

Satisfactory Service Execution Certificate – Reference Sheet



EPS biotechnology, s. r. o.
 V Pastouškách 205, 686 04 Kunovice
 IČO: 26295059, www.epssro.cz

Project Title	Groundwater Remediation at the Site of Former Soviet Military Base: Kozí Hřbetý, Všejanya
Timeframe	2011 – 2013
Project General Investor	Ministry of the Environment of the Czech Republic
Client	ENVIGEO s.r.o.
Contact Person, Phone number	Ing. David Ides, tel. +420 605 331 644
Total Volume of Work (USD)	\$ 279,592.20
Activities Executed by the EPS, s.r.o.	Groundwater Remediation at the Former Military Base
Detailed Description of the Work in Question	<p>Supplementary survey of the site (drilling works, atmogeochemical measurements, geophysics, well-logging). Installation, deployment, and management of technology for the remediation of groundwater contaminated with oil hydrocarbons: Groundwater pump-and-treat remediation including surface treatment and recycling into the fractured bedrock, biodegradation technologies, <i>in situ</i> chemical oxidation (ISCO), and detailed site monitoring.</p> <p>Pollutant Concentration Range:</p> <ul style="list-style-type: none"> • Initial: 0,8 m free phase product on groundwater table • Final: no free phase present

Photodocumentation



The work was executed consistent with the approved project plan, in required quality, and according to the project contract and the contracted parameters.

Investor / Client / Supervisor confirmation of the finished work:

In Prague on 16.12.2013

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Project Title	Facility For the Processing And Disposal of Hazardous Wastes from the Biosolid, s.r.o. Company
Timeframe	2010 - 2016
Project General Investor	Biosolid, s.r.o.
Client	Biosolid, s.r.o.
Contact Person, Phone Number	Ing. Radek Ulman, work manager, +420 774 722 770
Total Volume of Work (tons)	389,114.09
Volume of Work by Year (tons):	<p>2012: 123,618.35</p> <p>2013: 74,998.39</p> <p>2014: 55,047.39</p> <p>2015: 94,371.13</p> <p>2016: 41,078.83</p>
Activities Executed by the EPS, s.r.o.	Bioremediation processing of hazardous wastes with the use of own approved biotechnologies EPS-INOK, EPS-CIU a EPS-PAL
Detailed Description of the Work in Question	<p>Bioremediation of hazardous wastes, especially soils and aggregate soils, railway track gravels, construction and demolition debris, sludge from well drilling and industrial cleaning, and waste waters contaminated with oil and chlorinated hydrocarbons with the objective of pollutant and hazardous properties removal before the material disposal or reuse. From 2012 to 2016, wastes from the following projects were treated:</p> <ul style="list-style-type: none"> • Redisposal of insufficiently demolished probes after crude oil and natural gas production in CHOPAV [Chráněná oblast přirozené akumulace vod (Protected area of natural water accumulation)]. Quaternary sediments of the Morava River (sectors II, V, VI a VII). • Remediation at the grounds of Aircraft Industries, a.s. company in Kunovice. • Remediation of the grounds of COLORLAK, a.s. company in Staré Město. • Remediation of the grounds of MAGNETON a.s. company in Hluk. • Reconstruction of railway tracks by the ŽSD, a.s. and EKOPOS Brno, s.r.o. companies. • Remediation of the sludge disposal landfill in Hluboče. • Revitalization of the „Spaliště“ (incinerator), site in the cadastre Staré Město u Uherského Hradiště. • Demolition works at the air force base in Bochoř u Přerova. • Remediation of the Hanon Systems Autopal s.r.o. company grounds in Hluk.

