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ECE-100FR314-00007
Revision 1

Environmental Cost Estimate for 100 F/IU RD/RAWP

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

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352

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Document Type: RPT

J. F. Urquidi
CH2M HILL Plateau Remediation Company

Date Published
March 2015

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APPROVED
By Ashley R Jenkins at 9:34 am, Mar 18, 2015

Release Approval | Date

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ECE-100FR314-00007

Environmental Cost Estimate for 100 F/IU RD/RAWP

Revision 1

Date: December 3, 2014

Project: CH2M HILL Plateau Remediation Company

Topic: Cost Analysis

Lead Estimator: J. Urquidi

Senior Review: S. Ferries

Administrative Use

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CHPRC ENVIRONMENTAL COST ESTIMATE COVER PAGE

Part 1: To be completed by the ER&QA Lead Cost Estimator

Project: 100 F/IU RD/RAWP	**Date:** December 3,2014
Calculation Title & Description: Environmental Cost Estimate for 100 F/IU RD/RAWP	
J. Urquidi **Project Cost Estimator(s)**	**Basis of Qualification:** MBA Public management, B.A. Social Sciences, over 30 years of cost engineering and estimating experience in process engineering and construction, remediation and investment banking industries including over 5 years of Hanford planning and estimating experience
S. Ferries **Cost Estimate Checker**	**Basis of Qualification:** Geologist with over 29 years of experience in environmental remediation, 16 years in cost estimating, 5 years of Hanford estimating.
S. Ferries **ER & QA Lead Cost Estimator**	**Basis of Qualification:** Geologist with over 29 years of experience in environmental remediation, 16 years in cost estimating, 5 years of Hanford estimating.

Part 2: To be completed by Project Cost Estimator

Calculation No.: ECE-100FR314-00007 **Revision No.:** 1

Revision History:

Revision No.	Description	Date	Affected Pages
0	Entire document	10/21/2014	All
1	Incorporated changes based on updated sampling plan	12/3/2014	All

Part 3: Document Review & Approval

Project Cost Estimator:	J. Urquidi/P070 Estimator/Scheduler NAME/POSITION	
	SIGNATURE	DATE
Cost Estimate Checker:	S. Ferries/Sr. Cost Estimator NAME/POSITION	
	SIGNATURE	DATE

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CHPRC ENVIRONMENTAL COST ESTIMATE COVER PAGE

ER & QA Lead Cost Estimator:	S. Ferries/Sr. Cost Estimator NAME/POSITION	
	SIGNATURE	DATE
Project Manager:	P. Burke/Project Manager NAME/POSITION	
	SIGNATURE	DATE
Responsible Manager:	R. Brunke/Manager NAME/POSITION	
	SIGNATURE	DATE

Terms

AWLN	automated water level network
CHPRC	CH2M HILL Plateau Remediation Company
COC	contaminant of concern
Cr(VI)	hexavalent chromium
CUL	cleanup level
DOE	U.S. Department of Energy
ECE	Environmental Cost Estimate
ECF	Environmental Calculation File
EPA	U.S. Environmental Protection Agency
FY	fiscal year
G&A	general and administrative
IC	institutional control
MNA	monitored natural attenuation
MSA	Mission Support Alliance
O&M	operations and maintenance
OH&P	overhead and profit
OU	operable unit
RDR	remedial design report
RAWP	remedial action work plan
ROD	record of decision
RTD	removal, treatment, and disposal
SAP	sampling and analysis plan
SME	subject matter expert
TCE	trichloroethene

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1 Introduction

CH2M HILL Plateau Remediation Company (CHPRC) prepared this Environmental Cost Estimate (ECE) for the following remedial design report (RDR)/remedial action work plan (RAWP) and associated addenda:

- *Integrated Remedial Design Report/Remedial Action Work Plan for 100-F/IU* (DOE/RL-2014-44) (Integrated RDR/RAWP)
- *Remedial Design Report/Remedial Action Work Plan Addendum for 100-FR-1, 100-FR-2, 100-IU-2, and 100-IU-6 Soil* (DOE/RL-2014-44-ADD1) (Soil Addendum)
- *Remedial Design Report/Remedial Action Work Plan Addendum for 100-FR-3 Groundwater* (DOE/RL-2014-44-ADD2) (Groundwater Addendum)

This ECE was revised to incorporate changes to the monitoring network based on review of the Groundwater Sampling and Analysis Plan (Appendix A of the Groundwater Addendum). The changes affected the number of new wells for Phase 1 installation and the total number of wells, aquifer tubes and seeps in the monitoring network. This ECE intended to estimate the costs associated with the selected remedies for the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2, and 100-IU-6 Operable Units (OUs), hereinafter referred to as 100-F/IU.

This ECE details the requirements of the soil and groundwater related remedies designed and implemented to meet the remedial action objectives identified in the 2014 U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy (DOE) record of decision (ROD) for 100-F/IU (*Hanford Site 100-F/IU Record of Decision for 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2, and 100-IU-6*). This ECE is a companion document to the Integrated RDR/RAWP (DOE/RL-2014-44) and corresponding Soil Addendum and Groundwater Addendum.

This estimate was prepared in accordance with the guidelines of EPA 540-R-00-002, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (OSWER 9355.0-75), and PRC-PRO-EP-40282, *Cost Estimating Procedure for Response Action Decision-Making*. This cost estimate is for the 100-F/IU remedy during the 150-year period from fiscal year (FY) 2015 through FY 2165.

2 Scope of Work

The plan and schedule for the 100-F/IU soil and groundwater remedies selected in the 100-F/IU ROD (EPA and DOE, 2014), are outlined in the 100-F/IU Integrated RDR/RAWP (DOE/RL-2014-44) and Addenda. The soil remedy in the 100-F/IU ROD (EPA and DOE, 2014) identified removal, treatment (as required), and disposal (RTD) of remaining waste sites associated with the 100-IU-2 and 100-IU-6 OUs, institutional controls (ICs) at 15 100-FR-1 and 100-FR-2 OU waste sites, and monitored natural attenuation (MNA) and ICs for the 100-FR-3 OU.

For the waste sites, the RTD remedy at 36 remaining sites in 100-IU-2 and 100-IU-6 OUs includes excavation of contaminated soil and debris, treatment as necessary to meet disposal criteria, and transport and disposal at the Environmental Restoration Disposal Facility. Waste sites are then backfilled and recontoured, followed by revegetation. The estimated time for the RTD remedy implementation is three to five years. There is no operations and maintenance (O&M) post-remediation for these sites. The RTD cost estimate for the 36 waste sites was provided by Washington Closure Hanford and includes the cost

for ICs required during remedial action. RTD costs are detailed in ECE-100FR111-00010, *Environmental Cost Estimate for 100 F/IU Vadose Zone and Groundwater RI/FS.* This estimate is presented in Appendix K of the 100-F/IU remedial investigation/feasibility study report (DOE/RL-2010-98, *Remedial Investigation/Feasibility Study for the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2, and 100-IU-6 Operable Units*).

ICs will be established to control access to residual contamination in soil and groundwater above standards for unrestricted use and unrestricted exposure. In 100-FR-1 and 100-FR-2 OUs, ICs to restrict excavation and/or prohibit irrigation at 15 waste sites are required. In 100-FR-3, ICs will prohibit well drilling and groundwater use at areas where groundwater exceeds cleanup levels (CULs). These ICs are implemented on a sitewide basis and costs are projected for the next 150 years. The IC costs include site access, personnel badging, real estate and deeds, warning signs along the Columbia River bank and other access points, maintaining a current site-wide ICs plan, controls for excavating soil, accessing and using groundwater, and irrigation restrictions. Costs for providing the programmatic ICs were developed in a cooperative effort with the Mission Support Alliance (MSA) contractor and CHPRC and are reported in ECF-Hanford-12-0067, *Institutional Controls Costs Apportioned by ROD Groups*. MSA provides the majority of the programmatic ICs.

For 100-FR-3, the MNA remedy will be implemented until the CULs of the groundwater contaminants of concern (COCs) (hexavalent chromium (Cr(VI)), trichloroethene (TCE), nitrate, and strontium-90) have been achieved. The timeframe for the groundwater CUL attainment is 35 years for Cr(VI), 50 years for TCE, 80 years for nitrate, and 150 years for strontium-90. The performance monitoring component of the MNA remedy extends for 150 years and includes the following:

- Installation of 11 new Phase I wells and 6 new Phase II monitoring wells
- Periodic sampling of 17 new and 28 existing monitoring wells, 6 aquifer tubes~~,~~ and 1 natural seep within the monitoring network. An additional 3 existing wells are in the monitoring network for water level measures only.
- Operation of an automated water level network (AWLN) at 17 locations for 5 years
- Collection of manual water level measurements for 10 years
- Investigation and repair/rehabilitation of 5 existing monitoring wells
- Repair and recommissioning of the 100-F river gauge station
- O&M of the monitoring network
- Replacement wells as required
- Well decommissioning

Samples will be collected and analyzed at the frequency and locations identified in the Groundwater Sampling and Analysis Plan (SAP) (Appendix A of the Groundwater Addendum). New wells (n= 17) will be sampled quarterly at year 1 and annually in years 2 through 5. Existing wells (n= 28) will be sampled annually or, in limited cases semiannually, for years 1 through 5. Sampling will occur on a biennial basis after year 5. Manual water level measurements will be obtained 3 times per year for the first 10 years of performance monitoring from the monitoring well network specified in the Groundwater SAP. As natural attenuation progresses, the number of locations in the monitoring network and the number of samples collected will decrease as the groundwater COC plumes size decrease and ultimately attain CULs.

Annual sample results from the monitoring network will be compiled in the annual Hanford Site groundwater report. Comprehensive performance monitoring reports that assess the natural attenuation processes, rates of attenuation, compliance evaluations, and overall protectiveness will be prepared every 5 years. Due to the influx of new information and sample results from new wells, significant data evaluation and updates to the existing groundwater model will be required during the first 5 years of performance monitoring. The initial comprehensive reports prepared after 5 and 10 years of performance monitoring will be the most extensive. Subsequent 5-year reports, including the 15-year report and onward, will require a lesser effort. The 5-year reports prepared for the 85-year report and onward will only include the strontium-90 plume and will require less extensive model updates and result analysis. A final remedial action report will be prepared when the CULs of all COCs have been attained which is expected to be on or about year 155.

