

## Project ISTC - K-1240p

# “Post-containment Management and Monitoring of Mercury Pollution in Site of Former PO “Khimprom” and Assessment of Environmental Risk Posed by Contamination of Groundwater and Adjacent Water Bodies of the Northern Industrial Area of Pavlodar”

### Quarterly technical report

on the work performed from 1 January 2007 - to 31 March 2007

Quarter 6

Non-profit JSC “Almaty Institute of Power Engineering and Telecommunication”, BG Chair of Environmental Technology

Address: 126, Baytursynov Str., Almaty, 050013, Kazakhstan

Project manager

Ilyushchenko M.A.  
PhD (Chemistry)



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Signature / Data

## 1. Summary of Technical Progress

### 1.1. Current Technical Status

Task Subtask	Start (quarter)	End (quarter)	Status / Comments
1.1.	1	4	It is not completed due to PCP bankruptcy
1.2.	4	8	Work interruption in VI Quarter
1.3.	1	12	Implementing/Samples analysis and / data processing of 1 <sup>st</sup> monitoring year
2.1.	1	2	Completed
2.2.	3	4	Completed
2.3.	5	6	Implementing /the local model is at the stage of calibration
2.4.	7	12	
2.5.	10	12	
2.6.	8	8	
2.7.	8	8	
2.8.	9	10	
2.9.	9	10	
3.1.	1	2	It is not completed due to PCP bankruptcy
3.2.	4	6	Negotiations with Pavlodar Oil Refinery were conducted about getting an access to the network of its observation boreholes. Pavlodar Oil Refinery refused to provide an access to the plant's boreholes.
3.3.	8	8	
3.4.	8	8	
3.5.	9	11	
3.6.	11	12	
4.1.	1	2	Completed
4.2.	2	10	Implementing /9/10 of bottom sediment samples were taken
4.3.	3	11	Implementing /Bathymetry map and sediment deposits thickness map were produced
4.4.	4	8	Work interruption in VI Quarter
4.5.	4	9	Work interruption in VI Quarter
4.6.	10	12	
5.1.	1	12	Implementing
5.2.	1	12	Implementing

## 1.2. Tasks of the work plan

**Task 1: Study of the movement of mercury in the groundwater rise in depressed area in saturated and unsaturated zones and its accumulation in the shallow ponds and vegetation. Development of management strategy to contain the risk to population in the vicinity and livestock.**

**Subtask 1.3.: To carry out 3-year monitoring program (sampling and analysis), including the monitoring of soils, surface and ground water, aquatic biota, milk, and grazing grass in the close vicinity of groundwater contamination. To measure the hydrogeological parameters (water levels in boreholes, pH, temperature, redox potential) simultaneously with groundwater sampling.**

- **State / Situation at the beginning of the current quarter**

During summer and fall (2007) field works the information on mercury concentration in groundwater, soil and near-earth atmosphere was collected and soil samples from the territory of the industrial site #1 were analyzed.

- **Fulfilled work**

Chemical and analytical works is been implementing with soil samples taken on the regular grid from the territory located to the north from the industrial site #1.

- **Results by the end of the current quarter**

The results were obtained which was an evidence of high mercury concentration in soils around both former special evaporation ponds for solid and liquid mercury wastes and along sewage system going from the former chlor-alkali production to the wastewater storage pond Baklyldak and the special evaporation ponds.

- **Personnel Commitments**

Name	Category	Work days
<b>AIPET</b>		
Ilyushchenko Mikhail Alexeevich	1	10
Muhkamejanov Khamit Waliachmetovich	2	3
Mikhailenko Nataliya Alexandrovna	2	26
Uskov Grigoriy Aleksandrovich	2	36
Yakovleva Lyudmila Vassilievna	2	5
Zyryanova Natal'ya Alexandrovna	2	35

**Task 2: Assessment of possibility for mercury-polluted groundwater flow to change its direction; study of interaction of contaminated groundwater with bearing strata and underlying aquifers:**

**Subtask 2.3: To create the detailed local model for the area of mercury contaminated groundwater**

- **State / Situation at the beginning of the current quarter**

Inverse non stationary task was solved. Change in hydro geological conditions since 1970 till 2001 was represented in the model. Coefficients of both elastic and gravity water loss of bearing strata were found as well as groundwater recharge as a result of losses of technical water from engineering pipelines was made more exact.

