

# Hanford Site Well Management Plan

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



**United States  
Department of Energy**  
P.O. Box 550  
Richland, Washington 99352

Project Hanford Management Contractor for the  
U.S. Department of Energy under Contract DE-AC06-96RL13200

Approved for Public Release  
(Upon receipt of Clearance approval)  
Further Dissemination Unlimited

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J. E. Auten, Fluor Hanford, Inc.

June 2003

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**TERMS**

FH  
ORP  
RL

Fluor Hanford, Inc.  
Office of River Protection  
U.S. Department of Energy, Richland Operations Office

## 1.0 INTRODUCTION

This document constitutes the roles and requirements to responsibly manage the drilling, completion, maintenance, remediation, and decommissioning of all wells supporting the U.S. Department of Energy, Richland Operations Office (RL). In addition, it provides the proper documentation requirements for all well activities on the Hanford Site including those wells under the jurisdiction of the U.S. Department of Energy Office of River Protection (ORP). Approximately 7,000 wells are present on the Site. Numerous water wells were drilled or hand-dug by early settlers for drinking water supplies, beginning in the latter half of the 19<sup>th</sup> Century. Several thousand wells have been drilled since the early 1940s to support the Hanford Site mission of producing plutonium for defense purposes. Additional wells are being drilled, and will continue to be drilled, to support the current Site mission of environmental clean-up.

A well, according to *Washington Administrative Code (WAC) 173-160-111* and Site definition, is any hole in the ground that penetrates the subsurface by mechanical means including GeoProbe<sup>®</sup> and cone penetrometer intrusions, instrumentation holes, geotechnical and environmental investigation borings, technology demonstration, and development wells, but excludes excavations produced by bulldozers, backhoes, scrapers, etc.

## 2.0 PURPOSE

The purpose of this document is to provide a set of requirements specific to each aspect of well management. The document does not address up-front tasks (e.g., excavation permit, plant work force review, data quality objectives, waste plans, funding) that may be required.

## 3.0 RESPONSIBILITIES

The FH Groundwater Protection Program is the RL-designated lead contractor for all well activities on the Hanford Site, exclusive of those activities undertaken within the confines of the tank farm fences, which are the responsibility of the ORP. However, the requirements for recording, documenting, and filing well drilling, construction, and installation records, including those generated by the ORP and its contractors, are the responsibility of the FH Groundwater Protection Program. It is the responsibility of the FH Groundwater Protection Program to provide the procedures and processes (e.g., memorandums of understanding, meetings) necessary to manage well activities as prescribed in Section 4.

The Fluor Hanford (FH), Central Plateau, Groundwater Protection Program will provide a point of contact or organizational contact to meet these requirements. The Web address is <http://apweb02.rl.gov/rapidweb/phmc/cprp-projects/index.cfm?PageNum=27>.

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<sup>®</sup> GeoProbe is a registered trademark of Kejr, Inc., Salina, Kansas.

## **4.0 WELL MANAGEMENT TASKS**

Six activity areas related to well management need to be properly administrated. These activities are described in Sections 4.1 through 4.6. Requirements for each activity are detailed in Appendices A through F. Because many wells were drilled before the current Washington State regulations were established, certain activities may require variances from the state regulations. Variances and the process for obtaining them are discussed in Section 4.7 and Appendix G.

### **4.1 DRILLING OF NEW WELLS**

Well drilling on the Hanford Site must meet the minimum requirements set forth by WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," applicable variances, and agreements between RL/ORP, RL/ORP representatives, and the Washington State Department of Ecology. Drilling also must meet Site-specific requirements. The work sequence and details to meet these requirements are provided in Appendix A.

### **4.2 WELL MAINTENANCE**

Maintenance of wells and associated equipment is required to ensure that well-related activities such as sampling can be conducted in an efficient and timely manner. Well maintenance prolongs the life expectancy of a well and, as such ensures the preservation of a significant U.S. Department of Energy investment. The requirements for requesting and conducting well maintenance are specified in Appendix B.

### **4.3 WELL DECOMMISSIONING**

Many of the wells on the Hanford Site were constructed before the current groundwater protection regulations were established, and these wells may provide preferential pathways for contaminant migration. The RL and ORP are addressing this problem by systematically decommissioning those wells that present a potential risk to groundwater and the environment or that are located within remedial action or facility decommissioning sites. The details to meet these requirements are provided in Appendix C.

### **4.4 HANDLING OF UNMARKED/UNMAPPED WELLS**

Numerous unmarked/unmapped wells have been discovered and are continuing to be discovered across the Hanford Site. The RL, the ORP, and the Washington State Department of Ecology require that all wells be marked and their location documented. The requirements for handling, marking, and documenting these newly found wells are provided in Appendix D.

#### 4.5 WELL ALTERATION

A number of existing wells may be of sufficient design and construction to be considered for alteration to meet newly identified strategic needs. The well alteration process is not unlike a new well installation. The requirements for this activity are provided in Appendix E.

#### 4.6 WELL SURVEYING – CIVIL

Well-coordinate surveys are an integral part of well drilling, construction, installation, and decommissioning. Well surveys provide a definitive location and/or elevation to support Site characterization, clean-up activities, and regulatory requirements. The details to meet this requirement are provided in Appendix F.