3 Estimate Methodology

Preparation of this cost estimate was based on the soil and groundwater remedies identified in the 100-F/IU ROD (EPA and DOE, 2014). Project scope items for the MNA remedy were itemized for specific periods based on the performance monitoring plan outlined in the Groundwater Addendum (which includes the Groundwater SAP) to satisfy the requirements of the 100-F/IU ROD (EPA and DOE, 2014). Current u~~U~~nit costs were applied for the labor, material subcontracts, and services expected in each period. Breakout of more detailed support costs is provided where possible. Where available, costs for routine procedures or typical systems (such as AWLN system) were taken from historical costs at Hanford or commonly available data sources such as RS Means Facilities Construction Cost Data (ISBN 978-0-87629-995-1) or RS Means Heavy Construction Cost Data (ISBN 978-0-97629-997-5) if actuals or onsite subject matter experts (SMEs) were not available.

This ECE was developed from an analysis of the wells to be sampled and the analytes to be tested, which provided the basis for a ground-up estimate to address the requirements of the ROD. Sections include 100-F/IU remedy summation sheets:

- MNA and performance monitoring
  - Project Management
  - Waste site RTD costs for 36 existing sites
  - Phase I and Phase II drilling costs (total of 17 wells)
  - Costs for replacement wells during performance monitoring
  - Periodic maintenance (inspections prior to sample collection, installation/maintenance of AWLN, recommissioning of the 100-F river gauge station, geophysical logging/general repairs/investigation/redevelopment at 7 existing monitoring wells, minor maintenance during performance monitoring)
  - Groundwater monitoring (sampling and analysis), reporting (annual updates to Hanford Site groundwater report and 5 year performance monitoring reports), and well decommissioning
- ICs for 150 years (waste sites and groundwater)

Preparation of this cost estimate has been based on the final remedy selection, historical labor, subcontract services and material costs, competitive market conditions, implementation schedule, and other variable factors. As a result, the final project costs may vary from this estimate due to many causes including the duration of the project.

4 Markups

The following typical markups were used in the cost estimate, as appropriate:

- Contractor Overhead and Profit (OH&P)—set at 0 percent, using CHPRC/MSA rates, although there is significant likelihood that performance may include subcontractor labor and/or services
- CHPRC General and Administrative (G&A) 20.0 percent
- Scope Contingency set at AACE International Class 3—20 percent
- Bid Contingency—not included

5 Escalation Rate

Escalation is not calculated in this estimate. All costs are presented in 2015 costs and rates.

6 Estimate Classification

The expected accuracy range of the cost estimate at this stage is approximately +30/-20 percent, consistent with EPA 540-R-00-002 and AACE International Recommended Practice No. 17R-97, *Cost Estimate Classification System*, Class 3 range (20 percent used), for the level of project definition available at this point in the Superfund process.

The expected accuracy range is an indication of the degree to which the final cost outcome for a given project could vary from the estimated cost. Accuracy is traditionally expressed as a +/- percentage range around the point estimate after application of contingency, with a stated level of confidence that the actual cost outcome would fall within this range (+/- measures are a useful simplification, given that actual cost outcomes have different frequency distributions for different types of projects), which typically results in a 90 percent confidence that the actual cost will fall within the bounds of the low and high ranges.
The accuracy range of an estimate is dependent upon a number of characteristics of the estimate input information and the estimating process. The extent and the maturity of the input information as measured by percentage completion (and related to level of project definition) is an important determinant of accuracy. However, factors besides the available input information also greatly affect estimate accuracy measures, primarily the state of technology in the project, the quality of reference cost estimating data, and the extremely long period over which the effort spans.

The accuracy of any given estimate is not fixed or determined by its classification category. Significant variations in accuracy from estimate to estimate are possible if any of the determinants of accuracy, such as maturity of technology selected, quality of reference cost data, quality of the estimating process, and skill and knowledge of the estimator vary. Additionally, accuracy is not necessarily determined by the estimating methodology used or the effort expended and must be evaluated on an individual estimate basis, usually in conjunction with some form of risk analysis process.

7 Cost Resources

The following cost resources were used in the development of the cost estimate:

- RS Means Facilities Construction Cost Data and Heavy Construction Cost Data (production rates, equipment operating costs), reference cited previously

- CHPRC historical data (200-ZP-1 drilling and hookups, 300-FF-5 OU sampling and analysis, S-SX, 200 W Pump & Treat well maintenance costs, 100 DX/HX Pump & Treat drilling methods, and well drilling and completion costs for the 200 and 100 Areas, as surveyed). Subcontract identification for rates used are included in the detail estimate.
- Vendor quotes
- Estimator judgment
- SME opinions

Labor unit prices reflect a burden rate including workers compensation, unemployment taxes, fringe benefits, and medical insurance.

Summarized estimated costs for waste site removal treatment and disposal, groundwater contaminant monitoring and MNA including labor, materials, subcontracts, and services for capital, operations and maintenance, as well as waste site remediation (denominated in FY15 dollars), and 150-year ICs are presented in Figure 1.

Figure 1

		Dollars	20% Contingency	Total
Capital:				
	Drilling	$ 1,628,773	$ 325,755	$ 1,954,600
	Replacement Drilling	$ 474,944	$ 94,989	$ 570,000
	RTD of 36 Existing Waste Sites	$ 9,630,000	$ -	$ 9,630,000
	Subtotal	$ 11,733,717	$ 420,743	$ 12,154,600
Operations and Maintenance				
	Management	$ 2,908,715	$ 581,743	$ 3,490,500
	Periodic Maintenance	$ 907,140	$ 181,428	$ 1,088,600
	Monitoring	$ 11,680,919	$ 2,337,984	$ 14,028,000
	150 Year Institutional Controls (Shared)	$ 26,205,500	$ -	$ 26,205,500
	Subtotal	$ 41,711,273	$ 3,101,155	$ 44,812,600
	Total:	$ 53,444,990	$ 3,521,898	$ 56,967,200

Figure 1. Complete Estimate Backup Detail Found in Appendix

8 Labor Costs

The estimate has been adjusted for local area labor rates, based on agreed upon labor rates among CHPRC, MSA, Hanford Atomic Metal Trades Council, and DOE as evidenced by the actual rates of pay fixed by these agreements for FY 2015.

9 Sales Tax

Taxes are excluded from this estimate and shall be applied when the materials accounts are entered into the Cobra Accounting program later.

10 Allowance Costs

The following allowance is included within the cost estimate:

- Mobilization allowance for the subcontractor based on past subcontracts
- Training allowance of $100 per course to recognize the time paid while the worker or supervisor is in mandatory general education and training for admission to the Site

- Small tool allowance of $250 per well campaign

11 Assumptions

Assumptions used in the cost estimate are described in this section. The following general assumptions are made:

- The Integrated RDR/RAWP (DOE/RL-2014-44), Soil Addendum (DOE/RL-2014-44-ADD1), and Groundwater Addendum (DOE/RL-2014-44-ADD2) are appropriate for use as basis for estimate effort.
- The Groundwater Addendum, which includes the Groundwater SAP, defines a routine groundwater well sampling and analysis program that will supersede all previous 100-FR-3 OU groundwater monitoring plans.
- Well decommissioning and abandonment costs were estimated with the assistance of soil and groundwater drilling SMEs. Administrative costs were assumed to follow WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," requirements.
- Sampling and laboratory analysis costs were based on sampling frequency and locations identified in the groundwater SAP. Costs were assumed to follow outside vendor current FY 2015 rate table for analysis.
- Sampling and laboratory analysis costs were based on sampling frequency and locations identified in the groundwater SAP. Costs were assumed to follow outside vendor current FY 2015 rate table for analysis.
- Assumptions for the cost of sampling and analysis include the following:
  - All COCs are included for the first 40 years
  - Phase II wells will be sampled for nitrate
  - After 10 years trace metals are eliminated from sampling
  - After 40 years, Cr(VI) is eliminated from sampling
  - After 55 years, TCE is eliminated from sampling
  - After 85 years, nitrate is eliminated from sampling
  - Monitoring network locations will be reduced by one-third of the initial count after the first 20 years of monitoring
  - Monitoring network locations are reduced by two-thirds of the initial count after 55 years
  - After the first 20 years, sampling frequency will change from biennial to once per 5 years
- 150-year IC efforts to follow rates and cost allocations developed for and used in prior ECE documents (ECF-Hanford-12-0067).

12 Exclusions

The following items have been excluded from the estimate:

- Treatment of any COC, except as specified in ROD, specifically, Cr(VI), TCE and degradation products, nitrate, strontium 90, and trace metals.

13 References

AACE International Recommended Practice No. 17R-97, 2011, *Cost Estimate Classification System*, TCM Framework: 7.3 – Cost Estimating and Budgeting, AACE International, Morgantown, West Virginia. Available at: http://www.aacei.org/non/rps/17r-97.pdf.

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Means, R.S., 2010, *Heavy Construction Cost Data*, 24th Annual Edition, Robert S. Means Company, Kingston, Massachusetts.

PRC-PRO-EP-40282, 2014, *Cost Estimating Procedure for Response Action Decision-Making and Work Plans*, Revision 1, Change 1, CH2M HILL Plateau Remediation Company, Richland, Washington (available upon request).

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-160.

