SURF SUSTAINABLE REMEDIATION FORUM

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PASCO SANITARY LANDFILL
NPL SITE - ZONE A REMOVAL ACTION REMEDIATION PROJECT

SURF Case Study #017

This case study highlights how sustainable remediation practices and carbon emissions tracking during the removal of 35,000 drums of hazardous materials at a former landfill provided benefits to the surrounding community.

BACKGROUND

The Industrial Waste Area Zone A at the Pasco Landfill National Priorities List (NPL) site is one of Washington State's most challenging cleanup sites due to the large amount of industrial waste disposed there in the 1970s.

During the project's design phase, the project team, including the contractor, worked closely with regulators to incorporate remediation strategies to safely remove the buried drums and protect the nearby community. Green and sustainable remediation (GSR) tenants and a carbon footprint tracking process were also included in the design. Because of the nature of remediation work, an adaptive management process was implemented to address the uncertainty of removing buried hazardous waste drums disposed of more than 50 years ago.

Remediation activities occurred between October 2020 and August 2022, representing one of the largest buried drum landfill cleanups in Washington state. More than 35,000 buried drums and 23,800 tons of waste were removed, excavated, categorized via HazCat® Chemical Identification, segregated by hazardous waste class, manifested, and transported to two out-of-state Resource Conversation and Recovery Act (RCRA) disposal facilities.

The structure over Zone A during drum removal activities

Example of drum carcass placement in Zone A Landfill

REMEDIAL STRATEGY

Two elements comprised the sustainability strategy:

- Environmental sustainability considerations
- The implementation of sustainable remediation elements of the work, including the confirmation, tracking, and aggregation of materials, supplies, and services.

Environmental Sustainability Considerations

- Engaging stakeholders early in the process
- Reducing greenhouse gas emissions
- Sourcing alternative fuels and renewable energy
- Reusing and recycling materials
- Purchasing materials with recycled content
- Reusing clean soil for backfill and road grading
- Identifying excavated materials (asphalt, concrete, steel) for recycling and repurposing
- Capturing, treating, and reusing stormwater
- Limiting idling time for waste-hauling trucks
- Prioritizing biodiesel as the primary fuel source for heavy equipment
- Sourcing local materials/subcontractors
- Using EarthCam camera network for remote oversight, reducing travel for agency visits
- Engaging the community (communication, sourcing)

***Click here** for a time lapse video of remediation activities inside the structure.*

Sustainable Remediation Activity Results

- Calculated EPA Scope 1, Scope 2, and Scope 3 carbon emissions with a custom carbon tracking spreadsheet that aggregated materials, supplies, and services
- Used EPA's SEFA (Spreadsheets for Environmental Footprint Analysis) to verify the project's greenhouse gas output
- Installed over 18,000 square feet of sheet pile containing 20% recycled material
- Used 551 MWh of electricity from renewable energy sources, including wind, hydroelectric, solar, and nuclear
- Recycled 229 tons of concrete, 10 tons of steel, and 1,000 tons of asphalt
- Repurposed 329 tons of concrete ballast
- Substituted 23,220 gallons of biodiesel for off-road diesel
- Used EPA-approved Tier 4 equipment when available
- Treated and reused approximately 175,000 gallons of contact water for dust suppression
- Purchased 43% of materials and services within 50 miles of the project site
- Reused on-site fill materials from the RCRA cover system (vs. importing fill from local sources)

ABI Mobile Ram installing sheet pile.

