).

No other new well needs within the TWRS Privatization Phase I Demonstration Site are envisioned for the future.

4.0 IDENTIFICATION OF WELLS FOR DECOMMISSIONING

The 21 existing wells are divided into four categories to aid in consolidating well usage (Appendix A) and identify candidates for decommissioning:

Category 1 - Decommissioned Wells - This category defines six existing boreholes which have, previous to this study, already been decommissioned. The wells are 299-E25-211, -215, -216, -219, -220, and -235. These wells are listed in the table and the locations are provided for reference to allow the construction contractor the ability to locate them during construction activities as necessary.

Category 2 - Candidate Decommission Wells - There are four existing boreholes identified with no use and are considered candidates for decommissioning. The wells are 299-E25-27, -45, -49, -50 (Appendix A) and are identified in Table 1 by an "N" under the USER column. A Well Decommissioning Plan (Skoglie 1996), provides specific decommissioning requirements for these wells.

Category 3 - Active Wells - Eleven total wells will be retained as active wells. Ten wells have been identified that support program requirements as summarized in Section 3.1.2. In addition, one well (former GTF RCRA well 299-E25-38) will remain active to support future well needs at the proposed ILLW Storage Facility. The wells are identified in Table 1. Well 299-E25-38, can be decommissioned (and is identified with a hold point in the decommissioning plan [Skoglie, 1996] pending further evaluation) if the ILLW facility does not require RCRA monitoring.

Category 4 - Compromised Wells - Four of the eleven Category 3 wells identified may be compromised by impacts from future privatization construction activities. The wells are identified as 299-E25-25, -32, -39, and -1000.

4.1 WELLS COMPROMISED BY PRIVATIZATION CONTRACTOR CONSTRUCTION ACTIVITIES

Results of the evaluation of the category 4 wells, completed by the three groundwater programs (RCRA, CERCLA, and Sitewide), are described in this section. Based on a review of the proposed construction activities for the Phase I privatization four wells may be compromised. Because the proposed construction area is still being studied and defined (TWRs Phase I Privatization Site Development Engineering Study), the exact number of category four wells that will be impacted is not known. The four wells, 299-E25-25, -32, -39, and -1000, have been prioritized according to the existing program(s) importance, i.e., based on program DQOs, spacial location, and the remaining saturated interval within the wells. This prioritization will assist in subsequently determining the need for, and replacement of, the impacted wells.

Category 4 wells are prioritized as follows:

Priority 1 - Well 299-E25-32 - Groundwater results support all three programs (RCRA, CERCLA, Sitewide). This well has added value because it is completed in two intervals (piezometer) within the upper aquifer and thus provides information about the vertical gradients, and radiochemical distribution across the interval. It is one of only a handful of wells at Hanford which provide this type of access to the aquifer. The location of this well is key to understanding the impacts and effects of B-Pond recharge to the aquifer, the decline of the artificial groundwater mound, and changes to the flow system. RCRA utilizes this well as an

upgradient location for several facilities. This well also has a good historical groundwater database and declining groundwater will not impact the ability to sample this well.

Priority 2 - Well 299-E25-25 - Utilized by the PNNL Sitewide Surveillance program. This well's location is also key to tracking the B-Pond mound decline and changing groundwater conditions. Declining groundwater will not impact the ability to sample this well.

Well 299-E25-1000 - Utilized by the PNNL program. This is the newest of all the wells within the area and is in a location that supports the evaluation and interpretation of regional groundwater conditions. Declining groundwater will not impact the ability to sample this well.

Priority 3 - Well 299-E25-39 - Utilized by the PNNL program. This well is also in a good location for evaluating the B-pond mound decline and effects on regional groundwater conditions. Declining groundwater will impact the ability to sample this well. Less than 8 ft of water is left in the screen and projected declines indicate that this well will go dry in a few years.

4.1.1 Compromised Wells Requirements

The Priority 1 well, E25-32, will require a replacement well installed further east if the vendors construction activity requires this well be decommissioned. Decommissioning costs are minimal (approximately \$5,000/well) and a replacement well can be installed for approximately \$75,000. Well planning, borehole drilling, and actual construction will require approximately 3 months.

Priority 2 wells will require one replacement if either; 1) 299-E25-1000 or, 2) both wells (299-E25-1000 and 299-E25-25) are decommissioned. If only 299-E25-25 is decommissioned, well 299-E25-1000 may be substituted.

The Priority 3 well (299-E25-39) can be decommissioned and will not require a replacement. Current plans are to systematically decommission the well when it can no longer be sampled.

Preliminary indications from the ongoing TWRS Privatization Phase I infrastructure project definition engineering studies indicate only one well (299-E25-32) with a high probability of being impacted. Based on the Priority 1 classification this well will require a replacement if it must be decommissioned. The other three compromised wells (priority 2 and 3) are located far enough east of the proposed construction zone that they would probably pose no problem. Easements will have to be established around the compromised wells to maintain access for sampling and provide protection from future land use activities. If the compromised wells turn out to impact the PC's construction then replacement of the wells will be required per this section.

5.0 FUTURE WELL ACCESS

Per the recommendations of this study, all planned construction activities shall be engineered to allow continued access to the active wells for the purpose of program groundwater sampling, well maintenance, or other scheduled work. Any contractor wishing to access wells will be required to acquire approval from the well custodian as identified in Table 1.

6.0 STUDY SUMMARY

There are a total of 21 wells within the demonstration area, 10 fulfill RCRA, CERCLA, or Site-wide groundwater program compliance requirements and DQOs. Well 299-E25-25 will require surface remediation [or a state waiver] to bring it into compliance with the WAC regulations. Six wells have, previous to this study, been decommissioned, and four wells have been identified to be decommissioned per the decommissioning plan (Skoglie 1996).

New well requirements within the demonstration area include; one new characterization well installed in support of and funded by the ILLW Storage Facility and, as will be determined, possible replacements for the compromised wells. It is recommended that discussions be held with the PC's prior to construction activities to negotiate a work-around for the compromised wells to minimize well decommissioning and maintain groundwater data continuity. Any well that resides within a parcel assigned to the PC(s) will require an easement for vehicle access and for sampling and well servicing.

If additional RCRA groundwater monitoring wells within the TWRS Phase I Demonstration Site are required by other programs they will be addressed separately by the WHC ROM Program in the appropriate RCRA groundwater monitoring plan as required by the facility permit. The location of the additional wells will need to be negotiated with the PC's.

The PC(s) should have the opportunity to take custody of any of the targeted category 2 wells (prior to decommissioning) to fulfill any of their future well needs. These well needs will be determined in operating permits (which will determine State groundwater monitoring requirements).

There are two options for funding category 2 well decommissioning.

Option 1 - Funding by TWRS to decommission the category 2 wells (approximately \$20,000 @ \$5,000/well). WHC Well Services will perform the decommissioning work to meet the TWRS schedule.

Option 2 - A well decommissioning program exists under the WHC Well Services Group which budgets (under the ROM program) and resource loads tasks to systematically define and decommission up to 50 wells per year. The wells identified in category 2 would have to be added to the Well Services decommissioning list and prioritized, accordingly, based on criteria defined in the well decommissioning plan (Skoglie, 1996). The wells would be

scheduled for decommissioning under the Well Services program schedule and the work completed by the group. Currently, based on the well decommissioning program, the Category 2 wells would be considered low priority and would probably not be scheduled for decommissioning in the FY 1998 time frame required to support the TWRS Privatization Phase I site development work. Further evaluation of this option relative to decommissioning the Category 2 wells within the TWRS Privatization site development schedule needs to be completed to finalize the funding scenario.

7.0 REFERENCES

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Skoglie, D. E., 1996, *Well Decommissioning Plan*, WHC-SD-EN-AP-161, REV 0, Draft Appendix I, *Fitness for Use Evaluation Recommendations for Hanford Site Wells*, Engineering Change Notice # 708153, Westinghouse Hanford Company, Richland, Washington.

Mercer, R. B., C. R. Wilson¹, C. M. Einberger¹, and R. L. Jackson, 1991, *Efficiency-Based Groundwater Monitoring Network Design for Hazardous Waste Sites*.

¹Golder Associates, Inc., Redmond, Washington 98052.

APPENDIX A
TWRS PRIVATIZATION PHASE I
WELL BASE MAP

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TANK WASTE
REMEDATION SYSTEM
PRIVATIZATION PHASE I
DEMONSTRATION SITE

LEGEND

- TWRS PHASE I PRIVATIZATION DEMONSTRATION SITE
- PROPOSED PRIVITIZATION CONTRACTOR'S FACILITY CONSTRUCTION SITE
- PROPOSED ILLW STORAGE FACILITY
- WELLS WITHIN DEMONSTRATION AREA
 - CATEGORY 1 DECOMMISSIONED WELLS
 - CATEGORY 2 WELLS TO BE DECOMMISSIONED
 - CATEGORY 3 ACTIVE GROUND WATER MONITORING WELLS
 - CATEGORY 4 COMPROMISED WELLS (EASEMENT/RIGHT OF WAY REQUIRED)
 - (R) RCRA/OPERATIONAL WELL
 - (S) SITE WIDE SURVEILLANCE WELL
- WELLS OUTSIDE DEMONSTRATION AREA

SITE PLAN

SCALE: 1:3000

4-3

NOTE: THIS MAP IS FOR REFERENCE ONLY. DO NOT USE FOR CONSTRUCTION OR ENGINEERING PURPOSES.

ICF KAISER HANFORD COMPANY
MAPPING SERVICES

CADFILE: ZRBT0661
DATE: 8-30-96

CUSTOMER: BRUCE WILLIAMS
DRAWN BY: RAFAEL TORRES

TITLE: MONITORING WELLS/TWRS PRIVITIZATION PHASE I
DEMONSTRATION SITE

APPENDIX B
TWRS PRIVATIZATION PHASE I
WELL AS-BUILT DIAGRAMS

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SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-25

