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Annex 1.

Contact details of authors and contributors

In the preparation of this book several organizations from Russian Federation and Ukraine submitted the historical data and materials, the results of current scientific and monitoring expedition investigations, satellite images and governmental information on the activities and actions followed the major accidental oil spill in the Black Sea area in November 2007. The most valuable information was received from the organization and scientists such as:

№	Name of organization and address	Abbreviation	Name	E-mail	Occupation	Specialization*
			RUSSIA			
1	Special Center on Hydrometeorology and Environmental Monitoring of the Black and Azov Seas of North-Caucasian Regional Division of Roshydromet; Sevastopolskaya 25, 354057, Sochi, RUSSIA, www. pogodasochi.ru	SCHME BAS	Yurenko Yury	bereg@sochi. com	Head of marine Department	Hydrology, meteorology
2.1	State Oceanographic Institute of Roshydromet, Kropotkinsky Lane 6, 119034 Moscow, RUSSIA, www. oceanography.ru	SOI	Korshenko Alexander	korshenko@mail.ru	Head of Lab.	Pollution, Monitoring
2.2		SOI	Panova Anastasia	panova_anastasia@mail.ru	Scientist	GIS technology
2.3		SOI	Krutov Anatoly	krutov@bk.ru	Senior scientist	Pollution, applied oceanography
2.4		SOI	Ermakov Vitaly	ermavit@mail.ru	Senior scientist	Mapping, Data Base management
2.5		SOI	Ivanov Dmitry	dr. ivanov56@mail.ru	Scientist	Pollution
2.6		SOI	Kochetkov Vladymyr	ko4vv@hotbox.ru	Scientist	Mapping
2.7		SOI	Postnov Alexander	a_postnov@mail.ru	Deputy Director	Meteorology, Hydrology, Pollution, Socio-economics
2.8		SOI	Ovsienko Sergei	snovs@orc.ru	Head of Lab.	Mathematical modelling in geophysical application, oil spill modeling
2.9		SOI	Zatsepa Sergei	zatsepa@gmail.com	Senior scientist	Mathematical modeling in geophysical application, oil spill modeling
2.10		SOI	Ivchenko Alexander	alivch@orc.ru	Senior scientist	Mathematical modeling in geophysical application, oil spill modeling
2.11		SOI	Kabatchenko Ilya	wavelab1@yandex.ru	Head of Lab.	Wind waves, modeling and climate
2.12		SOI	Filippov Yury	ugfil@mail.ru	Senior scientist	Water dynamics, currents
	Southern Branch of Shirshov's Institute Oceanology RAS, 353467 Gelendzhik, Krasnodar Region, RUSSIA	SB SIO RAS	Chasovnikov Valery	chasovn@mail.ru	Head of Lab.	Standard Hydrochemistry, Pollution
4.1	FGU CherAzTekhMordirektsiya of Rosprirodnadzor of Ministry of Natural Resources and Ecology, Rubatskaya st. 1, village Alexino, 353925 Novorossiysk, Krasnodar region, RUSSIA, www. bsatmd.ru, info@bsatmd.ru	CherAz-TekhMordirektsiya (ChAD)	Nasurov Akram	bsadirectorate@mail.ru	Deputy Director	Management of Pollution Monitoring

4.2	FGU CherAzTekhMordirektsiya of Rosprirodnadzor of Ministry of Natural Resources and Ecology, Rubatskaya st. 1, village Alexino, 353925 Novorossiysk, Krasnodar region, RUSSIA, www. bsatmd.ru, info@bsatmd.ru	CherAz-TekhMordi-rektsiya (ChAD)	Gogitidze Timur	bsadirectorate@ mail.ru	Deputy Head of Department	Ecology, Chemistry Pollution
5.1	Space Research Institute of Russian Academy of Sciences,, Profsoyuznaya str. 84/32, 117997 Moscow, RUSSIA, www. iki. rssi.ru	IKI RAS	Lavrova Olga	olavrova@iki. rssi.ru	Head of Labora-tory	Remote sensing, Satellite images
5.2		IKI RAS	Bocharova Tatiana	tabo@iki. rssi.ru	Scientist	Remote sensing, Satellite images
5.3		IKI RAS	Mityagina Marina	mityag@iki. rssi.ru	Senior scientist	Remote sensing, Satellite images
5.4.		IKI RAS	Strochkov A.	astro@mail.ru	Senior Scientist	Remote sensing, Satellite images
6	Krasnodar Regional Center on Hydrometeorology and Environ-mental Monitoring of Roshydromet, Rashpilevskaya 36, 350000 Krasnodar, RUSSIA, www. kcgmc.ru	KRCGMS	Tkachenko Yury	yuyut@kubanmeteo.ru	Head of the Center	Physical oceanography
7.1	Estuarine Hydrometeorological Station «Kuban», Rosa Luxem-burg 60, 353500 Temruk, Krasnodar Region, RUSSIA	EHMSK	Ivanov Alexey	temrmeteo@kuban-meteo.ru	Director	Physical oceanography
7.2		EHMSK	Derbicheva Tamara	temrhimlab@kuban-meteo.ru	Head of Lab.	Chemistry, pollution, monitoring
8	Institute of Geography RAS, Moscow, 117019, Staromonetny Lane 29	IG RAS	Fashchuk Dmitry	fashchuk@mail.ru	Major scientist	Marine Ecology, anthropogenic influence
9.1	Shirshov's Institute Oceanology RAS, Nakhimovsky prospekt 36, 117997 Moscow, RUSSIA, www. ocean.ru	SIO RAS	Flint Mikhail	M_FLINT@ORC.ru	Deputy Director	Zooplankton
9.2		SIO RAS	Kucheruk Nikita	nvkucheruk@mail.ru	Head of Lab.	Zoobenthos
9.3		SIO RAS	Belyaev Nikolay	ratnick@mail.ru	Scientist	Chemistry, pollution
9.4		SIO RAS	Shapovalova Elisaveta	esshap@gmail.com	Junior Scientist	Chemistry, pollution
9.5		SIO RAS	Kolyuchkina Galina	galka. sio@gmail.com	Scientist	Zoobenthos, biomarkers
9.6		SIO RAS	Simakova Uljana	yankazeisig@ gmail.com	Junior Scientist	Macrophytobenthos
9.7		SIO RAS	Spiridonov Vasiliy	VSpiridonov@wwf.ru	Senior scientist	Zoobenthos
9.8		SIO RAS	Peresypkin, Valeriy	peresypkin@ocean.ru	Head of Lab.	Chemistry, pollution
9.9		SIO RAS	Khlebopashev Pavel	pvkh1999@mail.ru	Junior Scientist	Chemistry
9.10		SIO RAS	Sapozhnikov F. V.	gyrosigma@fromru. com	Scientist	Benthos
10	Russian Federal Research Institute on Fisheries and Ocean-ography (VNIRO), V. Krasnoselskay 17, 107140 Moscow, www. vniro.ru	VNIRO	Sapozhnikov Victor	marecol@vniro.ru	Head of Lab., prof.	Hydrochemistry
11	White Sea Biological Station Lomonosov Moscow State Univer-sity, a/ya 20, Glavpochtamt, Kandalakshsky region, Murmans-kaya oblast, 184042, RUSSIA	WSBS MSU	Makarov A.V.	amakarov@wwf.ru	Engineer	Benthos
12	Center of Environmental Chemistry, Scientific and Industrial Unit "Typhoon", Pobeda prospect 4, Obninsk, Kaluga region, RUSSIA	Typhoon	Kochetkov Alexander	akochet@mail.ru	Head of Lab.	Analytical chemistry

UKRAINE						
1.1	Marine Branch of Ukrainian Hydrometeorological Institute, Sovietskaya street 61, 99011 Sevastopol, UKRAINE, www.uhmi.org.ua/sub/sevastopol/	MB UHMI	Ilyin Yuriy	mb_uhmi@stel.sebastopol.ua	Director	Regional oceanography
1.2		MB UHMI	Shibaeva Svetlana		Scientist	Marine chemistry
1.3		MB UHMI	Fomin Volodymir		Head of Laboratory	Marine dynamics modelling
1.4		MB UHMI	Diakov Nikolay		Scientist	Marine hydro-meteorology
1.5		MB UHMI	Malchenko Yuriy		Scientist	Marine chemistry
1.6		MB UHMI	Repetin Leonid		Senior Scientist	Marine hydro-meteorology
2.1	Marine Hydrophysical Institute of NASU, Kapitanskaya street 2, 99011 Sevastopol, UKRAINE, www.mhi.iuf.net	MHI	Ivanov Vitaliy	vaivanov@alpha.mhi.iuf.net	Director	Marine physics
2.2		MHI	Khmara Tatiana		Scientist	Marine physics
2.3		MHI	Goriachkin Yuriy		Senior Scientist	Regional oceanography
2.4		MHI	Lemeshko Yevgeniy		Senior Scientist	Marine physics
2.5		MHI	Sovga Olena		Scientific Secretary	Marine chemistry
2.6		MHI	Ovsianiy Yevgeniy		Scientist	Marine chemistry
3.1	Institute of Geological Sciences of NASU, O.Gonchara street 55-b, 01054 Kiev, UKRAINE, www.igs-nas.org.ua	IGS	Gozhik Petro	info@igs-nas.com.ua	Director	General and marine geology
3.2		IGS	Bagriy Igor		Deputy director	General and marine geology
3.3		IGS	Ivanova Anna		Scientist	Geography
4.1	Ukrainian Scientific Center of Ecology of the Sea, Ministry of the Environment Protection, Odessa, French blvd., 89	UkrSCES	Komorin Viktor	vkomorin@mail.ru	Deputy Director	Hydrology
4.2		UkrSCES	Denga Yuriy	lawmd@te.net.ua	Head of Lab.	Pollution
4.3		UkrSCES	Zarubin Yuriy	lawmd@te.net.ua	Head of Lab.	Pollution, TPHs
4.4		UkrSCES	Tsymbaliuk Kirilo	lawmd@te.net.ua	Scientist	PAHs
4.5		UkrSCES	Khapchenko Ludmila	lawmd@te.net.ua	Scientist	Trace metals
4.6		UkrSCES	Vostrikova Taisa	lawmd@te.net.ua	Scientist	OCPs, PCBs
4.7		UkrSCES	Belozer Vasiliy	lawmd@te.net.ua	Scientist	TOC
4.8		UkrSCES	Zolotarev Georgiy	lawmd@te.net.ua	Scientist	Granulometry
5.1	Southern Scientific Research Institute of Marine Fisheries and Oceanography; Sverdlov Street 2, 98300 Kerch, AR Crimea UKRAINE, www.yugniro.crimea.com	YugNIRO	Gubanov Evgeny	yugniro@kerch.com.ua	Director	Ichtyogy, fisheries management
5.2		YugNIRO	Trotsenko Borys	island@crimea.com	Deputy Director on Science	Regional&Fisheries oceanography, DB maintaining, GIS
5.3		YugNIRO	Panov Borys	yugniro@kerch.com.ua	Fisheries Oceanology Department, Head	Fisheries oceanography, forecasting, GIS