- **Fulfilled work**

Calibration of the local model was completed. The parameters found do not contradict experimental data, obtained as a result of field works and laboratory study. The calibration results enable to say about adequacy of the new local model to existing natural conditions

- **Results by the end of the current quarter**

Three-dimensional demonstration variant of the local model was produced.

- **Personnel Commitments**

Name	Category	Work days
<b>IHH</b>		
Panichkin Vladimir Yurievich	2	40
Miroshnichenko Oxana Leonidovna	2	40
Trushel' Lyudmila Yurievna	2	16
Zakharova Nonna Maximovna	2	14

**Task 3: Study of the spread of groundwater plume contaminated with oil products from the territory of Pavlodar Oil Refinery; development of model and assessment of environmental risk posed by oil-products contamination of groundwater in the Northern industrial area of Pavlodar. Subtask 3.2: Basing on the hydro-geological model of Northern industrial area of Pavlodar to estimate the most likely direction of the plume of oil products with groundwater**

- **State / Situation at the beginning of the current quarter**

In order to choose probable direction of the spread of groundwater plume contaminated with oil products it is necessary to conduct groundwater monitoring according to existing network of observation boreholes belonging to Pavlodar Oil Refinery (POR) as well as boreholes located beyond its industrial area between the plant and Pavlodarskoe village. In 2001-2005 an access to these boreholes was free. In fall of 2006 during soil sampling near the borehole #54 (see Quarter IV report on K-1240 project, Section 1.1.2.4.; Annual Report for the first year of K-1240 project, Section 8.1.3.2.) AIPET team was warned by security of POR about necessity to have permission to conduct some work with the boreholes belonging to POR as well as in the vicinity of them.

- **Fulfilled work**

Official letter with offer for cooperation with ISTC K-1240 project and request to provide with an access to observation boreholes network belonging to POR was addressed to Mr. V.G. Fomin, Chief Executive of JSC "Pavlodar Oil Refinery".

- **Results by the end of the current quarter**

Verbal refusal of the request to provide with an access to observation boreholes network belonging to POR was received.

- **Personnel Commitments**

Name	Category	Work days
<b>AIPET</b>		
Ilyushchenko Mikhail Alexeevich	1	2
Yakovleva Lyudmila Vassilievna	2	4

**Task 4: Assessment of possibility to contain the risk posed by mercury pollution of lake Balkyldak including the fish within it.**

**Subtask 4.3: To create and analyze the map of Hg contamination of bottom sediments using the software package "ArcGIS – Spatial Analysis".**

- **State / Situation at the beginning of the current quarter**

Within GIS of the wastewater storage pond Balkyldak preliminary vector map of the pond depths (bathymetric map), thickness of its bottom sediments and their mercury contamination was

produced using software package “ArcGIS – Spatial Analysis” on the results of testing of 69 points (about 1/3 of the scheduled work) as well as preliminary calculation of amount of mercury deposited in the bottom sediment of the pond Balkyldak was done.

- **Fulfilled work**

In March of 2007 additionally 159 samples of bottom sediments of the wastewater storage pond Balkyldak were taken from 94 testing points (a little more than 80 % of total work content), measurements of the pond depths and sediment thickness were taken. The samples frozen were delivered to Almaty to Chemical and Analytical Laboratory. Vector map of depths of the wastewater storage pond Balkyldak and thickness of its bottom sediments was produced using software package “ArcGIS – Spatial Analysis” (see Annex 1).

- **Results by the end of the current quarter**

The vector map of depths of the wastewater storage pond Balkyldak and thickness of its bottom sediments showed decrease in deposit of mercury contaminated sediments as well as a mercury thereafter compared to the preliminary map of 2006.