Appendix

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative**

Prepared for C/ Phil Burke **12/1/2014 15:24**

PCS: J.F. Urquidi

Projct Management

Revision GIF

Status	Activity ID	Resource/COCS	Resource Description	Hours	Hr @ Rate	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.01.1000**	**Project Management, Project design based on EPA-540-00-R2**							Design assumptions	
RD/RAWP	030.14.05.01.01.1000	1-N/A	PO Contracts							
RD/RAWP	030.14.05.01.01.1000	1-21	PO Contracts						Phase I wells	11
RD/RAWP	030.14.05.01.01.1000	1-N/A							Phase II wells	6
RD/RAWP	030.14.05.01.01.1000								Replacement wells	5
RD/RAWP	030.14.05.01.01.1000	1-M010-CPN-REG	First Line Supervisors	2,820.0	$ 253,771.80			2.0 per month first 80 years; then for remaining 75 years hours per month = 1.0	SOW work	
RD/RAWP	030.14.05.01.01.1000	1-P070-CPN-REG	Planner/Scheduler/Estimators	900.0	$ 71,712.00			1.0 per month first 80 years; then for remaining 75 years hours per month = 0.5	Periodic reporting	
RD/RAWP	030.14.05.01.01.1000	1-P030-CPN-REG	Buyers/Procurement/Contracting	900.0	$ 59,616.00			1.0 per month first 80 years; then for remaining 75 years hours per month = 0.5	Periodic contrat renewals	
RD/RAWP	030.14.05.01.01.1000	1-M020-CPN-REG	Managers & Executives	10,500.0	$ 1,867,635.00			10.0 per month first 80 years; then for remaining 75 years hours per month = 1.0	General supervision and interface	
RD/RAWP	030.14.05.01.01.1000	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	1,410.0	$ 143,270.10			1.0 per month first 80 years; then for remaining 75 years hours per month = 0.5	SOW work	
			Total Hours	**16,530.00**						
			Total Extended		**2,396,004.90**					
			Total S/C & Svc. cost			**0.00**				
RD/RAWP	**030.14.05.01.01.1040**	**Surveying**								
RD/RAWP	030.14.05.01.01.1040	1-21	PO Contracts			6664	3D210	RSM 02.21.13.09.0020 Topo survey	assume cost per site	392.00
RD/RAWP	030.14.05.01.01.1040	1-21	PO Contracts			3,410		Set Locations/well monuments RSM 02.21.13.13.0600	assume individual site cost adjusted upward by SME opinion; factor= 1	155.00
			Total Hours	**0.00**						
			Total Extended		**0.00**					
			Total S/C & Svc. cost			**10,074.00**				
RD/RAWP	**030.14.05.01.01.1050**	**Permitting**								
RD/RAWP	030.14.05.01.01.1050	1-21	PO Contracts			17,850.00	3D210	0.0005 of total of 35,700,000	Assuming all but start cards included here for the whole project period (155 years)	
			Total Hours	**0.00**						
			Total Extended		**0.00**					
			Total S/C & Svc. cost			**17,850.00**				
Total: 030.14.05.01.01.1000										
			Total Hours	**16,530.00**						
			Total Extended		**2,396,004.90**					
			Total S/C & Svc. cost			**27,924.00**				
			Total Dollars					$ 2,423,928.90		

For the waste sites, the RTD remedy at 36 remaining sites in 100-IU-2 and 100-IU-6 OUs includes excavation of contaminated soil and debris, treatment as necessary to meet disposal criteria, and transport and disposal at the Environmental Restoration Disposal Facility. Waste sites are then backfilled and re-countoured, followed by revegetation. The estimated time for the RTD remedy implementation is 3 to 5 years. There is no Operations and Maintenance (O&M) post-remediation for these sites. The RTD cost estimate for the 36 waste sites was provided by Washington Closure Hanford (WCH) and includes the cost for ICs required during remedial action. RTD costs are detailed in *Environmental Cost Estimate for 100 F/IU Vadose Zone and Groundwater RI/FS* (ECE-100FR111-00010, 2013). This estimate is presented in Appendix K of the *Remedial Investigation/Feasibility Study for the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2, and 100-IU-6 Operable Units* (100-F/IU RI/FS report) (DOE/RL-2010-98).

Estimated cost at time of reporting: **$9,630,000**

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative** Revision GIF

Prepared for CA Phil Burke **12/1/2014 15:24**

PCS: J.F. Urquidi

Phase I and Phase II Drilliing

RD/RAWP	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Drilling Oversight**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			$ 130,500.00		Mob and Remob		
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	605	$ 54,443.95			One full day plus daily percent time = .25		
RD/RAWP	030.14.05.01.010.01	1-P090-CPN-REG	Industrial Hygienists	550	$ 53,878.00			Daily percent time = .25		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	2210	$ 224,558.10			Full time in field + 1 day/well		
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	44	$ 3,075.60			Initial well site survey and startup per well in hours =2.0	Depth of well	50.00
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable						depth to water	35.00
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	220	$ 22,354.20			well design, hours per well = 10	progress rate in feet per hour	5
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	220	$ 19,797.80			well design hours per well= 10		
RD/RAWP	030.14.05.01.010.01	1-M020-CPN-REG	Managers & Executives	220	$ 39,131.40			well design per well = 10		
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable						Field days per well	10.00
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			$ 770.00		training assume 1 course per crewmember/year + 3 for site supervisor	Rig Crew	4.00
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			13,600.00		standby time cost	days in the field	170.00
RD/RAWP	030.14.05.01.010.01								standby time assumed in percent of days	2%
			Total Hours	**4,069.00**					wells drilled simultaneously	1.00
			Total Extended		**417,239.05**					
			Total S/C & Svc. cost			**144,870.00**				
RD/RAWP	**030.14.05.01.010.01**	**Cultural & Ecological Review Phase I, Phase II and Walkdown of all proposed sites**								
RD/RAWP	030.14.05.01.010.01	ECO	PO Contracts			68,000.00		Review		
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	34.00	$ 3,059.66			walkdown	assume hours per site=:	2.0
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	34.00	$ 3,454.74			walkdown		
RD/RAWP	030.14.05.01.010.01	1-M020-CPN-REG	Managers & Executives	34.00	$ 6,047.58			walkdown		
RD/RAWP	030.14.05.01.010.01	1-P030-CPN-REG	Buyer	34.00	$ 2,252.16			walkdown		
			Total Hours	**136.00**						
			Total Houra @ Rate		**14,814.14**					
			Total S/C & Svc. cost			**68,000.00**				
RD/RAWP	**030.14.05.01.010.01**	**Road, Pad, laydown area construction**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			105,600.00		Roads, Phase I and II		
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			118,800.00		laydown areasPhase I and II	square feet per road	800.0
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			4,752.00		Pads Phase I and II	square feet per laydown area	900.0
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			4,250.00		bollards Phase I and Phase II	Number of Bollards= 4 per well, assume unit cost per bollard=	250.00
		1-21	PO Contracts						concrete pad square feet (S/C 40058 rel 90)	36.0
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts							
			Total Hours	**0.00**						
			Total Extended		**0.00**					
			Total S/C & Svc. cost			**233,402.00**				

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative** Revision G1F

Prepared for C/Phil Burke **12/1/2014 15:24** **Phase I and Phase II Drilliing**

PCS: J.F. Urquidi

RD/RAWP	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Drilling and Completions**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			117,300		drilling of wells, all phases	see rate sheet for drilling cost details	
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			89,250		Well construction, all phases		
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			111,966		well completions, all phases		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	170	$ 17,273.70			well coordination, records custody, BTR and start card	assume hours per well	10
RD/RAWP	030.14.05.01.010.01	1-C081-CPN-REG	Pipefitters	170	$ 12,053.00			developing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	170	$ 12,843.50			developing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-L070-CPN-REG	Light Vehicle Drivers	170	$ 11,617.80			developing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	170	$ 12,843.50			developing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-WG	mllw waste			1,696.96		drill cuttings disposal	cuttings in cubic yards	0.65
RD/RAWP	030.14.05.01.010.01	1-WA	purge water			16.64		Purge water disposal cost	purge water volume in gal	32.62
RD/RAWP	030.14.05.01.010.01	1-HSSA-TD08-REG	TEAMSTER GROUP VIII	34.0	$ 1,663.76			Purge water driver cost	wells volumes purged	3
RD/RAWP	030.14.05.01.010.01	PWT	purge water truck			379		purge water truck use		
			Total Hours	**884.00**						
			Total Houras @ Rate		**68,295.26**					
			Total S/C & Svc. cost			**320,608.94**				
RD/RAWP	**030.14.05.01.010.01**	**Well Sampling per SAP**								
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable				3D210			
RD/RAWP	030.14.05.01.010.01	1-10	Materials			21,250	3D220		assume sampling materials per well	250
RD/RAWP	030.14.05.01.010.01	1-P080-CPN-REG	Health Physicists	85	$ 8,115.80		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	85	$ 5,941.50		3D500		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	85	$ 6,421.75		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	85	$ 8,636.85		3D800		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	85	$ 6,086.85		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable				3D400			
			Total Hours	**425.00**						
			Total Extended		**35,202.75**					
			Total S/C & Svc. cost			**21,250.00**				
RD/RAWP	**030.14.05.01.010.01**	**Analysis cost**								
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			1,675.07	3D210		1 sample at completion depth	1
RD/RAWP	030.14.05.01.010.01	EPA 8082	TCE and degeneration products			4,799.90				1
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			3,495.12	3D220			1
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			5,684.67	3D600			1
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			4,248.95	3D500			1
RD/RAWP	030.14.05.01.010.01	1-N/A	disposable sampling materials			4,250.0	3D600		Allowance for disposable cost for disposable material per well	250
RD/RAWP	030.14.05.01.010.01	T060	IH Tech	85.0	$ 5,941.50		3D800	1 hour per sample	hours per sampling	5
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping	85.0		2,286.35	3D600	wells * analytes	Initial sampling suite	5
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging	85.0		1,247.10	3D400	wells * analytes		
			Total Hours	**255.00**						
			Total Extended		**5,941.50**					
			Total S/C & Svc. cost			**27,687.15**				
Total: 030.14.05.01.01										
			Total Hours	**5,769.00**						
			Total Extended		**541,492.70**					
			Total S/C & Svc. cost			**815,818.10**				
			Hashtotal Hours & S/C & Svc. cost Combined				**821,587.1**			
			Total Dollars					$ 1,363,079.80		