- Bioremediation of sludge from the cleaning of industrial wastewater of Purum s.r.o. company, Nehlsen Třinec, s.r.o. company, and MND a.s. company.
- And others.
- **Pollutant Concentration Range (BTEX, C₁₀-C₄₀, PAH, CHC, PCB):**
 - **Initial:** the order of 10³ – 10⁴ mg/kg (dried weight)
 - **Final:** BTEX < 0,4 mg/kg, C₁₀-C₄₀ < 300 mg/kg, PAH < 6 mg/kg, CHC < 1 mg/kg, PCB < 0,2 mg/kg

Photodocumentation



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Project Title	Facility For the Processing And Disposal of Hazardous Wastes from the Celio, a.s. company.
Timeframe	2010 - 2016
Project General Investor	Celio, a.s.
Client	Celio, a.s.
Contact Person, Phone number	Ing. Jindřich Kauca, busines-technology manager, +420 736 758 015
Total Volume of Work (tons)	108,817.57
Activities Executed by the EPS, s.r.o.	Bioremediation Processing of Hazardous Wastes With the Use of Own Approved Biotechnologies EPS-INOK, EPS-CIU a EPS-PAL
Detailed Description of the Work in Question	<p>Bioremediation of hazardous wastes, especially soils and aggregate soils, railway track gravels, construction and demolition debris, sludge from well drilling and industrial cleaning, and waste waters contaminated with oil and chlorinated hydrocarbons with the objective of pollutant and hazardous properties removal before the material disposal or reuse. From 2010 to 2016, wastes from the following projects were treated:</p> <ul style="list-style-type: none"> • Ongoing supply of hazardous wastes of various origin and catalogue number disposed at the biodegradation field of the Celio, a.s. company. • Soils and construction debris from investment and remediation efforts realized within the grounds of the Unipetrol RPA, s.r.o. petrochemical facility in Litvínov – Záluží. • Liquidation of former liquid waste landfills of the Unipetrol RPA, s.r.o. company. • Bioremediation of unsaturated zone and groundwater from former phenol-producing unit of the Unipetrol RPA, s.r.o. company. • Reconstruction of railway tracks, especially at the Unipetrol RPA, s.r.o. company Chempark in Litvínov – Záluží. • And others. • Pollutant Concentration Range (BTEX, C₁₀-C₄₀, PAH, CHC, PCB): <ul style="list-style-type: none"> ○ Initial: 10³ mg/kg (dried weight) ○ Final: BTEX < 0,4 mg/kg, C₁₀-C₄₀ < 300 mg/kg, PAH < 6 mg/kg, CHC < 1 mg/kg, PCB < 0,2 mg/kg

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Project Title	Biodegradation Field of the EPS Biotechnology, s.r.o. Company at the Grounds of COZ Landfill in Ostrava
Timeframe	2010 - 2016
Partnering Party	AWT Rekultivace, a.s.
Contact Person, Phone Number	Bc. Ing. Ivana Michálková, +420 734 682 592
Waste Receiving Party, Contact Person, Phone Number	COZ landfill, Ing. Jaroslav Rusek, decontamination and recycling division chief manager, +420 604 604 756
Total Volume of Work (tons)	83,523.84
Activities Executed by the EPS, s.r.o.	Bioremediation treatment of hazardous wastes with the use of own approved biotechnologies EPS-INOK, EPS-CIU a EPS-PAL.
Detailed Description of the Work in Question	<p>Bioremediation of hazardous wastes, especially soils and aggregate soils, railway track gravels, construction and demolition debris, sludge from remediation of groundwater, casting molds, and cores contaminated with oil and chlorinated hydrocarbons, with the objective to remove the contamination and hazardous waste properties prior to their disposal or reuse.</p> <ul style="list-style-type: none"> • Pollutant Concentration Range (C₁₀-C₄₀, PAH): <ul style="list-style-type: none"> ○ Initial: n × 10⁴ mg/kg (dried weight) ○ Final: C₁₀-C₄₀ < 300 mg/kg, PAH < 6 mg/kg,

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Date: 1.11.2016

Partnering Party Verification of Executed Work:

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EPS biotechnology, s. r. o.
 V Pastouškách 205, 686 04 Kunovice
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Project Title	Remediation of Contaminated Site Within the Grounds of MAGNETON a.s. Company in Kroměříž
Timeframe	2013 – 2014
Project General Investor	The Ministry of Finance of the Czech Republic
Client	EKORA s. r. o. Sinkulova 48/329, 140 00 Praha 4
Contact Person, Phone Number	Mgr. Ondřej Stískal, +420 775 904 775
Total Volume of Work (USD)	\$334,058.32 VAT excluded
Activities Executed by the EPS, s.r.o.	<i>In situ</i> decontamination of the saturated zone by the remediation technology suite including venting, air-sparging, soil washing, soil washing with detergents, aerobic bioremediation of oil hydrocarbons, aerobic biodegradation of chlorinated hydrocarbons.
Detailed Description of the Work in Question	<ol style="list-style-type: none"> 1) Technical site preparation <ol style="list-style-type: none"> a) Drilling works – probes, wells (monitoring, application, air-sparging, venting) b) Decontamination unit – remediation technology units' installation. 2) Remediation operation <ol style="list-style-type: none"> a) Monitoring b) Remediation works control c) Remediation works documentation, evaluation, and reporting <p>Pollutant Concentration Range (PAH, CHC):</p> <ul style="list-style-type: none"> ○ Initial: CHC >16,000 µg/l, PAH >10,000 µg/l ○ Final: CHC < 600 µg/l, PAH < 400 µg/l

Photodocumentation



Drilling works



Site equipping



Remediation monitoring and control

The work was executed consistent with the approved project plan, in required quality, and according to the project contract and the contracted parameters.

Investor / Client / Supervisor confirmation of the finished work:

Project Title:	Balakom, a.s. Opava – Komárov – Completion of Contaminated Bedrock and Groundwater Exploration in the Vicinity of Building no. 20, Biodegradation <i>in-situ</i> .
Project General Investor:	Akzo Nobel Coatings CZ, s.r.o. Podvihovská 304/12, 747 70 Opava 9 – Komárov UID: CZ60792213
Client:	INPOST, spol. s r.o. Havlíčková 6, 686 01 Uherské Hradiště UID: CZ00568023
Timeframe:	2004 – 2009
Total Volume of Works (USD):	\$389,420.00
Detailed Description of the Work in Question:	<ul style="list-style-type: none"> ▪ Execution of complete current exploration at the target site ▪ Uncased low-diameter probe drilling ▪ Aquifer ceiling mapping (geophysical prospection) ▪ Determination of current contamination plume area and the spread of oil hydrocarbon product across the groundwater table ▪ Data processing, 3D model of the aquifer ceiling, contaminant quantification, remediation project proposal ▪ Remediation works leading to the removal of soils exceeding the MCL in the vicinity of building no. 20. Using the technology of <i>in-situ</i> biodegradation, a total of 15,320 m³ of soil was treated.
Results Attained:	<p>The range and spread of the contamination in the soil and groundwater was specified, the overall amount of contaminant was quantified, the remediation project was proposed, the remedy of the site was performed, and the target contaminant limits were reached consistent with the Czech Environmental Inspectorate decision.</p> <p>Pollutant Concentration Range (BTEX):</p> <ul style="list-style-type: none"> • Initial: Free phase saturation (BTEX > 100,000 mg/kg (dry weight)) • Final: BTEX < 2,000 mg/kg (soil), BTEX < 1,000 mg/l (groundwater)
Reference Verification Contact:	Client: INPOST, spol. s r.o., Bohumil Píštěk, tel: +420 572 535 981
Sponsor (Client) Verification of the Services Provided	
We hereby confirm, that the works executed by the company EPS, s.r.o. on the above described contract were conducted consistent with the approved project plan, in required quality, and according to the project contract and the contracted parameters.	
In Uherské Hradiště 8.2.2011	Bohumil Píštěk, CEO

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EPS biotechnology, s. r. o.
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Project Title	Revitalization of the „Spaliště“ („Incinerator“) Site, Cadastre Staré Město u Uherského Hradiště
Timeframe	01/2015 – 08/2015
Project General Investor	EU – Operational Program Environment
Client	REC Group s.r.o. (funding applicant, funding recipient)
Contact Person, Phone Number	Radomír Bureš, +420 777 704 301
Total Volume of Work (USD)	\$ 1,269,290.00
Activities Executed by the EPS, s.r.o.	<p>Major pollutants at the site of question were PCB, toxic metals, non-polar extractable substances (C₁₀-C₄₀), PAH, and BTEX.</p> <p>The objective was to remove the old ecological burden caused by infilling of former oxbow lake (1.5 km southwest from Staré Město) by municipal and industrial waste during the 2nd half of 20th century.</p> <p>The following activities were conducted:</p> <p>Bedrock exploration update, remediation project development, installation of subsurface isolation wall (length = 60 m, depth = 11 m) for Morava River dam protection, selective excavation of soils contaminated with PCB and highly limit-exceeding toxic metal concentrations (828 metric tons of hazardous wastes disposed by incineration), excavation of waste remnants and contaminated soils (12,254 metric tons of hazardous wastes, disposed at biodegradation field), construction-remediation groundwater pumping and its treatment at remediation unit (4,620 m³), remediation monitoring, infilling of excavated pit, risk analysis development, work evaluation, and final report composition.</p> <p>Pollutant Concentration Range:</p> <ul style="list-style-type: none"> • Initial: C₁₀-C₄₀ = 5,000 – 10,000 mg/kg (dry weight), C₁₀-C₄₀ = 5 mg/l • Final: C₁₀-C₄₀ < 300 mg/kg (dry weight), C₁₀-C₄₀ < 0,75 mg/l