Grouping data into categories (i.e., energy, fuel consumption, transportation, and materials) was determined to be the best way to assess the data accurately was groupings into the following categories: energy, fuel consumption, transportation, and materials. From there, the groups were subdivided into trackable work elements, resulting in a framework that included the following:

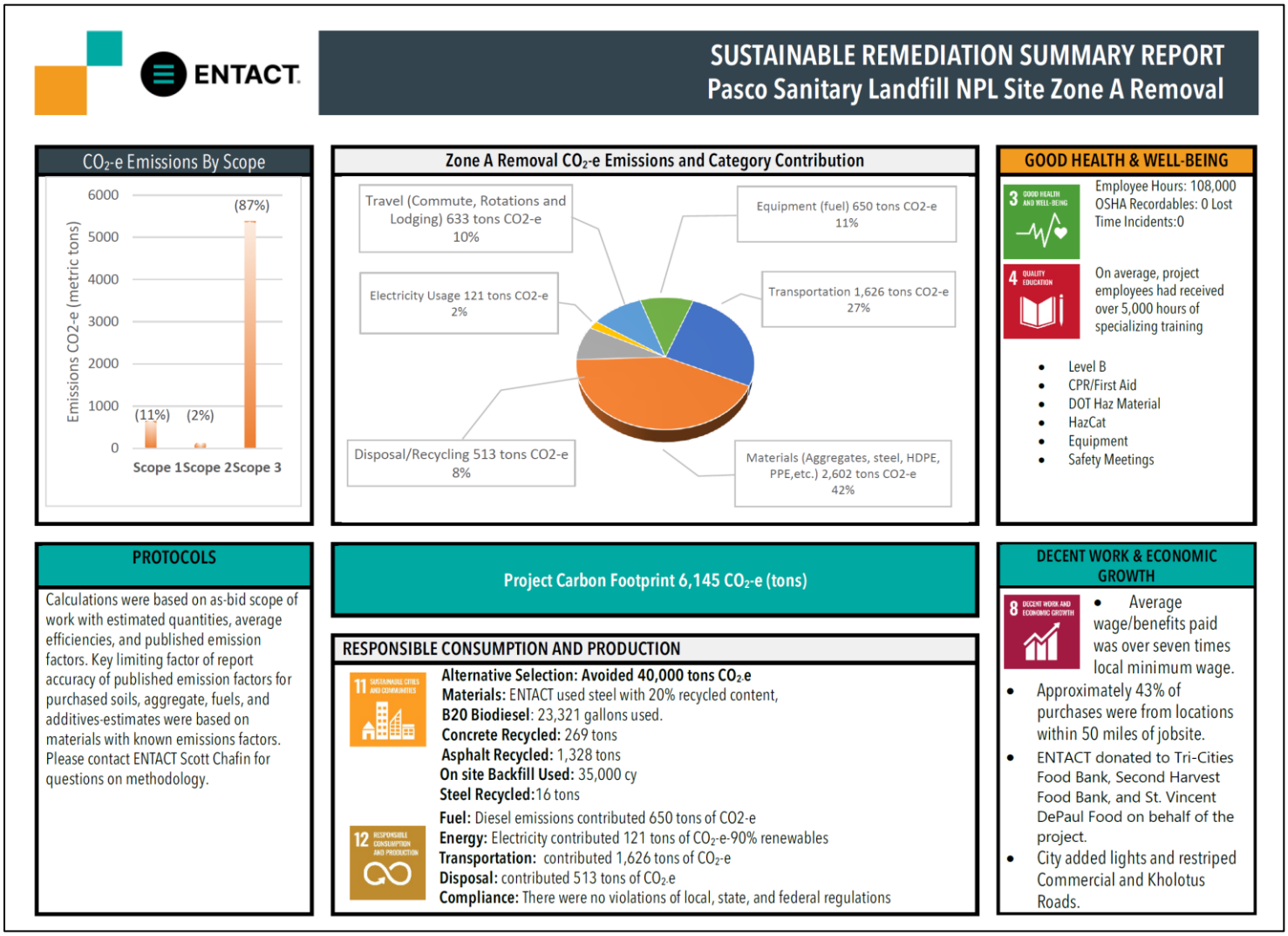
Energy	**Fuel**	**Transportation**	**Materials**
Electricity	Biodiesel	Equipment	Asphalt
Natural Gas	Diesel	Materials	Aggregate
	Gasoline	Disposal	Concrete
		Airline Travel	Disposal
		Commutes	HDPE recyclables
			Steel
			Water

Project controls allowed tracking job costs, materials, and supplies using project spreadsheets and accounting reports. The project material tracking spreadsheets were modified to include items that were not routinely tracked, for example, electricity usage, natural gas consumption, transportation of materials and equipment, air travel, commutes, lodging, and FedEx shipping. Additional project site control mechanisms were implemented to capture the data documented in the material tracking spreadsheet data and the applied emission factors.