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative** Revision G1F

Prepared for C/ Phil Burke **12/1/2014 15:24** **Replacement Well Drilling**

PCS: J.F. Urquidi

PMB or CLIN7	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Drilling Design and Oversight**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			$ 21,000.00		Mob and Remob	Active wells	50
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	137.5	$ 12,373.63			One full day plus daily percent time = .25	lifetime failure rate = .10	10%
RD/RAWP	030.14.05.01.010.01	1-P090-CPN-REG	Industrial Hygienists	125	$ 12,245.00			percent time = .25	replacement wells	5.00
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	510	$ 51,821.10			Full time in field + 1 day/well	Late replacements	0.00
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	10	$ 699.00			Initial well site survey and startup per well in hours =2.0	Depth of well	50.00
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable							
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	50	$ 5,080.50			well design, hours per well = 10	progress rate in feet per hour	5
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	50	$ 4,499.50			well design hours per well= 10		
RD/RAWP	030.14.05.01.010.01	1-M020-CPN-REG	Managers & Executives	50	$ 8,893.50			well design per well = 10		
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable						Field days per well	10.00
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			$ 770.00		training assume 1 course per crewmember/year + 3 for site supervisor	Rig Crew	4.00
RD/RAWP	030.14.05.01.010.01					4,000.00		standby time cost	days in the field	50.00
RD/RAWP	030.14.05.01.010.01								standby time assumed in percent of days	2%
			Total Hours	**932.50**					**wells drilled simultaneously**	1.00
			Total Extended		**95,612.23**					
			Total S/C & Svc. cost			**25,770.00**				
RD/RAWP	**030.14.05.01.010.01**	**Cultural & Ecological Review and walkdowns for Replacement Drilling**								
RD/RAWP	030.14.05.01.010.01	ECO	PO Contracts			20,000.00		Review		
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	10.00	$ 899.90			walkdown	hours persite	2.0
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	10.00	$ 1,016.10			walkdown		
RD/RAWP	030.14.05.01.010.01	1-M020-CPN-REG	Managers & Executives	10.00	$ 1,778.70			walkdown		
RD/RAWP	030.14.05.01.010.01	1-P030-CPN-REG	Buyer	10.00	$ 662.40			walkdown		
			Total Hours	**40.00**						
			Total Houra @ Rate		**4,357.10**					
			Total S/C & Svc. cost			**20,000.00**				
RD/RAWP	**030.14.05.01.010.01**	**Road, Pad, laydown area construction**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			51,000.00		Roads		
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			27,000.00		laydown areas	square feet per road	800
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			21.60		Pads	square feet per laydown area	900
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			-		bollards	Bollards	0
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts						concrete pad square feet (S/C 40058 rel 90)	36
			Total Hours	**0.00**						
			Total Extended		**0.00**					
			Total S/C & Svc. cost			**78,021.60**				

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative** Revision G1F

Prepared for CA Phil Burke **12/1/2014 15:24** **Replacement Well Drilling**

PCS: J.F. Urquidi

PMB or CLIN7	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Drilling and Completions**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			34,500		Replacement well drilling		
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			26,250		Well construction		
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			32,931		well completions		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	50	$ 5,080.50			well coordination, records custody, BTR and start card	assume hours per well	10
RD/RAWP	030.14.05.01.010.01	1-C081-CPN-REG	Pipefitters	50	$ 3,545.00			developing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	50	$ 3,777.50			developing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-L070-CPN-REG	Light Vehicle Drivers	50	$ 3,417.00			developing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	50	$ 3,777.50			developing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-WG	mllw waste			499.10		drill cuttings disposal	cuttings in cubic yardsy	0.65
RD/RAWP	030.14.05.01.010.01	1-WA	purge water			4.89		Purge water disposal cost	purge water volume in gal	32.62
RD/RAWP	030.14.05.01.010.01	1-HSSA-TD08-REG	TEAMSTER GROUP VIII	489.3	$ 23,945.60			Purge water driver cost	wells volumes purged	3
RD/RAWP	030.14.05.01.010.01	PWT	purge water truck			5,456		purge water truck use		
			Total Hours	**739.34**						
			Total Houras @ Rate		**43,543.10**					
			Total S/C & Svc. cost			**99,641.42**				
RD/RAWP	**030.14.05.01.010.01**	**Well Sampling per SAP**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts				3D210			
RD/RAWP	030.14.05.01.010.01	1-10	Materials			6,250	3D220		assume sampling materials per well	250
RD/RAWP	030.14.05.01.010.01	1-P080-CPN-REG	Health Physicists	25	$ 2,387.00		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	25	$ 1,747.50		3D500		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	25	$ 1,888.75		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	25	$ 2,540.25		3D800		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	25	$ 1,790.25		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable				3D400			
			Total Hours	**125.00**						
			Total Extended		**10,353.75**					
			Total S/C & Svc. cost			**6,250.00**				
RD/RAWP	**030.14.05.01.010.01**	**Analysis cost**								
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			591.2	3D210		1 sample at completion depth	1
RD/RAWP	030.14.05.01.010.01	EPA 8082	TCE and degeneration products			1,694.1				1
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			1,233.6	3D220			1
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			2,006.4	3D600			1
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			1,499.6	3D500			1
RD/RAWP	030.14.05.01.010.01	1-N/A	disposable sampling materials			1,500.0	3D600		Allowance for disposable cost for disposable material per well	250
RD/RAWP	030.14.05.01.010.01	T060	IH Tech	6.0	$ 419.40		3D800		hours per sampling	5
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping	30.00		1,247.1	3D600	wells * analytes	Initial sampling suite	5
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging	30.00		2,046.0	3D400	wells * analytes		1
			Total Hours	**66.00**						
			Total Extended		**419.40**					
			Total S/C & Svc. cost			**11,817.94**				
Total: 030.14.05.01.01										
			Total Hours	**1,902.84**						
			Total Extended		**154,285.58**					
			Total S/C & Svc. cost			**241,500.95**				
			Total Dollars					$	395,786.53	

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative** Revision G1F

Prepared for C/ Phil Burke **12/1/2014 15:24** **Periodic maintenance**

PCS: J.F. Urquidi

RD/RAWP	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Maintenance Plans, SOWs, for maintenance inspections before site visits**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts						Sampling Trips subjct to maintenance plan	302
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	151	$ 13,588.49				assume time per site visit planned	0.50
RD/RAWP	030.14.05.01.010.01	1-G020-CPN-REG	Office Clerks-General	302	$ 12,412.20				assume time per site visit planned	1.00
RD/RAWP	030.14.05.01.010.01	1-P070-CPN-REG	Planner/Scheduler/Estimators	151	$ 12,031.68				assume time per site visit planned	0.50
RD/RAWP	030.14.05.01.010.01	1-P090-CPN-REG	Industrial Hygienists	302	$ 29,583.92				assume time per site visit planned	1.00
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	75.5	$ 5,406.56				assume time per site visit planned	0.25
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	75.5	$ 5,277.45				assume time per site visit planned	0.25
RD/RAWP	030.14.05.01.010.01					-				
RD/RAWP	030.14.05.01.010.01									
			Total Hours	**1,057.00**					wells drilled simultaneously	
			Total Extended		**78,300.30**					
			Total S/C & Svc. cost			**0.00**				
RD/RAWP	**030.14.05.01.010.01**	**Periodic AWLN Monitoring Rack maintenance**								
RD/RAWP	030.14.05.01.010.01	1-10	Materials			21,780			Number of AWLMS wells involved=	18.0
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	180.0	$ 16,198.20			assume write Task order and supervise, hours per crew trip= 2.0	Number of Years projected maintenance	5.0
RD/RAWP	030.14.05.01.010.01	1-C020-CPN-REG	Electricians	180.0	$ 13,500.00			assume number per crew = 1	Assume 1 maintenance trip duration in hours=	2.00
RD/RAWP	030.14.05.01.010.01	1-C081-CPN-REG	Pipefitters	180.0	$ 12,762.00			annual review/renewal of task order, hours =	Assume battery replacement semiannualy cost=	180.00
RD/RAWP	030.14.05.01.010.01	1-P090-CPN-REG	Industrial Hygienists	10.0	$ 979.60			annual review/renewal of task order= 2.0	Assume 1 submersible water level transducer repl. 1 per well, lifetime of effortl=	310.00
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	135	$ 9,667.35			assume asurvey and leave site, hours = 1.5		
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	135	$ 9,436.50			assume asurvey and leave site, hours = 1.5		
			Total Hours	**820.00**						
			Total Houras @ Rate		**62,543.65**					
			Total S/C & Svc. cost			**21,780.00**				
RD/RAWP	**030.14.05.01.010.01**	**River Gauge Station repair**								
RD/RAWP	030.14.05.01.010.01	1-21	Subcontract			3,000		Road repair, assume no crossings, gravel construction	500 .0 lf of road at rate	
RD/RAWP	030.14.05.01.010.01	1-21	subcontract			1,380		wheeled loader equipment rental	assume full week Sunbelt 057-0006	1,380.0
RD/RAWP	030.14.05.01.010.01	1-10	Materials			800		Loader fuel and maint assume 6 hrs/day, full week	RSM 01.54.33.4710 hourly op rate	33.35
RD/RAWP	030.14.05.01.010.01	1-HSSA-OE08-REG	OPERATOR GROUP VIII	40.0	$ 2,030.28			loader operator	Time in Field in days	4.00
RD/RAWP	030.14.05.01.010.01	1-HSSA-OE01-REG	OPERATOR GROUP I	40.0	$ 1,837.87			oiler		
RD/RAWP	030.14.05.01.010.01	1-E020-CPN-REG	Civil Engineers	40.0	$ 4,840.00			civil design	engineering and design in hours	40.00
RD/RAWP	030.14.05.01.010.01	1-E050-CPN-REG	Environmental Engineers	2.0	$ 191.18			FMP approval	assume general FMP approval in hours	2.00
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	2.0	$ 203.22			FMP approval		
RD/RAWP	030.14.05.01.010.01	1-M020-CPN-REG	Managers & Executives	2.0	$ 355.74			FMP approval		
RD/RAWP	030.14.05.01.010.01	1-21	subcontract			4,000		cultural survey for road		
RD/RAWP	030.14.05.01.010.01							repair estimated as seawall repair	12.0 ft high seawall, 6 ' width RSM35.31.16.13.0160	149.00
RD/RAWP	030.14.05.01.010.01								seawall effort at RSM duration multiplied by 2; days=	2.00
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01	1-10	Materials			7,152		materials for repair	materials following RSM 35.31.16.0160 cost per lf adj x 4	596.00
RD/RAWP	030.14.05.01.010.01	CEQ	MSA Crane rental			5,218		MSA Crane rental	assume 1 week minimum, daily rate	1,304.44
RD/RAWP	030.14.05.01.010.01	1-HSSA-OE08-REG	OPERATOR GROUP VIII	20.00	$ 1,015.14			Crane operator	note: operator & oiler not needed for full time crane on site	
RD/RAWP	030.14.05.01.010.01	1-HSSA-OE01-REG	OPERATOR GROUP I	20.00	$ 918.93			Oiler		
RD/RAWP	030.14.05.01.010.01	1-HSSA-CM03-REG	CEMENT MASONS III	160.00	$ 7,524.66			Seawall construction crew	skilled workers following RSM C-17 crew profile crew =	8.00
RD/RAWP	030.14.05.01.010.01	1-C020-CPN-REG	Electricians	20	$ 1,500.00			water level gauging install	assume gauging install in days	2.00
RD/RAWP	030.14.05.01.010.01	1-C081-CPN-REG	Pipefitters	20	$ 1,418.00			water level gauging install		
RD/RAWP	030.14.05.01.010.01	1-10	Materials			8,500		estimated as AWLN system	unit cost	8,500.00
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	100	$ 8,999.00			supervision	assume additional planning days	4.00
			Total Hours	**466.00**						
			Total Houras @ Rate		**30,834.02**					
			Total S/C & Svc. cost			**30,050.16**				