5.4		YugNIRO	Petrenko Oleg	yugniro@kerch.com.ua	Marine Ecosystem Protection Lab., Head	Chemistry, pollution, environmental impacts
5.5		YugNIRO	Zhugailo Svetlana	yugniro@kerch.com.ua	Senior Scientist	Chemistry, pollution, environmental impacts
5.6		YugNIRO	Smirnov Sergey	drssergius@mail.ru.	Fisheries Sector Informational Support, Head	GIS, Data Visualization, Data Formats Conversions
5.7		YugNIRO	Borovskaya Raisa	yugniro@kerch.com.ua	Distant Monitoring Sector, Head	Remote sensing, Satellite images interpretation, forecasting
6.1	Institute of Biology of the Southern Seas of NASU, Nakhimova av. 2, 99011 Sevastopol, AR Crimea, UKRAINE, www.ibss.org.ua	IBSS	Eremeev Valeriy	director@ibss.iuf.net	Director	Hydrobiology, Pollution, Socio-economics
6.2		IBSS	Boltachev Alexander	a_boltachev@mail.ru	Deputy Director	Hydrobiology, Ichthyology, Socio-economics
6.3		IBSS	Mironov Oleg	msh@ibss.iuf.net	Head of Department	Oil pollution, environmental impacts, bacteriology
6.4		IBSS	Gaevskaya Albina	a.gaevskaya@ibss.org.ua	Head of Department	Parasitology
6.5		IBSS	Alyomov Sergey	msh@ibss.iuf.net	Senior Scientist	Zoobenthos
6.6		IBSS	Zagorodnyaya Yuliya	Artamant@yandex.ru	Senior Scientist	Marine zooplankton
6.7		IBSS	Klimova Tatyana	msh@ibss.iuf.net	Scientist	Ichthyoplankton
6.8		IBSS	Bryantseva Yuliya	brekall5@gmail.com	Scientist	Phytoplankton
6.9		IBSS	Mukhanov Vladimir	v.s.mukhanov@gmail.com	Scientist	Microbiology
6.10		IBSS	Rylkova Olga	olga.rylkova@gmail.com	Scientist	Microbiology
6.11		IBSS	Karpova Evgeniya	a_boltachev@mail.ru	Leading Engineer	Ichthyology
6.12		IBSS	Burdiyan Natalia	msh@ibss.iuf.net	Leading Engineer	Bacteriology
6.13		IBSS	Stokozov Nikolai	stokozov@mail.ru	Head of Laboratory	Physical oceanography, radionuclides
6.14		IBSS	Malakhova Ludmila	malakh2003@list.ru	Senior Scientist	Organochlorine compounds and polychlorinated biphenyls
6.15		IBSS	Kostova Svetlana	sk_kostova@mail.ru	Senior Scientist	Trace metals (mercury)
6.16		IBSS	Mirzoeva Nataliya	natmirz@mail.ru	Senior Scientist	Anthropogenic long–lived radionuclides

Annex 2

Inventory of cruises and field investigations

Table A2. List of cruises and field investigations in relation with the accidental oil spill in November 2007 in the Kerch Strait.

N	№	Project	Area**	Institution, Ministry, Place	Substrate	Parameters	Period	Number of samples/stations	Data Owner
					RUSSIA				
1.1	1	Monitoring of Russian part of the Black and Azov Seas	Coastal waters KS, BS, AZ	KUS (Kuban Estuarine Station), Roshydromet, town Temruk	Water	TPHs, Temperature	13.11.2007–03.06.2009	617/99	SOI, Moscow, www.oceanography.ru
1.2	2*	Monitoring of Russian part (Abrau Durso-Panagia-Kuban) of the Black and Azov Seas	Coastal waters KS, BS, AZ	Special Center on Hydrometeorology and Environmental Monitoring of the Black and Azov Seas (SCHEM BAS), town Sochi	Water	TPHs, Hydrology, Hydrochemistry, Pollution	28.08.2003–15.07.2005	79	SOI, Moscow, www.oceanography.ru
1.3	3*	Monitoring of Russian part (Abrau Durso-Panagia-Kuban) of the Black and Azov Seas	Coastal waters KS, BS, AZ	Special Center on Hydrometeorology and Environmental Monitoring of the Black and Azov Seas (SCHEM BAS), town Sochi	Bottom Sediments	TPHs, Pollution	28.08.2003–15.10.2004	3 stations	SOI, Moscow, www.oceanography.ru
2.1	4	Consequences of accidental oil spill	KS, BS, AZ	CherAzTehMorDirektsia, Rosprirodnadzor, MNR, city Novorossiysk	Water, Bottom sediments	TPHs, Hydrology, Hydrochemistry, Pollution	24.07.2008–31.08.2008	78/43	CherAzTehMorDirektsia
2.2	5	Consequences of accidental oil spill	KS, BS, AZ	CherAzTehMorDirektsia, Rosprirodnadzor, MNR, city Novorossiysk	Water, Bottom sediments	TPHs, Hydrology, Hydrochemistry, Pollution	10.2008	88/75	CherAzTehMor-Direktsia
2.3	6	Consequences of accidental oil spill	KS, BS, AZ	CherAzTehMorDirektsia, Rosprirodnadzor, MNR, city Novorossiysk	Water, Bottom sediments	TPHs, Hydrology, Hydrochemistry, Pollution	11.2008	64/36	CherAzTehMor-Direktsia
3.1	7	Complex marine expedition	KS	VNIRO, Moscow	Water, Bottom sediments	Hydrology, Hydrochemistry, Pollution by Petroleum Hydrocarbons	July 2008	38	VNIRO, Moscow, www.vniro.ru
4.1	8	Complex expedition on the Taman Peninsula	TP	Southern Scientific Center RAS, Rostov-on-Don	Water, Bottom sediments, Plankton, Benthos	Salinity, pH surface, pH bottom, Oxygen concentration in surface layer (mg/l), Oxygen concentration in the bottom surface (mg/l), Pressure (kPa), CTD profiling, TPHs surface, TPHs bottom, Benthos, Zooplankton, Microzooplankton surface, Microzooplankton bottom, Phytoplankton surface, Phytoplankton bottom, Bacterioplankton surface, Bacterioplankton bottom	16–18 November 2007	27 stations	Southern Scientific Center RAS, www. ssc-ras.ru
4.2	9	Complex expedition on the Taman Peninsula	TP	Southern Scientific Center RAS, Rostov-on-Don	Water, Bottom sediments, Plankton, Benthos	CTD profiling, Hydrochemistry, Heavy metals, TPHs surface, Benthos, Phytoplankton, Microplankton, Zooplankton	11–13 December 2007	29 stations	Southern Scientific Center RAS, www. ssc-ras.ru

4.3	10	Diesel Icebreaker «Captain Demidov»	KS	Southern Scientific Center RAS, Rostov-on-Don	Water, Plankton	Hydrochemistry, Phytoplankton, Bacterioplankton, Mesozooplankton	3 February 2008	1 station	Southern Scientific Center RAS, www. ssc-ras.ru
4.4	11	Complex expedition on the Taman Peninsula	TP	Southern Scientific Center RAS, Rostov-on-Don	Water, Bottom sediments, Plankton, Benthos	Hydrochemistry, TPHs surface, TPHs bottom, Zoobenthos, Picoplankton, Microplankton, Phytoplankton, Mesozooplankton	18–21 February 2008	24 stations	Southern Scientific Center RAS, www. ssc-ras.ru
4.5	12	Complex expedition on the Taman Peninsula	KS, TP	Southern Scientific Center RAS, Rostov-on-Don	Water, Bottom sediments, Plankton, Benthos	CTD profiling, Hydrochemistry, TPHs surface, TPHs bottom, Microplankton, Phytoplankton, Mesozooplankton, Zoobenthos,	22–26 April 2008	29 stations	Southern Scientific Center RAS, www. ssc-ras.ru
4.6	13	Complex expedition on the Taman Peninsula	TP	Southern Scientific Center RAS, Rostov-on-Don	Water, Bottom sediments, Plankton, Benthos	Hydrochemistry, TPHs, Heavy metals, Bacterioplankton, Phytoplankton, Zooplankton, Benthos, Bottom sediments	21–25 August 2008	37 stations	Southern Scientific Center RAS, www. ssc-ras.ru
4.7	14	Complex expedition onboard RV «Deneb»	KS	Southern Scientific Center RAS, Rostov-on-Don	Water, Plankton, Benthos	CTD profiling, pH, Oxygen, Nutrients, Phytoplankton, Microzooplankton, Mesozooplankton, Picoplankton, Benthos	13–25 April 2008	10 stations	Southern Scientific Center RAS, www. ssc-ras.ru
4.8	15	Complex expedition onboard RV «Deneb»	KS	Southern Scientific Center RAS, Rostov-on-Don	Water, Plankton	CTD profiling, pH, Oxygen, Nutrients, Phytoplankton, Microzooplankton, Mesozooplankton, Mycoplankton, Picoplankton, Ichthyoplankton	18–24 June 2008	12 stations	Southern Scientific Center RAS, www. ssc-ras.ru
4.9	16	Complex expedition onboard RV «Deneb»	KS	Southern Scientific Center RAS, Rostov-on-Don	Water, Plankton, Benthos	CTD profiling, pH, Oxygen, Nutrients, Phytoplankton, Microzooplankton, Mesozooplankton, Jelly plankton, Picoplankton, Dissolved organic matter, Suspended organic matter, Chlorophyll, Lithology, Benthos	06–16 October 2008	8 stations	Southern Scientific Center RAS, www. ssc-ras.ru
5.1	17	Visual observation of the coast	Crimea	IG RAS	Visual	Pollution by Petroleum Hydrocarbons	12–14 March 2008	—	Institute of Geography RAS
5.2	18	Visual observation of the coast	Crimea	IG RAS	Bottom sediments, Visual	Bottom sediments and zoobenthos pollution by Petroleum Hydrocarbons, Visual observation	13–25 August 2008	41 stations	Institute of Geography RAS
6.1	19	Complex expedition, rubber boat	CH, AZ, DG, TB	SIO RAS	Bottom sediments, Visual	Bottom sediments and macrozoobenthos pollution, visual investigations zoobenthos and macrophytes, salinity, water temperature	26.02–12.032008	39 stations	SIO RAS & WWF
6.2	20	Complex expedition, rubber boat	CH, AZ, DG, TB	SIO RAS	Water, Bottom sediments, Visual	Water and Bottom sediments pollution, Visual observation, water temperature	16–31.07.2008	39 stations	SIO RAS
6.3	21	Complex expedition, rubber boat	CH, AZ, DG, TB	SIO RAS	Bottom sediments, Visual	Water and Bottom sediments pollution, Visual observation, water temperature	1–15.07.2009	39 stations	SIO RAS