New or additional items were added to the tracking list and aggregated from the project inception. Some items not initially identified include personal protective equipment (PPE), lodging, water consumption and treatment, social aspects such as purchasing materials and supplies within 50 miles of the project, safety metrics, employee training, and charitable contributions. The Carbon Footprint Summary Report (CFSR) highlights these key metrics and others, including carbon emissions and comparison of the estimated carbon footprint of the closest competing alternative, and social aspects of the work, such as safety metrics, training, and charitable efforts.

The work resulted in approximately 6,145 tons of emitted CO_2-e, which were further refined as described below.

- Scope 1 emissions, which included emissions released from directly controlled assets, accounted for 650 tons of CO_2-e or slightly more than 11% of all project emissions.
- Scope 2 emissions, which included indirect emissions from purchased or acquired electricity, steam, heat, or cooling, accounted for 121 tons of CO_2-e or slightly less than 2% of all project emissions.
- Scope 3 emissions, which included indirect emissions from purchased goods and services, employee commute, business travel, transportation, etc., accounted for approximately 5,374 tons of CO_2-e or about 87% of all project emissions.



Stakeholder engagement was crucial to successful implementation and was incorporated into the design and project administration. The project team included state regulators, local officials, emergency and health services, Idaho and Oregon regulators, businesses, landowners, and civic groups. Positive outcomes included:

- Resulted in positive community impact by sourcing local services, supplies, and materials for drum removal and utilizing local knowledge and expertise in the Tri-Cities Area.
- Donated to local food banks and emergency response organizations.
- Encouraged stakeholder involvement by having open houses before the start of work with regular touch points at project milestones and project completion.
- Received no community complaints during the execution of the work.
- Safely transported all removed wastes to two disposal facilities without any incidents. Completed over 100,000 labor hours without an OSHA incident.
- During COVID, implemented prevention practices, which resulted in zero on-site outbreaks and project delays (see photo on p. 4).
- Paved the way for the next phase of work – in-situ thermal desorption of impacted soils.

SUSTAINABLE REMEDIATION TRIPLE BOTTOM LINE

ENVIRONMENT

- Avoided the import of 36,000 cy by recycling on-site soils
- Reduced water consumption by 175,000 gallons by using an on-site water treatment system
- Prevented landfilling 1,613 tons of concrete, asphalt, and steel through recycling

SOCIAL

- Engaged stakeholders to ensure alignment of project goals and performance
- Project activities removed long-term risks to people and the environment in the Tri-Cities area

ECONOMIC

- Reduced emissions by purchasing more than 40% of materials and services from the local community
- Successfully completed project under budget and on time

KEY LESSONS LEARNED

Several challenges were successfully addressed during project design and implementation and the lessons learned are applicable to other remediation projects. These include efficient navigation and application of complex waste regulations, upfront considerations of adaptive management practices to address unforseen field conditions, and proactive and early engagement with disposal facilities, multiple state agencies, and local emergency response personnel. Key lessons learned during the project are discussed below.

- Sustainability goals can be customized based on project requirements and stakeholder input.
- The contractor's early engagement during the design process led to the efficient implementation of GSR strategies and project carbon emissions tracking.
- Collaborative engagement among state regulators, the Potentially Liable Persons (PLPs), the consulting teams, and the general contractor was critical to the planning process, leading to realistic and optimized construction and waste-handling approaches.
- Adaptive management strategies were instrumental in developing the innovative waste management approaches, including recycling and reusing materials to help reduce transportation and disposal volumes.
- Standardizing the material tracking sheet format made data input intuitive, and leveraging the accounting system, APIs, or third-party software simplified data entry.
- A comparison of the project estimate and proposed design with actual project data provided additional insight for future projects.

FOR MORE INFORMATION…

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