

# Bioremediation Projects

Since Enretech was formed in 1995, our bioremediation technologies and services have been successfully used in more than 50 bioremediation projects in countries including Tanzania, Kazakhstan, Vietnam, Micronesia, Australia, Japan and New Caledonia. Most involved the breakdown of soil contaminated with petroleum hydrocarbons resulting from mining, manufacturing or petroleum operations.

See below for a summary of the majority of bioremediation projects Enretech has been involved in:

Case #	Site	Type	Contaminant	Test	Start (ppm)	End (ppm)	Percent Decrease	Time (days)	Scale (m3)	Comments
1	Test Cells	Ex-Situ	Petroleum Hydrocarbon (diesel & hydraulic oil)	TPH	465	245	47%	50	1.2	Study by Bergeson-Boese & Assoc.
2	Mechanical Repair Facility	In-Situ	Petroleum Hydrocarbon (parts washer sludge)	TPH	472,000	57,000	88%	65	not listed	Reduced further to 4,3835 ppm at day 250.
3	Fire Training Area	Ex-Situ	Petroleum Hydrocarbon (mostly C15-C29+)	TPH	18,340	2,390	87%	30	550	
4	Fire Training Area	Ex-Situ	PAH Polyaromatic Hydrocarbons	PAH	2,800	780	72%	21	550	
5	BHP Temco	Ex-Situ	Petroleum Hydrocarbon (mostly C10-C36)	TPH	72,000	16,000	78%	30	145	
6	Aluminium Manufacturing	Ex-Situ, Bioreactor	Petroleum Hydrocarbon (transformer oil: mostly C15-C28)	TPH	1,000,000	2,000	99.80%	14	not listed	Further reduced 1,500 ppm at day 38.
7	Aluminium Manufacturing	Ex-Situ, Bioreactor	PCB (transformer oil: Arochlor 1260)	PCB 1260	55	0	99.98%	38	not listed	
8	Underground Storage Tank Leak	Ex-Situ	Petroleum Hydrocarbon (mostly diesel)	TPH	3,050	771	75%	78	13	Further reduced 318 ppm at day 143.
9	Tractor Maintenance Facility	Ex-Situ	Petroleum Hydrocarbon (oil, grease & diesel)	TPH	3,431	529	85%	113	837	TPH not detectable at day 189.
10	Tractor Maintenance Facility	Ex-Situ	Petroleum Hydrocarbon (oil, grease & diesel)	TPH	1,566	314	80%	102	900	Further reduced to 28 ppm at day 183.
11	Aboveground Storage Tank Spill	Ex-Situ	Petroleum Hydrocarbon (mostly diesel)	TPH	7,500	460	94%	45	7.5	Further reduced to 28 ppm at day 183.
12	Oil Drilling Spill	Ex-Situ	Petroleum Hydrocarbon (Crude Oil)	TPH	387,000	3,833	99%	99	not listed	
13	Tractor Trailer Accident Site	Ex-Situ	Petroleum Hydrocarbon (Diesel)	TPH	149,960	16,926	89%	42	not listed	

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14	Petrol Station Soil Clean-up	Ex-Situ	Petroleum Hydrocarbon (Petrol)	TPH	220	45	80%	43	825	Original TPH-G level not available.
15	Petrol Station Soil Clean-up	Ex-Situ	Petroleum Hydrocarbon (Diesel)	TPH	778	74	90%	43	52.5	Original TPH-G level not available.
16	Waste Collection Site Clean-up	Ex-Situ	Petroleum Hydrocarbon (mostly C10-C36)	TPH	24,700	129	99%	56	37.5	
17	Transformer Oil Remediation	Ex-Situ	PCB (Arochlor 1242, 1260)	PCB	106	24	77%	90	not listed	Further reduced to 1.44 ppm at day 210.
18	Transformer Oil Remediation	Ex-Situ	Petroleum Hydrocarbon (transformer oil: mostly C15-C28)	TPH	100,000	2,670	97%	210	not listed	Further reduced to "Not detected" at day 240.
19	Sump Oil Drum Leak	In-Situ	Petroleum Hydrocarbon (sump oil)	TPH	22,300	602	97%	130	4.5	Site supported grass growth at day 130.
20	Sludge Pond Clean-up (Trial 1)	In-Situ	Petroleum Hydrocarbon (oil & greases)	TOG	600,000	160,000	73%	138	1	26 kg of ERT-1 per m3 applied.
21	Sludge Pond Clean-up (Trial 2)	In-Situ	Petroleum Hydrocarbon (oil & greases)	TOG	600,000	66,000	89%	82	1	104 kg of ERT-1 per m3 applied.
22	Sludge Pond Clean-up (full scale)	In-Situ	Petroleum Hydrocarbon (oil & greases)	TOG	600,000	ongoing	ongoing	ongoing	>500	application of ERT-1 commenced Jan/98
23	Sludge separation Process - Trial	In-Situ	Petroleum Hydrocarbon (20 year old Crude)	TPH	275,000	75,000	73%	30	not listed	
24	UST Clean-up	Ex-Situ	Petroleum Hydrocarbon (unleaded petrol)	TPH	3,800	176	95%	56	not listed	Further reduced to <100 ppm at day 84.
25	Oil Drilling Spill	In-Situ	Petroleum Hydrocarbon (Crude Oil)	TPH	61,330	5,540	91%	127	4	Minimal moisture received by remote site.
26	Contaminated Quarry Clean-up	Ex-Situ	Petroleum Hydrocarbon (Petrol)	TPH	1,200	161	87%	33	338	Further reduced to <10 ppm at day 58.
27	Contaminated Quarry Clean-up	Ex-Situ	Petroleum Hydrocarbon (BTEX)	BTEX	200	10	95%	33	338	
28	UST Clean-up	Ex-Situ	Petroleum Hydrocarbon (waste oil)	TPH	36,564	49	99.87%	184	>100	
29	Substation Transformer Explosion	In-Situ	Petroleum Hydrocarbon (transformer oil)	TPH	2,781	369	86.73%	219	750	Gravel media avg. 0.5" dia.. Soil was sandy clay with some pebble.
30	NASA Pilot Study	Ex-Situ	Petroleum Hydrocarbon	TPH	568	10	98.24%	60	not listed	