UKRAINE									
1.1	22	RV «Experiment»	KS	MHI, Black Sea Branch MSU	Water, Bottom sediments,	CTD profiling, Currents, TPHs, TM in water and bottom sediments (Fe_2O_3; TiO_2; MnO; Cr; Co; Cu; Ni; Zn; Pb; Sr; As; V, Cd)	08–12 December 2007	5 stations	MHI, www. mhi. iuf. net
1.2	23	RV «YKR 10–20»	TI	MHI, Black Sea Branch MSU, MB-UHMI	Water, Bottom sediments	CTD profiling, Suspended Solids, Nutrients, Detergents, Phenols, TPHs	28–29 February 2008		MHI, www. mhi. iuf. net
1.3	24	RV «YKR 10–20»	TI	MHI, IGS NASU, Black Sea Branch MSU	Water, Bottom sediments	CTD profiling, Geo-Morphology, Pesticides in water, TM (Fe_2O_3, TiO_2, MnO, Cr, Co, Cu, Ni, Zn, Sr, V) and TPHs in bottom sediments	14–15 March 2008		MHI, www. mhi. iuf. net
1.4	25	RV «Experiment»	KS	MHI	Water	CTD profiling, Suspended Solids	24 March 2008		MHI, www.mhi.iuf.net
1.5	26	RV «YKR 10-20»	TI	MHI	Water	CTD profiling, Suspended Solids	08-09 April 2008		MHI, www.mhi.iuf.net
1.6	27	RV «YKR 10-20»	KS	MHI, MB-UHMI	Water	CTD profiling, Suspended Solids, Currents (ADCP), pH, Oxygen, Nutrients, Detergents, TPHs	21-25 April 2008		MHI, www.mhi.iuf.net
1.7	28	RV «YKR 10-20»	TI	MHI, MB-UHMI	Water	CTD profiling, pH, Oxygen, Nutrients, Detergents, TPHs	11-12 June 2008		MHI, www.mhi.iuf.net
1.8	29	RV «YKR 10-20»	KS	MHI	Water	CTD profiling	22-24 July 2008		MHI, www.mhi.iuf.net
1.9	30	RV «YKR 10-20»	TI	MHI	Water	CTD profiling, Geo-Morphology,	08 August 2008		MHI, www.mhi.iuf.net
1.10	31	RV «YKR 10-20»	TI, KS	MHI	Water	CTD profiling, Suspended Solids, Currents (ADCP)	01-05 September 2008		MHI, www.mhi.iuf.net
1.11	32	RV «YKR 10»	TI	MHI	Water	CTD profiling	27 November 2008		MHI, www.mhi.iuf.net
1.12	33	RV «YKR 10»	TI	MHI	Water	CTD profiling, Suspended Solids, Currents (ADCP)	9-13 December 2008		MHI, www.mhi.iuf.net
1.13	34	RV «YKR 10»	TI	MHI	Water	CTD profiling	15 April 2009		MHI, www.mhi.iuf.net
1.14	35	RV «YKR 10»	TI, KS	MHI	Water	CTD profiling, Suspended Solids, Currents (ADCP)	25-26 June 2009		MHI, www.mhi.iuf.net
1.15	36	RV «YKR 10-20»	KS, TI	MHI	Water	CTD profiling, Suspended Solids	12 November 2009		MHI, www.mhi.iuf.net
1.16	37	RV «YKR 10-20»	KS, TI	MHI, MB-UHMI	Water	CTD profiling, Suspended Solids, pH, Oxygen, Nutrients, Detergents, TPHs	4-5 December 2009	18 stations	MHI, MB-UHMI, www. mhi.iuf.net
2.1	38	30th RV «Vladymyr Parshin»	AZ, KS	UkrSCES	Water, Bottom sediments	CTD profiling, Secci disk, pH, Oxygen, Nutrients, BOD_5, Organic carbon, S, Detergents, TM, Aliphatic and aromatic PHs, PAHs, Pesticides	30 June to 10 July 2009	14 stations (with NW Shelf total 23)	UkrSCES

2.2	39	31th RV «Vladymyr Parshin»	AZ, KS	UkrSCES	Water, Bottom sediments	CTD profiling, Secci disk, ADCP, pH, Oxygen, Nutrients, BOD5, Organic carbon, S, Detergents, TM, Aliphatic and aromatic PHs, PAHs, Pesticides	4-15 December 2009	85 stations (water), 32 (bottom sediments)	UkrSCES
3.1	40*	Ukrainian monitoring programme	KS	MB-UHMI	Water	Pollution by Petroleum Hydrocarbons	1981-2007	2075 stations	MB-UHMI
4.1	41*	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, Nutrients, SS	26.02.2002	27 (Water), 32 (BS)	YugNIRO
4.2	42*	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, Nutrients	29.11.2002	30 (Water), 16 (BS)	YugNIRO
4.3	43*	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, Nutrients, SS, Plankton, Benthos	24.05.2003	30 (Water), 30 (BS)	YugNIRO
4.4	44*	YugNIRO	TI	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, ChH, TM, SS, Plankton, Benthos	22.11.2003	9 (Water), 9 (BS)	YugNIRO
4.5	45*	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, SH, Nutrients, SS, Fe, Plankton, Benthos	22.10.2005	30 (Water), 30 (BS)	YugNIRO
4.6	46*	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, SH, Nutrients, SS, Fe, Plankton, Benthos	14.11.2005	29 (Water), 24 (BS)	YugNIRO
4.7	47*	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water	Water pollution by TPHs, SH, Nutrients, SS, Fe	06.09.2007	30 (Water), 30 (BS)	YugNIRO
4.8	48*	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, SH, Nutrients, SS, Fe, Plankton, Benthos	18.10.2007	12 (Water), 11 (BS)	YugNIRO
4.9	49	YugNIRO	KS (central part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, S, Plankton, Benthos	21.11.2007	6 (Water), 6 (BS)	YugNIRO
4.10	50	YugNIRO	KS (central& southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, SH, Nutrients, S, Benthos	07.02.2008	14 (Water), 14 (BS)	YugNIRO
4.11	51	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, TM, Plankton, Benthos	22.04.2008	12 (Water), 9 (BS)	YugNIRO
4.12	52	YugNIRO	KS (central& southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, SH, TM, SS, Plankton, Benthos	22.04.2008	16 (Water), 13 (BS)	YugNIRO

4.13	53	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs	05.2008	6 (Water), 3 (BS)	YugNIRO
4.14	54	YugNIRO	KS (central& southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, SH, SS, Fe, Plankton, Benthos	23.09.2008	14 (Water), 14 (BS)	YugNIRO
4.15	55	YugNIRO	KS (central& southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, SH, Fe	12.11.2008	16 (Water), 5 (BS)	YugNIRO
4.16	56	YugNIRO	KS (southern part)	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO), Kerch	Water, Bottom sediments	Water and BS pollution by TPHs, SH, SS	30.03.2009	18 (Water), 7 (BS)	YugNIRO
5.1	57*	IBSS	CC, AZ	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	Ichthyoplankton, ichtyofauna parasites fauna	25-27.06.2006	8 stations	IBSS NAS UKRAINE, www.ibss.org.ua
5.2	58*	IBSS	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	Parasites fauna of fish	May 2006	-	IBSS NAS UKRAINE, www.ibss.org.ua
5.3	59*	IBSS	CC, AZ	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	Phyto-, zoo-, ichthyoplankton, ichtyofauna, salinity, water temperature, oxygen	28.07-01.08.2007	8 stations	IBSS NAS UKRAINE, www.ibss.org.ua
5.4	60	IBSS	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	Ichthyoplankton, ichtyofauna parasites of fishes	28-29.11.2007	8 stations	IBSS NAS UKRAINE, www.ibss.org.ua
5.5	61	IBSS RV Experiment	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water, Bottom sediments	BS pollution by TPHs, bacteriobenthos, macrozoobenthos	08-12.12.2007	26 stations	IBSS NAS UKRAINE, www.ibss.org.ua
5.6	62	IBSS	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water, Bottom sediments	Water & BS chemistry and pollution, Chlorinated hydrocarbons, Mercury, Anthropogenic long–lived radionuclides, phytoplankton, bacterioplankton, virioplankton, picophytoplankton , zooplankton, macrozooplankton, ichthyoplankton, bacteriobenthos, macrozoobenthos	12-18.12.2007	13 stations	IBSS NAS UKRAINE, www.ibss.org.ua
5.7	63	IBSS RV Experiment	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Bottom sediments	BS pollution by TPHs, bacteriobenthos, macrozoobenthos	24.03.2008	29 stations	IBSS NAS UKRAINE, www.ibss.org.ua
5.8	64	IBSS	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	Parasites of fishes	May 2008	-	IBSS NAS UKRAINE, www.ibss.org.ua
5.9	65	IBSS	CC, AZ	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	Phyto-, zoo-, ichthyoplankton, ichtyofauna, salinity, water temperature, oxygen	08-15.07.2008	8 stations	IBSS NAS UKRAINE, www.ibss.org.ua
5.10	66	IBSS	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	Heterotrophic and photoautotrophic microplankton, zooplankton	08-09.2009	30 stations	IBSS NAS UKRAINE, www.ibss.org.ua
5.11	67	IBSS, Ministry Emergency Situations	KS, AZ	Institute Biology of the Southern Seas (IBSS), Sevastopol, MES, Kerch	Water	Phytoplankton, BS pollution by TPHs, macrozoobenthos	26-28.08.2009	22 stations	IBSS NAS UKRAINE, www.ibss.org.ua

5.12	68	IBSS	KS	Institute of Biology of the Southern Seas (IBSS), Sevastopol	Water	Bacterioplankton, picophyto-plankton, Phyto-, zoo-, ichthyoplankton,	08-09.2009	20 sta-tions	IBSS NAS UKRAINE, www.ibss.org.ua
5.13	69	RV «Naftogas-68»	BS, KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	zooplankton	25-26.09.2009	10 samples	IBSS NAS UKRAINE, www.ibss.org.ua
5.14	70	IBSS	CC, AZ	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water	Phyto-, zoo-, ichthyoplankton, ichtyofauna, parasites of fishes	07-12.08.2010	8 sta-tions	IBSS NAS UKRAINE, www.ibss.org.ua
6.1	71	UNEP Expedition	KS, AZ	UNEP	Bottom sediments	Bottom sediments pollution by Petroleum Hydrocarbons	15-25.07.2008	6 samples	UNEP

Parameters: BS — Bottom Sediments, TPHs — Total Petroleum Hydrocarbons, PHs — Petroleum Hydrocarbons, PAHs — Polycyclic Aromatic Hydrocarbons, ChH — Chlorinated Hydrocarbons (including pesticides and PCBs); TM — Trace Metals, Fe — Iron, S — Sulfur, SS — Suspended Solids, BOD_5 — Biochemical Oxygen Demands for 5 days, SH — Standard Hydrochemistry (including Nutrients),

Notes: * — field investigations completed before the accident in November 2007

** — Geographical area: KS — Kerch Strait, BS — Black Sea, AZ — Azov Sea, TP — Taman Peninsula, TI — Tuzla Island, CH — Chushka Spit, DG — Dinsky Bay, TB — Taman Bay, CC — Cazantip Cape.