Photodocumentation



The work was executed consistent with the approved project plan, in required quality, and according to the project contract and the contracted parameters.

Investor / Client / Supervisor confirmation of the finished work:

In Staré Město, on 5th October 2015



OPERAČNÍ PROGRAM
 ŽIVOTNÍ PROSTŘEDÍ



EVROPSKÁ UNIE
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Pro vodu,
 vzduch a přírodu

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EPS biotechnology, s. r. o.
 V Pastouškách 205, 686 04 Kunovice
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Project Title	Remediation of the Bedrock and Groundwater of Contaminant Plume No. 11 Using the ISCO Technology.
Timeframe	2015 – 2016
Project General Investor	The Ministry of Finance of the Czech Republic
Client	AQUTEST, a.s., Geologická 4, 152 00 Praha 5, IČ: 447 94 843
Contact Person, Phone Number	Mgr. Richard Hampl, tel. +420 739 243 065
Total Volume of Work (USD)	2015: \$67,087.00 2016: \$461,134.00
Activities Executed by the EPS, s.r.o.	Remediation and intensification works: construction of injection-well network, reagent application into the aquifer, monitoring of the oxidation reaction course and pollutant (non-polar extractable substances, oil hydrocarbons, BTEX, phenols, indene) degradation, data processing, evaluation, and reporting).
Detailed Description of the Work in Question	Construction of the application-monitoring probe network (100 pcs), mobile oxidant distribution network and piping, and work-safety technology. Injection of oxidants (modified Fenton's reagent and activated sodium persulfate). Monitoring of the contamination levels, redox reaction course, oil hydrocarbon free phase presence, and the evolution of risk factors (temperature, pH, groundwater table level, and generation of VOC). Data processing, evaluation, and reporting. <ul style="list-style-type: none"> • Pollutant Concentration Range: <ul style="list-style-type: none"> ○ Initial: C₁₀-C₄₀ > 130,000 µg/l, BTEX > 17,340 µg/l ○ Final: C₁₀-C₄₀ < 2,900 µg/l, BTEX < 890 µg/lg

Photodocumentation



Drilled core



Application-monitoring probe construction



Groundwater sampling and monitoring

The work was executed consistent with the approved project plan, in required quality, and according to the project contract and the contracted parameters.

Investor / Client / Supervisor confirmation of the finished work:

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 V Pastouškách 205, 686 04 Kunovice
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Project Title	Remediation of Industrial Landfill in Cadastre Bukovany
Timeframe	2012 - 2013
Client	Bukovany Municipality (EU Operational Program Environment funding recipient – primary area of support 4.2 – Removing old ecological burdens)
Contact Person, Phone Number	Miroslav Šiška, mayor, tel: +420 317 701 236
Total Volume of Work (USD)	\$ 1,514,290.00 VAT excluded
Detailed Description of the Work in Question	<p>Remediation of the galvanic sludge landfill, elimination of the cyanide-contamination within the aquifer and the vadose zone, realization of remedial efforts including the following steps:</p> <ul style="list-style-type: none"> - Landfill site exploration update - Geophysical measurements, exploration - Groundwater quality monitoring system development and construction - Remediation well system and utility network construction - Gradual decomposition of the landfill body, disposal of wastes contaminated with toxic metals (Cd, Cr, Ni) - Controlled excavation of unsaturated zone parts contaminated by toxic metals - Construction of drainage system within the former landfill body - Groundwater pump-and-treat realization - Operational application of ISCO (Fenton's reagent and activated persulfate) - Infilling of excavated pit and land recultivation - Running and final monitoring of the saturated and unsaturated zone remediation - Updated risk analysis composition - Control and assessment of work <p>Pollutant Concentration Range:</p> <ul style="list-style-type: none"> • Initial: CN⁻ = 8,82 mg/l, Cd = 2,200 mg/kg, Cr = 42,000 mg/kg, Ni = 30,000 mg/kg, CHC = n × 10⁴ mg/l • Final: CN⁻ = 0,78 mg/l, Cd = 1,91 mg/kg, Cr = 9,41 mg/kg, Ni = 2,93 mg/kg, CHC = 0,051 mg/l

