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NEXGEN Energy Solutions
Hydrocarbon sludge remediation and recovery technology platform



NEXGEN05

PERFORMANCE. PURITY. PROGRESS.

ADVANCED CHEMICAL SOLUTION



NEXGEN06

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NEXGEN Energy Solutions

**A Breakthrough Hydrocarbon Sludge
Remediation & Recovery Technology Platform**

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INTRODUCTION

NEXGEN Energy Solutions is an advanced hydrocarbon sludge remediation and recovery technology platform developed to address one of the most persistent and costly challenges in the global oil and gas industry: the accumulation, treatment, recovery, and management of hydrocarbon sludge in tanks, vessels, terminals, refineries, and offshore facilities.

For decades, operators have regarded hydrocarbon sludge as an unavoidable operational burden—resulting in production losses, high cleaning costs, prolonged downtime, safety risks, and expensive waste disposal requirements. **NEXGEN** challenges this conventional approach.

Rather than viewing sludge as waste, **NEXGEN** recognises it as a valuable hydrocarbon resource that can potentially be recovered, reclaimed, and returned to the value chain.

This philosophy forms the foundation of the **NEXGEN** Technology Platform.

WHAT IS NEXGEN?

NEXGEN is a specialised hydrocarbon sludge remediation and recovery technology platform designed to:

**Soften and mobilise
hardened sludge
deposits**

**Reduce
hydrocarbon
viscosity**

**Release trapped hydrocarbons
from sludge matrices**

**Improve pumpability
and transferability**

**Accelerate tank
cleaning operations**

**Reduce waste
generation and
disposal requirements**

**Enhance hydrocarbon
recovery opportunities**

The platform comprises proprietary formulations developed specifically for the oil, gas, marine, refining and storage industries.

THE INDUSTRY CHALLENGE

CRUDE OIL STORAGE TANKS

- Bottom sludge accumulation
- Wax deposits
- Asphaltene deposits
- Sediment build-up



REFINERIES

- Slop tanks
- Intermediate storage tanks
- Product tanks
- Process residue tanks

OFFSHORE FACILITIES

- FPSOs
- FSOs
- Floating storage facilities
- Offshore production systems



MARINE INDUSTRY

- Cargo tanks
- Fuel storage tanks
- Sludge holding systems



Over time, sludge accumulation can significantly reduce storage capacity, hinder operations, increase maintenance costs, and create substantial safety and environmental challenges.

NEXGEN SOLUTION

NexGEN provides a systematic approach to sludge remediation through **five key mechanisms**:

1



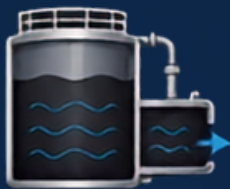
Sludge Softening

The technology penetrates hardened sludge deposits and progressively reduces their structural rigidity.

Benefits:

- Easier handling
- Reduced mechanical intervention
- Improved processing efficiency

2



Sludge Mobilisation

NexGEN transforms static sludge deposits into pumpable material.

Benefits:

- Improved transfer capability
- Reduced manual excavation
- Enhanced operational efficiency

3



Viscosity Reduction

By reducing hydrocarbon viscosity, NexGEN improves fluidity and processability.

Benefits:

- Improved flow characteristics
- Easier pumping
- Enhanced recovery potential

4



Hydrocarbon Recovery Enhancement

Hydrocarbons trapped within sludge deposits can potentially be released and recovered.

Benefits:

- Increased asset recovery
- Reduced hydrocarbon losses
- Improved economic returns

5



Waste Minimisation

By facilitating hydrocarbon recovery and sludge reduction, NexGEN helps minimise final waste volumes.

Benefits:

- Lower disposal requirements
- Reduced environmental burden
- Improved sustainability performance

A smarter approach to **sludge remediation, recovery, and waste reduction.**

LABORATORY ANALYSIS AND TECHNICAL VALIDATION

Independent laboratory testing conducted by **SGS** on sludge samples demonstrated the presence of recoverable hydrocarbon characteristics. The tested sample exhibited:

- Kinematic Viscosity @ 40°C: 5.910 mm²/s
- Relative Density: 0.8596
- pH: 7.21
- Flash Point: <40°C

These results indicate that the sludge contains hydrocarbon fractions with potential recovery value rather than representing inert waste material alone.

Mercury Analysis and **HSE** Considerations Additional **SGS** analysis detected Mercury (Hg) concentrations of: **485 ppb**.