Annex 3

Inventory of Data sets on the Kerch Strait accidental oil spill, 11 November 2007

Table A3. List of data sets collected in relation with the accidental oil spill in the Kerch Strait on 11 November 2007.

	Project	Area*	Institution	Substrate	Layer	Parameters	Period	Number samples/stations	Format	Owner
1.1 RU	Monitoring of Russian waters	Coastal waters KS, BS, AZ	EHMSK (Kuban Estuarine Station), town Temruk	Water	Surface, Water column	TPHs, Temperature	13.11.2007–03.06.2009	617	MS Excel	SOI, Moscow
1.2 RU	Monitoring of Russian part (Abrau Durso-Panagia-Kuban) of the Black and Azov Seas	Coastal waters KS, BS, AZ	Special Center on Hydrometeorology and Environmental Monitoring of the Black and Azov Seas (SCHEM BAS), town Sochi	Water	Surface, Water column	TPHs, Hydrology, Hydrochemistry, Pollution	28.08.2003–15.07.2005	79	MS Excel	SOI, Moscow
1.3 RU	Monitoring of Russian part (Abrau Durso-Panagia-Kuban) of the Black and Azov Seas	Coastal waters KS, BS, AZ	Special Center on Hydrometeorology and Environmental Monitoring of the Black and Azov Seas (SCHEM BAS), town Sochi	Bottom sediments	Bottom sediments	TPHs	06.08.2003–16.10.2004	8	MS Excel	SOI, Moscow
2.1 RU	Consequences of accidental oil spill	KS, BS, AZ	CherAzTehMorDirektsia, Rosprirodnadzor, MNR, city Novorossiysk	Water, Bottom sediments	Water column, Bottom sediments	TPHs, Hydrochemistry	24.07.2008–31.08.2008	121	MS Excel	CherAzTehMorDirektsia, Novorossiysk
2.2 RU	Consequences of accidental oil spill	KS, BS, AZ	CherAzTehMorDirektsia, Rosprirodnadzor, MNR, city Novorossiysk	Water, Bottom sediments	Water column, Bottom sediments	TPHs, Hydrochemistry	10.2008	163	MS Excel	CherAzTehMorDirektsia, Novorossiysk
2.3 RU	Consequences of accidental oil spill	KS, BS, AZ	CherAzTehMorDirektsia, Rosprirodnadzor, MNR, city Novorossiysk	Water, Bottom sediments	Water column, Bottom sediments	TPHs, Hydrochemistry	11.2008	100	MS Excel	CherAzTehMorDirektsia, Novorossiysk
3.1 UA	Hydrochemical surveys around Tuzla Island	KS, TI	MB UHMI, MHI, Sevastopol	Water	Surface	CTD profiling, SS, pH, Oxygen, Nutrients, Detergents, TPHs	29.02.2008; 24.04.2008; 11.06.2008; 04.12.2009	52 stations	MS Excel	MB UHMI
3.2 UA	Hydrological and chemical monitoring of the Kerch Strait on 4 standard stations	KS	Marine Hydromet Station Opasnoe	Water	Water column	Bottle water sampling (T, S, standard chemistry and pollution), currents	2003–2010, 10-daily or monthly repetition of works on 4 standard stations in the Northern narrowness of the Kerch Strait (with exception of ice presence times)	4 stations	MS Excell	MB UHMI

4.1 UA	Kerch Strait Monitoring- 2002, 2003, 2005, 2007, 2008, 2009, 2010	KS	Southern Scientific Research Institute of Marine Fisheries and Oceanography (YugNIRO) Kerch	Water, Bottom sediments	Water (surface& nearbottom layer), Bottom sediments	Water and BS pollution by TPHs, SH, TM, SS, Plankton, Benthos	26.06/29.11.2002, 24.05/22.11.2003, 22.05/14.11.2005, 06.09/18.10/21.11.2007, 07.02/22.04/25.05/23.09/12.11.2008, 30.03/25.06/18.09/.2009, 23.03/25.06/18.09/.2010	59/46, 60/16, 55/53, 12/35/18, 43/45/9/42/37, 42/55/42, 42	MS Excel	YugNIRO
5.1 UA	Consequences of accidental oil spill	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Bottom sediments	Bottom sediments	BS pollution by TPHs, Bacteriobenthos, Zoobenthos	08–12.12.2007; 24.03.2008; 26–28.08.2009	26; 29; 22	MS Excel	IBSS
5.2 UA	Monitoring of Cazantip Cape	CC, AZ	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water, Bottom sediments	Water (surface& nearbottom layer)	Phyto-, zoo-, ichthyoplankton, ichthyofauna, parazitofauna, hydrochemistry	25–27.06.2006; 28.07–01.08.2007; 08–15.07.2008; 07–12.08.2010	8 stations, 5000 samples of fishes	MS Excel	IBSS
5.3 UA	Kerch Strait Monitoring-	KS	Institute Biology of the Southern Seas (IBSS), Sevastopol	Water, Bottom sediments	Water (surface& nearbottom layer), Bottom sediments	Bacterio-, phyto-, zoo-, ichthyoplankton	28–29.11.2007; 12–18.12.2007; 26–28.08.2009; 08–09.2009; 25–26.09. 2009	8, 13, 30, 20, 10	MS Excel	IBSS

KS* — Kerch Strait, BS — Black Sea, AZ — Azov Sea, TI — Tuzla Island, SS — Suspended Solids, CC — Cazantip Cape

Annex 4

Oceanographical, hydrophysical, chemical and biological laboratories, participated in the Kerch accidental oil spill studies

№	Name of organization and address	Abbreviation	Laboratory	Head of Laboratory	E-mail	Specialization*
			RUSSIA			
1.1	Special Center on Hydrometeorology and Environmental Monitoring of the Black and Azov Seas of North-Caucasian Regional Division of Roshydromet, Sochi, Sevastopolskaya 25, 354057, Sochi, RUSSIA, www.pogodasochi.ru	SCHEM BAS	Marine Department	Yurenko Yury	bereg@sochi.com	Hydrology, Meteorology, Applied Oceanography
1.2		SCHEM BAS	Complex Labortatory of Environmental Monitoring (CLEM)	Ljubimtsev Andrey	pogoda@sochi.com	Standard Hydrochemistry, Water Pollution
2.1	State Oceanographic Institute of Roshydromet, Kropotkinsky Lane 6, 119034 Moscow, RUSSIA, www.oceanography.ru	SOI	Marine Pollution Monitoring Lab. (LMZ)	Korshenko Alexander	korshenko@mail.ru	Pollution, Monitoring
2.2		SOI	Modeling of marine water state Lab.	Ovsienko Sergei	s.ovsienko@gmail.com	Oil spills modeling
2.3		SOI	Structure of Marine waters and Modeling of currents Lab.	Grigoriev Alexander	agprivat@mail.ru	Modeling of marine waters currents and sea level
2.4		SOI	Wind-wave Lab.	Kabatchenko Ilya	wavelab1@yandex.ru	Modeling of wind waves and wind climate
3	Estuarine Hydrometeorological Station «Kuban», Rosa Luxemburg 60, 353500 Temruk, Krasnodar Region, RUSSIA	EHMSK	Monitoring Pollution of Surface Waters Lab. (LMZPW)	Derbicheva Tamara	temrhimlab@kuban-meteo.ru	Standard Hydrochemistry, Pollutants: TPHs, TM, Detergents, Pesticides, Phenols
4	Institute of Geography RAS, Moscow, 117019, Staromonetniy Lane, 29	IG RAS	Ecological Lab.	Fashchuk Dmitry	fashchuk@mail.ru	Marine Ecology, anthropogenic influence consequences
5.1	P.P. Shirshov Institute of Oceanology RAS, Nakhimovsky prospekt, 36, 117997 Moscow, RUSSIA, www.ocean.ru	SIO RAS	Ecology of the distribution of planktonic organisms Lab.	Flint Mikhail	M_FLINT@ORC.ru	Zooplankton
5.2		SIO RAS	Ecology of coastal bottom communities Lab.	Kucheruk Nikita	nvkucheruk@mail.ru	Zoobenthos
5.3		SIO RAS	Ocean Chemistry Lab.	Peresypkin Valery	peresypkin@ocean.ru	Chemistry, Pollution
5.4		SIO RAS	Biochemistry and Hydrochemistry Lab.	Makkaveev Petr		Hydrochemistry
5.5	Southern Branch of Shirshov's Institute Oceanology RAS, 353467 Gelendzhik, Krasnodar Region, RUSSIA	SB SIO RAS	Chemistry Lab.	Chasovnikov Valery	chasovn@mail.ru	Standard Hydrochemistry, Pollutants: TPHs, Sulphur, TM, Phenols, Detergents, PAHs, Pesticides, PCBs.
6	Russian Federal Research Institute of Fisheries and Oceanography (VNIRO), V.Krasnoselskay 17, 107140 Moscow, RUSSIA, www.vniro.ru	VNIRO	Marine Ecology Lab.	Sapozhnikov Victor	marecol@vniro.ru	Hydrochemistry