#### 4.7 VARIANCES

WAC 173-160 provides the means to obtain a variance from state requirements for drilling/construction, alteration, and decommissioning of wells when strict compliance with the requirements and standards are impractical. As the RL/ORP lead for well documentation, the FH Groundwater Protection Program is responsible for requesting coordinating, documenting, and tracking all variances from WAC 173-160. Appendix G provides the process for requesting and obtaining variances from WAC 173-160 regulations.

#### 4.8 FORMS

Forms relative to the documentation of well management activities have changed over time and may be revised from time to time in the future. The FH Groundwater Protection Program currently has in place the necessary forms to document all well management activities. Current blank printable forms shall be posted on the FH Central Plateau web page (<http://apweb02.rl.gov/rapidweb/phmc/cprp-projects/index.cfm?PageNum=27>) . See Appendix H.

### 5.0 WASTE MANAGEMENT DURING WELL ACTIVITIES

Regulatory controls (e.g., *Revised Code of Washington*, waste management plans, waste control plans) discuss the handling and disposition of waste generated during well activities on the Hanford Site. Such plans document agreements between RL and/or ORP and the operable unit lead regulatory agency. These plans should be posted on the FH Central Plateau web page, <http://apweb02.rl.gov/rapidweb/phmc/cprp-projects/index.cfm?PageNum=27> .

### 6.0 GEOPHYSICAL LOGS/DIRECTIONAL HOLE SURVEYS

Geophysical logs for wells on the Site are available electronically on two web sites maintained and updated respectively by The SM Stoller Corp. and Pacific Northwest National Laboratory (PNNL). The SM Stoller Corp. web address is

<http://www.gjo.doe.gov/programs/hanf/HTFVZ.html> , and the PNNL web address is <http://boreholelogs.pnl.gov>. Directional hole surveys are available on the PNNL web site.

## 7.0 RESPONSIBLE ACTION MATRIX

The responsibility for wells on the Hanford Site is divided between the RL and the ORP. Three organizations under the authority of RL have extensive well activities: Pacific Northwest National Laboratory, Fluor Hanford Central Plateau, and the River Corridor Project Contractor. Several other contractors have limited well activities. The organization supporting well activities for the ORP is currently CH2M HILL Hanford Group, Inc. The Responsible Action Matrix provides a quick reference for organizations to determine their well task responsibilities (Table 1).

## 8.0 REFERENCES

*Revised Code of Washington*, as amended, Olympia, Washington.

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Olympia, Washington.

Table 1. Responsible Action Matrix (5 Pages)

Activity	DOE Richland Operations Office				DOE Office of River Protection
	Fluor Hanford, Inc.	Pacific Northwest National Laboratory	Other Contractors	River Corridor Contractor	CH2M HILL Hanford Group, Inc.
<b>WELL DRILLING</b>					
Well Drilling Request	X	X	X	X	X
Subcontract Preparation	X				X
Subcontract Review	X	X	X	X	X
Assign Well Identification Number	X				
Award Drilling Contract/Notice to Proceed	X				X
Assign well name	X				
Submit Notice of Intent	X	X			X
Document Drilling	X				X
Survey well	X				X
Ecology Submittal w/Letter	X				X
Mgmt/Maintenance of Hanford Well Information System	X				
Mgmt/Storage of Maintenance Records	X				
Mgmt/Storage of Procurement Records	X				X
Operable Unit Manager Notification	X	X	X	X	
<b>WELL MAINTENANCE (Nonroutine)</b>					
Problem Identification	X	X	X		X
Maintenance Request	X				X
Generate/Issue Maintenance Package	X				X

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Table 1. Responsible Action Matrix (5 Pages)

Activity	DOE Richland Operations Office				DOE Office of River Protection
	Fluor Hanford, Inc.	Pacific Northwest National Laboratory	Other Contractors	River Corridor Contractor	CH2M HILL Hanford Group, Inc.
Complete Activities/Submittals	X				X
Mgmt/Maintenance of Hanford Well Information System	X				
Mgmt/Storage of Maintenance Records	X				
Mgmt/Storage of Procurement Records	X				X
<b>WELL MAINTENANCE (Routine)</b>					
Select Wells for Routine Well Maintenance	X				
Generate/Issue Maintenance Package	X				X
Complete Activities/Submittals	X				X
Mgmt/Maintenance of Hanford Well Information System	X				
Mgmt/Storage of Maintenance Records	X				
Mgmt/Storage of Procurement Records	X				X
<b>WELL DECOMMISSIONING</b>					
Well Decommissioning Request	X	X	X	X	X
Review for Usage	X				X
Decommissioning Determination	X				X
Decommissioning Notification	X				X
Decommissioning Profile Preparation	X				X
Subcontract Preparation	X				X
Award Decommissioning Contract	X				X

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Table 1. Responsible Action Matrix (5 Pages)