Photodocumentation



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 V Pastouškách 205, 686 04 Kunovice
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Project Title	Remediation of Former Galvanic Sludge Disposal Site in Hluboče (cadastre Bylnice)
Timeframe	2013 - 2015
Project General Investor	State environmental fund of the Czech Republic, Operational Program Environment, Priority Axis 4.2. and ASIP Environmental Property s.r.o.
Client	Vodohospodářské stavby (Water management structures) Javorník-CZ s.r.o.
Contact Person, Phone number	Ing. Jan Čech, +420 518 322 685
Total Volume of Work by Year (USD)	2013: \$55,702.18 VAT excluded 2014: \$672,503.34 VAT excluded 2015: \$30,593.67 VAT excluded
Detailed Description of the Work in Question	<p>Remediation of former galvanic sludge disposal site located immediately adjacent to the 1st zone of Bílé Karpaty landscape park. Elimination of the saturated and unsaturated zone contamination by toxic metals and chlorinated hydrocarbons; realization of corrective measures.</p> <p>Major remediation objectives:</p> <ol style="list-style-type: none"> 1. To remove the water defective condition, 2. to prevent further aerial and spatial spread of the contamination beyond the defined limits, 3. to preclude unsaturated zone washing by the percolating meteoric and surface waters. <ul style="list-style-type: none"> - Completion of the waste disposal site exploration - Geophysical prospecting and exploration - Construction of groundwater quality monitoring system - Gradual disassembly of the landfill body, disposal and incineration of wastes contaminated with toxic metals (Ni, Cd, Cr, As) - Controlled excavation of soils contaminated with toxic metals - Construction of drainage system inside the former landfill body - Construction of remediation well system and installation of treatment technology - Infilling of excavated pits and area recultivation - Pump-and-treat remediation of the groundwater - Full scale ISCO application (modified Fenton's reagent) - Saturated and unsaturated zone remediation monitoring - Operation monitoring, evaluation, and control <p>Pollutant Concentration Range:</p> <ul style="list-style-type: none"> • Initial: CHC = $n \times 10^4$ mg/kg (soil dry weight), CHC = $n \times 10^4$ µg/l (groundwater) • Final: CHC < 500 µg/l (groundwater)

Photodocumentation



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Project Title	Old Ecological Burden Removal within the Grounds of Former LOANA Company
Timeframe	07/2011
Project General Investor	František Tomaník, UID: CZ10589350, tel.+420 606 723 430
Client	MEGA a.s., UID: CZ44567146
Contact Person, Phone Number	RNDr. Jaroslav Hrabal, tel. +420 487 888 607 Ing. Stanislav Kratochvíl, tel. +420 487 888 607
Total Volume of Work (USD)	\$514,690.00 VAT excluded
Activities Executed by the EPS, s.r.o.	Remediation/Construction Works on Removing an Old Ecological Burden.
Detailed Description of the Work in Question	Excavation works, collection and disposal of soils contaminated by chlorinated hydrocarbons, delivery of inert material for pit infilling, infilling and compaction of excavated pits, restoration of paved surfaces, remediation monitoring, biodegradation of contaminated soils (catalogue waste no. 170503) at the decontamination field in the total volume of 4,158.31 tons. Pollutant Concentration Range: <ul style="list-style-type: none"> • Initial: CHC > 10⁴ mg/kg (dry weight), CHC > 5000 µg/l • Final: CHC < 1 mg/kg (dry weight), CHC < 400 µg/l

Photodocumentation



Sample collection during excavation



Excavation remediation



Surface renewal

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