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative** Revision G1F

Prepared for C/ Phil Burke **12/1/2014 15:24** **Periodic maintenance**

PCS: J.F. Urquidi

RD/RAWP	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Geophysical Logging as Required**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			25,000		Mobilization of Logging S/C	Assume number of wells logged=	5
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	200.00	$ 17,998.00				Field Duration per well in days	2.00
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	225.00	$ 22,862.25				assume each well accrues a mobilization charge	
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	100.00	$ 7,161.00				Planning time per well in days 2	2.00
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	100.00	$ 6,990.00				Additional Geologist report analysis time in hours per well	5.00
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			10,000		Demob charge		
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts	0		1,250		report charge		
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable		$ -			Assume occasional additional camera survey for wells,		
			Total Hours	**625.00**						
			Total Houras @ Rate		**55,011.25**					
			Total S/C & Svc. cost			**36,250.00**				
RD/RAWP	**030.14.05.01.010.01**	**General Inspections/minor maintenance**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts						Assume as many maint trips as sampling trips	
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	151	$ 13,588.49				assume time per site visit planned	0.50
RD/RAWP	030.14.05.01.010.01	1-G020-CPN-REG	Office Clerks-General	302	$ 12,412.20				assume time per site visit planned	1.00
RD/RAWP	030.14.05.01.010.01	1-P070-CPN-REG	Planner/Scheduler/Estimators	151	$ 12,031.68				assume time per site visit planned	0.50
RD/RAWP	030.14.05.01.010.01	1-P090-CPN-REG	Industrial Hygienists	1208	$ 118,335.68				assume time per site visit planned	4.00
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	604	$ 43,252.44				assume time per site visit planned	2.00
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	1208	$ 84,439.20				assume time per site visit planned	4.00
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	28	$ 2,005.08			Assume occasional additional camera survey for wells,	number of wells camera surveyed	7.00
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	28	$ 2,845.08			Assume occasional additional camera survey for wells,	duration in hours=	4.00
RD/RAWP	030.14.05.01.010.01	1-C081-CPN-REG	Pipefitters	28	$ 1,985.20			Assume occasional additional camera survey for wells,		
			Total Hours	**3,708.00**						
			Total Houras @ Rate		**290,895.05**					
			Total S/C & Svc. cost			**0.00**				

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative** Revision G1F

Prepared for C/ Phil Burke **12/1/2014 15:24** **Periodic maintenance**

PCS: J.F. Urquidi

RD/RAWP	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**general Repairs, Bailing, redevelopment**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts				3D210		Assume repair in % well trips= 5.0%	15
RD/RAWP	030.14.05.01.010.01	1-10	Materials			1,875	3D220		assume sampling materials per well	250
RD/RAWP	030.14.05.01.010.01	1-P080-CPN-REG	Health Physicists	7.5	$ 716.10		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	Industrial Health/Safety Tech	7.5	$ 524.25		3D500		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	7.5	$ 566.63		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	7.5	$ 762.08		3D800		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	7.5	$ 537.08		3D600		assumesample trips per day	2
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	151	$ 15,343.11			well coordination, records custody, BTR and start card	5 crew members 1 day per well repaired, elapsed time in hours	10
RD/RAWP	030.14.05.01.010.01	1-C081-CPN-REG	Pipefitters	151	$ 10,705.90			repairing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	151	$ 11,408.05			repairing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-HSSA-TD07-REG	TEAMSTER GROUP VII	151	$ 7,334.25			repairing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	151	$ 11,408.05			repairing well	hours per well	10
RD/RAWP	030.14.05.01.010.01	1-WG	mllw waste			75.36		sand/drill cuttings disposal	sand/cuttings in cy per well; assume feet of case sanded=4	0.03
RD/RAWP	030.14.05.01.010.01	1-WA	purge water			89.26		Purge water disposal cost	purge water volume in gal	197.05
RD/RAWP	030.14.05.01.010.01	1-HSSA-TD08-REG	TEAMSTER GROUP VIII	0.5	$ 23.87			Purge water driver cost	Purge water truck use in hours per well	3
RD/RAWP	030.14.05.01.010.01	PWT	purge water truck			5		purge water truck use	wells volumes purged	3
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	50	$ 5,080.50			Grouting to above RUM as required	wells required=	5
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	50	$ 3,580.50			Grouting to above RUM as required	assumed duration in hours=	20
RD/RAWP	030.14.05.01.010.01	1-N/A	Not Applicable		$ -			Grouting to above RUM as required	assumed average grouting height in feet	10
RD/RAWP	030.14.05.01.010.01	21-Jan	subcontract			75,000		Grouting to above RUM as required	drilling contractor mobilization rate per required well	15000
RD/RAWP	030.14.05.01.010.01	1-21	Subcontract			5250	3D400	Grouting to above RUM as required	drilling contracctor construction rate per foot	105
			Total Hours	**892.99**						
			Total Extended		**67,990.36**					
			Total S/C & Svc. cost			**82,295.07**				
			Total Hours	**7,568.99**						
			Total Extended		**585,574.62**					
			Total S/C & Svc. cost			**170,375.23**				
			Total Dollars					**755,949.85**		

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative**

Prepared for C/ Phil Burke **12/1/2014 15:24**

PCS: J.F. Urquidi

Revision

Monitoring, Reporting, Decommissioning

WBS & Title: 030.14.05.01.01

	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**WAC 173-160 required annual reporting; First year only**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			148,167.00	3D800	Specialist fate and transport modeling and reporting for annual report pkg. Annual cost = $60,000	Report requirement Cycles:	1
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	32	$ 4,718.08		3D400		SSPA est cost year 1	148,167.00
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	240	$ 24,386.40				SSPA est cost year 2	96,330.00
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	20	$ 1,698.60				SSPA est cost year 3	93,403.00
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	20	$ 1,317.40				SSPA est cost year 4	90,475.00
RD/RAWP	030.14.05.01.010.01	1-Client	Client Intervention-Review	32	$ -		3D200		SSPA est cost year 5 and 10	160,246.00
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	80	$ 8,128.80		3D800			
			Total Hours	**424.0**						
			Extended		**40,249.28**					
			Total S/C & Svc. cost Priced as Dollars			**148,167.00**				
RD/RAWP	**030.14.05.01.010.01**	**Annual sampling of wells: Field Work Sample Collection 1st year only**								
RD/RAWP	030.14.05.01.010.01						3D210		IH Tech field crew size	2
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	257.5	$ 23,172.43		3D220		Supervisor Hours per well trip	2.5
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	515.0	$ 52,329.15		3D800		Hours in full day:	10
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH/Safety Tech	1,030.0	$ 71,997.00		3D600		Full day, crew of 2, number of wells per day:	2
RD/RAWP	030.14.05.01.010.01	1-WG	WG solid waste disposal			26.52			weight of debris per well trip in #	5
RD/RAWP	030.14.05.01.010.01	1-WA	Purge water disposed			44.13			Volume of purge water in gallons = (4 inch case diameter, 65 ft water, 3 volumes)*trips	4,412.79
RD/RAWP	030.14.05.01.010.01	PWT	Purge Water Truck use cost			1,148.45	3D400		Purge water disposal rate per gallon	$ 1.00
RD/RAWP	030.14.05.01.010.01	L070	Light vehicle operator (truck driver)	515.0	$ 35,195.10				**IH presence a wellhead per day**	4
RD/RAWP	030.14.05.01.010.01	1-N/A								
			Total Hours	**2,317.5**						
			Extended		**182,693.68**					
			Total S/C & Svc. cost			**1,219.10**				
RD/RAWP	**030.14.05.01.010.01**	**Manual Water Level Monitoring, 1st year only**								
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	42.0	3,779.58		3D210		Number of trips this period	42
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	10.5	1,066.91				Number of trips achievable per day	2
									workhours per day	10
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	210.0	15,865.50			Manual waterlevel monitoring measurement trips	assume hours per trip:	2
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	210.0	15,865.50			Manual waterlevel monitoring measurement trips	assume hours per trip:	2
RD/RAWP	030.14.05.01.010.01								Geologist analysis time per datapoint	0.25
RD/RAWP	030.14.05.01.010.01	1-21	subcontract			1,218.00		4 sites per day; truck fuel and maint as RSM 01.54.33.7200 daily=		1
			Total Hours	**472.5**						
			Extended		**36,577.49**					
			Total S/C & Svc. cost Priced as Dollars			**1,218.00**				
RD/RAWP	**030.14.05.01.010.01**	**Lab costs: Monitoring**	**Well Annual sampling program, 1st year only**							
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			2,463.34	3D210			
RD/RAWP	030.14.05.01.010.01	EPA 8260	TCE and degeneration products			10,423.36				
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			21,381.88				
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			7,022.24				
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			1,249.69				
RD/RAWP	030.14.05.01.010.01	1-10	disposable sampling materials			25,750.00			disposable materials,forms,bottles per well trip	$ 250.00
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH Tech					included in packaging		
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping			3,512.30		Package delivery service (common carrier, FEDEX etc)		
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging			856.34		Packaging service		
			Total Hours	**-**						
			Extended		**-**					
			Total S/C & Svc. cost Priced as Dollars			**72,659.15**				