Activity	DOE Richland Operations Office				DOE Office of River Protection
	Fluor Hanford, Inc.	Pacific Northwest National Laboratory	Other Contractors	River Corridor Contractor	CH2M HILL Hanford Group, Inc.
Submit Notice of Intent	X				X
Document Decommissioning	X				X
Survey Well	X				X
Ecology Submittals	X				X
Mgmt/Maintenance of Hanford Well Information System	X				
Mgmt/Storage of Decommissioning Records	X				
Mgmt/Storage of Procurement Records	X				X
Operable Unit Manager Notification	X	X	X	X	X
<b>UNMARKED / UNMAPPED WELLS</b>					
Potential Unmarked/Unmapped Well Identification	X	X	X	X	X
Preliminary Survey	X				X
Notification of Fluor Hanford	X	X	X	X	X
Data Search	X				
Inspection and Documentation	X				
Well Determination	X				
<b>NO</b> is not a well					
Notify Reporting Contractor	X				
Notify Fluor Hanford-Environmental Information Systems	X				

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Table 1. Responsible Action Matrix (5 Pages)

Activity	DOE Richland Operations Office				DOE Office of River Protection
	Fluor Hanford, Inc.	Pacific Northwest National Laboratory	Other Contractors	River Corridor Contractor	CH2M HILL Hanford Group, Inc.
YES is a well					
Notify Reporting Contractor	X				
Assign well Identification Number	X				
Perform Formal Survey	X				X
Mgmt/Maintenance of Hanford Well Information System	X				
<b>WELL ALTERATION</b>					
Well Alteration Request	X	X	X	X	X
Subcontract Preparation	X				X
Award Contract	X				X
Submit Notice of Intent	X				X
Document Field Activities	X				X
Survey well	X				X
Ecology Submittal w/Letter	X				X
Mgmt/Maintenance of Hanford Well Information System	X				
Mgmt/Storage of Maintenance Records	X				
Mgmt/Storage of Procurement Records	X				X
Operable Unit Manager Notification	X	X	X	X	X

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Table 1. Responsible Action Matrix (5 Pages)

Activity	DOE Richland Operations Office				DOE Office of River Protection
	Fluor Hanford, Inc.	Pacific Northwest National Laboratory	Other Contractors	River Corridor Contractor	CH2M HILL Hanford Group, Inc.
<b>WELL SURVEYING</b>					
Survey New Wells	X				X
Survey Altered Wells	X				X
Survey Unmarked/Unmapped Wells	X				X
<b>VARIANCES</b>					
Variance Request	X	X	X	X	X
Variance Preparation	X	X	X	X	X
Variance Submittal	X				
Mgmt/Storage of Approved Variances	X				

DOE = U.S. Department of Energy.  
 Ecology = Washington State Department of Ecology.

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**APPENDIX A**

**WELL DRILLING**

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## APPENDIX A

### WELL DRILLING

Well drilling on the Hanford Site is an ongoing effort to support characterization, groundwater remediation, and long-term monitoring of the subsurface and groundwater underlying the Hanford Site. It is the intent of the U.S. Department of Energy, Richland Operations Office (RL) and the Office of River Protection (ORP) to see that all well installations on the Hanford Site meet the minimum requirements as set forth by *Washington Administrative Code* (WAC) 173-160, "Minimum Standards for Construction and Maintenance of Wells," applicable variances, and agreements between RL/ORP, RL/ORP representatives, and the Washington State Department of Ecology (Ecology), and that they meet Site-specific requirements.

For the purposes of this document, the definition of a well is any hole in the ground that penetrates the subsurface by mechanical means including GeoProbe<sup>®</sup> and cone penetrometer intrusions, instrumentation holes, geotechnical and environmental investigation borings, technology demonstration and development wells (WAC 173-160-111 and Site definitions) but excludes excavations produced by bulldozers, backhoes, scrapers, etc.

This attachment addresses only those items that are directly related to the actual drilling function, and it assumes that all permitting and reviews (e.g., the necessary excavation permit, plant work force review, data quality objectives, waste plan, funding) are approved and in place.

Fluor Hanford (FH) is the RL-designated lead for all drilling and well activities on the Hanford Site, exclusive of those activities undertaken within the confines of the tank farm fences. Well drilling and well activities within the tank farm fences are the responsibility of the ORP. However, the requirements for recording, documenting, and filing well drilling, construction, and installation records are the same for the entire Site.

The FH Groundwater Protection Program is responsible for managing and maintaining well records (exclusive of monitoring and testing data) from all programs. Those records shall include all drilling and well records exclusive of groundwater sampling and water-level measurement records.

In accordance with the contract between RL and FH, FH is responsible for providing all drilling services on the Hanford Site exclusive of tank farm activities. FH generally subcontracts well drilling activities to qualified drilling firms; however, in some cases such as (but not limited to) GeoProbe installations, it is commonplace to perform the work with Hanford Site personnel and equipment. Regardless of the work, or work force, the basic requirements for well installation remain the same and are as follows.

- The requesting organization/contractor will provide the well technical specifications to the FH Groundwater Protection Program.

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<sup>®</sup> GeoProbe is a registered trademark of Kejr, Inc., Salina, Kansas.

