

Well 12A Case Study:
Use of Green Remediation Contract Requirements and Reporting Practices during Excavation Activities

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Presentation Outline

- Site background
- EPA Region 10 Clean and Green Policy
- Environmental Footprint Analysis
- Contract requirements
- Reporting procedures
- Results



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Well 12A Site Background

- OU1 of EPA fund-led Commencement Bay - South Tacoma Channel Superfund Site in Tacoma, Washington.
- Site had history of various industrial practices including oil recycling and solvent processing
 - ▶ Filter cake, a by-product of oil recycling, was used as fill material
- Contaminants in soil and groundwater include chlorinated solvents, VOCs, PCBs, metals and DNAPL
- Original ROD signed in 1983
- ROD Amendment 2 signed in 2009
 - ▶ Continued groundwater extraction treatment system (GETS) operation
 - ▶ Excavation and disposal of filter cake and contaminated soil
 - ▶ In-situ thermal remediation (ITR)
 - ▶ Enhanced anaerobic bioremediation (EAB)
 - ▶ Institutional controls, contingency for monitored natural attenuation, & monitoring
- Excavation took place August 2011 – March 2012



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EPA Region 10 Clean & Green Policy

- Issued in 2009
- Goal: To enhance the environmental benefits of federal cleanup programs by promoting technologies and practices that are sustainable
- Lists 11 green remediation technologies/practices which are to be implemented unless a site-specific evaluation demonstrates impracticability or favors an alternative approach
- Includes intent to measure cost differentials and environmental benefits associated with implementing the policy
- Applies to all Superfund cleanups including those performed by USACE contractors
 - ▶ Green remediation was also specifically addressed in the Interagency Agreement between EPA R10 and USACE for Well 12A



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Environmental Footprint Analysis

- Preliminary analysis conducted in 2009; formally documented in 2012 following EPA's *Methodology for Understanding and Reducing a Project's Environmental Footprint*
- Categories considered: Materials and Waste, Water, Energy and Air
- Focused on excavation, ITR, EAB, and GETS operation
- For the majority of metrics evaluated, excavation had the greatest footprint per cubic yard of media, primarily resulting from:
 - ▶ Offsite disposal of non-hazardous waste material
 - ▶ Borrow material for backfill
- Suggested best management practices (BMPs) for reducing footprint
- Team concluded that excavation should be the focus of Green Remediation (GR) efforts for Well 12A



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Green Remediation Contract Requirements

- Specified Green Remediation BMPs:
 - ▶ Use cleaner fuel and cleaner diesel control technology where practicable; turn off engines when not in active use for >5 minutes.
 - ▶ Incorporate recycled and local materials to extent practicable/feasible.
 - ▶ Minimize the amount of waste disposal in landfills. Identify and provide justification for materials that cannot be recycled/reused.
 - ▶ Use recycled concrete for fill material, pipe bedding, and crushed rock.
 - ▶ Use recycled asphalt pavement (RAP) for 20% of hot mix asphalt.
 - ▶ Consider rail the preferred alternative for transportation of materials.
- Required contract submittals:
 - ▶ Green Remediation Plan
 - ▶ Waste Management Plan
 - ▶ Final Green Remediation Report
- Required GR discussion during pre-construction & progress meetings.
 - ▶ GR actions tracked and reported in progress meeting minutes.



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Green Remediation Reporting

- USACE collected data from the excavation contractor and summarized it in a table for monthly reporting to EPA R10.
 - Table format was based on the Clean and Green Policy.