7	White Sea Biological Station Lomonosov Moscow State University, a/ya 20, Glavpochtamt, Kandalakshsky raion, Murmanskaya oblast, 184042, RUSSIA	WSBS MSU	Benthos Lab.	Tzetlin Alexander	atzetlin@wsbs-msu.ru, atzetlin@gmail.com, atzetlin@mail.ru	Benthos
8	Scientific and Industrial Unit «Typhoon», Pobeda prospect 4, Obninsk, Kaluga region, RUSSIA	Typhoon	Center of Environmental Chemistry	Kochetkov Alexander	akochet@mail.ru	Analytical chemistry
			UKRAINE			
1.1	Marine Branch of Ukrainian Hydrometeorological Institute, Sovetskaya street 61, 99011 Sevastopol, UKRAINE, www.uhmi.org.ua/sub/sev-astopol/	MB UHMI	Laboratory of coastal zone and river mouths	Ilyin Yuriy	mb_uhmi@stel.sebastopol.ua	Azov and Black Sea coastal oceanography, marine meteorology, riverine inputs, estuarine hydrology
1.2		MB UHMI	Laboratory of marine chemistry	Riabinin Anatoliy	mb_uhmi@stel.sebastopol.ua	Standard hydrochemistry, pollutants: TPHs, chemical properties of atmospheric precipita-tions and aerosols
1.3		MB UHMI	Laboratory of marine hydro-meteorology	Fomin Volody-myr	fomin@vip.sevsky.net	Azov and Black seas oceanography and marine meteorology, numerical modeling of dynamical processes
2.1	Marine Hydrophysical Institute of National Academy of Science of Ukraine. Kapitanskaya street 2, 99011 Sevastopol, UKRAINE, www.mhi.iuf.net	MHI	Department of shelf hydrophysics	Ivanov Vitaliy	vaivanov@alpha.mhi.iuf.net	Shelf and coastal zone hydrophysics
2.2		MHI	Department of marine bio-geo-chemistry	Konovalov Sergey	sergey@alpha.mhi.iuf.net	Marine chemistry and ecology
3	Institute of Geological Sciences of National Academy of Science of Ukraine, O. Gonchara street 55-b, 01054 Kiev, UKRAINE, www.igs-nas.org.ua	IGS		Gozhik Petro	info@igs-nas.com.ua	General and marine geology
4	Ukrainian Scientific Center of Ecology of the Sea, Ministry of the Environment Protection, Odessa, French blvd., 89	UkrSCES	Department of Analytical Research	Denga Yuriy	lawmd@te.net.ua	Standard Hydrochemistry, Particle size analysis, Pollutants: TPHs, PAHs, Pesticides, PCBs etc.
5	Marine Hydrometeorological Station «Opasnoye», Turgeneva street 5, Zhukovka settlement, 98307 Kerch, Crimea, UKRAINE	MHS Opas-noye	no	Golovnenko Svitlana	no	Marine meteorology and hydrology, regional monitoring of the Kerch Strait water quality
6.1	Southern Scientific Research Institute of Marine Fisheries and Ocean-ography; Sverdlov Street 2, 98300 Kerch, AR Crimea UKRAINE, www.yugniro.crimea.com	YugNIRO	Marine Ecosystem Protec-tion Lab. (MEPL)	Petrenko Oleg	yugniro@kerch.com.ua	Standard Hydrochemistry, Pollutants: Trace Metals, TPHs, Chlororganics, Environmental Impacts, Zooplankton
6.2		YugNIRO	Distant Monitoring Sector	Borovskaya Raisa	yugniro@kerch.com.ua	Remote sensing, Satellite images interpretation, forecasting
6.3		YugNIRO	Non-fishes Resources Sector	Litvinenko Nataly	yugniro@kerch.com.ua	Zooplankton, Benthos
7.1	Institute of Biology of the Southern Seas of NASU, Nakhimova av. 2, 99011 Sevastopol, UKRAINE, www.ibss.org.ua	IBSS	Department of plankton	Boltachev Alexander	a_boltachev@mail.ru	Bacterioplankton, phytoplankton, zooplankton, ichthyoplankton, ichthyofauna, biodiversity, marine ecology
7.2		IBSS	Department of marine sanitary hydrobiology	Mironov Oleg	msh@ibss.iuf.net	Marine ecology, Oil pollution, bacteriology, benthos
7.3		IBSS	Ecological parasitology Department	Gaevskaya Albina	a.gaevskaya@ibss.org.ua	Ecological parasitology
7.4		IBSS	Laboratory of Radiation and Chemical Biology	Stokozov Nikolai	stokozov@mail.ru	Marine radioecology and biogeochemistry

Annex 5.

Measures taken by Ukraine

Tarasova Oksana, Bon Alexander

5.1. General overview of activities in the extraordinary situation

As soon as the competent authorities were informed about the incident in the Kerch Strait the salvage and rescue operation as prescribed by the national system of Ukraine was started. The Operational Commission presided by the representatives of the Ministry of Transport of Ukraine was immediately set up and consisted of the representatives of the Ministry of Transport, Ministry of Emergencies, Ministry of the Environmental Protection, Ministry of Health and other concerned agencies. The main task of the initial phase of the incident was to save lives and to stop leakage of the heavy oil.

From the very beginning of the incidents in the Kerch Strait the Ministry of the Environmental Protection of Ukraine directed its efforts mainly at:

- Assessments of the impact of the extraordinary incidents on the marine environment;
- Daily monitoring observations of the levels of pollutants in the marine waters in the areas of the incidents of the vessels of the Russian Federation (near the island Tuzla and the coastline of the Kerch Strait) from the Cape Takil at the south of the Kerch Strait to the Cazantip Cape in the Sea of Azov around the Kerch Peninsula;
- Satellite monitoring of the pollution (analysis and interpretation of the satellite images);
- Operative information for the Cabinet of the Ministers of Ukraine about the state of the environment in the impacted area, observed changes and implemented measures for minimization of the impact of the incidents on the marine environment and the coastal line;
- Coordination of the efforts of the subordinated territorial and specialized agencies that in cooperation with representatives of the other competent authorities and general public directly worked in the impacted area.

The scientific and technical measures for elimination of the consequences of the extraordinary situation included:

- Involvement of the leading scientific institutions — Marine Hydrophysical Institute (MHI, Sevastopol), Southern Scientific and Research Institute of Fisheries and Oceanography (YugNIRO, Kerch), Kovalevsky Institute of the Biology of the Southern Seas (IBSS, Sevastopol).
- Modeling of the extraordinary situation and forecast of the possible effects as in whole for the Black Sea environment and for the separate components of the marine ecosystems.
- Preparation and Implementation of «The Research Program for the Assessment of the Consequences of the Pollution of the Marine Ecosystem resulted from the Kerch Incident on 11.11.2007. Development of Recommendations for Mitigation of the Negative Consequences».

5.2. Operational Monitoring Observations

Operational monitoring observations of the state of the marine environment in the Kerch Strait and adjacent marine areas, including the areas of vessel incidents, Tuzla Island, and the coastal waters from the Cape Takil (in the southern part of the Kerch Strait) till Cazantip Cape (the Sea of Azov), around the Kerch Peninsula has been started immediately after the incidents and carried out by the specialized bodies of the Ministry of the Environmental Protection — State Environmental Inspection of the Sea of Azov, State Azov-Black Sea Environmental Inspection and the State Environmental Inspection of the North-Western Part of the Black Sea. The data obtained from the operational monitoring after the necessary analyses were made public daily at the website of the Ministry of the Environmental Protection.

5.3. The field studies of the state of the marine environment in the area of the Kerch Strait and adjacent areas of the Black and Azov Seas

The Ministry of the Environmental Protection of Ukraine developed and approved the Program of Integrated Environmental Monitoring of the Kerch Strait and adjacent areas of the Black and Azov Seas (further on the Program) in order to assess the consequences of the incident in the Kerch Strait.

The Program provided for the integrated marine monitoring investigations and assessment of the impact of the incident pollution in the Kerch Strait. The Program was coordinated by the Ukrainian Scientific Center of the Sea Ecology (UkrSCES — Odessa) and implemented jointly with the Institute of the Biology of the Southern Seas (IBSS-Sevastopol), Marine Hydrophysical Institute (MHI-Sevastopol), Ukrainian Scientific and Research Institute of the Environmental Problems (USRIEP-Kharkov), and the Southern Institute of Fisheries and Oceanography (YugNIRO-Kerch).

The Program also provisioned the possibility of participation of scientists from the Russian Federation in the implementation of the joint marine monitoring studies in the assessment of the consequences of the Kerch incident for the marine environment. This possibility was discussed at the meeting of the Joint Russian-Ukrainian Working Group on the liquidation of the consequences of the natural disaster that took place on 11–12 November 2007 in the Kerch Strait.

According to the Program two research expeditions were organized on board of the research vessel «*Vladymyr Parshin*» which allowed the comprehensive assessment of the state of the environment of the Kerch Strait and adjacent areas of the Black and Azov Seas. Based on the analysis of the collected data the significant impacts on the marine ecosystem were not observed. In the second expeditions the Russian representative (State Oceanographic Institute, Moscow) took part and collect the samples of bottom sediments from the Kerch Strait area.

5.4. The measures for the cleanup operation and utilization of the sand — heavy fuel oil mixtures

According to the Ukrainian assessments, 2000 tons of total 4077 tons of heavy fuel oil cargo carried by *Volganeft-139* were spilled into the Kerch Strait causing the pollution of the marine and coastal environment of the Strait and adjacent areas in the Black and Azov Seas.

In the first phase of the cleanup operations 5940 tons of sand-heavy fuel oil mixture were collected: in 2007–4200 tons, in 2008–1740 tons, respectively. Somewhat later 400 tons of sand-heavy fuel oil mixture were collected in the coastal area of the Kherson administrative unit that were stored at specially organized storage places nearby v. Zalizny Port, Krugloozerka and at the former plant for construction materials in the town of Genichensk and were utilized by the local authorities. More than 450 tons of the sand-heavy fuel oil mixtures were collected from the coastal area of the Tuzla Island.

The collected in the cleanup operation of the marine environment and coastal area sand-heavy fuel oil mixture was transported and stored at the territory of the State Enterprise «Kerch Marine Trade Port». The decision about the location of the technological equipment designed for the processing of the sand-heavy fuel oil mixture was made based on findings of the scientific and technological seminar on the selection of the technology for utilization of mixture held on 24.03.2008 in the city of Kerch. Finally the mixture processed into 6765,350 tons of commercial road paving materials by 04.12.2008 according to the report of the State Enterprise «Kerch Marine Trade Port».

5.5. Assessment of the economic losses from the environmental pollution of Ukraine resulted from the emergency situation

The Ministry of the Environmental Protection estimated the economic losses from the oil pollution of the environment resulted from the wracked vessels in the territorial sea and inner marine waters of Ukraine at a total amount of 1064824292 USD calculated according to the size of fines for environmental pollution (approved by the Resolution of the Cabinet of Minister of Ukraine dated 03.07.1995 №484).

Additionally the Republic Committee for the Environmental Protection of the Autonomous Republic of Crimea made the final estimations based on the measurements of the compositions and properties of soils at the 91 control sites (calculated with use of the Methodology of Calculation of Losses From Pollution and Littering of the Land Resources in Case of Violation of the Environmental Legislation (approved by the Order of the Ministry of the Environment dates 04.04.2007 №149 are registered in the Ministry of Justice on 25.04.2007 №422/13689).

Based on the analysis of the samples collected since November 2007 till April 2008 the total amount of losses from the pollution of land resources reached 432798366 UAH or 85702646 USD. Thus, total amount of economic losses from pollution of the environment of Ukraine is 1150526938 USD.

According to the Order of Vice Prime Minister of Ukraine (04.2008 №18445/1/1–08) the Ministry of Justice of Ukraine was designated responsible for requesting the payments for the environmental losses resulted from the incident in the Kerch Straight and the full liability of the foreign judicial entities.

The Ministry of the Environmental Protection within its power and competence prepared a set of documents on the legal grounds and evidences in the court case of liability for caused environmental damage and submitted this set to the Cabinet of the Minister of Ukraine (letter dated 28.03.2008 №4024/19/10–08) for further actions. In addition, according to established procedures, apruved by Decree of the President of Ukraine issued on 25.06.2002 №581, the Inter-governmental Working Group on the Preparation of the Appeal of Ukraine on the Compensation of Losses was formed.