WELL DESIGNATION : 299-E25-25
 RCRA FACILITY : Not documented
 CERCLA UNIT : 200 Aggregate Area Management Study
 HANFORD COORDINATES : N 41,001.6 W 43,648.4 [18Jul85]
 LAMBERT COORDINATES : N 446,192 E 2,251,572 [HANCONV]
 DATE DRILLED : Apr85
 DEPTH DRILLED (GS) : 288-ft
 MEASURED DEPTH (GS) : Not documented
 DEPTH TO WATER (GS) : 263-ft, Apr85;
 263.9-ft, 10Jun93
 CASING DIAMETER : 8-in, carbon steel, 0-150-ft;
 6-in, carbon steel, +2.74-253-ft
 ELEV TOP CASING : 669.42-ft, [18Jul85]
 ELEV GROUND SURFACE : Not documented
 PERFORATED INTERVAL : 8-in casing, 0-150;
 SCREENED INTERVAL : 269-289-ft, 6-in #10 slot stainless steel
 COMMENTS : FIELD INSPECTION, 27Aug93,
 Carbon steel casings. Capped and locked
 No pad, posts or permanent identification.
 Not in radiation zone.
 AVAILABLE LOGS : Geologist
 TV SCAN COMMENTS : Not applicable
 DATE EVALUATED : Not applicable
 EVAL RECOMMENDATION : Not applicable
 LISTED USE : Grout semiannual water level measurement, 01Jun85-10Jun93,
 CURRENT USER : WHC ES&M w/l monitoring and RCRA sampling
 PUMP TYPE : Hydrostar
 MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY			
Drilling Method: <u>Cable tool</u> Drilling Fluid Used: <u>Water</u> Driller's Name: <u>L. Bultena</u> Drilling Company: <u>Onwego Drilling</u> Date Started: <u>11Mar85</u>	Sample Drive barrel Method: <u>Hard tool</u> Additives Used: <u>Not documented</u> WA State Lic Nrs: <u>Not documented</u> Company Location: <u>Kennewick, WA</u> Date Complete: <u>10Apr85</u>	WELL NUMBER: <u>299-E25-25</u> Hanford Coordinates: N/S <u>N 41,001.6</u> E/W <u>W 43,648.4</u> State Coordinates: N <u>446,192</u> E <u>2,251,572</u> Start Card #: <u>Not documented</u> T <u> </u> R <u> </u> S <u> </u> Elevation Ground surface: <u>Not documented</u>	
Depth to water: <u>263-ft Apr85</u> (Ground surface) <u>263.9-ft 10Jun93</u>			
GENERALIZED Stratigraphy Log Geologist's Log SI=slightly		Elevation of reference point: <u>(669.42-ft)</u> (top of casing) Height of reference point above ground surface <u>ND</u>	
0=5: Sl. silty SAND 5=10: Fine-med SAND 10=15: Cse=very cse SAND w/SILT lenses 15=25: Med=very cse SAND w/PEBBLES 25=35: Med=cse SAND 35=40: Sl. gravelly SAND 40=50: SAND 50=55: Gravelly SAND 55=70: SAND 70=80: Silty SAND 80=100: SAND 100=140: SAND & silty SAND lenses 140=155: Gravelly SAND 155=160: SAND 160=170: Gravelly silty SAND 170=175: Sandy GRAVEL 175=180: Silty sandy GRAVEL 180=185: Silty gravelly SAND 185=195: Sandy GRAVEL 195=270: Silty sandy GRAVEL 270=288: Silty pebbly SAND		Depth of surface seal <u>(0=20-ft)</u> Type of surface seal: Cement grout between 8 and 12-in casing as 12-in was being pulled (removal not documented, but assumed) 8-in ID carbon steel casing, <u>0=150-ft, perforated 2 cuts/rd/ft</u> 6-in carbon steel casing, <u>+ND=253-ft</u> Annular seal, cement grout between 6-in and perforated 8-in casing, <u>0=150-ft</u> Hole diameter, <u>20=150-ft, 9-in nominal</u> <u>150=288-ft, 7-in nominal</u>	
Packer set <u>@ 249-ft</u> 6-in casing pulled back from total depth 20-ft blank, <u>249=269-ft</u> 6-in stainless steel telescoping screen, <u>269=289-ft, #10-slot</u> Borehole drilled depth: <u>(288-ft)</u>			
Drawing By: <u>RKL/2E25-25.ASB</u> Date : <u>07Sep93</u> Reference : <u>HANFORD WELLS</u>			

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-27

WELL DESIGNATION : 299-E25-27
RCRA FACILITY : (Grout?)
CERCLA UNIT : 200 Aggregate Area Management Study
HANFORD COORDINATES : N 39,855.5 W 45,135.8 [18Jul85]
LAMBERT COORDINATES : N 445,041 E 2,250,087 [HANCONV]
DATE DRILLED : May85
DEPTH DRILLED (GS) : 300-ft
MEASURED DEPTH (GS) : Not documented
DEPTH TO WATER (GS) : 269-ft, May85;
272.0-ft, 10Jun93
CASING DIAMETER : 12-in, carbon steel, ~0-80-ft
8-in, carbon steel, 0-160-ft;
6-in, carbon steel, +2.0-257-ft
ELEV TOP CASING : 676.08-ft [18Jul85]
ELEV GROUND SURFACE : 674.06-ft, Brass cap [18Jul85]
PERFORATED INTERVAL : 8-in casing, 0-150;
SCREENED INTERVAL : 274-294-ft, 6-in #10 slot stainless steel
COMMENTS : FIELD INSPECTION, 23Aug89,
6-in carbon steel casing.
18-in concrete pad, no posts, capped and locked.
AVAILABLE LOGS : Geologist, driller
TV SCAN COMMENTS : Not applicable
DATE EVALUATED : Not applicable
EVAL RECOMMENDATION : Not applicable
LISTED USE : Grout semiannual water level measurement, 01Jun85-10Jun93;
CURRENT USER : WMC ES&M w/l monitoring,
PUMP TYPE : None documented
MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY			
Drilling Method: <u>Cable tool</u> Drilling Fluid Used: <u>Water</u> Driller's: _____ Name: <u>L. Bultena</u> Drilling Company: <u>Omnege Drilling</u> Date: _____ Started: <u>10Apr85</u>	Sample Drive barrel Method: <u>Hard tool</u> Additives Used: <u>Not documented</u> WA State Lic Nr: _____ Company Location: <u>Kennewick, WA</u> Complete: <u>30May85</u>	WELL NUMBER: <u>299-E25-27</u> Hanford Coordinates: N/S <u>N 39,855.5</u> E/W <u>W 45,135.8</u> State Coordinates: N <u>445,041</u> E <u>2,250,087</u> Start Card #: <u>Not documented</u> T _____ R _____ S _____ Elevation Ground surface: <u>674.06-ft Brass cap</u> TEMPORARY WELL NO: _____	
Depth to water: <u>269-ft May85</u> (Ground surface) <u>272.0-ft 10Jun93</u>			
GENERALIZED Geologist's STRATIGRAPHY Log SI=slightly		Elevation of reference point: <u>[676.08-ft]</u> (top of casing) Height of reference point above <u>[2.0-ft]</u> ground surface Depth of surface seal <u>[0-90-ft]</u> Type of surface seal: Cement grout between 8-in and 12-in casing as 12-in was pulled back 10-ft 18-in round pad 12-in ID carbon steel casing, <u>0-80-ft</u> Hole diameter, 13-in nominal, <u>0-90-ft</u> 8-in ID carbon steel casing, <u>0-160-ft</u> Perforated <u>0-138 & 148-160-ft, 2 cuts/ft/rd</u> Annular seal, cement grout between 6-in and perforated 8-in casing, <u>0-138 & 148-160-ft</u> Hole diameter, <u>90-160-ft, 9-in nominal</u> <u>160-300-ft, 7-in nominal</u> Packer set @ <u>254-ft</u> 6-in casing pulled back from total depth 20-ft blank, <u>254-274-ft</u> 6-in stainless steel telescoping screen, <u>274-294-ft, #10-slot</u> Borehole drilled depth: <u>[300-ft]</u>	
0-5: SL silty pebbly SAND 5-10: SL silty sl gravelly SAND 10-15: Gravelly SAND 15-35: SL gravelly SAND 35-50: SAND 50-55: SL silty SAND 55-60: SL silty sl gravelly SAND 55-65: SL silty SAND 65-75: SL silty sl gravelly SAND (GRAVEL lens @72-ft) 75-80: SL silty SAND 80-90: SL silty sl gravelly SAND 90-95: SL silty SAND 95-116: SAND 116-117: SILT lens 117-125: SL silty SAND 125-130: SAND w/some silty SAND lenses 130-155: SAND 155-170: SL silty SAND 170-175: SL silty sandy GRAVEL 175-180: SL silty sl sandy GRAVEL 180-185: SL sandy GRAVEL 185-190: SL silty sandy GRAVEL 190-205: Sandy GRAVEL 205-210: SL silty sandy GRAVEL 210-215: SL silty sl gravelly SAND 215-220: SL gravelly silty SAND 200-225: Silty sandy GRAVEL 225-230: SL silty sandy GRAVEL 230-235: Silty sandy GRAVEL 235-240: SL gravelly silty SAND 240-245: Silty sandy GRAVEL 245-250: Silty sandy GRAVEL+gravelly SAND 250-265: SL silty sandy GRAVEL 265-270: SL gravelly silt SAND 270-275: Silty gravelly SAND 275-285: Silty SAND 285-290: SL gravelly silty SAND 290-295: Silty SAND 295-300: Gravelly silty SAND			
Drawing By: <u>RKL/ZE25-27.ASB</u> Date: <u>07Sep93</u> Reference: <u>HANFORD WELLS</u>			

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-29

WELL DESIGNATION : 299-E25-29
RCRA FACILITY : Grout
CERCLA UNIT : 200 Aggregate Area Management Study
HANFORD COORDINATES : N 40,170 W 45,735
LAMBERT COORDINATES : N 445,355 E 2,249,487
DATE DRILLED : Oct87
DEPTH DRILLED (GS) : 330-ft
MEASURED DEPTH (GS) : 328.8-ft, Q-27Aug93
DEPTH TO WATER (GS) : Not documented, Oct87;
(P)=270.1-ft, 10Jun93,
(Q)=269.7-ft, 10Jun93,
CASING DIAMETER : 12-in carbon steel, +0.8~3.5-ft;
2-in, stainless steel, +0.7~256.5-ft, (P);
2-in, stainless steel, +0.7~325.0-ft, (Q)
ELEV TOP CASING : 673.06-ft, (12-in casing) [27Mar92-NGVD'29]
ELEV GROUND SURFACE : 672.29-ft, Brass cap [27Mar92-NGVD'29]
PERFORATED INTERVAL : Not applicable
SCREENED INTERVAL : P - 2-in, 256.5~276.5-ft, stainless steel, slot not documented
Q - 2-in, 325~330-ft, stainless steel, slot not documented
COMMENTS : FIELD INSPECTION, 27Aug93;
12-in carbon steel protective casing, 2 ea 2-in stainless steel piezometers.
4-ft by 4-ft concrete pad, 4 posts, 1 removable.
Capped and locked, brass cap in pad with well ID.
Not in radiation zone.
AVAILABLE LOGS : Geologist
TV SCAN COMMENTS : Not applicable
DATE EVALUATED : Not applicable
EVAL RECOMMENDATION : Not applicable
LISTED USE : Grout quarterly water level measurement, (P) 01Dec89~10Jun93
(Q) 01Dec89~10Jun93;
CURRENT USER : WHC ES&M w/l monitoring and RCRA sampling,
PNL sitewide sampling 93
PUMP TYPE : Hydrostar (P)
MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY

Drilling Method: <u>Cable tool</u>	Sample Drive barrel Method: <u>Hard tool</u>	WELL NUMBER: <u>299-E25-29</u>	TEMPORARY WELL NO:
Drilling 200E Area	Additives	Hanford	
Fluid Used: <u>Water</u>	Used: <u>Not documented</u>	Coordinates: W/S <u>N 40.170</u>	E/W <u>W 45.735</u>
Driller's: <u>R. Perry</u>	Utah State	State	
Name: <u>R. Perry</u>	Lic Nr: <u>354</u>	Coordinates: N <u>445,355</u>	E <u>2,249,487</u>
Drilling Company: <u>Basin and Range</u>	Location: <u>Fork, Utah</u>	Start	
Date	Date	Card #: <u>Not documented</u>	T <u> </u> R <u> </u> S <u> </u>
Started: <u>02Sep87</u>	Complete: <u>07Oct87</u>	Elevation	
		Ground surface: <u>672.29-ft Brass cap</u>	