This finding reinforces the importance of proper sludge management and risk assessment. **NEXGEN** supports safer remediation practices by reducing the need for extensive manual sludge handling and tank entry operations, thereby helping to minimise personnel exposure to hazardous contaminants.

Mercury-containing materials must continue to be managed in accordance with applicable environmental, occupational safety and regulatory requirements



WHY NEXGEN REPRESENTS A BREAKTHROUGH



Traditional tank cleaning methods generally focus on:

- Sludge removal
- Waste transportation
- Waste disposal

NEXGEN introduces a fundamentally different approach:

FROM DISPOSAL TO RECOVERY

Traditional Model:	NEXGEN Model:
Remove sludge	Remediate sludge
Dispose sludge	Recover hydrocarbons
Incur disposal cost	Minimise waste
-	Create value sludge
-	Incur disposal cost

This shift from a waste-management mindset to an asset-recovery strategy represents a potentially transformative development for the industry.

OPERATIONAL BENEFITS

Improved Cleaning Efficiency

NEXGEN helps improve cleaning effectiveness by:

- Softening hardened deposits
- Reducing sludge viscosity
- Enhancing sludge mobility

Reduced Downtime

Tank cleaning projects often require extended shutdown periods.

By improving remediation efficiency, NEXGEN has the potential to significantly shorten project durations depending on tank conditions, sludge characteristics, and operational requirements.

Increased Storage Capacity

Removing accumulated sludge restores usable tank volume. Benefits include:

- Higher operational efficiency
- Increased storage utilisation
- Improved asset performance

ECONOMIC BENEFITS

Reduced Cleaning Costs

Potential savings may arise from:

- Reduced manual intervention
- Reduced mechanical cleaning requirements
- Reduced operational complexity

Reduced Disposal Costs

Scheduled waste disposal is often one of the largest cost components in tank cleaning projects.

NEXGEN supports:

- Lower sludge volumes
- Reduced disposal requirements
- Improved waste management economics

Recovery of Valuable Hydrocarbons

Recovered hydrocarbons may:

- Offset remediation costs
- Generate additional value
- Improve project economics

HEALTH, SAFETY AND ENVIRONMENTAL BENEFITS

Reduced Tank Entry Requirements

NEXGEN supports remediation strategies that may reduce the frequency and duration of confined-space entry activities.

Reduced Personnel Exposure

Potential reduction in exposure to:

- Hydrogen Sulphide (H₂S)
- Volatile Organic Compounds (VOC)
- Benzene
- Hydrocarbon vapours
- Mercury-contaminated sludge

Improved Operational Control

A structured remediation process promotes:

- Better planning
- Better monitoring
- Improved risk management

APPLICATIONS ACROSS THE OIL & GAS VALUE CHAIN

Upstream Sector	Midstream Sector	Downstream Sector
Offshore production facilities	Tank terminals	Refineries
FPSOs	Storage facilities	Petrochemical complexes
FSOs	Pipeline storage systems	Product storage terminals
Crude storage systems	Marine logistics hubs	Fuel distribution facilities

WHO SHOULD USE NEXGEN?

National Oil Companies

- PETRONAS
- Saudi Aramco
- ADNOC

FPSO and FSO Operators

- Bumi Armada
- Yinson Production

Tank Terminal Operators

- Petroleum terminals
- Strategic storage facilities
- Marine tank operators
- Crude oil storage operators

Refinery Operators

- Hengyuan Refining Company
- PRefChem

Shipyards & Marine Service Providers

- Malaysia Marine and Heavy Engineering (MMHE)

THE FUTURE OF HYDROCARBON SLUDGE MANAGEMENT

As the global energy industry moves toward greater efficiency, sustainability and asset optimisation, operators can no longer afford to treat hydrocarbon sludge solely as waste.

The future lies in:

Recovery rather than disposal

Value creation rather than waste generation

Remediation rather than removal alone

NEXGEN Energy Solutions has been developed to support this transition.

By combining advanced chemical science, engineering application, hydrocarbon recovery principles and operational efficiency, **NEXGEN** offers a next-generation approach to one of the industry's oldest challenges.

NEXGEN Energy Solutions Hydrocarbon Sludge Remediation & Recovery Technology Platform Recover. Remediate. Regenerate. Transforming Hydrocarbon Sludge into Recoverable Value.