5.6. Coordination of the activities on the elimination of the consequences of the extraordinary situation and utilization of the sand-heavy fuel oil mixture

In November 2007 the Ministry of the Environmental Protection formed the Working Group for coordinated operational collection, analysis and assessment of the environmental data, cleanup actions and making the grounded decisions on elimination of the consequences of the incident that was transformed into the Governmental Commission for the assessment of the environmental damage resulted from the incidents of the marine vessels on the later stage as well as preparation of the proposals for the localization and liquidation of pollution, as well as future minimization of the effects and prevention measures. Two working meetings of the specialized working group and three meetings of the Governmental Commission were held.

The Governmental Commission on Elimination the Consequences of the Natural Disaster Occurred on 11–12 November 2007 in the Kerch Strait (further on the Governmental Commission) was formed according to the Resolution of the Cabinet of Ministers dated 19.03.2008 №496-p for coordination of the activities of the involved central and local executive authorities. The tasks of the Governmental Commission were the analysis of the urgent needs for the minimization of the negative impacts of the incidents and adoption of the adequate decisions aimed at the coordination of the actions of the central and local authorities in elimination these consequences

The Governmental Commission met three times — 21.03.2008, 03.04.2008 and 25.12.2008. At the first meeting held on 21 March 2008 the following issues were discussed and approved:

- organization of the work of the Governmental Commission,
- utilization of the collected sand-heavy oil fuel mixture that was stored at the territory of the State Enterprise «Kerch Marine Trade Port» and at the coast of the Arabatska Spit and safety of its storage,
- Action plan of measures for elimination of the consequences of the Kerch Strait that has been developed in line with Order of the Cabinet of Ministers of Ukraine dated of 19.03.2008 №496-p «About the urgent measures to overcome the consequences of the natural hazard that happened on 11–12 November 2007 in the Kerch Strait»,
- Organization of the working visit of the members of the Governmental Commission to the Autonomous Republic of Crimea.

The approved resolutions of the Commission were as follows:

- approval of the selection of the company for utilization of the sand — heavy oil mixture (Company «Ecocenter», city of Kirovograd),
- approval of the tender procedure for one company (Company «Ecocenter»),
- approval of the Action Pan for measures of the elimination of consequences of the Kerch Strait Incident on 11–12 November 2007.

As a follow up of the Meeting of the Governmental Commission the technical seminar on the selection of the technology for processing of the sand heavy oil fuel, at which the representatives of executive authorities of the Republic of Crimea and Crimean Academy of Sciences, city of Kerch were present, was held and following decisions were made and implemented:

- The selection place for technological equipment for processing the sand-heavy oil fuel mixture at the State Enterprise «Kerch Marine Trade Port»,
- Approval of the technology for processing the sand-heavy oil fuel mixture proposed by the Company «Ecocenter» and recommended by the Governmental Commission.

The Task Force for Elimination of the Consequences of the Kerch Incident started its work as was recommended by the technical seminar and the action plan for processing of the sand-oil mixture stored at the State Enterprise «Kerch Marine Trade Port» was approved and its implementation started.

The second Meeting of the Governmental Commission in which members of the Task Force for Elimination of the Consequences of the Kerch Incident, experts and representatives of the public participated also was carried out in Kerch in 2008. During the meeting the progress in the processing of sand-heavy oil fuel mixture was presented and the necessary measures for its completion were approved as well as further steps for improvement of cooperation with the Russian Federation in solving the environmental problems in the Black and Azov Seas were discussed.

The third meeting of the Governmental Commission was held on 25 December 2008 in the city of Kiev that reviewed the implemented activities and concluded that all tasks in elimination of the environmental pollution in the Kerch Strait were successfully realised. The Governmental Commission was dissolved by the Cabinet of Minister of Ukraine.

5.7. The Joint Ukrainian — Russian Working Group on the Elimination of Consequences of the Natural Disaster in the Kerch Strait on 11–12 November 2011

The bilateral Working Group of the Russian Federation and Ukraine was formed in the end of 2007. For the implementation of the Para 3 of the Resolution of the Cabinet of Ministers of Ukraine dated 19.03.2008 №496-p «About Urgent Measures for Elimination of Consequences of the Natural Disaster that occurred on 11–12 November 2007 in the Kerch Strait» the work of the Joint Ukrainian-Russian Working Group on the Elimination of the Consequences of Natural Disaster Occurred on 11–12 November 2007 in the Kerch Strait (further on the Working Group) was renewed. Four Meetings of the Working Group were held: 22.05.2008, Anapa, 17.07.2008, Kerch, 07.11.2008, Anapa and 29.05.2008, Kerch. The Working Group approved:

a) Plan of Joint Actions of the Ukrainian and Russian Parties in Elimination of the Consequences of the Kerch Incident, safety of marine transport and environmental safety in the area,

b) Program of joint monitoring observations of the environmental state of the Kerch Strait proposed by the Ukrainian Party.

During the work of the Group the following issues were discussed:

- salvaging of the vessels «*Volnogorsk*», «*Kovel*» and «*Nakhichevan*» that sank in the Kerch incident on 11–12 November 2007,
- joint marine monitoring investigations for the assessment of the state of the marine environment in the area of the Kerch Strait and adjacent areas of the Black and Azov Seas,

- introduction of the regional system of safety of marine transport and environmental safety in the Black and Azov Seas,
- joint action plan for elimination of the incidents and ensuring the safety of marine transport and environmental safety,
- improvement of coordination of the corresponding competent authorities of Ukraine in the ensuring the safety of marine transport and environmental safety in the Black and Azov Seas.

The most important outcome of the discussions in the framework of the Working Group was the achieved agreement above salvaging and transportation of the damaged sunken parts of the tanker *Volgoneft-139* the most dangerous for the marine environment along the Russian coast.

Conclusions

The coordinated actions of the competent national authorities of Ukraine and the concerned central and local authorities and public for elimination of the consequences of the incident that occurred on 11–12 November 2007 in the Kerch Strait were evaluated as timely and efficient in implementing the tasks established by the Government of Ukraine and the President of Ukraine.

The implementation of the Action Pan for measures of the elimination of consequences of the Kerch Strait Incident on 11–12 November 2007 did not require additional resolutions, therefore the Cabinet of Minister dissolved the Governmental Commission and the competent authorities pursued the following:

- Salvaging of the ships *Volnogorsk*, *Nakhichevan* and *Kovel,*
- Further strengthening of the state system of safety of marine transport and environmental safety,
- seek compensation of economic losses resulting from the pollution of the marine and coastal environment of Ukraine that shall be coordinated by the Ministry of Justice and the Ministry of Transport,
- strengthening the Russian — Ukrainian cooperation in safety of marine transport and environmental protection.

Annex 6.

Measures taken by the Russian Federation

6.1. List of ships taking part in the operations after the storm on 11 November 2007

- *KIL-25* specialized vessel belonging to the Russian Black Sea Fleet;
- *GS-700* vessel of the Russian Black Sea Fleet;
- *Velboat-668* vessel belonging to the Russian Federal Security Service Frontier Guards;
- *Volgoneft-250* tanker for oil products pumping of the BashVolgoTanker public company;
- *Volgoneft-119* m/v of the BashVolgoTanker;
- *Volgoneft-249* m/v of the BashVolgoTanker;
- *Lenaneft-199* m/v of the BashVolgoTanker;
- *PK-18/35* self-propelled floating crane;
- *SLV-05* for collecting oil products of the Rosmorport federal unitary enterprise;
- *Captain Zadorozhny* sea-going tug of the Rosmorport;
- *Mercury* sea-going tug of the Rosmorport;
- *Vostok* pilot cutter of the Rosmorport;
- *Berkut* pilot cutter of the Rosmorport;
- *Potyomkinets Gasanenko* pilot cutter of the Rosmorport;
- *Sportis-2468* high-speed boat of the Russian Ministry of Emergencies;
- *Valery Zamaraev* cutter of Russian Ministry of Emergencies;
- *BM-627* boat of Russian Ministry of Emergencies;
- *Sportis* high-speed boat of the Novorossiysk DSRUTO;
- *Vodolaz-2* roadstead diver cutter of the Novorossiysk DSRUTO;
- *Lamor* skimming vessel for collecting oil products of the Novorossiysk DSRUTO;
- *Tornado* sea-going tug of the Novorossiysk DSRUTO;
- *Svetlomor-3* sea-going salvage tug of the Novorossiysk DSRUTO;
- *Svetlomor-4* sea-going Ukrainian salvage tug;
- *Protei* sea-going tug of the Anship Ltd;
- *MB-173* vessel;
- *Neptunia* sea-going tug;
- *I. Krasnoselsky* sea-going tug;
- *Irakl* Ukrainian sea-going tug;
- *LK-57* Ukrainian pilot cutter;
- *Odonis* Ukrainian sea-going tug;
- *Mekhanik Krasotkin* Ukrainian sea-going tug;
- *Val* sea-going tug of the Donrechflot public company;
- *Enikale* sea-going tug belonging to the EvroTEK Universal Ltd.;
- *Mekhanik Razhev* m/v;
- *Bora* Ukrainian sea-going tug;
- *Impulse* emergency response vessel.

6.2. Measures for emergency situation tackling and environment monitoring realizing

In respect to the *Volgoneft-139* m/v stern part:

- the *Volgoneft-139* m/v stern part was moored within the area of the Caucasus (Kavkaz) port berth No24 branch section. Two BPP-1100 booms (150 m and 170 m) were deployed;
- on 16 November 2007 a verification report was received specifying that 886.1 tons of heavy fuel oil were pumped from the *Volgoneft-139* m/v tanks No7 and No 8 to the *Volgoneft-119* m/v.
- the operations of cleaning the heavy fuel oil spill-over produced by the *Volgoneft-139* m/v stern section were carried out and completed by personnel and technical facilities of the Novorossiysk Department for Safe and Rescue Measures, And Boat Lifting Underwater Technical Operations (DSRUTO). Oily water was collected at location of the boat tanks No 7 and No 8. Approximately, 50 m^3 of heavy fuel oil and 120 m^3 of oily water were collected there.

In respect to the *Volgoneft-139* m/v bow part:

- the *Svetlomor-3* salvage tug collected discharged oil products within the spill area on 15–17 November 2007. Approximately 43 tons of oily mixture and 1200 kg of heavy fuel oil (in barrels on board) were collected;
- on 17 November 2007, divers of the *Vodolaz-2* roadstead diver cutter from the Novorossiysk DSRUTO inspected the *Volgoneft-139* m/v bow part in order to determine its feasibility of recovery;
- on 23 July-14 August 2008, an operation to lift the *Volgoneft-139* m/v bow part was conducted in the Kerch Strait water area.