Depth to water: Not documented
(Ground surface) 270.2-ft 10Jun93 (P)

GENERALIZED Geologist's STRATIGRAPHY Log

0-45 SAND
45-105: SAND and SILT
105-140: SAND
140-165: Pebbly SAND
165-195: SAND
195-205: Pebbly SAND
205-330: SAND (and GRAVEL?)
(Log shows cuttings, assumed to be GRAVEL)

Drawing By: RKL/2E25-29.ASB
Date: 08Sep93
Reference:

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-30

WELL DESIGNATION : 299-E25-30
RCRA FACILITY : Grout
CERCLA UNIT : 200 Aggregate Area Management Study
HANFORD COORDINATES : N 39,710 W 44,900
LAMBERT COORDINATES : N 444,897 E 2,250,323
DATE DRILLED : Oct87
DEPTH DRILLED (GS) : 330-ft
MEASURED DEPTH (GS) : Not documented
DEPTH TO WATER (GS) : 271-ft, Oct87;
: 276.0-ft, 10Jun93 (Q)
CASING DIAMETER : 12-in carbon steel, +0.3~3.5-ft;
: 2-in, stainless steel, +0.3~263.5-ft, (P);
: 2-in, stainless steel, +0.0~325.0-ft, (Q)
ELEV TOP CASING : 678.15-ft (12-in casing)
ELEV GROUND SURFACE : ~677.9-ft, Estimated
PERFORATED INTERVAL : Not applicable
SCREENED INTERVAL : P - 256.5~276.5-ft, 2-in stainless steel, #20 slot,
: Q - 325~330-ft, 2-in stainless steel, #20 slot,
COMMENTS : FIELD INSPECTION, 20Jan92;
: Stainless steel piezometer tubing, 12-in protective casing.
: 4-ft by 4-ft concrete pad, 4 posts, 1 removable
: capped and locked, brass cap in pad with well ID.
AVAILABLE LOGS : Geologist
TV SCAN COMMENTS : Not applicable
DATE EVALUATED : Not applicable
EVAL RECOMMENDATION : Not applicable
LISTED USE : Grout quarterly water level measurement, (P) 01Jun91, then uncalibrated transducer
: Grout semiannual water level measurement, (Q) 01Dec89~10Jun93;
CURRENT USER : WHC ES&M w/l monitoring,
: PNL sitewide sampling 93
PUMP TYPE : Hydrostar (P)
MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY			
Drilling Method: <u>Cable tool</u> Drilling: <u>200E Area</u> Fluid Used: <u>Water</u> Driller's: Name: <u>B. Perry</u> Drilling Company: <u>Basin and Range</u> Date: _____ Started: <u>02Sep87</u>	Sample Drive barrel Method: <u>Hard tool</u> Additives: Used: <u>Not documented</u> Utah State Lic Mr: <u>354</u> Company: <u>Spanish</u> Location: <u>Fork, Utah</u> Date: _____ Complete: <u>07Oct87</u>	WELL NUMBER: <u>299-E25-30</u> Hanford Coordinates: N/S <u>N 39.710</u> E/W <u>W 44.900</u> State Coordinates: N <u>444,897</u> E <u>2,250,323</u> Start Card #: <u>Not documented</u> T _____ R _____ S _____ Elevation Ground surface: <u>677.9-ft Estimated</u> TEMPORARY WELL NO: _____	
Depth to water: <u>271-ft Oct87</u> (Ground surface) <u>276.0-ft 10Jun93-9</u> GENERALIZED Geologist's STRATIGRAPHY Log			
0-5: SAND, SILT & CLAY 5-10: SAND, trace GRAVEL 10-30: SAND, SILT & CLAY 30-55: SAND, some SILT 55-95: SAND, trace SILT 95-100: Pebbly SAND 100-115: SAND, some SILT 115-135: SAND, little-no SILT (Perched water saturated zone 120-160-ft) 135-160: SAND 160-265: SAND, w/PEBBLES and cuttings (assumed GRAVEL) 265-310: SAND 310-323: Sandy GRAVEL 323-330: Gravelly SAND			
Drawing By: <u>RKL/2E25-30,ASB</u> Date: <u>08Sep93</u> Reference: _____			

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-31

WELL DESIGNATION : 299-E25-31
 RCRA FACILITY : A-29 Ditch
 CERCLA UNIT : 200 Aggregate Area Management Study
 HANFORD COORDINATES : N 40,311 W 45,752
 LAMBERT COORDINATES : N 445,495 E 2,249,470
 DATE DRILLED : Jul87
 DEPTH DRILLED (GS) : 298-ft
 MEASURED DEPTH (GS) : Not documented
 DEPTH TO WATER (GS) : 264-ft, Jul87;
 270.1-ft, 17Jun93
 CASING DIAMETER : 4-in, stainless steel, +2.1~259-ft
 6-in, stainless steel, +2.98~0.5-ft
 ELEV TOP CASING : 674.64-ft, [25Mar93-NGVD'29]
 ELEV GROUND SURFACE : 671.66-ft, Brass cap [25Mar93-NGVD'29]
 PERFORATED INTERVAL : Not applicable
 SCREENED INTERVAL : 259~279-ft, 4-in stainless steel
 COMMENTS : FIELD INSPECTION,
 AVAILABLE LOGS : Geologist
 TV SCAN COMMENTS : Not applicable
 DATE EVALUATED : Not applicable
 EVAL RECOMMENDATION : Not applicable
 LISTED USE : A29 Ditch quarterly water level measurement, 11Jul88~17Jun93,
 CURRENT USER : WHC ES&M w/l monitoring and RCRA sampling,
 PNL sitewide sampling 93
 PUMP TYPE : Hydrostar
 MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY					
Drilling Method: <u>Air Rotary</u> Fluid Used: <u>Air</u> Driller's: _____ Name: <u>Nelson</u> Drilling Company: <u>Nelson Well Drill</u> Date Started: <u>22Jun87</u>	Sample Method: <u>Air returns</u> Additives: _____ Used: <u>Foam</u> WA State: _____ Lic Nr: <u>Not documented</u> Company: _____ Location: <u>Pasco, WA</u> Date Complete: <u>16Jul87</u>	WELL NUMBER: <u>299-E25-31 A4778</u> TEMPORARY WELL NO: _____ Hanford Coordinates: N/S <u>N 40,311</u> E/W <u>W 45,752</u> State: _____ Coordinates: N <u>445,495</u> E <u>2,249,470</u> Start Card #: <u>Not documented</u> T _____ R _____ S _____ Elevation _____ Ground surface: <u>671.66-ft Brass cap</u>			
Depth to water: <u>264-ft Jul87</u> (Ground surface) <u>270.1-ft 17Jun93</u> GENERALIZED Geologist's STRATIGRAPHY Log					
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; border: none;"> 0-27: No record 27-33: Black SAND 33-79: No record 79-99: Black, silty SAND 99-117: Black, sandy, silty GRAVEL 117-137: Coarse SAND, fine GRAVEL 137-177: No record 177-197: Coarse SAND, fine GRAVEL 197-217: Large GRAVEL, COBBLES 217-220: COBBLES, GRAVEL 220-225: No record 225-230: Very open, moist 230-237: No record 237-258: COBBLES, GRAVEL, SAND 258-271: No record 271-276: Medium SAND and GRAVEL 276-298: No record </td> <td style="width: 50%; vertical-align: top; border: none;"> <div style="position: absolute; top: 240px; left: 550px; width: 40%;"> Elevation of reference point: <u>(674.64-ft)</u> (top of casing) Height of reference point above <u>(2.98-ft)</u> ground surface Depth of surface seal <u>(3-249-ft)</u> Type of surface seal: Volclay grout, 3-249-ft 4x4-ftx4-in concrete pad extending 3-ft into annulus 4-in ID T304 stainless steel casing, <u>2.1-259.0-ft</u> Hole diameter, 9-in nominal <u>0-298-ft</u> Bentonite pellets, <u>249-254-ft</u> Silica sand pack, <u>254-298-ft, mesh not documented</u> 4-in ID stainless steel screen, <u>259-279-ft, slot not documented</u> Borehole drilled depth: <u>(298.0-ft)</u> </div> </td> </tr> </table>				0-27: No record 27-33: Black SAND 33-79: No record 79-99: Black, silty SAND 99-117: Black, sandy, silty GRAVEL 117-137: Coarse SAND, fine GRAVEL 137-177: No record 177-197: Coarse SAND, fine GRAVEL 197-217: Large GRAVEL, COBBLES 217-220: COBBLES, GRAVEL 220-225: No record 225-230: Very open, moist 230-237: No record 237-258: COBBLES, GRAVEL, SAND 258-271: No record 271-276: Medium SAND and GRAVEL 276-298: No record	<div style="position: absolute; top: 240px; left: 550px; width: 40%;"> Elevation of reference point: <u>(674.64-ft)</u> (top of casing) Height of reference point above <u>(2.98-ft)</u> ground surface Depth of surface seal <u>(3-249-ft)</u> Type of surface seal: Volclay grout, 3-249-ft 4x4-ftx4-in concrete pad extending 3-ft into annulus 4-in ID T304 stainless steel casing, <u>2.1-259.0-ft</u> Hole diameter, 9-in nominal <u>0-298-ft</u> Bentonite pellets, <u>249-254-ft</u> Silica sand pack, <u>254-298-ft, mesh not documented</u> 4-in ID stainless steel screen, <u>259-279-ft, slot not documented</u> Borehole drilled depth: <u>(298.0-ft)</u> </div>
0-27: No record 27-33: Black SAND 33-79: No record 79-99: Black, silty SAND 99-117: Black, sandy, silty GRAVEL 117-137: Coarse SAND, fine GRAVEL 137-177: No record 177-197: Coarse SAND, fine GRAVEL 197-217: Large GRAVEL, COBBLES 217-220: COBBLES, GRAVEL 220-225: No record 225-230: Very open, moist 230-237: No record 237-258: COBBLES, GRAVEL, SAND 258-271: No record 271-276: Medium SAND and GRAVEL 276-298: No record	<div style="position: absolute; top: 240px; left: 550px; width: 40%;"> Elevation of reference point: <u>(674.64-ft)</u> (top of casing) Height of reference point above <u>(2.98-ft)</u> ground surface Depth of surface seal <u>(3-249-ft)</u> Type of surface seal: Volclay grout, 3-249-ft 4x4-ftx4-in concrete pad extending 3-ft into annulus 4-in ID T304 stainless steel casing, <u>2.1-259.0-ft</u> Hole diameter, 9-in nominal <u>0-298-ft</u> Bentonite pellets, <u>249-254-ft</u> Silica sand pack, <u>254-298-ft, mesh not documented</u> 4-in ID stainless steel screen, <u>259-279-ft, slot not documented</u> Borehole drilled depth: <u>(298.0-ft)</u> </div>				
Drawing By: <u>TJW/2E25-31.ASB</u> Date: <u>27Aug96</u> Reference: <u>HANFORD WELLS</u>					