No.	Action	Measure/Units	Estimated Cost Impacts	Environmental Benefits (Quantity if possible)	Evaluation Demonstrates Impracticability or Favors Alternative Approach (Determine justification or state NA)	Notes for Consideration (e.g. Design or Contractor Proposal reference project document if applicable)
1. Renewable Energy, Energy Conservation and Energy Efficiency						
1a	Field office equipment was EnergyStar qualified	4 laptop computers, 1 inkjet printer	Electricity cost saved, negligible amount	Reduced CO2 emissions by approx. 550 lb	-	Contractor proposal; Kernron Green Remediation Plan
1b	Use bio-diesel powered generators as electricity source for project trailer	-	-	-	Impracticable. Per Contractor, No bio-diesel powered generators were available within the State of Washington. A diesel-powered generator was obtained from a local vendor and used for the first 31 working days (205 hours). Electricity for the remaining 9 working days was supplied by Tacoma Power, which uses over 99% hydropower and nuclear for power generation.	Contractor proposal; Kernron Green Remediation Plan
2. Cleaner Fuels, Diesel Emissions Controls and Retrofits, and Emission Reduction Strategies						
2a	Used cleaner engines, cleaner fuel and cleaner diesel control technology on diesel powered equipment	-	-	-	Impracticable. Per Contractor, the nearest rental company that has bio-diesel construction equipment is located 777 miles from the site. More emissions would have been generated if this equipment was transported and utilized on this project than if regular equipment was utilized.	Design, Spec Sect 01136 Part 2.018

Results

- Improved coordination among project team members
 - New RAP spec resulted from GR-focused design meetings.
 - Contractor sought USACE feedback while preparing Green Remediation Plan.
- Documentation of data related to specific GR BMPs
 - Contractor had a misunderstanding about cleaner diesel technology.
 - Contractor reported \$13K and \$10K savings from use of RAP and recycled concrete, respectively.
- Accountability for GR objectives
 - Documentation requirements for recycled material quantities and justification for landfilled materials resulted in less waste.
- Implementation of contractor-proposed GR actions
 - Used liquid IDW in place of potable water for in-situ chemical oxidation
 - Rented hybrid vehicles and mandated carpooling to jobsite
- Documentation of actions to be considered for future use on the site
 - Implemented: local vendors and recycling facilities
 - Deemed impracticable: rail use for transportation of materials

Questions?

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Appendix

Example monthly Green Remediation Report prepared by USACE for submittal to EPA R10

GREEN REMEDIATION REPORT

Project Number: JAG # DW9495 7940-01-0
 EPA Project Name: Commencement Bay - South Tacoma Channel O&U - Time Oil Well 12A
 Project Status: Excavation and Chemical Oxidation Treatment Complete
 Reporting Period: June 2012

No.	Action	Measure/Units	Estimated Cost Impacts	Environmental Benefits (Quantity if possible)	Evaluation Demonstrates Impracticability or Favors Alternative Approach (Determine justification or state NA)	Notes for Consideration (e.g. Design or Contractor Proposal reference project document if applicable)
1. Renewable Energy, Energy Conservation and Energy Efficiency						
1a	Field office equipment was EnergyStar qualified	4 laptop computers, 1 inkjet printer	Electricity cost saved, negligible amount	Reduced CO2 emissions by approx. 550 lb	-	Contractor proposal; Kernron Green Remediation Plan
1b	Use bio-diesel powered generators as electricity source for project trailer	-	-	-	Impracticable. Per Contractor, No bio-diesel powered generators were available within the State of Washington. A diesel-powered generator was obtained from a local vendor and used for the first 31 working days (210 hours). Electricity for the remaining 9 working days was supplied by Tacoma Power, which uses over 99% hydropower and nuclear for power generation.	Contractor proposal; Kernron Green Remediation Plan
2. Cleaner Fuels, Diesel Emissions Controls and Retrofits, and Emission Reduction Strategies						
2a	Used cleaner engines, cleaner fuel and cleaner diesel control technology on diesel powered equipment	-	-	-	Impracticable. Per Contractor, the nearest rental company that has bio-diesel construction equipment is located 777 miles from the site. More emissions would have been generated if this equipment was transported and utilized on this project than if regular equipment was utilized.	Design, Spec Sect 01136 Part 2.018
2b	Turned off engines rather than idling (diesel and off-road vehicles to idle)	260.3 equipment idling hours saved (13h was emission hours)	2300 Savings on fuel costs	Reduced CO2 emissions by approx. 2.25 tons	-	Contractor proposal; Kernron Green Remediation Plan