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- The FH Groundwater Protection Program will review the well technical specification with respect to developing a drilling subcontract and/or the appropriate choice of construction.
- Once the construction choice has been determined, the FH Groundwater Protection Program will provide a Hanford Well Identification Number for each proposed well.
- After the work scope has been let or released for work, the FH Groundwater Protection Program will assign well names as appropriate.
- Before field activities are begun, the subcontractor/organization must file a Notice of Intent to Construct (Start Card) as prescribed by WAC 173-160 or applicable variances.
- All field activities (i.e., drilling, construction, and installation) will be documented on appropriate forms (see Appendix H) as required by the FH Groundwater Protection Program. The documentation will describe the activities in sufficient detail to recreate all activities. Drawings and/or dimensioned sketches may be appropriate supplemental documentation.
- As an integral part of drilling, construction, and/or installation activities, a brass survey marker with the stamped well identification number and well name will be permanently placed in the cement pad near the well casing.
- All wells will be surveyed and reported on the appropriate form as required by the FH Groundwater Protection Program. Survey requirements are provided in Appendix F.
- Once all drilling, construction, and installation activities have been completed, the drilling subcontractor or supporting organization will prepare all applicable Washington State forms and will transmit them to Ecology under an appropriate submittal letter.
- Duplicate copies and/or original forms of all the drilling, construction, and/or installation documentation shall be submitted to the FH Groundwater Protection Program. The FH Groundwater Protection Program will enter the records into the Records Management Information System and will add appropriate new well information into the Hanford Well Information System, both of which are administered by FH.
- FH Procurement may require copies of drilling documents and other documentation for subcontracting purposes. Procurement documentation and well records normally are not filed in a common area; therefore, procurement documentation is not considered to fulfill the requirements contained in this document.

REFERENCE:

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Olympia, Washington.

**APPENDIX B**

**WELL MAINTENANCE**

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## APPENDIX B

### WELL MAINTENANCE

Wells located across the Hanford Site are used by Site contractors for a variety of vadose and groundwater programs. As such, these wells require varying degrees of maintenance during their life cycle. It is the intent of the U.S. Department of Energy, Richland Operations Office (RL) to see that wells used in support of groundwater activities receive the maintenance necessary to sustain these activities in a timely manner while preserving a valued resource. It is also the intent of RL that the well maintenance program meet the requirements of *Revised Code of Washington*, RCW 18.104, "Water Well Construction," RCW 70.105, "Hazardous Waste Management Act," and *Washington Administrative Code*, WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells."

This appendix addresses only those items that are directly related to well maintenance functions, and it assumes that all permitting and reviews (e.g., the necessary excavation permit, plant work force review, data quality objectives, waste plan, funding) are approved and in place.

Fluor Hanford (FH) is the RL-designated lead for all well maintenance activities on the Hanford Site, exclusive of those activities undertaken within the confines of the tank farm fences. Well maintenance activities within the tank farm fences are the responsibility of the Office of River Protection. However, the requirements for recording, documenting, and filing well maintenance records are the same Site wide. The FH Groundwater Protection Program is responsible for managing and maintaining all well maintenance records. The FH Groundwater Protection Program normally subcontracts well maintenance services. This document addresses only the process for requesting, issuing, and documenting well maintenance activities. It assumes that the waste management plans, funding, contract, etc. are approved and in place.

The well maintenance program will address those nonscheduled activities normally referred to as nonroutine well maintenance necessary to conduct scheduled well usage (e.g., water sampling, pumping, injection). Nonroutine well maintenance consists of such tasks as replacing sampling pumps, repairing and replacing well tubing, removing foreign objects from wells, etc. The process for requesting nonroutine well maintenance is as follows.

- The well name or well identification number and specific reason for the requested nonroutine well maintenance will be reported to the well maintenance subcontract lead.
- The well maintenance subcontract lead will request a well maintenance package for the proposed work from the FH Procurement Buyer's Technical Representative.
- After the work is completed, the Buyer's Technical Representative will review the work package for accuracy and concurrence of completion.
- The FH-Groundwater Protection Program will generate a well maintenance package and will provide the waste management designation and authorization to proceed.
- The Buyer's Technical Representative will be notified that the requested well maintenance package is being issued.

- The approved well maintenance package will be issued to the well maintenance subcontract lead. The well maintenance subcontract lead will schedule and track the work.
- After the work is completed, the Buyer's Technical Representative will review the work package for accuracy and concurrence of completion.
- The completed well maintenance package will be submitted to the FH Groundwater Protection Program for closeout and submittal to the Records Management Information System, and appropriate new well information will be added into the Hanford Well Information System.

In addition, the well maintenance program will provide preventive maintenance and inspections, normally referred to as routine maintenance. Preventive maintenance (routine well maintenance) consists of (1) checking the well pump for function, (2) removing the pump, (3) performing a video camera survey, (4) brushing/cleaning the screen or perforations, (5) redeveloping the well, (6) removing fill material and debris from the well bore, and (7) reinstalling the pump. The process for scheduling preventive maintenance (routine well maintenance) is as follows.