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-32

WELL DESIGNATION : 299-E25-32
 RCRA FACILITY : A-29 Ditch
 CERCLA UNIT : 200 Aggregate Area Management Study
 HANFORD COORDINATES : N 41,199.2 W 44,325.4 [27Jun88-200E]
 LAMBERT COORDINATES : N 446,387 E 2,250,894 [HANCONV]
 DATE DRILLED : Jun88
 DEPTH DRILLED (GS) : 354-ft
 MEASURED DEPTH (GS) : 279.2-ft, 09Apr93 (P)
 DEPTH TO WATER (GS) : 264-ft, Jun88;
 266.5-ft, 22Jun93 (P); 265.6-ft, 22Jun93 (Q)
 CASING DIAMETER : 12-in, carbon steel, +2.3-in-OD-ft
 4-in, stainless steel, +1.1-in-259-ft, (P);
 2-in, stainless steel, +0.6-in-320-ft, (Q)
 ELEV TOP CASING : 670.38-ft, [27Jun88-200E]
 ELEV GROUND SURFACE : 668.07-ft, Brass cap [27Jun88-200E]
 PERFORATED INTERVAL : Not applicable
 SCREENED INTERVAL : 4-in 259-279-ft, stainless steel, #20 slot
 2-in 320-330-ft, stainless steel, #20 slot
 COMMENTS : FIELD INSPECTION, 20Jan92;
 12-in carbon steel, 4-in stainless steel casing.
 4-ft by 4-ft concrete pad, 4 posts, 1 removable.
 Capped and locked, brass cap in pad with well ID.
 Not in radiation zone.
 AVAILABLE LOGS : Geologist
 TV SCAN COMMENTS : Not applicable
 DATE EVALUATED : Not applicable
 EVAL RECOMMENDATION : Not applicable
 LISTED USE : A29 Ditch monthly water level measurement, (P) 19Oct88-22Jun93,
 Grout quarterly water level measurement, (Q) 01Dec89-22Jun93
 CURRENT USER : WHC ES&M w/l monitoring and RCRA sampling,
 PNL sitewide w/l monitoring 93
 PUMP TYPE : Hydrostar (P)
 MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY			
Drilling Method: <u>Cable tool</u> Drilling: <u>200E Area</u> Fluid Used: <u>Water</u> Driller's: _____ Name: <u>O. Amos</u> Drilling Company: <u>Kaiser Engineers</u> Date: _____ Started: <u>12Nov87</u>	Sample Method: <u>Drive barrel</u> Additives: _____ Used: <u>Not documented</u> WA State Lic Nr: <u>1224</u> Company Location: <u>Hanford</u> Date Complete: <u>27Jun88</u>	WELL NUMBER: <u>299-E25-32</u> Hanford Coordinates: N/S <u>N 41,199.2</u> E/W <u>W 44,325.4</u> State Coordinates: N <u>446,387</u> E <u>2,250,894</u> Start Card #: <u>Not documented</u> T _____ R _____ S _____ Elevation Ground surface: <u>668.07-ft Brass cap</u>	TEMPORARY WELL NO: _____
Depth to water: <u>264-ft Jun88</u> (Ground surface) <u>266.5-ft 22Jun93(P)</u> GENERALIZED Geologist's STRATIGRAPHY Log			
0-5: Not documented 10-30: Silty gravelly SAND 10-35: SAND 35-45: Silty SAND 45-50: SAND 50-60: Gravelly SAND 60-65: Silty SAND 65-80: SAND 80-90: Silty SAND 90-95: SAND 95-110: Silty SAND 110-140: Silty gravelly SAND 140-145: Silty SAND 145-155: SAND 155-160: Gravelly silty SAND 160-180: Silty sandy GRAVEL 180-185: Sandy GRAVEL 185-235: Silty sandy GRAVEL 235-245: Gravelly silty SAND 245-285: Silty sandy GRAVEL 285-295: Gravelly silty SAND 295-300: GRAVEL 300-305: Sandy GRAVEL 305-350: Silty sandy GRAVEL 350-354: BASALT flowtop		Elevation of reference point: <u>[670.38-ft]</u> (top of 12-in casing) Height of reference point above <u>[2.3-ft]</u> ground surface Depth of surface seal <u>[0-12-ft]</u> Type of surface seal: Cement grout to 12-ft 4 x 4-ft x 4-in concrete pad Hole diameter, 0-13-ft, 13-in nominal 12-270-ft, 11-in nominal 2-in ID T304 stainless steel tubing, <u>0-6-320-ft (Q)</u> 4-in ID T304 stainless steel casing, <u>1-1-259.4-ft (P)</u> Powdered bentonite, <u>12-251-ft</u> Granular bentonite, <u>251-253-ft</u> 4-in stainless steel screen, <u>259.4-279.4-ft, #20-slot</u> Sandpack, <u>253-284.8-ft</u> Hole diameter, 9-in nominal, <u>270-354-ft</u> Granular bentonite, tremied "EnViroGel" <u>284.8-310.5-ft</u> 2-in T304 stainless steel screen, <u>320-330.6-ft, #20-slot</u> Sandpack, <u>310.5-338-ft</u> Bentonite/sand slurry, <u>338-354-ft</u> Borehole drilled depth: <u>[354-ft]</u>	
Drawing By: <u>RKL/2E25-32.ASB</u> Date: <u>08Sep93</u> Reference: <u>HANFORD WELLS</u>			

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-33

WELL DESIGNATION : 299-E25-33
 RCRA FACILITY : Grout
 CERCLA UNIT : 200 Aggregate Area Management Study
 HANFORD COORDINATES : N 40,116.20 W 45,609.55 [28Jun88]
 LAMBERT COORDINATES : N 445,301 E 2,249,613 [HANCONV]
 DATE DRILLED : Mar88
 DEPTH DRILLED (GS) : 400-ft
 MEASURED DEPTH (GS) : Not documented
 DEPTH TO WATER (GS) : 266.5-ft, Mar88;
 267-ft, 01Dec92
 CASING DIAMETER : 6-in, stainless steel, +2.62~0.5-ft;
 4-in, stainless steel, +ND~261.9-ft
 ELEV TOP CASING : 650.23-ft, [27Mar92-NGVD'29];
 674.97-ft, [27Jun88]
 ELEV GROUND SURFACE : Not documented
 PERFORATED INTERVAL : Not applicable
 SCREENED INTERVAL : 261.9~282.2-ft, 4-in stainless steel, #20-slot
 COMMENTS : FIELD INSPECTION, 12Aug89;
 Stainless steel casing. 4-ft by 4-ft concrete pad, 4 posts, 1 removable
 capped and locked, brass cap in pad with well ID.
 OTHER; Casing was apparently cut off 25-ft after Jun88.
 AVAILABLE LOGS : Geologist
 TV SCAN COMMENTS : Not applicable
 DATE EVALUATED : Not applicable
 EVAL RECOMMENDATION : Not applicable
 LISTED USE : Grout semiannual water level measurement, 08Jul88~01Dec91;
 CURRENT USER : WHC ES&M w/l monitoring and RCRA sampling,
 PNL site-wide sampling 93
 PUMP TYPE : Hydrostar
 MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY			
Drilling Method: <u>Cable tool</u> Drilling: <u>200E Area</u> Fluid Used: <u>Water</u> Driller's: _____ Name: <u>Multiple</u> Drilling: _____ Company: <u>Kaiser Engineers</u> Date: _____ Started: <u>12Nov87</u>	Sample Method: <u>Drive barrel</u> Additives: _____ Used: <u>Not documented</u> WA State: _____ Lic Nr: <u>Not documented</u> Company: _____ Location: <u>Hanford</u> Complete: <u>24Mar88</u>	WELL NUMBER: <u>299-E25-33</u> Hanford Coordinates: N/S <u>N 40.116.20</u> E/W <u>W 45.609.55</u> State: _____ Coordinates: W <u>445.301</u> E <u>2,249.613</u> Start: _____ Card #: _____ T _____ R _____ S _____ Elevation: _____ Ground surface: <u>Not documented</u>	TEMPORARY WELL NO: _____
Depth to water: <u>266.5-ft Mar88</u> (Ground surface) <u>247-ft Dec92</u>			
GENERALIZED Geologist's STRATIGRAPHY Log SI=slightly			
0-30: SAND 30-35: Silty gravelly SAND 35-45: SAND 45-50: Silty SAND 50-55: Silty gravelly SAND 55-60: SI gravelly SAND 60-65: SAND 65-75: Silty SAND 75-80: SI silty SAND 80-85: Silty SAND 85-105: SAND 105-110: Gravelly silty SAND 110-115: Silty gravelly SAND 115-135: SAND 135-140: SI silty SI gravelly SAND 140-165: Not documented 165-185: SAND 185-190: Gravelly SAND 190-200: Gravelly silty SAND 200-205: Gravelly SAND 205-215: Silty sandy GRAVEL 215-220: SI silty sandy GRAVEL 220-225: SI silty SI sandy GRAVEL 225-270: Silty sandy GRAVEL 270-285: Silty SAND 285-290: SI silty gravelly SAND 290-305: Silty sandy GRAVEL 305-310: Silty gravelly SAND 310-320: SI silty sandy GRAVEL 320-325: SAND 325-350: Sandy GRAVEL 350-385: Silty sandy GRAVEL 385-400: BASALT		Elevation of reference point: <u>(650.03-ft)</u> (top of casing) Height of reference point above <u>ND</u> ground surface Depth of surface seal <u>(2.0-20.0-ft)</u> Type of surface seal: Cement grout 2-20-ft 4x4-ft x 4-in concrete pad extending 2-ft into annulus Hole diameter, 0-120-ft, 13-in nominal 120-315-ft, 11-in nominal 4-in ID T304 stainless steel casing, +ND=261.9-ft Granular/powdered bentonite, 20-244.8-ft Bentonite pellets, 244.8-249.8-ft Silica sand pack, 249.8-ND-ft, 10-20-mesh 4-in T304 stainless steel screen, 261.9-282.2-ft, #20-slot Volclay grout, Depths not documented Hole diameter, 315-380-ft, 9-in nominal 380-400-ft, 8-in nominal Borehole drilled depth: <u>[400-ft]</u>	
NOTE: Construction diagram is as-built. Well has apparently been cut off 25-ft to present elevation. Former top-of-casing elevation was 674.97-ft.			
Drawing By: <u>RKL/2E25-33.ASB</u> Date: <u>08Sep93</u> Reference: _____			

