

Company Profile

Terralog Technologies Inc.™ (TTI™) is an international environmental services company headquartered in Calgary, Canada

TTI specializes in Petroleum Geomechanics and deep well disposal waste management using the Slurry Fracture Injection™ (SFI) technology.

SFI™ is an environmentally sustainable technology used to place petroleum exploration and production (E & P) waste, Biosolids & contaminated soils in the deep subsurface (geo-sequestration).

SFI is a permanent **Zero Discharge** disposal solution.

Terralog's Services are built on our extensive experience in deep well disposal of E&P waste streams; combined with expertise in geomechanics, geology, rock mechanics, reservoir engineering, and environmental management with practical field experience in long-term deep well injection operations.

In Indonesia, *PT Terralog Teknologi Indonesia* uses the SFI process to operate one of the largest deep well disposal projects for E & P waste streams in the world. The SFI project is located at the Duri oilfield in the Riau province of Sumatra, Indonesia.

In the eight years since the Duri SFI project began in December 2002, over 912,000 cubic meters (5.7 million barrels) of oily viscous fluid waste (oily sludge) has been injected back into deep geological formations, essentially returning the waste stream to its place of origin.

The SFI process is being successfully used by clients/operators around the world. TTI is active in Canada, USA, Norway, Indonesia and Saudi Arabia.

SFI Disposal of Waste Streams

Slurry Fracture Injection is an ideal solution for permanent zero discharge disposal of multiple waste streams:

Petroleum Industry

- Disposal of E&P wastes
- Drilling wastes
- Oilfield produced solids
- Oily viscous fluids/sludge
- Tanks bottoms
- Contaminated soils
- NORM

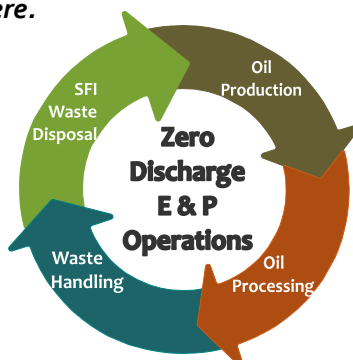
Municipalities

- Wastewater treatment sludge (i.e. Biosolids)
- Sulfur, fly ash, incinerator residue
- Industrial effluent, sludge
- CO2 sequestration
- Other waste streams.

Zero Discharge E&P Operations

Terralog helps our clients achieve Zero Discharge E&P operations. Slurry Fracture Injection has a proven environmental record of Zero Discharge waste disposal with no impact on the biosphere.

- ✓ Permanent 'Zero Discharge' Disposal
- ✓ Protects underground sources of drinking water, soil and air quality
- ✓ No surface and groundwater contamination.
- ✓ No impact on future land use
- ✓ Safeguards human health by reducing pollution



TTI Services

Technical Feasibility Studies

- Geological assessments: evaluate and select suitable formations
- Material audits: waste characterization & volumes
- Operating strategy development & monitoring programs for process control
- Project recommendations (equipment, facilities, wells development, etc)

Project Regulatory Support

- Interaction with regulators: preparation of regulatory documentation and permit applications

Project Implementation

- FEED
- Development of budgets, tasks & schedules
- Installation of SFI facilities and equipment

Project Management and Field Operations

- Complete injection services in the field (equipment, personnel, and injection operations)
- Project management & engineering services: environmental & operational assurance

SFI

Proven Results

- ✓ **Accepted by Regulators world-wide**
- ✓ **Over 6 million barrels of waste disposed to date**
- ✓ **Environmental protection**
 - protects underground sources of drinking water, soil and air quality
 - prevents surface water and ground water contamination
- ✓ **Immediate results**
- ✓ **Cost effective**
- ✓ **Achieves 'zero surface discharge'**
 - does not impair future land use
- ✓ **Reduces pollution to safeguard human health**
- ✓ **Safe and secure disposal approach**
 - crude-derived wastes are returned to their place of origin
- ✓ **Efficient & economical waste management strategy**
- ✓ **Permanent & secure disposal**
- ✓ **Long-term liability to operator/generator is greatly reduced**

For more information please contact:



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Deep Well Disposal Processes

Slurry Fracture Injection (SFI)

- high pressure injection and rates (fracturing)
- large waste volumes (up to 17,000 m³/month)
- continuous injection cycles
- multiple waste streams
- dedicated disposal wells

Water Injection/Disposal

- low injection pressure, high rates
- large waste-water volume (1000's m³ produced water)
- dedicated disposal wells

Cuttings Re-Injection (CRI)

- moderate/low injection pressure and rates
- smaller waste volumes (<100m³ batches)
- drilling wastes from drilling a well (cuttings)
- rig/platform based operations

**Typical Disposal Depths:
350 – 2,000 meters**

Slurry Fracture Injection The SFI Process

- Waste material is delivered by truck to the SFI site on a continuous basis. The waste is screened, and then mixed with produced water to create slurry. Other waste streams can be granulated, and then mixed with water.
- SFI technology can effectively dispose of materials with grain sizes up to 5 mm. The slurry is made with the highest possible solid material concentration – from 10 to 30 percent by volume.
- The slurry is pumped down a waste disposal well at in-situ fracturing pressures. It is important to determine the proper slurry concentrations, injection rates and volumes sustainable by the target geological structure
- Target structures are usually thick permeable, confined and unconsolidated geological formations. In these types of formations the high in situ compressive stresses and the high pressure bleed off capacity of the target formation ensures that the waste is permanently immobilized in the formation.
- Process Control: Extensive monitoring/data analyses/engineering occurs during SFI operations, to map the waste pod and assess fracture containment, storage capacity and wellbore integrity.