- The FH Groundwater Protection Program is responsible for designating the wells (outside of the tank farm fences) to be scheduled for preventive maintenance (routine well maintenance) and for notifying the U.S. Department of Energy Office of River Protection tank farm contractor of those wells within the tank farms that require preventive maintenance.
- Preventive maintenance shall be scheduled at least every 5 years, based on the drilling completion date and the date of the last preventive maintenance, whichever is the most recent.
- Wells scheduled for preventive maintenance shall be those used for groundwater monitoring (sampling and/or water-level monitoring) and remediation (e.g., pump and treat wells, in situ redox manipulation wells). Maintenance of wells supporting other programs or projects across the Site may be included in the maintenance schedule at the request of the program manager.
- The FH Groundwater Protection Program will issue the necessary well maintenance packages (preventive maintenance) to the well maintenance subcontract lead.
- The well maintenance subcontract lead will schedule and track the work.
- After the work is completed, the Buyer's Technical Representative will review the work package for accuracy and concurrence of completion.
- The completed well maintenance package will be submitted to the FH Groundwater Protection Program for closeout and submittal to the Records Management Information System and appropriate new well information will be added into the Hanford Well Information System.

REFERENCES:

PNNL-13788, 2002, *Hanford Site Groundwater Monitoring for Fiscal Year 2001*, Pacific Northwest National Laboratory, Richland, Washington.

RCW 18.104, "Water Well Construction," *Revised Code of Washington*, as amended, Olympia, Washington.

RCW 70.105, "Hazardous Waste Management Act," *Revised Code of Washington*, as amended, Olympia, Washington.

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Olympia, Washington.

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**APPENDIX C**

**WELL DECOMMISSIONING**

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## APPENDIX C

### WELL DECOMMISSIONING

Well decommissioning on the Hanford Site is an ongoing effort to support Hanford Site cleanup. It is the intent of the U.S. Department of Energy, Richland Operations Office (RL) and the Office of River Protection (ORP) to see that all wells on the Site meet the minimum requirements for wells as set forth by *Washington Administrative Code*, WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," applicable variances, and agreements between RL/ORP, RL/ORP representatives, and the Washington State Department of Ecology). Those wells that do not meet these requirements are subject to decommissioning.

This appendix addresses only those items that are directly related to the actual well decommissioning function, and it assumes that all permitting and reviews (the necessary excavation permit, plant work force review, data quality objectives, waste plan, funding) are approved and in place.

In accordance with the contract between RL and Fluor Hanford (FH), the FH Groundwater Protection Program is responsible for providing all well decommissioning services on the Hanford Site, exclusive of the tank farms. Well activities within the tank farm fences are the responsibility of the ORP. However, the requirements for recording, reporting, and documenting well activities including well decommissioning are the same for the entire Site. The FH Groundwater Protection Program is responsible for managing and maintaining all well records.

A variety of well construction designs at the Hanford Site do not meet the minimum requirements of WAC 173-160 (noncompliant wells). Age, condition, location, design, etc. make strict compliance with WAC 173-160 decommissioning impractical. As standard practice, and in accordance with the agreement between RL/ORP and the Washington State Department of Ecology, the FH Groundwater Protection Program will prepare the decommissioning detail work or decommissioning profile for each well decommissioned at the Hanford Site. The wells to be scheduled for decommissioning are the wells that are decommissioned in support of project-specific requests or RL direction; e.g. high risk wells, area consideration, RL project needs. Requirements for decommissioning wells in support of project-specific requests are as follows.

- The requesting organization/contractor will provide to the FH Groundwater Protection Program a request to decommission a well or wells, supporting documentation describing the specific need to remove the wells, and a preliminary schedule. The requesting organization/contractor is responsible for providing decommissioning funding.
- The FH Groundwater Protection Program will review the request with respect to well use. The basis for use determination will be groundwater monitoring wells (sampling and/or water-level monitoring) remediation wells (e.g., pump and treat wells, in situ redox manipulation).
- If it is determined that the well(s) is not being used in any of the groundwater monitoring (sampling and/or water level monitoring) remediation (e.g., pump and treat wells, in situ redox manipulation wells) programs, the FH Groundwater Protection Program will notify

the Hanford Site contractors and the requesting organization/contractor that the well(s) is being scheduled for decommissioning.