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-37

WELL DESIGNATION : 299-E25-37
 CERCLA UNIT : 200 Aggregate Area Management Study
 RCRA FACILITY : Grout
 HANFORD COORDINATES : N 40,461.5 W 45,749.2 [10Nov89-200E]
 LAMBERT COORDINATES : N 445,646 E 2,249,472; [HANCONV]
 N 135,818.4m E 575,949.2m [10Nov89-WAD83]
 DATE DRILLED : Jul89
 DEPTH DRILLED (GS) : 280.7-ft
 MEASURED DEPTH (GS) : 280.9-ft, 27Aug93
 DEPTH TO WATER (GS) : 264.6-ft, 11Aug89;
 268.3-ft, 10Jun93
 CASING DIAMETER : 4-in stainless steel, +1.1"=260.0-ft;
 6-in stainless steel, +2.94"=0.5-ft;
 ELEV TOP CASING : 673.64-ft, [25Mar93-NGVD'29]
 ELEV GROUND SURFACE : 670.70-ft, Brass cap [25Mar93-NGVD'29]
 PERFORATED INTERVAL : Not applicable
 SCREENED INTERVAL : 260.0"=280.7-ft, 4-in #10-slot stainless steel w/channel pack
 COMMENTS : FIELD INSPECTION, 27Aug93;
 4 and 6-in stainless steel casing.
 4-ft by 4-ft concrete pad, 4 posts, 1 removable.
 Capped and locked, brass cap in pad with well ID.
 Not in radiation zone.
 OTHER:
 AVAILABLE LOGS : Geologist, driller
 TV SCAN COMMENTS : Not applicable
 DATE EVALUATED : Not applicable
 EVAL RECOMMENDATION : Not applicable
 LISTED USE : Grout semiannual water level measurement, 01Dec89"=10Jun93
 CURRENT USER : WHC ES&M w/l monitoring and RCRA sampling,
 PNL sitewide sampling 93
 PUMP TYPE : Hydrostar
 MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY			
Drilling Method: <u>Cable tool</u> Drilling: <u>200 W Water</u> Fluid Used: <u>Supply</u> Driller's: <u>C. Walmsley</u> Name: <u>C. Walmsley</u> Drilling Company: <u>Kaiser Engineers</u> Date: <u>14Jun89</u> Started: <u>14Jun89</u>	Sample Hard tool Method: <u>Drive barrel</u> Additives: <u>Used: Not documented</u> WA State: <u>Lic Mr: Not documented</u> Company: <u>Location: Hanford</u> Date: <u>Complete: 13Jul89</u>	WELL NUMBER: <u>299-E25-37 A4785</u> TEMPORARY WELL NO: _____ Hanford Coordinates: N/S <u>N 40,461.5</u> E/W <u>W 45,749.2</u> State <u>NAD83 W 135,818.4m E 575,949.2m</u> Coordinates: N <u>445,646</u> E <u>2,249,472</u> Start Card #: <u>Not documented</u> T _____ R _____ S _____ Elevation Ground surface: <u>670.70-ft (Brass cap)</u>	
Depth to water: <u>264.6-ft Aug89</u> (Ground surface) <u>268.3-ft 10Jun93</u> GENERALIZED Geologist's STRATIGRAPHY Log Sl=slightly			
0-10: SAND 10-15: Sl muddy SAND 15-20: Sl muddy gravelly SAND 20-25: Sl gravelly muddy SAND 25-35: Gravelly SAND 35-50: SAND 50-55: Muddy SAND 55-65: SAND 65-70: SAND/sl muddy SAND 70-80: SAND 80-85: Sl muddy SAND 85-90: SAND 90-95: Sl muddy SAND 95-100: SAND 100-105: Muddy SAND 105-120: SAND 120-125: Sl gravelly SAND 125-130: Sl muddy SAND 130-150: SAND 150-155: Sl gravelly SAND 155-165: SAND 165-185: Gravelly SAND 185-190: Sandy GRAVEL 190-195: Gravelly SAND 195-200: Muddy sandy GRAVEL 200-250: Sandy GRAVEL 250-270: Muddy sandy GRAVEL 270-275: Sl gravelly muddy SAND 275-280: Sandy GRAVEL	<div style="position: absolute; right: 10px; top: 240px; width: 60%;"> Elevation of reference point: <u>(673.64-ft)</u> (top of casing) Height of reference point above <u>(2.94-ft)</u> ground surface (Brass Cap) Depth of surface seal <u>(3.0-10.1-ft)</u> Type of surface seal: Cement grout, 3.0-10.1-ft, 4x4-ft x 6-in concrete pad extends 3.0-ft into annulus Hole diameter, 3-20.3-ft, 13-in nominal 20.3-153.7-ft, 11-in nominal 153.7-280.7-ft, 9-in nominal 4-in ID T304 stainless steel casing, +1.1-260.0-ft Granular bentonite, 10.1-253.2-ft, 8-20-mesh 1/2-in Envirolgel bentonite tablets, 253.2-255.9-ft Silica sand pack, 255.9-280.7-ft, 10-20-mesh 4-in stainless steel screen, 260.0-280.7-ft, #10-slot w/channel pack Borehole drilled depth: <u>(280.7-ft)</u> </div>		
Drawing By: <u>TJW/2E25-37, ASB</u> Date: <u>27Aug96</u> Reference: <u>WCH-MR-0203</u>			

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-38

WELL DESIGNATION : 299-E25-38
CERCLA UNIT : 200 Aggregate Area Management Study
RCRA FACILITY : Grout
HANFORD COORDINATES : N 40,056.4 W 45,469.0 [10Nov89-200E]
LAMBERT COORDINATES : N 445,241 E 2,249,753; [HANCONV]
N 135,695.2m E 576,034.9m [10Nov89-WAD83]
DATE DRILLED : Sep89
DEPTH DRILLED (GS) : 283.0-ft
MEASURED DEPTH (GS) : Not documented
DEPTH TO WATER (GS) : 265.1-ft, 05Jul89;
268.2-ft, 10Jun93
CASING DIAMETER : 4-in stainless steel, +1.4~258.6-ft;
6-in stainless steel, +3.0~0.5-ft
ELEV TOP CASING : 673.75-ft, [27Mar92-NGVD'29]
ELEV GROUND SURFACE : 670.77-ft, Brass cap [27Mar92-NGVD'29]
PERFORATED INTERVAL : Not applicable
SCREENED INTERVAL : 258.6~279.6-ft, 4-in #10-slot stainless steel w/channel pack
COMMENTS : FIELD INSPECTION,
OTHER:
AVAILABLE LOGS : Geologist, driller
TV SCAN COMMENTS : Not applicable
DATE EVALUATED : Not applicable
EVAL RECOMMENDATION : Not applicable
LISTED USE : Grout semiannual water level measurement, 01Dec89~10Jun93;
CURRENT USER : VHC ES&M w/l monitoring and RCRA sampling,
PNL sitewide sampling 93
PUMP TYPE : Hydrostar, intake @ 279.1-ft
MAINTENANCE :

B-20

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-39

WELL DESIGNATION : 299-E25-39
CERCLA UNIT : 200 Aggregate Area Management Study
RCRA FACILITY : Grout
HANFORD COORDINATES : N 40,518 W 43,673.0 [22Jan91-200E]
LAMBERT COORDINATES : N 445,708 E 2,251,548; [HANCONV]
N 135,737.27m E 576,581.88m [22Jan91-MAD83]
DATE DRILLED : Oct90
DEPTH DRILLED (GS) : 282.4-ft
MEASURED DEPTH (GS) : Not documented
DEPTH TO WATER (GS) : 264.6-ft, 20Sep90;
265.5-ft, 14Jun93
CASING DIAMETER : 4-in stainless steel, +0.4"-257.5-ft;
6-in stainless steel, +2.8"-0.5-ft
ELEV TOP CASING : 671.23-ft, [22Jan91-NGVD'29]
ELEV GROUND SURFACE : 668.45-ft, Brass cap [22Jan91-NGVD'29]
PERFORATED INTERVAL : Not applicable
SCREENED INTERVAL : 257.5"-277.8-ft, 4-in #10-slot stainless steel
COMMENTS : FIELD INSPECTION,
OTHER:
AVAILABLE LOGS : Geologist, driller
TV SCAN COMMENTS : Not applicable
DATE EVALUATED : Not applicable
EVAL RECOMMENDATION : Not applicable
LISTED USE : Grout quarterly water level measurement, 01Jun91-14Jun93;
CURRENT USER : WHC ES&M w/l monitoring and RCRA sampling
PUMP TYPE : Hydrostar, intake @ 270.0-ft, (GS)
MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY			
Drilling Method: <u>Cable tool</u> Drilling: <u>200 W Water</u> Fluid Used: <u>Supply</u> Driller's: <u>D. Ludtke</u> Drilling: <u>Kaiser Engineers</u> Date: <u>13Aug90</u> Started: <u>13Aug90</u>	Sample Hard tool Method: <u>Drive barrel</u> Additives: <u>Not documented</u> Used: <u>Not documented</u> Lic Mr: <u>Not documented</u> Location: <u>Manford</u> Date: <u>18Oct90</u> Complete: <u>18Oct90</u>	WELL NUMBER: <u>299-E25-39</u> Manford Coordinates: W/S <u>N 40.518</u> E/W <u>W 43.673</u> State <u>NAD83 N 135,837.27m E 576,581.88m</u> Coordinates: N <u>445,708</u> E <u>2,251,548</u> Start Card #: <u>Not documented</u> T <u> </u> R <u> </u> S <u> </u> Elevation Ground surface: <u>668.45-ft (Bress cap)</u>	
Depth to water: 264.6-ft 20Sep90 (Ground surface) 265.5-ft, 14Jun93 GENERALIZED Geologist's STRATIGRAPHY Log Sl=slightly			
0=7: Silty SAND 7=14: Sl gravelly SAND 14=20: SAND w/lenses of GRAVEL 20=21: Sl gravelly SAND 21=85: SAND 85=155: Sl silty SAND 155=160: Sl silty gravelly SAND 160=170: Sl silty SAND 170=190: Silty SAND 190=200: Sandy GRAVEL 200=210: Silty sandy GRAVEL 210=225: Sandy GRAVEL 225=230: Silty sandy GRAVEL 230=235: Sl silty SAND 235=240: SAND 240=283: Sandy GRAVEL	<div style="position: absolute; right: 0; top: 0; width: 100%; height: 100%; pointer-events: none;"> <div style="position: absolute; top: 0; right: 0;">Elevation of reference point: <u>671.23-ft</u> (top of casing)</div> <div style="position: absolute; top: 10%; right: 0;">Height of reference point above <u>2.78-ft</u> ground surface</div> <div style="position: absolute; top: 20%; right: 0;">Depth of surface seal <u>3.0-18.0-ft</u></div> <div style="position: absolute; top: 25%; right: 0;">Type of surface seal: Cement grout, 3.0-18.0-ft 4x4-ft x 6-in concrete pad extends 3.0-ft into annulus</div> <div style="position: absolute; top: 35%; right: 0;">Hole diameter, <u>3.0-18.4-ft, 13-in nominal</u> <u>18.4-206.3-ft, 11-in nominal</u> <u>206.3-282.4-ft, 9-in nominal</u></div> <div style="position: absolute; top: 45%; right: 0;">4-in ID stainless steel casing, <u>+0.4-257.5-ft</u></div> <div style="position: absolute; top: 55%; right: 0;">Granular bentonite, <u>18.0-250.2-ft, 8-20-mesh</u></div> <div style="position: absolute; top: 65%; right: 0;">4-in bentonite pellets, <u>250.2-253.5-ft</u></div> <div style="position: absolute; top: 70%; right: 0;">Silica sand pack, <u>253.5-281.4-ft, 20-40-mesh</u></div> <div style="position: absolute; top: 75%; right: 0;">4-in stainless steel screen, <u>257.5-277.8-ft, #10-slot</u> w/welded bottom cap</div> <div style="position: absolute; top: 85%; right: 0;">Fill, <u>281.4-282.4-ft</u></div> <div style="position: absolute; top: 90%; right: 0;">Borehole drilled depth: <u>(282.4-ft)</u></div> </div>		
Drawing By: <u>RKL/2E25-39.ASB</u> Date: <u>08Sep93</u> Reference: <u>WHC-SD-EN-DP-048</u>			

