

LANDFILL END-USE DECISION MAKING FRAMEWORK

Application of continual management processes for closed landfill value optimization

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WELCOME: VICTOR O. OKEREKE PH.D., P.E., DEE, CLSSS



Leadership / Consultant: Over 32 years in landfill and solid waste management leadership Project Delivery: Led 100s of large municipal infrastructure projects successfully Integrator... of Lean Six Sigma practices into solid waste management

Management engineer and developer of improved approaches and management systems and tools to solve enterprise problems holistically. Helping enterprises achieve Excellence in Environmental Management





United States



Average annual closed landfill post closure care costs (in 2005)*

AMERICA'S LANDFILLS



*Duffy (2005b) converted to current year with assumed 3% annual escalation rate **SWANA (2007), Statista.com (2019) ***Statista.com (2019)



THE FUTURE OF CLOSED LANDFILLS





PRESENTATION OBJECTIVES

- A decision-making process framework
- Achieve a shared understanding





PRESENTATION SUBTOPICS







Value Proposition



Framework Overview



Framework Application Feedback and Discussion



CURRENT STATE





KEY CHALLENGES AND OBSTACLES

Several **technical** and **management** challenges and obstacles combine to make landfill end-use value realization a tall task.



DIFFICULT REGULATIONS





INEFFECTIVE STRATEGY



MAKING PROCESS



EXISTING LANDFILL POST CLOSURE MANAGEMENT FRAMEWORKS



WSDOE and USEPA have not endorsed any of these approaches



VALUE PROPOSITION





PRESENT AND FUTURE STRATEGY

The Need for a Paradigm Shift



Shift to Asset-Centric Strategy can improve end-use value realization



4 MAIN BENEFITS FRAMEWORK PROVIDES:











FRAMEWORK OVERVIEW





DEALING WITH ORGANIZATIONAL MESSES RATHER THAN PROBLEMS

A mess is a system of interrelated problems. We should be concerned with messes, not problems.

Science has provided powerful methods, techniques and tools for solving problems, but it has provided little that can help in solving messes. The lack of mess-solving capability is the most important challenge facing us.



-Russ Ackoff, University of Pennsylvania



FRAMEWORK ARCHITECTURE

Taking a Holistic Approach





Architecture: is the *Blueprint of the Landfill End Use Decision Making Framework (LEDMF)*





FRAMEWORK FOUNDATION Strategic Direction for Closed Landfills









A Systems Perspective

Asset - Centric Strategy



Strategic Flexibility



Continuous Process Improvement



FRAMEWORK FOUNDATION Process Governance







The Framework can be applied at the different management – levels





FRAMEWORK FOUNDATION



To facilitate proper planning, decision-making and process improvement, we must draw on several methodologies:







FRAMEWORK PROCESSES How they interact to Support Decision-Making





FRAMEWORK FULLY INTEGRATED VIEW

COMPLETE FRAMEWORK WITH DECISION OUTCOMES AND INFORMATION FLOW

STRATEGIC DIRECTION



THE RESULTS ARE DECISIONS MADE AT DIFFERENT LEVELS PER THE FRAMEWORK GOVERNANCE

VIKEK Environmental Engineers, LLC MEASURES ARE LINKED TO PROCESSES AND OUTCOMES





FRAMEWORK APPLICATION





FRAMEWORK APPLICATION METHODOLOGY

,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ACTIVITY	GATE 1	GATE 2	GATE 3
₹ <u></u>	Decision Checkpoint/Gate Questions	 What is the current trend of the contaminants/ components of concern? What are the root cause of problems? Can root cause be mitigated via adaptive management to achieve targets? Is transformative process or design needed? 	 Can transformative actions achieve required targets in the requisite timeline? Is the landfill ready for redevelopment? How do the transformative alternatives compare? 	 What is site value vs risk ? What is the closed landfill project strategic portfolio value? Is redevelopment right for the organization from a socio – economic - environmental perspective?
-`Ų	Understand & Plan	End use objectivesPlanned strategyRisk Profile	Risk Profileremediation optionsCost-Benefit	Portfolio componentsValue of components
 ✓ 	Do / Implement	Modeling and analysisMonitoring plansPrepare reports	Modeling adjustmentsRemedial designsPrepare reports	 Portfolio valuations , alignment & prioritization
Q,	Study / Check	Evaluate Risk ProfilesResults vs Plan	Evaluate Risk ProfilesResults vs Plan	Evaluate strategic valuesEvaluate relative values
→	Decide & Act	 Decide continuous improvement acceptability 	 Decide transformation acceptability 	 Approve project Reject project Defer project

UNDERSTAND

Strategic Direction for Hypothetical Landfill Sub-Portfolio

Engineers, LLC





FRAMEWORK ADAPTATION TO FIT YOUR BUSINESS



Define Strategic Direction

5



Define Organization's Process Model



Define Closed Landfill Value Stream



Adapt Decision Framework to Business



Define Process Performance Model / Dashboard



7 Deploy Framework & Processes and Align, Realign Landfill Management Program



SUMMARY

- ★ Much focus on achieving post closure termination
- ★ Enables Landfill owners to
 - Define flexible end-use objectives and strategy
 - Be prepared to take advantage of opportunities anytime

- ★ Provides the structure for continual collaboration with with all key stakeholders in the decision-making process
- ★ Is focused on landfill asset value realization while balancing regulatory compliance with landfill value optimization





SMALL IMPROVEMENTS CAN MAKE A DIFFERENCE

There is no genius in our company. We just do whatever we believe is right, trying every day to improve every little bit and piece. But when 70 years of very small improvements accumulate , they become a revolution

> -Katsuaki Watanabe, President of Toyota Motor Corp.







THANK YOU!



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FEEDBACK AND DISCUSSION





KEY LITERATURE REVIEWED

- 1. USEPA (2011). Handbook on the Benefits, Costs & Impacts of Land Cleanup & Reuse. EPA-240-R-11-001
- 2. Statistica.com (2019). Energy and Environmental Services. *Waste Management*.
- 3. Ronald S. Cusano (2015). Is Your Landfill or Other Wasting Asset Fairly Assessed? Schnader Harrison Segal and Lewis LLP. Mondaq.com.
- 4. USEPA (2014). Closed Waste Sites a Community Assets: A guide for Municipalities, Landfill Owners, and Regulators. EPA/600R 14/349.
- 5. ITRC (2006). Evaluating, Optimizing or Ending Postclosure Care at Municipal Waste Landfills Based on Site-Specific Data Evaluations. The Interstate Technology & Regulatory Council Alternative Landfill Technology Team. September 2006.
- 6. WDOE (2011). Preparing for Termination of Postclosure Care Activities at Landfills Closed under Washington State Administrative Codes 173-304 /351.
- 7. Daniel P. Duffy (2005b), <u>Https://www.msw</u> management .com
- 8. WSDOE (2003). Closed and Abandoned Landfills . <u>Https://fortress.wa.gov</u>
- 9. SWANA Applied Research Foundation (2007). The Long-term Environmental Risks of Subtitle D Landfills
- 10. WELLINGTON GREEN (2003). Landfill examination, aftercare and redevelopment: an integrated strategy. SUFALNET (Sustainable Use of Former and Abandoned Landfills. The SUFALNET PROJECT.
- 11. EREF(2006). Performance- Based System for Post-Closure Care at MSW Landfills: A Procedure for Providing Long-term Stewardship under RCRA Subtitle D. Prepared by GEOSYNTEC CONSULTANTS *for EREF.*