2c	Rail used for transportation of excavated materials to the disposal facility	-	-	-	Impracticable. Per Contractor, the cost of disposal by rail would have been twice the cost for disposal by truck.	Design, Spec Sect 1.1760 Part 2.01D
2d	Purchase and use local materials to the extent practicable and/or feasible	84% of vendors and recycling facilities are located within 25 mi of site or are nearest qualified vendors (e.g. the nearest disposal facility to accept hazardous waste)	Unknown savings for reduced shipping costs	Reduced air pollution emissions by unknown quantity	-	Design, Spec Sect 01136 Part 3.026
3. Water Conservation and Efficiency						
3a	Maximized the use of water for dust suppression by using biodegradable covers instead	-	-	-	During construction, dust control measures were unnecessary as determined by real-time particulate monitoring. Site conditions were often wet due to precipitation or vapor suppression methods.	Design, Spec Sect 02050 Part 3.01D
3b	Minimized the use of potable water for chemical oxidation treatment by using liquid IDW	650 gal water saved (250 gal generated by Kernron and 400 gal generated by IDW to heat auxiliary power)	\$648 Savings for avoiding discharge of IDW to local sanitary sewer	Reduced water consumption by approx. 200 gal	-	Contractor proposal during chemical oxidation process
4. Sustainable Site Design						
4a	None	-	-	-	NA, project does not involve sustainable site design opportunities	-
5. Use of reused or recycled industrial materials						
5a	Used recycled asphalt pavement (RAP) for 20% of total hot mix asphalt	34 tons RAP	\$13,000 Savings for buying less virgin asphalt	Reduced use of virgin petroleum products by 20%	-	Design, Drawing Sheet C-1.7 Note 2
5b	Used recycled concrete for fill materials, pipe bedding, and crushed rock base	2,125 CY recycled concrete	\$10,000 Savings for using recycled concrete instead of conventional materials	Reduced air pollution emissions by unknown quantity	-	Design, Sheet C-1.7 Note 6, Spec Sect 02300 Part 3.02C

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6. Recycling and Reuse of Materials Generated on Site						
6a	Segregated and recycled concrete, re-bar and other strong metal	3 1/2 tons of concrete, 15,360 lbs of metal, 40 lbs of cardboard, 12 lbs of plastic and aluminum, 3 lb of glass, 3.82 tons of misc material (styro waste, metal rebar, cardboard, plastic, paper, aluminum, etc.) collected during demolition; unknown quantity of recycled pallets	\$40,000 savings for avoiding landfill fees	Diverted 328 tons of waste from landfill; reduced pollution associated with producing virgin products	-	Design; Sheet C-L 3 Note 5
7. Environmentally Preferable Purchasing						
7a	Use biodegradable liners and covers for dust control	-	-	-	See Action 3a	Design; Spec Sect 02050 Part 3 G10D
8. Green Concrete						
8a	None	-	-	-	NA; project does not involve concrete placement	-
9. Methane Recovery from Landfills						
9a	None	-	-	-	NA; project does not involve a landfill	-
10. Greenhouse Gas Emission Reduction Technologies						
10a	None	-	-	-	NA; all emission reduction strategies are addressed under item 2	-
11. Environmental Management Systems (EMS) Practices						
11a	Print on white post-consumer recycled paper and print double sided. Make electronic submissions when possible.	54 lb of 100% post-consumer recycled paper; 13.5 lb of 30% post-consumer recycled paper	Negligible savings	Reduced use of virgin paper products by 58 lb	-	Contractor proposal; Remediation Plan
11b	Recycle used printer ink cartridges at local office supply store	12 ink cartridges	Negligible savings	Diverted 1 lb of plastic from landfill	-	Contractor proposal during construction
11c	Purchase refilled printer ink cartridges for printing project documents	12 cartridges	Negligible savings	Diverted 1 lb of plastic from landfill	-	Contractor proposal during construction

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11d	Furnish field office with pre-owned furniture and filing equipment	100% pre-owned furniture and filing equipment	\$465 Savings on furniture costs	Eliminated use of virgin materials for office furniture	-	Contractor proposal during construction
11e	Mandate carpooling to the jobsite for contractor personnel	2 less field vehicles used daily (3 vehicles used instead of 5; approximately 800 fewer miles driven)	\$3,100 Savings in gas and vehicle rental costs	Reduced CO2 emissions by approx. 750 lb	-	Contractor proposal; Remediation Plan
11f	Rent hybrid vehicles for transportation to job site	Hybrid used in place of conventional vehicle for 22 days (140 miles)	Negligible	Reduced CO2 emissions by approx. 60 lb	-	Contractor proposal; Remediation Plan

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