- If it is determined that the well(s) is being used by one of the groundwater monitoring programs, the FH Groundwater Protection Program will negotiate with that groundwater monitoring program and the requesting organization/contractor to (1) drop the well from the groundwater program (taking into account regulatory requirements), (2) use a different well, (3) leave the well in place, or (4) replace the well in an acceptable location. Well replacement cost is the responsibility of the requesting organization/contractor.
- Once the course of action has been determined, the FH Groundwater Protection Program will proceed according to Appendix A or this appendix.
- For decommissioning, the FH Groundwater Protection Program will prepare a decommissioning profile and available well information pertinent to generating and issuing a decommissioning subcontract and schedule.
- The DOE-RL geophysical logging subcontractor will be provided a list of wells to be decommissioned. The subcontractor should review the list with respect to available geophysical logs and the need to update existing files.
- Before field activities are begun, the subcontractor must file a Notice of Intent to Decommission (Start Card), as prescribed by WAC 173-160, or applicable variances.
- Field activities then may proceed according to the decommissioning profile.
- All field activities (decommissioning) will be documented on the appropriate forms (Appendix H), as required by the FH Groundwater Protection Program. The documentation will describe the activities in sufficient detail to show that all aspects of the decommissioning profile have been met. Drawings and/or dimensioned sketches may be appropriate supplemental documentation.
- As an integral part of the decommissioning activities, a brass survey marker will be permanently placed in cement as specified in the decommissioning profile.
- Once all decommissioning activities have been completed, the drilling subcontractor or supporting organization will prepare all applicable Washington State forms and will transmit them to Ecology under an appropriate submittal letter.
- Duplicate copies and/or original forms of all the decommissioning documentation shall be submitted to the FH Groundwater Protection Program. The FH Groundwater Protection Program will enter the records into the Records Management Information System and will update the Hanford Well Information System. The FH Groundwater Protection Program is responsible for managing and maintaining the Hanford Well Information System.
- FH Procurement may require copies of decommissioning documents and other documentation for subcontracting purposes. Procurement documentation and well records normally are not filed in a common area; therefore, procurement documentation

is not considered to be fulfillment of the documentation requirements contained in this document.

REFERENCES:

PNNL-13788, 2002, *Hanford Site Groundwater Monitoring for Fiscal Year 2001*, Pacific Northwest National Laboratory, Richland, Washington.

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Olympia, Washington.

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**APPENDIX D**

**UNMARKED/UNMAPPED WELLS**

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## APPENDIX D

### UNMARKED/UNMAPPED WELLS

Historically, the Hanford Site has had numerous contractors supporting the U.S. Department of Energy, Richland Operations Office. These contractors managed and supported various missions/projects that drilled wells across the Hanford Site. Well-specific information including location was not necessarily collected or stored in a complete or consistent manner by today's standards. And at the time, there was no single verified source for the available information.

During the course of normal business it is not unusual for Hanford Site contractors or subcontractors to locate unmarked and/or unmapped wells. The potential for this to occur is not limited to any particular portion of the Site. The requirements for reporting undocumented wells (a well without a well report) now must follow *Washington Administrative Code*, WAC 173-160-141, "Minimum Standards for Construction and Maintenance of Wells," and the applicable variances and agreements among the Washington State Department of Ecology and RL and the Office of River Protection.

At the direction of RL, a data source is being maintained and updated that provides well drilling, decommissioning, maintenance, geologic, hydrologic, and survey, etc., information. The single source for storing well documentation is the Records Management Information System, and the source for well information is the Hanford Well Information System, managed and maintained by the Fluor Hanford (FH) Groundwater Protection Program. The Hanford Well Information System is updated systematically to correct historical data and collect new data.

The well(s) that fall into the category of unmarked/unmapped are the wells that do not have a Hanford Well Identification Number affixed to the well casing or affixed to an alternative location immediately adjacent to the well, visible and sufficiently anchored to be considered permanent.

The proper procedure for reporting and handling an unmarked/unmapped well is as follows.

- When an unmarked well is discovered in the field, take the appropriate actions necessary to protect the well and the surrounding area. In accordance with WAC 173-160, it is unlawful for an unlicensed person to alter a well.
- Determine the well location by Global Positioning System surveying. Global Positioning System survey support shall be available through FH Environmental Information Systems or other qualified surveyor.
- If possible, measure the casing diameter and measure the amount of casing extending above ground surface, and note whether the casing appears to be filled with sand, gravel, cement, debris, etc. Do not attempt to measure the depth or drop foreign material into the well casing.
- Upon receipt of the Global Positioning System survey coordinates, notify the FH Groundwater Protection Program and provide the available information.

- The FH Groundwater Protection Program will perform a data search to determine whether the structure is a documented well.
- If it is determined that the structure is not a documented well, the FH Groundwater Protection Program will arrange to have the structure inspected.
- If the inspection determines that the structure is not a well, the reporting party will be notified, and disposition of the structure can proceed according to plan.
- If the structure is determined to be an unmarked/unmapped well, FH will assign a Hanford Well Identification Number (if required), affix the well identification number to the well, and perform a formal Global Positioning System survey per Appendix F. All available information will be entered into the Hanford Well Information System and the Records Management Information System.
- If the structure is determined to be a well and to be impacting project work, the project must proceed according to Appendix C.

REFERENCE:

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Olympia, Washington.

**APPENDIX E**

**WELL ALTERATION**

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## APPENDIX E

### WELL ALTERATION

Well alteration (commonly referred to as well remediation), like well drilling on the Hanford Site, supports characterization of the subsurface and groundwater underlying the Site. The basic requirements for well alteration with respect to Washington State regulations are the same as those for well drilling. The U.S. Department of Energy, Richland Operations Office (RL) and the Office of River Protection (ORP) require that well alteration on the Hanford Site meet the minimum requirements as set forth by *Washington Administrative Code*, WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," the applicable variances, and agreements between RL/ORP, RL/ORP representatives, and the Washington State Department of Ecology and that it meet Site-specific requirements.