WBS & Title: 030.14.05.01.01 — 100-F/IU Preferred Alternative

Prepared for C/ Phil Burke — 12/1/2014 15:24

PCS: J.F. Urquidi

Revision: GIF

Monitoring, Reporting, Decommissioning

WBS & Title: 030.14.05.01.01

	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**WAC 173-160 required annual reporting; Years 2 thru 5**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			160,246.0	3D800	Specialist fate and transport modeling and reporting for 5 year report	Report requirement Cycles:	4
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			280,208.0	3D800	Specialist fate and transport modeling and reporting for annual report		
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	128	$ 18,872.32					
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	960	$ 97,545.60					
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	80	$ 6,794.40					
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	80	$ 5,269.60					
RD/RAWP	030.14.05.01.010.01	1-Client	Client Intervention-Review	128	$ -		3D200	0.50 hours per well/sample for review and filing of activity report		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	320	$ 32,515.20		3D800	0.50 hours per well/analyte for review and filing of activity report		
			Total Hours	**1,696.0**						
			Extended		**160,997.12**					
			Total S/C & Svc. cost Priced as Dollars			**440,454.00**				
RD/RAWP	**030.14.05.01.010.01**	**Annual sampling of wells: Field Work Sample Collection Years 2 thru 5**								
RD/RAWP	030.14.05.01.010.01						3D210		IH Tech field crew size	2
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	640.0	$ 57,593.60		3D220		Supervisor Hours per well trip	2.5
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	1,280.0	$ 130,060.80		3D800		Hours in full day:	10
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH/Safety Tech	2,560.0	$ 178,944.00		3D600		Full day, number of wells per day:	2
RD/RAWP	030.14.05.01.010.01	1-WG	WG solid waste disposal			65.92			weight of debris per well trip in #	5.00
RD/RAWP	030.14.05.01.010.01	1-WA	Purge water disposed			176.51			Volume of purge water in gallons = (4 inch case diameter, 65 ft water, 3 volumes)*trips	4,412.79
RD/RAWP	030.14.05.01.010.01	PWT	Purge Water Truck use cost			2,854.40	3D400		Purge water disposal rate per gallon	$ 1.00
RD/RAWP	030.14.05.01.010.01	L070	Light vehicle operator (truck driver)	1,280.0	87,475.2				Purge water truck daily rental	
RD/RAWP	030.14.05.01.010.01	2F	Fuel cost			14,159.00			assume round trip miles per well	30.00
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	544	$ 41,099.20			Manual waterlevel monitoring measurement trips years 2 thru 5	assume hours per trip:	2
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	544	$ 41,099.20			Manual waterlevel monitoring measurement trips years 2 thru 6	assume hours per trip:	2
RD/RAWP	030.14.05.01.010.01	1-21	subcontract			7,888.00		4 sites per day; truck fuel and maint as RSM 01.54.33.7200 daily=	Manual water level measurement trips this period	272
			Total Hours	**6,848.0**						
			Extended		**536,272.00**					
			Total S/C & Svc. cost			**25,143.83**				
RD/RAWP	**030.14.05.01.010.01**	**Manual Water Level Monitoring, Years 2 thru 5 Only**								
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	220.0	19,797.80		3D210		Number of trips this period	220
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	55.0	5,588.55				Number of trips achievable per day	2
									Workhours per day	10
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	1,100.0	83,105.00			Manual waterlevel monitoring measurement trips years 2 thru 5	assume hours per trip:	2
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	1,100.0	83,105.00			Manual waterlevel monitoring measurement trips years 2 thru 6	assume hours per trip:	2
RD/RAWP	030.14.05.01.010.01								Geologist analysis time per datapoint	0.25
RD/RAWP	030.14.05.01.010.01	1-21	subcontract			6,380.00		4 sites per day; truck fuel and maint as RSM 01.54.33.7200 daily=		
			Total Hours	**2,475.0**						
			Extended		**191,596.35**					
			Total S/C & Svc. cost Priced as Dollars			**6,380.00**				
RD/RAWP	**030.14.05.01.010.01**	**Lab costs: Monitoring well Annual sampling program, years 2 through 5**								
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			9,853.4	3D210			
RD/RAWP	030.14.05.01.010.01	EPA 8260	TCE and degeneration products			22,149.6				
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			43,586.1				
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			28,089.0				
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			4,998.8				
RD/RAWP	030.14.05.01.010.01	1-10	disposable sampling materials			32,000.00			disposable materials,forms,bottles per well	$ 125.00
RD/RAWP	030.14.05.01.010.01	T060	IH Tech		$ -			included in packaging		
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping			4,364.8		Package delivery service		
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging			2,660.5		packaging service		
			Total Hours	**-**						
			Extended		**-**					
			Total S/C & Svc. cost			**147,702.14**				

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative**
Prepared for C/ Phil Burke **12/1/2014 15:24**
PCS: J.F. Urquidi

Revision G1F

Monitoring, Reporting, Decommissioning

WBS & Title: 030.14.05.01.01

	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source	
RD/RAWP	**030.14.05.01.010.01**	**WAC 173-160 required annual reporting; Years 6 thru 10**									
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			160,246.0	3D800	1 Specialist fate and transport modeling and reporting for 5 year report	Report requirement Cycles:	1	
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	32	$ 4,718.08				years	5	
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	240	$ 24,386.40			years 7,9 and 10 sample results integration			
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	20	$ 1,698.60						
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	20	$ 1,317.40						
RD/RAWP	030.14.05.01.010.01	1-Client	Client Intervention-Review	32	$ -		3D200	0.5 hours per well/analyte for review and filing of activity report			
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	80	$ 8,128.80		3D800	0.5 hours per well/analyte for review and filing of activity report			
			Total Hours	**424.0**							
			Extended		**40,249.28**						
			Total S/C & Svc. cost Priced as Dollars			**160,246.00**					
RD/RAWP	**030.14.05.01.010.01**	**Periodic sampling of wells: Field Work Sample Collection Years 6 thru 10**									
RD/RAWP	030.14.05.01.010.01								IH Tech field crew size	2	
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	637.5	$ 57,368.63		3D220		Supervisor Hours per well trip	2.5	
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	1,275.0	$ 129,552.75		3D800		Hours in full day:	10	
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH/Safety Tech	2,550.0	$ 178,245.00		3D600		Full day, crew of 2, number of wells per day:	2	
RD/RAWP	030.14.05.01.010.01	1-WG	WG solid waste disposal			6.57			weight of debris per well trip in #	5	
RD/RAWP	030.14.05.01.010.01	1-WA	Purge water disposed			21.64			Volume of purge water in gallons = (4 inch case diameter, 30 ft water, 3 volumes)*well s		2,163.96
RD/RAWP	030.14.05.01.010.01	PWT	Purge Water Truck use cost			1,427.20	3D400				
RD/RAWP	030.14.05.01.010.01	L070	Light vehicle operator (truck driver)	510.0	34,853.4						
RD/RAWP	030.14.05.01.010.01										
			Total Hours	**4,972.5**							
			Extended		**400,019.78**						
			Total S/C & Svc. cost			**1,455.41**					
RD/RAWP	**030.14.05.01.010.01**	**Manual Water Level Monitoring, Years 6 thru 10 Only**									
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	222.0	19,977.78		3D210		Number of trips this period	222	
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	55.5	5,639.36				Number of trips achievable per day	2	
									Workhours per day	10	
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	1,110.0	83,860.50			Manual waterlevel monitoring measurement trips	assume hours per trip:	2	
RD/RAWP	030.14.05.01.010.01	1-R051-CPN-REG	Nuclear Wst Process Oper (NCO)	1,110.0	83,860.50			Manual waterlevel monitoring measurement trips	assume hours per trip:	2	
RD/RAWP	030.14.05.01.010.01	1-21	subcontract			6,438.00		4 sites per day; truck fuel and maint as RSM 01.54.33.7200 daily=			
									Geologist analysis time per datapoint	0.25	
			Total Hours	**2,497.5**							
			Extended		**193,338.14**						
			Total S/C & Svc. cost Priced as Dollars			**6,438.00**					
RD/RAWP	**030.14.05.01.010.01**	**Lab costs: Monitoring well Annual sampling program, years 6 through 10**									
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			5,419.3	3D210		Monitoring duration in years	5	
RD/RAWP	030.14.05.01.010.01	EPA 8260	TCE and degeneration products			12,214.9					
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			26,213.4					
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			3,009.5					
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			2,499.4					
RD/RAWP	030.14.05.01.010.01	1-10	disposable sampling materials			12,750.00			disposable materials,forms,bottles, etc. per well	$	250.00
RD/RAWP	030.14.05.01.010.01	T060	IH Tech	-	$ -			included in packaging	minutes per SAF/sample set/well	60	
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping			17,391.0		Package delivery service			
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging			10,600.4		packaging service			
			Total Hours	-							
			Extended		-						
			Total S/C & Svc. cost			**90,097.84**					