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31	Drilling rig blowout		Crude oil (approx. 1000 barrels)	TPH		Not Available		210	not listed	Site was reported to have completely returned to natural state.
32	Wate sludge around storage tanks	Ex-Situ	Petroleum Hydrocarbon	TPH	N.Av.	N.Av.	77.00%	56	55	Biopile used.
33	Plastics Manuf. Spill	In-Situ	Vinyl Acetate	VA	3,152	100	96.83%	69	not listed	Low soil temperature at end of project.
34	Wate Oil Disposal Facility - sludge disposal	Ex-Situ	Petroleum Hydrocarbon (HEPH/LEPH)	TPH	750,000	1,200	99.84%	42	not listed	Bioaugmentation process.
35	Oil-based Mud Cuttings	Ex-Situ	Petroleum Hydrocarbon (Crude oil)	TPH	11,309	4,347	62%	47	13 gallons	
36	Transformer Site Remediation	In-Situ	Transformer Oil	TPH	41,120	8,830	79%	30	not listed	Contaminated through leakage from valves and joints.
37	Transformer Site Remediation	In-Situ	Transformer Oil	TPH	106,050	4,347	96%	47	not listed	
38	Petroleum Storage Tanks	Ex-Situ	Petroleum Hydrocarbon (Crude Oil Sludge)	TPH	135,938	40,454	70%	145	0.5	Data supplied by Petrolimex, Vietnam.
39	Aircraft Maintenance	Ex-Situ	Synthetic Hydraulic Fluid (Aviation)	TPH	2,750	1,350	51%	60	0.024	Bioremediation Trial for Ansett.
40	Aircraft Maintenance	Ex-Situ	Synthetic Lubricating Fluid (Aviation)	TPH	3,350	765	77%	60	0.024	Bioremediation Trial for Ansett.
41	Oil Drilling Rig	Ex-Situ	Synthetic Drilling Fluid (HDF 200 Drilling Base Fluid)	TOG	24.420 g	14.412 g	42.4%	42	not listed	Bench scale only. Trial conducted in Indonesia.
42	Electrical Substation	Ex-Situ	Transformer Oil	TPH	42,830	trace	not quantified	75	61	Contamination 5 years old. Also cleaned cement.
43	Old Bus Depot	In-Situ	Mainly C24-C36 TPH	TPH	46,333	1,233	97%	40	10	Remediation by EM Group. Used Enhancer as well.
44	Pipeline leak in wilderness area	In-Situ	Light Crude Oil	TPH		Not Available		180	27,000	Main area cleaned up is small river 5 km long.
45	Truck Accident	In-Situ	Diesel Fuel	LEPH, HEPH		Not Available		N.Av.	4	Sampling not conducted, based on success of Project #46.
46	Fuel Truck Roll-over	In-Situ	500L of Diesel Fuel	LEPH, HEPH	N.Av.	N.D.	N.Av.	40	10	N.D. = Not Detected.

Shading indicates the data is anecdotal.

Mean:

84%

81 days

If you are interested in exploring if Enretech's bioremediation technologies or services are able to address your contaminated site, get in touch for a no-obligation discussion.



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