As is the case with well drilling, this document addresses only those items that are directly related to the actual well alteration, and it assumes that the necessary permitting and reviews (e.g., the excavation permit, plant work force review, data quality objectives) are approved and in place.

The Fluor Hanford (FH) Groundwater Protection Program is the RL-designated lead for all drilling and well activities at the Hanford Site, exclusive of those activities undertaken within the confines of the tank farm fences. Well drilling and well activities within the tank farm fences are the responsibility of the ORP. However, the requirements for recording, documenting, and filing well alteration records are the same Site wide. The FH Groundwater Protection Program is responsible for managing and maintaining all well records.

In accordance with the contract between RL and FH, the FH Groundwater Protection Program is responsible for providing drilling services at the Hanford Site, exclusive of tank farm activities. The FH Groundwater Protection Program generally subcontracts well alteration activities to qualified drilling firms; however, there may be instances such as (but not limited to) GeoProbe® installation modifications or alterations where the use of Site personnel and equipment is more appropriate. Regardless of the work force, the basic requirements for well alteration remain the same and are as follows.

- The requesting organization/contractor will provide the well technical specification to the FH Groundwater Protection Program.
- The FH Groundwater Protection Program will review the well technical specification with respect to developing a well alteration subcontract and/or the appropriate choice of construction.
- **Altered wells will retain their original Hanford Well Identification Number and Hanford well name.**

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- Before field activities are begun, the subcontractor or organization must file a Notice of Intent to Construct (Start Card) as prescribed by WAC 173-160 or applicable variances.
- All field activities will be documented on the forms, as prescribed by the FH Groundwater Protection Program. The documentation will describe the activities in sufficient detail to recreate all activities. Drawings and/or dimensioned sketches may be appropriate supplemental documentation.
- As an integral part of well alteration activities, a brass survey marker will be permanently placed in cement, at ground surface, adjacent to the well if not already present.
- A new well survey is required upon completion of well alteration activities. All wells will be surveyed and reported on an appropriate form as prescribed by the FH Groundwater Protection Program. Survey requirements are provided in Appendix F.
- Once all field activities have been completed, the subcontractor or organization will prepare all applicable Washington State forms and will transmit them to Ecology under an appropriate submittal letter.
- Duplicate copies and/or original forms of all the drilling, alteration, construction, and/or installation documentation shall be submitted to the FH Groundwater Protection Program. The FH Groundwater Protection Program will enter the records into the Records Management Information System and will update the Hanford Well Information System. The FH Groundwater Protection Program is responsible for managing and maintaining the Hanford Well Information System.
- FH Procurement may require copies of the drilling, alteration, construction, and/or installation documents and other documentation for subcontracting purposes. Procurement documentation and well records normally are not filed in a common area; therefore, procurement documentation is not considered to be fulfillment of the requirements contained in this document.

REFERENCE:

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Olympia, Washington.

**APPENDIX F**

**WELL SURVEYING - CIVIL**

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## APPENDIX F

### WELL SURVEYING - CIVIL

Well surveying is an integral part of well drilling, construction, installation, and decommissioning, and is vital to Hanford Site characterization and cleanup efforts. As the U.S. Department of Energy, Richland Operations Office lead for all drilling and well activities, the Fluor Hanford Groundwater Protection Program is responsible for seeing that each well installed at the Hanford Site has, as a minimum, an X-Y (easting-northing) coordinate survey. Groundwater monitoring and sampling wells are required to have a Z (vertical) coordinate survey. X-Y and Z coordinate surveys by a licensed surveyor are mandatory and shall be standard operating procedure for all groundwater monitoring and sampling well installations.

All horizontal surveys (X-Y) shall be conducted and recorded in the Washington State Plane (South Zone), *North American Datum of 1983* (NAD83) and all vertical (Z) values shall be conducted and reported in *North American Vertical Datum of 1988* (NAVD88). At a minimum, the reference point for all well surveys shall be the brass survey marker permanently placed at each well, unless other points are specified by the end user.

Survey accuracy for all wells should meet or exceed +/- 1 meter in the horizontal (X-Y) plane and < +/- 10 centimeters in the vertical (Z) plane. All well surveys must be documented on the appropriate form and entered as a well record in the Records Management Information System. The survey data will be entered and tracked in the Hanford Well Information System, managed and maintained by the Fluor Hanford Groundwater Protection Program.

Typically, wells are placed into service immediately upon completion; therefore, survey data are required in a timely manner. A 30-day turnaround time (from well completion to data entry) is required unless otherwise specified by the end user. Consideration should be given to the sample-ready requirements to meet *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989) milestones when specifying survey turnaround times.

In most cases, unmarked/undocumented wells do not have brass survey markers; these wells require only an X-Y coordinate survey. The survey points for such wells will be the ground surface, north side of casing.

#### REFERENCES:

NAD83, 1983, *North American Datum of 1983*, National Geodetic Survey, Federal Geodetic Control Committee, Silver Springs, Maryland.

NAVD88, 1988, *North American Vertical Datum of 1988*, National Geodetic Survey, Federal Geodetic Control Committee, Silver Springs, Maryland.