WBS & Title: 030.14.05.01.01 — 100-F/IU Preferred Alternative

Prepared for C: Phil Burke — 12/1/2014 15:24

PCS: J.F. Urquidi

Revision: GIF

Monitoring, Reporting, Decommissioning

WBS & Title: 030.14.05.01.01

	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**WAC 173-160 required annual reporting; Years 11 thru 20**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			120,000.0	3D800	2 five year reports Specialist fate and transport modeling and reporting for annual report pkg. Annual cost = $60,000	Report requirement Cycles:	2
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	64	$ 9,436.16				Years	10
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	480	$ 48,772.80					
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	40	$ 3,397.20					
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	40	$ 2,634.80					
RD/RAWP	030.14.05.01.010.01	1-Client	Client Intervention-Review	64	$ -		3D200	0.50 hours per well/analyte for review and filing of activity report		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	160	$ 16,257.60		3D800	0.50 hours per well/analyte for review and filing of activity report		
			Total Hours	**848.0**						
			Extended		**80,498.56**					
			Total S/C & Svc. cost Priced as Dollars			**120,000.00**				
RD/RAWP	**030.14.05.01.010.01**	**Periodic sampling of wells: Field Work Sample Collection Years 11 thru 20**								
RD/RAWP	030.14.05.01.010.01								IH Tech field crew size	2
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	102.0	$ 9,178.98		3D220		Supervisor Hours per well trip	2.5
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	2,550.0	$ 259,105.50		3D800		Hours in full day:	10
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH/Safety Tech	5,100.0	$ 356,490.00		3D600		Full day, crew of 2, number of wells per day:	2
RD/RAWP	030.14.05.01.010.01	1-WG	WG solid waste disposal			26.27			weight of debris per well trip in #	5
RD/RAWP	030.14.05.01.010.01	1-WA	Purge water disposed	2,164.0		21.64			Volume of purge water in gallons = (6 inch case diameter, 30 ft water, 3 volumes)*trips	2,163.96
RD/RAWP	030.14.05.01.010.01	2M	Purge Water Truck use cost			26,775.00	3D400		Purge water disposal rate per gallon	$ 1.00
RD/RAWP	030.14.05.01.010.01	L070	Light vehicle operator (truck driver)	250.0	$ 17,085.00				Purge water truck daily rental	
RD/RAWP	030.14.05.01.010.01	2F	Fuel cost			1,331.00			assume round trip miles per well	30.00
RD/RAWP	030.14.05.01.010.01								assume purge water truck mileage in MPG	6.00
RD/RAWP	030.14.05.01.010.01								assume fuel use while idling	1.00
RD/RAWP	030.14.05.01.010.01								assume number of hours per day idling	4.00
			Total Hours	**10,166.0**						
			Extended		**$ 641,859.48**					
			Total S/C & Svc. cost			**28,153.90**				
RD/RAWP	**030.14.05.01.010.01**	**Lab costs: Monitoring well Annual sampling program, years 11 through 20**								
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			10,838.7	3D210			
RD/RAWP	030.14.05.01.010.01	EPA 8260	TCE and degeneration products			24,429.8				
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			52,426.7				
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			30,095.3				
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			-		trace metals no longer surveyed		
RD/RAWP	030.14.05.01.010.01	1-10	disposable sampling materials per well			62,500.00			disposable materials,forms,bottles per well	$ 250.00
RD/RAWP	030.14.05.01.010.01	T060	IH Tech		$ -			included in packaging	minutes per SAF/sample set/well	60
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping			34,782.0		Package delivery service		
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging			21,200.7		packaging service		
			Total Hours	**-**						
			Extended		**-**					
			Total S/C & Svc. cost			**236,273.19**				
RD/RAWP	**030.14.05.01.010.01**	**WAC 173-160 required annual reporting; Years 21 thru 40**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			240,000.0	3D800	4 cycles of Specialist fate and transport modeling and reporting for annual report pkg. Annual cost = $60,000	Report requirement Cycles:	4
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	128	$ 18,872.32		3D400		years	20
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	960	$ 97,545.60		3D800			
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	80	$ 6,794.40		3D400			
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	80	$ 5,269.60		3D200			
RD/RAWP	030.14.05.01.010.01	1-Client	Client Intervention-Review	128	$ -		3D200	0.50 hours per well/analyte for review and filing of activity report		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	320	$ 32,515.20		3D800	0.50 hours per well/analyte for review and filing of activity report		
			Total Hours	**1,696.0**						
			Extended		**160,997.12**					
			Total S/C & Svc. cost Priced as Dollars			**240,000.00**				

WBS & Title: 030.14.05.01.01 — 100-F/IU Preferred Alternative

Prepared for C/ Phil Burke — 12/1/2014 15:24

PCS: J.F. Urquidi

Revision: G1F

Monitoring, Reporting, Decommissioning

WBS & Title: *030.14.05.01.01*

	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Periodic sampling of wells: Field Work Sample Collection Years 21 thru 40**								
RD/RAWP	030.14.05.01.010.01								IH Tech field crew size	2
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	2,400.0	$ 215,976.00		3D220		Supervisor Hours per well trip	2.5
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	4,800.0	$ 487,728.00		3D800		Hours in full day:	10
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH/Safety Tech	9,600.0	$ 671,040.00		3D600		Full day, crew of 2, number of wells per day:	2
RD/RAWP	030.14.05.01.010.01	1-WG	WG solid waste disposal			52.53			weight of debris per well trip in #	5
RD/RAWP	030.14.05.01.010.01	1-WA	Purge water disposed	1,315.4		52.61			Volume of purge water in gallons = (4 inch case diameter, 30 ft water, 3 volumes)*trips	1,315.35
RD/RAWP	030.14.05.01.010.01	PWT	Purge Water Truck use cost			2,140.80	3D400			
RD/RAWP	030.14.05.01.010.01	L070	Light vehicle operator (truck driver)	960.0	$ 65,606.40					
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
			Total Hours	**19,075.4**						
			Extended		**1,440,350.40**					
			Total S/C & Svc. cost			**2,245.94**				
RD/RAWP	**030.14.05.01.010.01**	**Lab costs: Monitoring well Periodic sampling program, years 21 through 40**								
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			7,882.7	3D210			
RD/RAWP	030.14.05.01.010.01	EPA 8260	TCE and degeneration products			13,029.2				
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			35,362.3				
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			22,738.7				
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			-				
RD/RAWP	030.14.05.01.010.01	1-10	disposable sampling materials per well			48,000.00			disposable materials,forms,bottles per well	$ 250.00
RD/RAWP	030.14.05.01.010.01	T060	IH Tech	-	$ -			icluded in packaging		
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping			13,094.4		Package delivery service		
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging			7,981.4		packaging service		
			Total Hours	**-**						
			Extended		**-**					
			Total S/C & Svc. cost			**148,088.75**				
RD/RAWP	**030.14.05.01.010.01**	**WAC 173-160 required annual reporting; Years 41 thru 55**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			180,000.0	3D800	3 cycles of Specialist fate and transport modeling and reporting for annual report pkg. Annual cost = $60,000	Report requirement Cycles:	3
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	96	$ 14,154.24				years	15
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	720	$ 73,159.20					
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	60	$ 5,095.80					
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	60	$ 3,952.20					
RD/RAWP	030.14.05.01.010.01	1-Client	Client Intervention-Review	96	$ -		3D200	0.50 hours per well/analyte for review and filing of activity report		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	240	$ 24,386.40		3D800	0.50 hours per well/analyte for review and filing of activity report		
			Total Hours	**1,272.0**						
			Extended		**120,747.84**					
			Total S/C & Svc. cost Priced as Dollars			**180,000.00**				
RD/RAWP	**030.14.05.01.010.01**	**Periodic sampling of wells: Field Work Sample Collection Years 41 thru 55**								
RD/RAWP	030.14.05.01.010.01								IH Tech field crew size	2
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	1,162.5	$ 104,613.38		3D220		Supervisor Hours per well trip	2.5
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro;	2,325.0	$ 236,243.25		3D800		Hours in full day:	10
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH/Safety Tech	4,650.0	$ 325,035.00		3D600		Full day, crew of 2, number of wells per day:	2
RD/RAWP	030.14.05.01.010.01	1-WG	WG solid waste disposal			52.53			weight of debris per well trip in #	5
RD/RAWP	030.14.05.01.010.01	1-WA	Purge water disposed			19.73			Volume of purge water in gallons = (4 inch case diameter, 30 ft water, 3 volumes)*trips	1,973.03
RD/RAWP	030.14.05.01.010.01	PWT	Purge Water Truck use cost			1,036.95	3D400		Purge water disposal rate per gallon	$ 1.00
RD/RAWP	030.14.05.01.010.01	L070	Light vehicle operator (truck driver)	465.0					Purge water truck daily rental	
RD/RAWP	030.14.05.01.010.01								assume round trip miles per well	30.00
RD/RAWP	030.14.05.01.010.01								assume purge water truck mileage in MPG	6.00
RD/RAWP	030.14.05.01.010.01								assume fuel use while idling	1.00
RD/RAWP	030.14.05.01.010.01								assume number of hours per day idling	4.00
			Total Hours	**8,602.5**						
			Extended		**665,891.63**					
			Total S/C & Svc. cost			**1,109.21**				

WBS & Title: 030.14.05.01.01 — 100-F/IU Preferred Alternative

Prepared for C/ Phil Burke — 12/1/2014 15:24

PCS: J.F. Urquidi

Revision: GIF

Monitoring, Reporting, Decommissioning

WBS & Title: 030.14.05.01.01

	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Lab costs: Monitoring well Periodic sampling program, years 41 through 55**								
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			$ -	3D210	hex chrome no longer surveyed		
RD/RAWP	030.14.05.01.010.01	EPA 8260	TCE and degeneration products			$ 8,794.71				
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			$ 26,521.76				
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			$ 10,031.78				
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			$ -				
RD/RAWP	030.14.05.01.010.01	1-10	disposable sampling materials per well			$ 4,500.00			disposable materials,forms,bottles per well	$ 250.00
RD/RAWP	030.14.05.01.010.01	T060	IH Tech	-				includd in packaging		
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping			$ 6,342.60		Package delivery service		
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging			$ 3,866.01		packaging service		
			Total Hours	-						
			Extended		-					
			Total S/C & Svc. cost			**60,056.85**				
RD/RAWP	**030.14.05.01.010.01**	**WAC 173-160 required annual reporting; Years 56 thru 85**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			360,000.0	3D800	6 cycles of Specialist fate and transport modeling and reporting for annual report pkg. annual cost = $60,000	Report requirement Cycles:	6
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	192	$ 28,308.48		3D400			
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	1440	$ 146,318.40		3D800			
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	120	$ 10,191.60		3D220			
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	120	$ 7,904.40		3D400			
RD/RAWP	030.14.05.01.010.01	1-Client	Client Intervention-Review	192	$ -		3D200			
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	480	$ 48,772.80		3D200			
			Total Hours	**2,544.0**						
			Extended		**241,495.68**					
			Total S/C & Svc. cost Priced as Dollars			**360,000.00**				
RD/RAWP	**030.14.05.01.010.01**	**Periodic sampling of wells: Field Work Sample Collection Years 56 thru 85**								
RD/RAWP	030.14.05.01.010.01								IH Tech field crew size	2
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	1,575.0	$ 141,734.25		3D220		Supervisor Hours per well trip	2.5
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro;	3,150.0	$ 320,071.50		3D800		Hours in full day:	10
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH/Safety Tech	6,300.0	$ 440,370.00		3D600		Full day, crew of 2, number of wells per day:	2
RD/RAWP	030.14.05.01.010.01	1-WG	WG solid waste disposal			52.53			weight of debris per well trip in #	5
RD/RAWP	030.14.05.01.010.01	1-WA	Purge water disposed			53.46			Volume of purge water in gallons = (4 inch case diameter, 30 ft water, 3 volumes)*trips	5,346.26
RD/RAWP	030.14.05.01.010.01	PWT	Purge Water Truck use cost			1,404.90	3D400			
RD/RAWP	030.14.05.01.010.01	L070	Light vehicle operator (truck driver)	630.0						
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
			Total Hours	**11,655.0**						
			Extended		**902,175.75**					
			Total S/C & Svc. cost			**1,510.89**				