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS

RESOURCE PROTECTION WELL - 299-E25-44

WELL DESIGNATION : 299-E25-44
 RCRA FACILITY : Grout
 CERCLA UNIT : 200 Aggregate Area Management Study
 HANFORD COORDINATES : N 39,930.35 W 45,222.74 [21Sep92-200E]
 LAMBERT COORDINATES : N 445,116 E 2,250,000 [HANCONV]
 : N 135.656,934m E 576,110.133m [HAD83-21Sep92]
 DATE DRILLED : Jun92
 DEPTH DRILLED (GS) : 293.3-ft
 MEASURED DEPTH (GS) : 285.8-ft, 18Dec92
 DEPTH TO WATER (GS) : 269.2-ft, 02Jun92
 : 270.3-ft, 18Dec92
 CASING DIAMETER : 6-in, stainless steel, +2.4"±0.5-ft;
 : 4-in, stainless steel, +ND±265.8-ft
 ELEV TOP CASING : 675.29-ft, [21Sep92-NGVD'29]
 ELEV GROUND SURFACE : 672.90-ft, Brass cap [21Sep92-NGVD'29]
 PERFORATED INTERVAL : Not applicable
 SCREENED INTERVAL : 265.8±285.9-ft, 4-in stainless steel, #10-slot
 COMMENTS : FIELD INSPECTION, 18Dec92;
 : Stainless steel casing. 4-ft by 4-ft concrete pad, 4 posts, 1 removable
 : capped and locked, brass cap in pad in pad with well ID.
 : Not in radiation zone.
 AVAILABLE LOGS : Geologist
 TV SCAN COMMENTS : Not applicable
 DATE EVALUATED : Not applicable
 EVAL RECOMMENDATION : Not applicable
 LISTED USE : No water level data;
 CURRENT USER : WHC ES&M RCRA sampling
 PUMP TYPE : Hydrostar
 MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY

Drilling Backhoe 0-15-ft	Sample	WELL	TEMPORARY
Method: Air rotary	Method: Air returns	NUMBER: 299-E25-44	WELL NO:
Drilling	Additives	Nanford	
Fluid Used: Not applicable	Used: Rock oil	Coordinates: N/S N 39,930.35 E/W W 45,222.74	
Driller's	WA State	State NAD83 N 135,656.934m E 576,110.133m	
Name: D. Mingo	Lic Nr: Not documented	Coordinates: N 445,116 E 2,250,000	
Drilling	Company	Start	
Company: Jensen/KEH	Location: Nanford	Card #: Not documented T R S	
Date	Date	Elevation	
Started: 06May92	Complete: 04Jun92	Ground surface: 672.90-ft (Brass cap)	

Depth to water: 269.2-ft Jun92
(Ground surface) 270.3-ft 18Dec92

GENERALIZED Geologist's
STRATIGRAPHY Log

0-10: SAND
10-15 Sandy GRAVEL
15-65: SAND, w/scattered PEBBLES
65-75: SAND, finer PEBBLES
75-110: SAND,
silty @ 82 and 90-91-ft
110-165: SAND, trace PEBBLES
165-173: Granular to pebble SAND
173-180: GRAVEL, pebble/cobble
180-218: GRAVEL
218-261: Pebble/cobble GRAVEL
261-263.3: SAND
263.3-263.5: SILT
263.5-264: SILT w/SAND and pebbly
SAND interbed
264-265.3: SAND, minor PEBBLES
265.3-269: Not documented
269-270: SILT, SAND
270-293.3: SAND

Drawing By: RKL/ZE25-44, ASB
Date : 08Sep93
Reference : NANFORD WELLS

SUMMARY OF CONSTRUCTION DATA AND FIELD OBSERVATIONS RESOURCE PROTECTION WELL - 299-E25-45

WELL DESIGNATION : 299-E25-45
 RCRA FACILITY : Grout
 CERCLA UNIT : 200 Aggregate Area Management Study
 HANFORD COORDINATES : N 39,937.7 W 44,973.2 [300ec92-200E]
 LAMBERT COORDINATES : N 445,126 E 2,250,249 [HANCONV];
 N 135,659.15m E 576,185.55m [WAD83-300ec92]
 DATE DRILLED : Jul92
 DEPTH DRILLED (GS) : 297.6-ft
 MEASURED DEPTH (GS) : Not documented
 DEPTH TO WATER (GS) : 271.9-ft, 30Jun92
 280.4-ft, 18Dec92
 CASING DIAMETER : 6-in, stainless steel, +2.7"~0.5-ft;
 4-in, stainless steel, +ND~269.4-ft
 ELEV TOP CASING : 678.45-ft, [30Dec92-NGVD'29]
 ELEV GROUND SURFACE : 675.74-ft, Brass cap [30Dec92-NGVD'29]
 PERFORATED INTERVAL : Not applicable
 SCREENED INTERVAL : 269.4~289.6-ft, 4-in stainless steel, #10-slot
 COMMENTS : FIELD INSPECTION, 18Dec92;
 4 and 6-in stainless steel casing.
 4-ft by 4-ft concrete pad, 4 posts, 1 removable.
 Capped and locked, brass cap in pad with well ID.
 Not in radiation zone.
 AVAILABLE LOGS : Geologist
 TV SCAN COMMENTS : Not applicable
 DATE EVALUATED : Not applicable
 EVAL RECOMMENDATION : Not applicable
 LISTED USE : No water level data;
 CURRENT USER : WHC ES&M RCRA sampling,
 PUMP TYPE : Hydrostar
 MAINTENANCE :

WELL CONSTRUCTION AND COMPLETION SUMMARY

Drilling Backhoe 0-15-ft	Sample	WELL	TEMPORARY
Method: Air rotary	Method: Air returns	NUMBER: 299-E25-45	WELL NO: _____
Drilling	Additives	Hanford	
Fluid Used: Not applicable	Used: Rock oil	Coordinates: N/S <u>N 39,939.7</u> E/W <u>W 44,973.2</u>	
Driller's	WA State	State NAD83 N <u>135,659.15m</u> E <u>576,185.55m</u>	
Name: D. Mingo	Lic Nr: Not documented	Coordinates: N <u>445,126</u> E <u>2,250,249</u>	
Drilling	Company	Start	
Company: Jensen/KEH	Location: Hanford	Card #: Not documented	T _____ R _____ S _____
Date	Date	Elevation	
Started: 04May92	Complete: 27Jul92	Ground surface: 675.74-ft (Brass cap)	

Depth to water: 271.9-ft Jun92
(Ground surface) 280.5-ft 18Dec92

GENERALIZED Geologist's
STRATIGRAPHY Log

0-10: Sandy SILT
10-20: Gravelly sandy SILT
20-45: Silty SAND
45-60: Gravelly silty SAND
60-65: Gravelly sandy SILT
65-75: Gravelly silty SAND
75-85: Silty SAND
85-110: Gravelly silty SAND
110-172.5: Silty SAND
172.5-185: Pebble SAND
185-195: Cobble sandy PEBBLE
195-230: Sandy cobble PEBBLE
230-267: Silty sandy PEBBLE
267-269: SILT
269-295: Silty SAND
295-297.6: Sandy PEBBLE

Drawing By: RKL/ZE25-45.ASB
Date : 08Sep93
Reference : HANFORD WELLS

KDR 2/15/94

P 1 of 3

WELL CONSTRUCTION SUMMARY REPORT

SIGNATURE/DATE

Page 1 of 1

WNC-5-014 Specification No. <u>WHC-SD-EN-AP-006</u> Rev. No. <u>0/0</u> ECNs <u>16744 16864 16874</u> <u>2/1/94 2/1/94 2/1/94</u>		Well No. <u>299-ESS-49</u> Temp. Well No. <u>299-ESS-49</u> Approximate Location <u>SPRINT TREATMENT FACILITY (STF)</u> Drill Method Type <u>BACKLOG FOR STARTER CASING, THEN AIR ROTARY</u> Drilling Fluid <u>N/A</u> Total Amount of Water Added During Drilling <u>~1000 gallons (approximate total)</u> Comments <u>① Columbia River water was used during drilling activities from ~282' to 293' due to heaving sand in that interval.</u>																																				
Project <u>W-0152</u> Drilling Company <u>PC EXPLORATION</u> Driller <u>T. MACHESKI / C. Shields</u> Other (Companies) <u>B.F. Strade (MCE/WTC)</u> Geologist(s) <u>J. BARRON / A. Templeton / F.S. Macker</u> <u>R. Edgington</u> <u>L.D. Lockard WHC Review</u>		Temporary Casings and Drilled Depth <table border="1"> <thead> <tr> <th>Casing Type and Size</th> <th>Interval</th> <th>Shoe OD</th> </tr> </thead> <tbody> <tr> <td><u>CS-12" DIAM.</u></td> <td><u>0 - 12.1'</u></td> <td><u>N/A</u></td> </tr> <tr> <td><u>CS-10" DIAM.</u></td> <td><u>0 - 158'</u></td> <td><u>N/A</u></td> </tr> <tr> <td><u>CS-8" DIAM.</u></td> <td><u>0 - 158'</u></td> <td><u>N/A</u></td> </tr> <tr> <td></td> <td><u>292'</u></td> <td></td> </tr> </tbody> </table> Drilled Depth <u>293'</u> Hole Diameter at TD <u>8"</u> Static Water Level/Date <u>272.19' @ 0718 8-25-93</u> Comments <u>272.3' @ 14:59 9/10/93 (WB)</u> <u>FOLLOWING COMPLETION</u>		Casing Type and Size	Interval	Shoe OD	<u>CS-12" DIAM.</u>	<u>0 - 12.1'</u>	<u>N/A</u>	<u>CS-10" DIAM.</u>	<u>0 - 158'</u>	<u>N/A</u>	<u>CS-8" DIAM.</u>	<u>0 - 158'</u>	<u>N/A</u>		<u>292'</u>																					
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Other Activity Aquifer Test Performed? <u>Yes</u> Type <u>Instantaneous Slug</u> Date <u>9/24/93</u> Well Abandoned? Date		Well Survey Data Date <u>11/16/93</u> Washington State Prime Coordinates <u>N 135° 68' 32.5" E 57° 42' 1.67"</u> Protective Casing Elevation <u>678.660</u> Brass Cap Elevation <u>678.44</u>																																				
Comments/Remarks <u>① BAILED SAND OVERLAP OUT OF HOLE 8/27 to 9/1 @ 14:43; ALSO OPERATIONS WERE SHUT DOWN @ Noon on 9/7 AND DIDNT RESUME UNTIL 9/10; ALSO OPERATIONS WERE ESSENTIALLY DOWN FROM 9/3 - 9/6 FOR HOLIDAY.</u> <u>② ADDED APPROXIMATELY 1000 GALLONS LOW COLUMBIA RIVER DURING COMPLETED PROJECT.</u>																																						