*Hanford Federal Facility Agreement and Consent Order*, 1994, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

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**APPENDIX G**

**VARIANCES**

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## APPENDIX G

### VARIANCES

*Washington Administrative Code*, WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," establishes the minimum standards for the construction and decommissioning of all wells in Washington State. WAC 173-160-106 provides the means to obtain a variance from these regulations for well construction and/or decommissioning. WAC 173-160-406 provides the means to obtain a variance from these regulations for construction and/or decommissioning of a resource protection well, environmental monitoring well, and geotechnical soil boring.

When strict compliance with the requirements and standards of WAC 173-160 are impractical, a variance request may be submitted to the Washington State Department of Ecology (Ecology) for consideration. The variance request must propose a comparable alternative specification that will provide equal or greater human health and resource protection than the minimum standards. The application must be in writing and must be approved by the Washington State Department of Ecology before construction and/or decommissioning of the well(s) begins.

The Fluor Hanford Groundwater Protection Program has been authorized by the U.S. Department of Energy, Richland Operations Office, to track all Ecology-approved variances from WAC 173-160. Any well user requiring a variance from these regulations shall prepare the variance, provide a copy to the FH Groundwater Protection Program, and submit the variance to Ecology (with RL concurrence) for their consideration.

The variance request shall contain at least the following information:

- Name, address, and telephone number of the person requesting the variance
- Address of the well(s) site (i.e., the operable unit)
- $\frac{1}{4}$ ,  $\frac{1}{4}$ , section, township, and range of the well(s) location
- The specific regulation(s) that cannot be followed
- The comparable alternative specification
- Justification for the request.

The variance application will be submitted to Ecology for consideration during a meeting with a representative from the requesting organization, the Richland Operations Office and/or the Office of River Protection, and Ecology. Upon approval, copies of the meeting minutes and the Ecology-signed variance will be forwarded to the meeting attendees and the Fluor Hanford Groundwater Protection Program for input to the Records Management Information System.

#### REFERENCE:

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Olympia, Washington.

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**APPENDIX H**

**FORMS**

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## APPENDIX H

## FORMS

Appendices A through G specify that well activities shall be documented on the appropriate forms. A number of forms are available to support the wide range of well activities on the Hanford Site. Several of these forms are required by *Washington Administrative Code*, WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," (shown below with an asterisk), while others are required as an integral part of well management for Fluor Hanford. Blank printable forms shall be available on the Fluor Hanford Central Plateau web page (<http://apweb02.rl.gov/rapidweb/phmc/cprp-projects/index.cfm?PageNum=27>).

The following forms, listed in sequential order of use, are appropriate for new well installation or well alteration:

- A-6003-663 Well Drilling/Decommissioning Planning Form
- \*ECY 040-22 Notice of Intent (Start Card) to Construct a Water Well
- \*ECY 040-27 Notice of Intent (Start Card) to Construct an Environmental Investigation Well
- \*ECY 040-55 Notice of Intent to Construct (Start Card)
  - Geotechnical Soil Boring
  - Soil Sampling (Contaminants)
  - Vapor Sampling
- A-6003-650 Field Activity Report No. 1 – Drilling Plan
- A-6003-651 Field Activity Report – Daily Drilling
- A-6003-711 Field Activity Report – Drawing Continuation Page
- A-6003-655 Field Activity Report Tubular Goods Tally
- A-6003-654 Field Activity Report Cement Calculations
- A-6003-653 Well Completion Log
- A-6003-642 Borehole Log
- A-6003-684 Field Cleaning and/or Decontamination
- A-6003-658 Well Construction Summary Report
- A-6003-657 Well Acceptance Report
- A6003-643 Well Summary Sheet

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- \*ECY 050-1-20..Water Well Report, or \*ECY –050-12 Resource Protection Well Report (either form acceptable to the Washington State Department of Ecology)
- A-6003-659 Well Survey Data Report.

The following forms, listed in sequential order of use, are appropriate to decommission a resource protection well, environmental monitoring well, vadose well, or geotechnical soil boring:

- \*ECY 040-24 Notice of Intent (Start Card) to Decommission a Water Well
- A-6003-657 Well Attributes Report
- A-6003-663 Well Drilling/Decommissioning Planning Form
- A-6003-650 Field Activity Report No.1 – Daily Drilling
- A-6003-651 Field Activity Report – Daily Drilling
- A6003-655 Field Activity Report Tubular Goods Tally
- A-6003-654 Field Activity Report Cement Calculations
- A-6003-684 Field Cleaning and/or Decontamination
- \*ECY 050-1-20 Water Well Report, or \*ECY –050-12 Resource Protection Well Report (either form acceptable to the Washington State Department of Ecology).

The following forms, listed in sequential order of use, are appropriate to conduct routine well maintenance activities, nonroutine well maintenance activities, and well inspections:

- Well Attributes Report
- Routine Well Maintenance Order
- Non-Routine Well Maintenance Order
- Camera Survey.

REFERENCE:

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Olympia, Washington.

## DISTRIBUTION

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	A.C. Tortoso	A6-38
	K.M. Thompson (8)	A6-38
	DOE Public Reading Room (#)	H2-53
9	<u>Pacific Northwest National Laboratory</u>	
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