WBS & Title: 030.14.05.01.01 **100-F/IU Preferred Alternative**

Prepared for C/ Phil Burke **12/1/2014 15:24**

PCS: J.F. Urquidi

Revision

Monitoring, Reporting, Decommissioning

WBS & Title: 030.14.05.01.01

	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Lab costs: Monitoring well Periodic sampling program, years 56 through 85**								
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			-	3D210		Monitoring duration in years	30
RD/RAWP	030.14.05.01.010.01	EPA 8260	TCE and degeneration products			-				
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			5,427.7				
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			34,108.0				
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			-				
RD/RAWP	030.14.05.01.010.01	1-10	disposable sampling materials per well			157,500.00			disposable materials,forms,bottles per well	$ 250.00
RD/RAWP	030.14.05.01.010.01	T060	IH Tech	-				included in packaging		
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping			42,966.0		Package delivery service		
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging			26,189.1		packaging service		
			Total Hours	-						
			Extended		-					
			Total S/C & Svc. cost			**266,190.84**				
RD/RAWP	**030.14.05.01.010.01**	**WAC 173-160 required annual reporting; Years 86 thru 155**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			-	3D800	Specialist fate and transport modeling and reporting are now internal	Report requirement Cycles:	15
RD/RAWP	030.14.05.01.010.01	1-21							SME estimated cost per cycle	10000
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	120	$ 17,692.80			adjusted based on SME input	years	70
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	900	$ 91,449.00			adjusted based on SME input		
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	75	$ 6,369.75			adjusted based on SME input		
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	75	$ 4,940.25			adjusted based on SME input		
RD/RAWP	030.14.05.01.010.01	1-Client	Client Intervention-Review	120	$ -		3D200	0.50 hours per well/analyte for review and filing of activity report		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	300	$ 30,483.00		3D800	0.50 hours per well/analyte for review and filing of activity report		
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	40	$ 5,897.60				final remedial action report budgeted separately	
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	160	$ 16,257.60				final remedial action report budgeted separately	
RD/RAWP	030.14.05.01.010.01	1-T020-CPN-REG	Drafters	24	$ 2,038.32				final remedial action report budgeted separately	
RD/RAWP	030.14.05.01.010.01	1-P160-CPN-REG	Technical Writers & Editors	16	$ 1,053.92				final remedial action report budgeted separately	
RD/RAWP	030.14.05.01.010.01	1-Client	Adjudication of Client comments	1	$ -		3D200	0.50 hours per well/analyte for review and filing of activity report	final remedial action report budgeted separately	
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	0	$ -		3D800	0.50 hours per well/analyte for review and filing of activity report	final remedial action report budgeted separately	
			Total Hours	**1,831.0**						
			Extended		**176,182.24**					
			Total S/C & Svc. cost Priced as Dollars			-				
RD/RAWP	**030.14.05.01.010.01**	**Periodic sampling of wells: Field Work Sample Collection Years 86 thru 155**								
RD/RAWP	030.14.05.01.010.01								IH Tech field crew size	2
RD/RAWP	030.14.05.01.010.01	1-M010-CPN-REG	First Line Supervisors	875.0	$ 78,741.25		3D220		Supervisor Hours per well trip	2.5
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro;	1,750.0	$ 177,817.50		3D800		Hours in full day:	10
RD/RAWP	030.14.05.01.010.01	1-T060-CPN-REG	IH/Safety Tech	3,500.0	$ 244,650.00		3D600		Full day, crew of 2, number of wells per day:	2
RD/RAWP	030.14.05.01.010.01	1-WG	WG solid waste disposal						weight of debris per well trip in #	5
RD/RAWP	030.14.05.01.010.01	1-WA	Purge water disposed	3,182.3		31.82			Volume of purge water in gallons = (6 inch case diameter, 30 ft water, 3 volumes)*trips	3,182.30
RD/RAWP	030.14.05.01.010.01	PWT	Purge Water Truck use cost			334.50	3D400			
RD/RAWP	030.14.05.01.010.01	L070	Light vehicle operator (truck driver)	375.0						
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
RD/RAWP	030.14.05.01.010.01									
			Total Hours	**9,682.3**						
			Extended		**501,208.75**					
			Total S/C & Svc. cost			**366.32**				

WBS & Title: 030.14.05.01.01 — 100-F/IU Preferred Alternative

Prepared for C/ Phil Burke — 12/1/2014 15:24

PCS: J.F. Urquidi

Revision: GIF

Monitoring, Reporting, Decommissioning

WBS & Title: 030.14.05.01.01

	Activity ID	Resource/COCS	Resource Description	Hours	Extended	S/C & Svc. cost	Org Code	Task/Function Description	Basis of Estimate and Assumptions	Source
RD/RAWP	**030.14.05.01.010.01**	**Lab costs: Monitoring well Periodic sampling program, years 86 through 155**								
RD/RAWP	030.14.05.01.010.01	EPA 7196	Hexavalent Chromium			-	3D210			
RD/RAWP	030.14.05.01.010.01	EPA 8260	TCE and degeneration products			-				
RD/RAWP	030.14.05.01.010.01	EPA 0300	Nitrates			-				
RD/RAWP	030.14.05.01.010.01	EPA 7780	Strontium 90			23,407.5				
RD/RAWP	030.14.05.01.010.01	EPA 6020	Trace Metals			-				
RD/RAWP	030.14.05.01.010.01	1-10	disposable sampling materials per well			-			disposable materials,forms,bottles per well	$ 250.00
RD/RAWP	030.14.05.01.010.01	T060	IH Tech	-				included in packaging		
RD/RAWP	030.14.05.01.010.01	ship	Package delivery service, shipping			5,115.0		Package delivery service		
RD/RAWP	030.14.05.01.010.01	pack	Package delivery service sample packaging			6,235.5		packaging service		
			Total Hours	-						
			Extended		-					
			Total S/C & Svc. cost			**34,757.98**				
RD/RAWP	**030.14.05.01.010.01**	**Well Decommissioning at end of Project**								
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			78,000.0		subcontractor "pull"casing and grout		
RD/RAWP	030.14.05.01.010.01	1-21	PO Contracts			10,400.0		Grout cost allowance	count is total number of wells to be decommissioned count by SME	
RD/RAWP	030.14.05.01.010.01	1-P070-CPN-REG	Planner/Scheduler/Estimators	12.5	$ 996.00			Planner scheduler to plan, hours per well = .25		
RD/RAWP	030.14.05.01.010.01	1-M030-CPN-REG	Project and Program Managers	50.0	$ 7,372.00			Manager to take responsibility hours per well = 1.0		
RD/RAWP	030.14.05.01.010.01	1-S030-CPN-REG	Geologists/Geophysicists/Hydro	100.0	$ 10,161.00			Geologist SOW and decommissioning report to State; hours per well = 2.0	approximate casing weight, in lbs 4 inch steel schedule 10 case	5.6
RD/RAWP	030.14.05.01.010.01	1-R052-CPN-REG	Nuclear Wst Process Oper (D&D)	500.0	$ 29,230.00			Tarping demo loads hours per well = 10.0	Grout seal and centering materials in ton per well	150
RD/RAWP	030.14.05.01.010.01	1-R052-CPN-REG	Nuclear Wst Process Oper (D&D)	500.0	$ 29,230.00			Tarping demo loads hours per well = 10.0		
RD/RAWP	030.14.05.01.010.01	1-T050-CPN-REG	Health Physics Technicians (Rad)	100.0	$ 7,161.00	18,750.00		NCO survey; hours per well = 2.0	disposable materials,forms,bottles per well	$ 250.00
RD/RAWP	030.14.05.01.010.01	1-L070-CPN-REG	Light Vehicle Drivers	100.0	$ 6,834.00			teamster, driving ERDF loads, hours per well = 2.00		
RD/RAWP	030.14.05.01.010.01	ROROT	RSM 01.54.33.7620 vac truck			836.3		Roll off truck cost		
RD/RAWP	030.14.05.01.010.01	PWT				6,032.0		purge water truck operating cost 116.00		1
RD/RAWP	030.14.05.01.010.01	1-L070-CPN-REG	Light Vehicle Drivers	520.0	$ 35,536.80			purge water truck driver	days per well decomissioned	1
RD/RAWP	030.14.05.01.010.01	1-WG	MLLW Disposal Charge	194.5		7,725.0		MLLW disposal at ERDF		
			Total Hours	**2,077.0**						
			Extended		**126,520.8**					
			Total S/C & Svc. cost			**121,743.25**				
			Grand Total Hours	**91,576.1**						
			Grand Total Extended		**6,839,921.35**					
			Grand Total S/C & Svc. cost			**2,901,677.60**				
			Total Dollars					**$ 9,741,598.94**		

WBS & Title: **030.14.05.01.01** **100-F/IU Preferred Alternative** Revision G1F

Prepared for CAM: Phil Burke **12/1/2014 15:24**

PCS: J.F. Urquidi

The following follows ECF-Hanford 12-0067 Rev-0

ECF-HANFORD-12-0067, REV. 0

1 Executive Summary (exerpt)

The total non-discounted cost for the ICs for 150 years is estimated to be $562,781,000 for the Hanford site (about $25,600,000 per ROD). The total discounted cost for the ICs at Hanford are estimated at $221,299,000 (about $10,100,000 per ROD).

The total non-discounted cost for the 5-Year Reviews for 150 years is estimated to be $13,740,000 (about $625,000 per ROD). The total discounted cost for the 5-Year Reviews for 150 years is estimated to be $4,175,000 (about $190,000 per ROD).
9/18/2012

Institutonal Controls Cost

562,781,000.00	150 year IC estimate
22.00	Separate RODs specifying Ics
25,580,954.55	150 year cost of ICs per ROD
150.00	divided by time period
170,539.70	annual cost per ROD

Periodic 5 Year Review Cost

13,740,000.00	150 year cost of 5 year reviews
22.00	separate RODs specifying Periodic reviews
624,545.45	150 year cost of periodic reviews per ROD
150.00	divided by time period
4,163.64	annual cost per ROD

Combined cost of ICs and Periodic reviews for remainder of Contract

682,158.79	4 more years of Ics
16,654.55	4/5 of the prep for the next Periodic review
698,813.33	cost for remainder of Contract
25,580,954.55	150 year IC pro rata cost
624,545.45	150 year cost of periodic reviews per ROD
26,205,500.00	Total 150 year cost ICS and reporting