The operations to lift the *Volgoneft-139* m/v bow part in the Kerch Strait water area were carried out by personnel and technical facilities of the Novorossiysk DSRUTO, the State Marine Pollution Control, Save and Rescue Administration Russian federal enterprise, SMPCSA and the Black Sea Fleet.

6.3. Chronology of first measures was taken

- 14 November 2007, in order to prevent the oil products spread to the Dinsky and Taman Bays, two booms, i. e., Super Max-1100, 200 m and BPP-830, 200 m, were installed on the strait between the Tuzla Spit and the Tuzla Island;
- 17 November 2007, divers of the *BM-627* boat inspected the *Nakhichevan* m/v. No missing persons were found;
- 15–19 November 2007, the *Vostok* pilot cutter was engaged with collecting the leaked oil products at location of the *Volgoneft-139* m/v bow part; 4500 kg of sorbent agent were used;
- 17 November 2007, the Russian *Svetlomor-3* and Ukrainian *LB-57* salvage tugs guided by the Kerch VTS — vessel traffic system were engaged with collecting the leaked oil products in the Kerch Strait water area;
- During the 17–22 November 2007 period, 930 kg of the SorbOil sorbent agent were used for additional clean-up at the *BN-139* location;

- 20 November 2007, the *Sportis-2468* cutter undertook examinations of the water area in the vicinity of berth No24, and cutter *Sportis* examined the shore line and water area near Tuzla Spit;
- 21 November 2007, the *Sportis* cutter and the *Captain Zadorozhny* tug having ecologists on board collected water samples on the Kerch Strait; the *Svetlomor-3* was engaged with collecting the spilled over oil products in the Kerch Strait southern part; the *Vodolaz-2* diver cutter jointly with the *Lamor* supply vessel completed the *Volgoneft-139* m/v bow part diving inspection in order to arrange for its lifting;
- 22 November 2007, the *BM-627* vessel and *Sportis* cutter made a diving inspection of the *Volnogorsk* m/v; the *Vodolaz-2* diver cutter jointly with the *Lamor* technical supply vessel undertook a diving inspection at location of the *Volgoneft-139* m/v bow part;
- 23 November 2007, the *Vodolaz-2*, *BM-627* and *Sportis* cutter inspected through diving the *Volgoneft-139* m/v bow part, and the *Volnogorsk* and *Nakhichevan* vessels. The *KIL-25* and *MB-173* boats were engaged with preparing pontoons and equipment necessary for the vessel lifting operations.

The Kerch Strait water area emergency was tackled by personnel and facilities of the Novorossiysk DSRUTO, the Taman port authorities, the Taman branch of the Rosmorport (the Russian sea ports) federal unitary enterprise, and the Black Sea Fleet.

6.4. Measures of emergency situation headquarters

In order to eliminate the accident consequences, the emergency situation headquarters took the following measures:

1. The stern section of the *Volgoneft-139* m/v was recovered and towed to Caucasus port.
2. Pumping operations of 886.253 tons of heavy fuel oil from the stern part of *Volgoneft-139* (tanks No7 and No8) to the *Volgoneft-119* were completed. On 4 December 2007, in total 1094 tons of the heavy fuel oil was released from the *Volgoneft-139* m/v stern part.
3. Through the efforts of the Novorossiysk DSRUTO personnel and facilities, operations were carried out to tackle the spilled over heavy fuel oil at the location of the *Volgoneft-139* m/v bow part. In total, 43 tons of oily mixture and 1200 kg of heavy fuel oil were collected.
4. The *Volgoneft-139* m/v, *Nakhichevan* m/v and *Volnogorsk* m/v bow parts were inspected by means of diving. Expenditures related to refloating operations were calculated. No heavy fuel oil at the bottom was detected.
5. On 9–10 December 2007, from the *Volgoneft-139* bow part heavy fuel oil left was pumped out from tanks No1 and No2 onto the *Mekhanik Razhev* m/v (1020 m^3 of oily water).
6. The port authorities specialists from the Taman Port Federal Institute jointly with representatives from Rosprirodnadzor (the Russian Federal Natural Resource Supervisory Management Service) and the Ministry of the Russian Federation for Civil Defense, Emergency Situations and Natural Disasters Response (EMERCOM), the Temruk area administration conducted environment conditions monitoring through collecting water samples at the *Volgoneft-139* bow part and locations of the other remaining parts.

7. At the Caucasus port, conditions of the water area in the vicinity of the *Volgoneft-139* stern section location were monitored. A boom was installed around the inspected area and the oil products surfacing slicks were collected.

8. The personnel and facilities (theVTS, pilots and ships crossing the area) of the port authorities of the Taman Port Federal Institute and the Taman branch of the Rosmorport federal unitary enterprise were engaged with visual monitoring over the water area conditions in the southern part of the Kerch Strait at location of the *Volgoneft-139* m/v bow part and other sunken vessels.

9. The Russian EMERCOM personnel jointly with the people living in the accident vicinity collected 47 000 tons of oil-contaminated substrate and seaweeds, and cleaned up nearly 46 km of the coastline.

10. From 15 February through the end of 2008, the Russian EMERCOM personnel (the KubanSpas branch, 82 persons) was engaged with cleaning the coastline from the oil-contaminated seaweeds around the Tuzla Spit, Kuchugury settlement, and in the southern part of the Chushka Spit.

11. Since 20 June 2008, the Novorossiysk DSRUTO personnel installed a boom in the southern part of the Kerch Strait to block-off the *Volgoneft-139* bow part before and during lifting. Monitoring was performed over the water surface ecological conditions, while the sorbent agents were used and spilled over oil products collected and loaded aboard the *Impulse* emergency response vessel.

12. On 14 August 2008, the *Volgoneft-139* bow section was lifted. It was towed to berth No25 at the Caucasus port. Later on, it was disassembled, cut into pieces and scrapped.

13. In total, 1098 tons of bunker oil was collected from the *Volgoneft-139* bow part.

6.5. Personnel and facilities engaged with the Kerch Strait emergency response on 11 November 2007

To rescue people at the time of catastrophe: *Neptunia, I. Krasnoselsky, LK-57, Captain Zadorozhny, Mercury* and *Irakl*.

To refloat the *Dika* and *Dimetra* barges: *Odonis, Mekhanik Krasotkin* and *Val.*

To discharge the oily water and tow the *Volgoneft-139* m/v stern part: *Volgoneft-119, Mercury, Captain Zadorozhny* and *Sportis.*

In search for people: *Velboat-668, LK-57, Enikale, Berkut, GS-700, Valery Zamaraev* and Mi-8 Helicopter of the Russian Ministry of Emergencies.

For pumping out heavy fuel oil from the *Volgoneft-123* m/v at the Caucasus port: *Volgoneft-249.*

Oil spill clean-up operations: collecting oily water, treating the Kerch Strait water area with sorbent agent and in collecting the water samples: *SLV-05, Lamor, Svetlomor-3, Svetlomor-4, Vostok, Potyomkinets Gasanenko, Captain Zadorozhny, Sportis* and 1500 m of booms, and 5 tons of sorbent agent.

For lifting the *Volgoneft-139* m/v bow part and in transshipping the heavy oil fuel: *KIL-25, Volgoneft-250, PK-18/35, Vodolaz-2, SLV-05, Lamor, Svetlomor-3, Svetlomor-4, Captain Zadorozhny, Mercury, Protei, Tornado, MB-173, Vostok, Berkut, Potyomkinets Gasanenko* and *SSP-200,* and *SSP-80* pontoons, two sets each, belong-

ing to the Novorossiysk DSRUTO and the divers, 14 persons from the Novorossiysk DSRUTO and Russian EMERCOM.

For discharging heavy fuel oil at the Novorossiysk port and taking in the oily water: *Lenaneft-199* and *Volgoneft-249*.

Employed in total, the first and second priority level facilities and means accounted for 33 vessels, 1500 m booms, two oil-filtering nets, four skimmers and two oil pumping systems, as well as 500 persons.

6.6. Measures taken at the governmental level. Coastal authorities and facilities involved in rectification of the Kerch Strait catastrophe consequences

The Russian Federation Government as a party to the joint Russian-Ukrainian working group on rectification of the catastrophe consequences issued Decree No1606-p on 14 November 2007 to recognize the oil products spill-over and the necessity for pollution prevention in the Kerch Strait water area and by its shores. The Russian Federation Deputy Minister of Transport B. Korol was appointed to chair the Russian party to the working group.

In compliance with paragraph 1 of report on the Meeting No VZ-P9–25pr held on 13 November 2007 and chaired by the Russian Federation Government Chairman V. Zubkov, and following up on Decree No163 issued on 15 November 2007 by the Russian Ministry of Transport, in order to rectify the Kerch Strait catastrophe consequences and determine the ship accidents causes, an Interdepartmental Commission was established, hereinafter referred to as the Commission. Commission's activity became governed by the Regulations on Commission approved by the Russian Minister of Transport and Chairman of the Commission I. Levitin on 13 December 2007 (No K-18/30424). The work carried out by the commission on rectification of the Kerch catastrophe consequences is described further on.

By Decree No AD-141-p dated 12 November 2007 and issued by the Rosmorrechflot federal agency of maritime and river transportation, an emergency response center was established to manage the Kerch accident consequences rectification. On the SMPCSA basis, a Rosmorrechflot immediate response group was organized to be a part of the established center.

The Novorossiysk Rescue in Accident and Underwater Engineering Center, a federal state unitary enterprise, FSUE was nominated the principal agency for rectifying the accident at sea consequences. The established center carried its work in cooperation with personnel and facilities of Russia's EMERCOM, Ministry of Defense and the Rosmorport FSUE.

In compliance with the Krasnodar Territory administration's Decision No 592 dated 12 November 2007 on the emergency response committee, certain personnel and facilities were urgently organized into a group in order to start rectifying the catastrophe consequences within the Krasnodar Territory. The following agencies were included into the group:

- Joint Emergency Rescue Center to incorporate representatives with executive authority from the Krasnodar Territory and federal executive institutions;
- EMERCOM personnel and facilities;

- the Krasnodar Territory fire department units;
- Kuban-SPAS rescue teams, the Krasnodar Territory emergency response public service;
- units of the Krasnodaravtodor public agency of the Krasnodar Territory;
- municipal squad units of the EMERCOM territorial subdivision in the Krasnodar Territory, from the Novorossiysk, Temruk, Crimea and Slavyansk regions in particular.

Representatives of public and environmental organizations took an active part in rectification of the catastrophe consequences, and among them were:

- joint student teams from Krasnodar, and the Gelendzhik and Anapa resort cities;
- cadets from the Novorossiysk Maritime Academy;
- a joint youth team from Armavir;
- volunteer and professional ornithologists from the hunting and fishing societies.

For rectification of the catastrophe consequences human and technical resources engaged were to total of 2500 persons and 300 units of equipment. 450 persons of military personnel were engaged with oily products removal from the shore.