19293

WELL SUMMARY SHEET

Boring or Well No. 299-E25-49

Sheet 1 of 2

Location ~1500' EAST OF GTF

Project W-152

Prepared By Andrew M. Templeton
(Sign/Print Name)

Date 8-27-93

Reviewed By Edward C. Roper / Edward C. Roper
(Sign/Print Name) Date 09/19/93

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
Temp. 12" CS CASING SET @ 12.1' THIN LAYER OF GRANULAR BENTONITE 2cm SD# BAGS AROUND CASING BASE 2.0'-12.0' PORTLAND CEMENT-1.0% 20% BAGS		0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150		0.0-5.0 FT Silty SAND 5.0-10.0 FT SAND 10.0-15.0 FT Gravelly SAND 15.0-25.0 FT Medium to Coarse SAND 25.0-30.0 FT Fine to Medium SAND 30.0-35.0 FT Medium to Coarse SAND 35.0-37.0 FT Slightly Silty SAND 37.0-45.0 FT Medium SAND 45.0-50.0 FT Medium SAND 50.0-53.0 FT Coarse SAND 53.0-65.0 FT Medium to Coarse SAND 65.0-67.0 FT Silty SAND 67.0-71.0 FT Fine to Medium SAND 71.0-73.0 FT Silty SAND 73.0-85.0 FT Fine to Medium SAND 85.0-86.0 FT Slightly Silty SAND 86.0-88.0 FT SAND 88.0-89.0 FT Silty SAND 89.0-105.0 FT Gravelly SAND 105.0-127.0 FT Fine SAND 127.0-132.5 FT Slightly Silty Gravelly SAND 132.5-143.0 FT Slightly Silty SAND 143.0-144.0 FT Sandy SILT 144.0-149.0 FT Slightly Silty SAND
Temp. 10" CS CASING set at 158'				
GRANULAR BENTONITE 12.0-256.4'				
Temp. 8" CS Casing				

1730P3

WELL SUMMARY SHEET

Boring or Well No. 299-E25-44

Sheet 2 of 2

Location ~1500' East of GTF

Project W-152

Prepared By J.N. Barron / F.S. Mucker Date 3-27-93Reviewed By Edward C. Lipp / E. Lipp Date 04/14/93(Sign/Print Name)
J.N. BARRON / J.N. B.

(Sign/Print Name)

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
Temp 10" CS Casing Set at 158'		150		149.0-156.0 FT SAND
		155		156.0-163.0 FT fine SAND
		160		163.0-180.0 FT Sandy GRAVEL
		165		
		170		
Temp 8" CS Casing		180.175		180.0-185.0 FT Slightly Silty Gravelly SAND
		180.2143		
		180.180		
		180.2413		
		180.185		
		190		185.0-200.0 FT Sandy GRAVEL
		195		
		200		200.0-205.0 FT Silty Sandy GRAVEL
		205		205.0-220.0 FT Sandy GRAVEL
BLANK SS 4" w/ CENTRALIZER		210		
		215		220.0-223.0 FT Silty Sandy GRAVEL
		220		223.0 FT 0.35' SAND lense
		225		223.0-228.0 FT Silty Sandy GRAVEL
		230		228.0-237.0 FT Sandy GRAVEL
		235		233.0-245.0 FT Silty Sandy GRAVEL
GRANULAR BENTONITE 12.0-256.4'		240		245.0-247.0 FT GRAVEL
		245		247.0-253.0 FT SAND
		250		253.0-265.0 FT Silty Sandy GRAVEL
		255		
1/2" BENTONITE PELLETS 256.4'-264.0'		260		265.0-271.0 FT Silty Gravelly SAND
Top of sand 264.0		265		
TOP OF SS SCREEN = 269.1'		270		271.0-274.0 FT Gravelly Silty SAND
STATIC WATER LEVEL = 272.3'		275		274.0-273.0 FT SAND
		280		
		285		
BOTTOM OF SCREEN = 289.5' (10-360)		290		Drillers T.O. @ 293.0'
BOTTOM OF SAND = 292.3' (20-40)		295		
Gravel (292.3 - 293.0)				

B-29

Pg 1 of 3

SIGNATURE/DATE

Page 1 of 1

Well No. 299-E25-50 Temp. Well No. 299-E25-50
Approximate Location GROUND TREATMENT FACILITY

Drill Method

Type Backhoe for starter casting, then Air Rotary
To Follow.

Drilling Fluid N/A

Total Amount of Water
Added During Drilling 8.4
11A 24/6/93 ~ 100 gals H₂O

Comments _____

Temporary Casings and Drilled Depth		
Casing Type and Size	Interval	Shoe OD
CS - 12" DIAM.	0 - 15.1'	N/A
CS - 10" DIAM	0 - 82'	N/A
CS - 8" DIAM	0 - 293'	N/A
	-	
Drilled Depth	294.2'	Hole Diameter at TD
		8 inch

2. Static Water Level/Date 272.12' @ 1540 on 9-10-93

Comments Soil subsidence occurred around outside of temporary casing after downsizing to 8" casing @ 82'

Date Started 9/14/93

Annular Seal/Filter Pack			
Type	Interval	Volume	Mesh Size
<u>SILICA SAND</u>	<u>294.1 - 264.8</u>	<u>9.10 cu.Ft.</u>	<u>10-20</u>
<u>PENTONITE PELLETS</u>	<u>264.8 - 261.0</u>	<u>0.93 cu.Ft.</u>	<u>1/2"</u>
<u>GRANULAR PENTONITE</u>	<u>261.0 - 19.7</u>	<u>90.17 cu.Ft.</u>	<u>8-20</u>
<u>PORTLAND CEMENT</u>	<u>19.7 - 1.0</u>	<u>21.84 cu.Ft.</u>	<u>TYPE I #11</u>

Well Survey Data

Date 11/16/93
Washington State
Prime Coordinates N: 135681.613 E: 576399.049
Protective Casing Elevation 677.60'
Brass Cap Elevation 675.30

1. RIVER WATER TO STABILIZE HOLE DURING

WELL SUMMARY SHEET

Boring or Well No. 299-E25-50

Sheet 1 of 2

Location GRUNT TREATMENT FACILITYProject W-0152Prepared By J. N. PARRON
(Sign/Print Name)Date 8/6/93Reviewed By Edmund PARRON / E. PARRON C.
(Sign/Print Name)Date 07/19/93

CONSTRUCTION DATA

Depth
in
Feet

GEOLOGIC/HYDROLOGIC DATA

Description

Diagram

Graphic Log

Lithologic Description

PORTLAND CEMENT (ENT) 10.7'-10'

12" TEMP CS SET @ 15.1'

GRANULAR BEDDED LITE (R-4) 24.2'-22'

10" TEMP CS SET @ 82'

8" TEMP CS

0

5

10

15

20

25

30

35

40

45

50

55

60

65

70

75

80

85

90

95

100

105

110

115

120

125

130

135

140

145

150

155

160

165

170

175

180

185

0-5 SANDY SILT

5-13.1' slightly silty SAND w/ sandy SILT

Lenses

13.1'-38' SAND

U

"

38'-39' silty SAND

39'-40' slightly silty SAND

40'-42' slightly silty SAND

42'-43' silty SAND

43'-62' slightly silty SAND

" " "

" " "

62'-69' silty SAND

69'-75' slightly silty SAND

75'-83' silty SAND

83'-95' slightly silty SAND

" " "

95'-104' silty SAND

" "

" "

104'-116' SAND

"

116'-135' silty SAND

" "

" "

" "

135'-144' SAND

144'-158' silty SAND

" "

" "

B-31

WELL SUMMARY SHEET

Boring or Well No. 299-E25-50

Sheet 2 of 2

Location GROUT TREATMENT FACILITY

Project W-0152

Prepared By J. B. Borden
(Sign/Print Name)

Date 09/16/93

Reviewed By Edward R. R. / C. L. F. /
(Sign/Print Name)

Date 09/19/93

CONSTRUCTION DATA

Description

Diagram

Depth
in
Feet

GEOLOGIC/HYDROLOGIC DATA

Graphic Log

Lithologic Description

8" TEMP CS SET @

293'

8-20 GRANULAR BENTONITE 261.0'-261.0'

SS BLANK CASING

1/2" BENTONITE PELLETS 264.8'-261.0'

STATIC WATER LEVEL 272.3'

10-20 SILICA SAND 294.1'-264.8'

20 SLOT SCREEN (SS) 289.70'-269.38'

Total Depth 294.2' BGS

SLUFF = 0.1'

160

165

170

175

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275

280

285

290

295

299

299

299

299

299

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299

144'-158' Silty SAND

158'-164' SAND

164'-200' Gravelly Silty SAND

200'-227' Silty Sand, GRAVEL

227'-228' SAND

228'-229' GRAVEL

229'-230' SAND

230'-245' Silty Sand, GRAVEL

245'-250' Slightly Silty Gravelly SAND

250'-255' SAND

255'-260' Slightly Silty Gravelly SAND

260'-268.8' Gravelly SAND

268.8'-269.85' Gravel

270'-274' Slightly Silty Gravelly SAND

274'-294' Top of Ring old Fm

294'-294' Gravelly Silty SAND

WELL CONSTRUCTION SUMMARY REPORT

KDR 7/15/94
SIGNATURE/DATE

Page 1 of 1

Specification No. 4246-5-014 Rev. No. 7ECNs 166764Project W 0152Drilling Company PC ExplorationDriller T. Macheski C. ShieldsOther Companies Golder AssociatesGeologist(s) J. BarronA. TempletonE. MocklerA.J. Anderson R.S. EdringtonL.D. Lickard WHC ReviewDate Drilling Started 8/9/93

Geophysical Logging

Sondes (type)	Interval	Date
<u>KUT</u>	<u>0 - 175</u>	<u>9-16-93</u>
<u>KUT</u>	<u>140' - 390'</u>	<u>10-12-93</u>
<u>Neutron Capture</u>	<u>255' - 380</u>	<u>10-14-93</u>

Well No. 299-EZ5-1000 Temp. Well No. _____Approximate Location Grout Treatment Facility

Drill Method

Type Bathoe Excav for starter casing 1 air rotaryDrilling Fluid N/A

Total Amount of Water Added During Drilling _____

Comments 450 gallons added during completionpermeability

Temporary Casings and Drilled Depth

Casing Type and Size	Interval	Shoe OD
<u>C3 - 12"</u>	<u>0 - 15.1'</u>	<u>N/A</u>
<u>C3 - 10"</u>	<u>0 - 178.6'</u>	<u>N/A</u>
<u>C3 - 8"</u>	<u>0 - 378.9'</u>	<u>N/A</u>

Drilled Depth 391.89' Hole Diameter at TD _____Static Water Level/Date 267.44' 10/22/93

Comments _____

Completion Activity

Date Started 10/23/93

Casing and Screen (Permanent)