Due to the necessary use of professional means and facilities while collecting and disposing oil products in highly polluted and poorly accessible areas, it was arranged to involve personnel and facilities from the Emergency Response and Ecological Center, ECOSPAS under the Russian EMERCOM to total 45 persons and 7 units of special equipment. They carried out the most difficult part of the work, i. e., operations for cleaning the seaweeds polluted by heavy fuel oil and removing oil products from the shore. The Tuzla Spit polluted bottom areas were treated with sorbent, while the sorption mass was pumped out and removed to its temporary storage place.

Storage of soil and seaweeds polluted with oil products was arranged at the specially equipped sites belonging to the Sirius closed joint stock society, the Azov-Black Sea experimental research and production enterprise, and in the target area by the Gorelaya mountain root in the Temruk region.

For accommodation of personnel engaged with rectification of the catastrophe consequences, temporary premises were arranged close to the coast cleaning area, where the railway cars were prepared as living quarters and catering, medical assistance and recreation were furnished.

For cleaning the coast polluted with oil products, the Krasnodar Territory administration established a reserve, and out of it 1200 sets of entrenching tools, 700 sets of protective garments for oil products collection and 20 000 polypropylene bags were distributed among the workers.

By now, the main coast cleaning works at the Tuzla and Chushka spits have been completed. The works were carried out to clean from secondary pollution specific coastal areas, as well as poorly accessible, waterlogged and flooded places requiring attendance of specialized units (the Ahilleon Cape and the Panagia Cape). Cleaning of the poorly accessible, waterlogged and flooded places in the Tuzla Spit southern end was jointly done by the Southern Regional Emergency Response and Ecological Center and the ECOSPAS teams totaling 46 persons, six units of equipment with participation of the Kuban-SPAS, the Krasnodar Territory Emergency Response Service totaling 60 persons and one unit of equipment.

As a result of the works performed in January 2008, the shoreline four km at five isles by the Chushka Spit and seven km at the Panagia Cape fishing port at the Tuzla Spit were cleaned. At the Tuzla Spit, were cleaned 1200 m of its shoreline. The sorbent booms were installed to protect the shoreline of the five cleaned isles. In total, 3775 sacks of oil-contaminated wastes were collected (2100 sacks near the Ilyich settlement and 1675 sacks on the shore) and taken to the Gorelaya mountain temporary landfill.

The Russian EMERCOM constantly searched for the lost seamen through employing rescue boats and while carrying out recovery operations, as well as through patrolling the shoreline and flying helicopters over the shore. For this, four helicopters were provided by the EMERCOM.

Sorption agents were used to absorb oil slick on the water surface in order to further collect it. To carry out the shoreline and water area clean-up operations, six tons of sorbent were used, while two tons of sorbent were delivered to the Ukrainian party in the course of the rescue and recovery operations. The Kerch Strait shoreline was inspected in search for people and to determine the polluted areas and focus on the areas prone to disrupt the ecological balance.

To arrange the works in the difficult to access areas, special equipment, professionally trained personnel and the ECOSPAS equipment, i. e., 45 persons and 7 pieces of technical means and special equipment were sent to the emergency area.

In order to decrease the oily sludge transporting distance to its place of storage and treatment, construction of a temporary crossing and flow-through dam was initiated. Subunits of the Southern region search-and-rescue team and an emergency response team from the Rescue in Accident and Underwater Engineering Center administration under the Russian EMERCOM conducted the offshore diving operations, while 35 EMERCOM divers were engaged. The following EMERCOM floating crafts were used in the course of the diving operations: the *Valery Zamaraev*, *Vodolaz-2*, *Sportis* and *KS-700* boats and vessels.

During the whole search and rescue period, and in the course of the rescue and recovery operations, the Rosselkhoznadzor specialists, the hunters and fishermen societies members kept collecting and recording the number, and scavenge of the birds killed by oil pollution. The perished birds were taken to the Beregovoy settlement area, while in total 5487 dead birds were collected and scavenged. Wherever the birds alive were found, they were washed and treated for rehabilitation at the Temrukchanka recreation center. A total of 244 birds were saved alive, 91 birds died during their rehabilitation treatment, and 111 birds were fully rehabilitated and set free, while 42 birds were transferred to the Russian Caucasus regional office of the World Wildlife Fund. In 2008, a general shoreline clean-up operation was carried out in the framework of preparation for the holiday season to liquidate the spring warming possible discharges.

In order to carry out the search and rescue operations, and rectify the Kerch Strait accident consequences, the Black-Azov seas border administration units of the Russian Federation Federal Security Service Coast Guards jointly with the Russian Federation Federal Security Service aviation were engaged in line with the Federal Executive Authorities Interaction Plan adopted by the Russian Federation Government Decree No 834 dated 26 August 1995. In their course, 57 hours were spent in the air, and the ships covered more than 600 miles during 70 navigation hours.

6.7. Damage assessment

Russia has submitted all the necessary documents to the IOPC Fund in accordance with established procedures. Its claim is under the on-going consideration.

Party involved	Extent of damage, rubles	Category	Fund percentage, per cent	Amount of compensation sought from the liability limitation fund
Novorossiysk Department for Safe and Rescue Measures, And Boat Lifting Underwater Technical Operations, the Novorossiysk DSRUTO	73450452	Clean-up of the sea area, stern towing and oil pumping out from the bow.	31.9	37207107
Federal Supervisory Natural Resource Management Service	6048000000	Damage caused to the environment and assessed through using the methodologies. Note: Documents submitted cover the expenses of up to 300,000 rubles.		
Krasnodar Regional Department for Emergency Situations and Federal Ecological Control	134943430	Shoreline clean-up.	58.60	68349106
Kerch Commercial Seaport, public enterprise	15871575	Accident response.	6.89	8036269
BashVolgoTanker, closed joint stock company	around 5000000	Storage and waste utilization.	2.17	2531016
Fund for Social and Economic Development of the Temruk region	around 1000000		0.44	513201

The Russian Federation Federal Hydrometeorology and Environment Monitoring Services ensured hydro-meteorological support for the search and rescue, and recovery operations within the Kerch Strait water area and in the Black and Azov seas adjacent areas.

Rosprirodnadzor (the Federal Supervisory Natural Resource Management Service) carried out the following works:

- Integrated inspections of polluted shore with subsequent reporting in writing; the polluted area was determined.
- Visual inspection of the Kerch Strait water area in the zone of boat pollution.
- Aircraft monitoring of pollution zone and mapping of its coordinates.
- Composition of pollution propagation working map on a daily basis based on the air reconnaissance data.
- Ecological monitoring over the sea operations for the sunken ship recovery and transportation.
- In cooperation with a specialized laboratory of the FSI Laboratorial Test and Measurement Center of the Southern Federal District, the sea water and bottom sediments in the polluted area were sampled jointly with taking samples from the shore soil in the amounts sufficient to determine the mass of pollutants to have affected the environment in the accident. In total, 1000 samples were collected.
- In cooperation with a specialized laboratory of the Federal Agency for Water Resources Kuban Basin Water Administration, the sea water conditions were continuously monitored in selected areas till the complete self-recovery of marine environment became apparent.
- Damage caused to all ecospheres in the accident result was estimated.

- Proposals were made about the site for temporary storage of the soil and algae contaminated with heavy fuel oil and their processing.
- Monitoring was performed over the shore areas exposed to the primary treatment and the soil analytical check-up sampling was carried out in order to detect the oil product residuals therein.
- For the ecological situation improvement, recommendations to carry out a long-term exercise were developed and presented to the Ukrainian side which further summarized them in cooperation with Rosprirodnadzor jointly with the information constantly obtained by the Russian laboratories and other services about the Kerch Strait ecological situation and exchanged with the Environmental Services of Ukraine on a daily basis.
- Scenarios were developed to organize a Bird Hospital in a Zaporozhie rural settlement.
- Proposals were made to include several top-priority exercises into the regional goal-oriented program targeting the Kerch Strait emergency area bio-resources recovery within the Azov and Black seas water area.

6.8. Main conclusions, certain legal deficiencies and lessons learnt

During the last 50 years, the waves of two meter maximum height were observed nine times only in the Kerch Strait northern part, i. e., six times in April, two times in June and once in July, and under the northern direction winds exclusively. Ships anchored at the berths in the Kerch Strait southern part were protected from the northern direction winds by the Tuzla Spit. The southern direction winds frequency could reach 12 % in the sea north-eastern part, while previously their speed had never exceeded 15–17 m/sec.

Throughout the period of instrumental observations starting from 1936, waves of two meter height and, moreover, of four meters height were registered under stormy wind conditions similar to those observed during the Kerch accident. All the year round except for March, waves of 0.7–1 m height and less prevailed on the strait. According to conclusions drawn by the Russian Meteorological Office laboratory for real-time marine forecasts, «the cyclone to have caused an abnormally strong storm on the Kerch Strait on 11 November 2007 was produced by a cold atmospheric front that had approached the Black Sea from the north-west on 10 November 2007. During a very short period of time (a day), an active cyclonic whirl got formed out of an atmospheric wave and triggered by the cold front arrived to the Black Sea basin in the vicinity of the Crimea Peninsula. Later on, during 11 November, it passed by the Crimea and the Azov Sea, reached the Black Sea shore and exhausted itself on 13 November. Such an "explosive" cyclone character could be attributed to the following factors: Huge air temperature contrasts observed in the cold front area (9–15 degrees), the Black Sea warm water area and a cold area advection from above in the free atmosphere, that caused a "surge" of night convection, produced huge storm and thunder clouds jointly with the wind gusts. With regard to the Kerch Strait (from the south to the north), the wind-generated waves overlapped the ripples from the south, while the wind started blowing first from the east and then changed direction to the southern and south-western, which produced synchronous resonant waves… Thus, two dangerous phenomena emerged simultaneously: A high storm wave and a strong equally increasing wind».

Numerical modeling of the wave situation to occur on 10–12 November 2007 at the Black Sea has shown that on 11 November the wind direction was the most wave-dangerous (from the south-west) while its speed was reaching up to 25 m/s (with gusts of up to 34 m/s). This phenomenon produced the waves of up to 12 m high in the open sea and of up to 4–8 m high on the Kerch Strait. For the river-sea navigation vessels designed to withstand the maximum permissible wave height of 2–2.5 m, those waves were extremely dangerous due to exceeding the boats such technical capacities as their hull strength, floatability and independent movement capability.

Also, by 11 November, about 120 vessels had gathered for unloading and were anchored at the berths in the Kerch Strait southern part. Ships were normally anchored at the berths of the Kerch Strait transshipment complex by instruction of the traffic superintendents from the Maritime Traffic Regulation Centre of the Kerch port (Ukraine). Sometime before, the Kerch Strait transshipment complex had been supervised by the Port Captain of the Caucasus port (Russia), after 2006 the complex was moved closer to the Ukrainian shore and its supervision was transferred to the Port Captain of the Kerch port (Ukraine). By this, the Russian side lost the ability to affect compliance with the safety standards at the complex.

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