Type	Depths	Length	Slot Size
<u>Casing</u>			
<u>Type 304</u>	<u>1.075' - 263.3'</u>	<u>264.3'</u>	<u>N/A</u>
<u>Type 304</u>	<u>263.3' - 293.6'</u>	<u>303' 1/2"</u>	<u>10</u>
<u>Cont wrap</u>			

Annular Seal/Filter Pack

Type	Interval	Volume	Mesh Size
<u>Bentonite</u>			
<u>Hole plug</u>	<u>297.5' - 391.6'</u>	<u>62.1 cu ft.</u>	<u>> 1/2"</u>
<u>10-20 sand</u>	<u>293.4' - 297.5'</u>	<u>2.14 cu ft.</u>	<u>10-20</u>
<u>20-40 sand</u>	<u>251.5' - 293.4'</u>	<u>12.3 cu ft.</u>	<u>20-40</u>
<u>3/8" pellets</u>	<u>254.3' - 258.5'</u>	<u>1.55 cu ft.</u>	<u>3/8"</u>
<u>Hole plug</u>	<u>243.1' - 254.3'</u>	<u>2.76 cu ft.</u>	<u>> 1/2"</u>

Other Activity

Aquifer Test Performed? N/AType N/A Date N/AWell Abandoned? N/ADate N/A

Well Survey Data

Date 12/14/93Washington State Prime Coordinates N:1355337.654 E:576478.436Protective Casing Elevation 674.40'Brass Cap Elevation 670.96Comments/Remarks See NCR #050058, EQA-93-100;NCR #050961, EQA-93-10510-20 sand 232.9' - 237.8' 1.07 cu ft 10-2010-20 sand 230.0' - 232.4' 1.07 cu ft 10-20Perm 14.1' - 230.0' 156.9 cu ft 8-20Type I-II 0' - 14.1' 24.1 cu ft.

WELL SUMMARY SHEET

Boring or Well No. 299-ESP-1000Sheet 1 of 3Location GTF: East of 200 EAST AREAProject W-0152Prepared By Steven J. Carlson
(Sign/Print Name)Date 11/5/93Reviewed By Edward C. Rouse / Edward C. Rouse
(Sign/Print Name)Date 11/19/93

CONSTRUCTION DATA

Description

Diagram

Depth
in
Feet

GEOLOGIC/HYDROLOGIC DATA

Graphic Log

Lithologic Description

Temporary 12" carbon steel

casing set at 15.1' BGS

Type I-II cement 0'-14.1' BGS

8-20 mesh bentonite seal

at 15.1'

Temporary 10" carbon steel

casing set at 178.6' BGS

w/ no shoe

Temporary 8" carbon steel

casing set at 378.9' BGS

w/ no shoe

Type 304 stainless steel

casing and 10 slot screen

set @ 293.6' BGS

WELL SUMMARY SHEET

Boring or Well No. 299-E25-1000

Sheet 2 of 3

Location GTF: East of 200 E AreaProject W-0152Prepared By Norman J. Ordian
(Sign/Print Name)Date 11/15/93Reviewed By Edward C. Rana Reviewed C.
(Sign/Print Name) EFKDate 11/19/93

CONSTRUCTION DATA

Depth
In
Feet

GEOLOGIC/HYDROLOGIC DATA

Description

Diagram

Graphic Log

Lithologic Description

Temporary 10" carbon steel
Casing set at 178.6' BGS
with no shoe

Temporary 8" carbon steel
Casing set at 378.9' BGS
with no shoe

8-20 mesh bentonite 14.1'-230.0'

10-20 sand 230.0'-232.4'

Formation 232.4'-232.9'

10-20 SAND 232.9'-237.8'

Formation 237.8'-243.1'

Note: see NCR 050961

attached

Hole plug > 1/2" 243.1'-254.3'

Non-hydrated 3/8" bentonite

pellets 254.5'-258.5' BGS

20-40 SAND 258.5'-293.4'

Type 304 continuous stainless
steel screen - 10.56"

263.3'-293.3' BGS

Stainless steel end cap

293.3'-293.6' BGS

10-20 Sand 293.4'-297.5' BGS

Hole plug - > 1/2" in size

297.5'-391.6' BGS

Note: Sand interval 351.6'-354.8'

165

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245

250

255

260

265

270

275

280

285

290

295

300

305

310

315

150'-161' SAND S

161'-169' slightly silty SAND (m) S

169'-171' SAND S

171'-174' gravelly silty SAND gms

174'-177.5' SAND S

177.5'-190' sandy Gravel SG

190'-191' gravelly SAND gS

191'-212.5' sandy GRAVEL SG

~ 65% gravel

212.5'-231' sandy GRAVEL SG

~ 55% gravel

231'-238' SAND S

238'-240' gravelly SAND gS

240'-251' sandy GRAVEL SG

251'-253' silty gravelly SAND gms

253'-263' sandy Gravel SG

263'-265' gravelly SAND gS

265'-303.5' sandy Gravel SG

303.5'-304' gravelly sandy SILT gS/M

304'-305' SILT M

305'-325' Gravel G

Sheet 3 of 3

Project W-0152

Date 11/10/93

A-6000-384 (01/93)

APPENDIX C
EFFICIENCY-BASED GROUNDWATER
MONITORING NETWORK DESIGN
FOR THE PROPOSED ILLW STORAGE FACILITY

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The analytical Monitoring Efficiency Model (MEMO) was originally utilized to support the design of the monitoring well network at the former GTF (DOE 1990). The use of this model was instrumental in demonstrating RCRA groundwater compliance. The MEMO was rerun to determine if, after the implementation of TWRS Privatization Phase I, the remaining active (Category 3) wells near the facility will provide a similar or adequate level of groundwater monitoring coverage for the proposed ILLW storage facility. This is done to predict whether or not additional wells need to be considered for the active category. The model was rerun utilizing the same input parameters as the former GTF and the results are displayed on the diagram on page C-5.

The results indicate that, based on the given well locations and number, the ILLW will have a 100% coverage for leak detection. This is considered adequate to meet the most stringent RCRA regulations. Based on these results no additional wells are required.

The following paragraphs summarize how the MEMO model works and provide some background information on its development. This information is taken from Mercer (1991).

The method simulates the migration of hypothetical contaminant plumes from the site and quantifies the efficiency of alternative well network designs in detecting those plumes. The approach is relatively simple, and the computed efficiency provides a quantified basis for optimizing the design. A map of the site showing areas where releases would or would not be detected by the given well network is attached. MEMO is applied using a menu-driven computer program.

Groundwater monitoring programs are required by the EPA to verify the continuing isolation of contaminants at most hazardous waste sites (EPA 1989, 40 CFR 264.91(a)). Although the intent of such monitoring is to protect human health and the environment through early detection of a contaminant release, a simple means for measuring the degree of protection offered by a monitoring system has not been well established. The MEMO model provides a simple method for quantifying and graphically displaying the efficiency of a given monitoring well network for detecting a potential contaminant release. The method is an extension and refinement of a physical design approach suggested by Massmann, Freeze, and others (Massmann and Freeze 1987 and Freeze et al., 1990, and Meyer and Brill 1988). It provides an easily understood way to adjust and optimize the network design to site and waste conditions, and to quantify the degree of protection for public and regulatory review. MEMO was developed at the request of Westinghouse Hanford Company, Richland, Washington, for the U.S. Department of Energy and has been used extensively in the design of groundwater monitoring networks.

To comply with current groundwater monitoring requirements, monitoring wells at hazardous waste sites must be located at intervals along the hydraulically downgradient limit of the waste disposal site (EPA 1989, 40 CFR 264.95(a)). MEMO predicts whether a contaminant release to groundwater from a specific location at the disposal site would be detected by a monitoring well. This is accomplished by mathematically generating a contaminant plume and determining whether that plume is intersected by a monitoring well before it migrates beyond a specified distance from the site. The process is repeated at many locations onsite to develop a map of predicted

locations where releases would or would not be detected. The 'monitoring efficiency' of a well network is then computed as the ratio of the area of detection to the total area of the site. For example, a determined efficiency of 90% predicts that releases occurring over 90% of the site would be detected by the monitoring wells, and releases occurring over 10% of the site would not be detected.

The model inputs consist of the transport parameters used to compute the shapes and sizes of the plumes, the directions and seepage velocity of groundwater movement, the analytical detection limits for water samples from the monitoring wells, and the extent to which the tip of a plume will be allowed to migrate beyond the disposal site boundary before it is detected. The principal outputs are the monitoring efficiency and a site map showing predicted non-detection locations.

The approach is fundamentally simple, and can be applied at most sites with available site-specific and literature-based information. Because the method is based upon a simulation of actual physical processes, evaluations of the adequacy of the design are focused upon the physical parameters and processes governing contaminant migration, rather than upon qualitative judgements of how many wells are enough. A level of uncertainty will always be present in the functioning of any groundwater monitoring network design, due to limitations on the number and spacing of wells. MEMO provides a simple way to quantify at least some of the uncertainty associated with network design.

```

+++++
++      MEMO Data File      ++
++                        ++
++      Monitoring Analysis Package  ++
++      MAP Version  1.1      ++
++                        ++
++      GOLDER ASSOCIATES INC.      ++
++                        ++
++      Run on 07/29/96 at 08:00:11  ++
+++++

```

```

-----
< Grout Treatment Facility      >
-----

```

```

*   SCALE FACTOR
    1.000000
*   SOURCE GRID PARAMETERS (x0,y0,grid spacing,max x incr,max y incr)
-45612.000000    40110.000000    15.000000
    19          46
*   POTENTIAL SOURCE AREA COORDINATES (#,x,y,unit#)
  1      -45342.00    40110.00    1
  2      -45612.00    40220.00    1
  3      -45612.00    40520.00    1
  4      -45342.00    40790.00    1
*   ARRAY SPACING FOR BUFFER ZONE COORDINATES (max. spacing)
    20.000000
*   INPUT BUFFER ZONE COORDINATES (#,x,y)
  1      -45520.00    41155.00
  2      -44974.00    41155.00
  3      -44974.00    39760.00
  4      -45520.00    39760.00
  5      -45980.00    39978.00
  6      -45980.00    40675.00
*   MONITORING WELL COORDINATES (#,x,y)
  1      -45735.00    40170.00
  2      -45753.00    40311.00
  3      -45609.00    40116.00
  4      -45749.00    40462.00
  5      -45219.00    40056.00
  6      -44219.00    40056.00
  7      -45469.00    40056.00
*   CONTAM. TRAN. PARAMETERS (CD/CO,ldisp,tdisp,difff,source width,lmb,cvel)
  5.260000E-02    28.000000    8.000000    0.000000E+00
    40.000000    0.000000E+00    1.000000E-01
*   GRADIENT ZONE COORDINATES (#,x,y,unit#,angle)
  1      -47000.00    42000.00    1    225.00
  2      -43000.00    42000.00    1    225.00
  3      -43000.00    39000.00    1    225.00
  4      -47000.00    39000.00    1    225.00
*   SOLUTION RESULTS
Maximum advection time =    36500.000000
Accuracy of solution =    1.000000E-04
Solution basis = buffer zone/advection time
Total # of source points =    624
# of undetected leaks =    0

```

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