- **Personnel Commitments**

Name	Category	Work days
<b>AIPET</b>		
Kamberov Rustam Irkenovich	2	36
Stepanov Vladimir Alexandrovich	3	27
Sharov Boris Alexandrovich	1	20
Primbetova Galina Iskanderovna	1	20
Kiseleva Raisa Alexandrovna	1	20
Shevchenko Natalia Nikolaevna	1	20
Aksenova Tatyana Vladimirovna	1	20
<b>PSU</b>		
Malkov Igor Viktorovich	1	11
Kuzmin Valery Sergeevich	1	25
Pastukh Viktor Petrovich	1	25
Bazarbekov Kairbai Urazambekovich	2	6
Kalieva Aida Akhmetbekovna	2	28

**Task 5: To draw up and discuss with local stakeholders the recommendations for the 2<sup>nd</sup> stage of demercurization and other remediation activities in the area of the former PO “Khimprom” (Northern industrial area of Pavlodar), including the recommendation for abolishment or further safe use of the wastewater storage pond – lake Balkyldak:**

**Subtask 5.1: To discuss the work program and obtained results with Pavlodar Territorial Department of Environmental Protection and with the managers of Pavlodar Chemical Plant.**

- **State / Situation at the beginning of the current quarter**

The results of mercury monitoring conducted within ISTC K-1240p in 2006 were regularly discussed with administration of Pavlodar Oblast Territorial Department of Environmental Protection, Environmental Protection Department of Oblast Akimat as well as with administrations of PCP and JSC “Kaustik” and Office of Public Prosecutor of Pavlodar oblast.

- **Fulfilled work**

The results of mercury monitoring of groundwater, soils and bottom sediments of the wastewater storage pond Balkyldak in the Northern industrial area of Pavlodar as well as necessity and possibility to conduct monitoring of groundwater for oil products have been discussed with administrations of Pavlodar Oblast Territorial Department of Environmental Protection, JSC “Pavlodar

Oil Refinery” and JSC “Kaustik”. Possibility to conduct monitoring of oil products in Pavlodar has also been discussed with Head of BMP.

- **Results by the end of the current quarter**

As a result of the discussion it was recommended to ISTC K-1240p project to broaden its scope of activity on mercury monitoring and not to conduct monitoring of oil products.

- **Personnel Commitments**

Name	Category	Work days
<b>AIPET</b>		
Ilyushchenko Mikhail Alexeevich	1	4
Muhkamejanov Khamit Waliachmetovich	2	3
Yakovleva Lyudmila Vassilievna	2	5
Mikhailenko Nataliya Alexandrovna	2	5
Uskov Grigoriy Alexandrovich	2	4
<b>PCP</b>		
Akhmetov Arthur Darazhatovich	1	20
Kuzmenko Larissa Vitalievna	1	18

### Subtask 5.2: To hold the workshops, press-conferences and presentation in order to discuss the interim results.

- **State / Situation at the beginning of the current quarter**

In 2006 the results of the mercury monitoring conducted within ISTC K-1240 project were discussed in mass media and with the public of the city of Pavlodar.

- **Fulfilled work**

In March, 2007 preparation of International Workshop on mercury danger funded by ISTC with support of Global Partnership Program was started which was planned to hold in Kazakhstan on the 28 May-1 June, 2007. AIPET took upon itself the Workshop preparation and holding at the support of Ministry of Environmental Protection of the Republic of Kazakhstan, Pavlodar Oblast Territorial Department of Environmental Protection and JSC “Kaustik”.

- **Results by the end of the current quarter**

Timing and location (Astana City) of the Workshop was determined, Application Form: ISTC Scientific Workshop Program was prepared, subjects were determined.

- **Personnel Commitments**

Name	Category	Work days
<b>AIPET</b>		
Ilyushchenko Mikhail Alexeevich	1	4
Yakovleva Lyudmila Vassilievna	2	10
Kamberov Rustam Irkenovich	2	18
<b>PCP</b>		
Akhmetov Arthur Darazhatovich	1	18
Kuzmenko Larissa Vitalievna	1	20

### Task 0: Project Management

- **Fulfilled work**

The Report for Quarter VI was prepared as well as possibility of correction of ISTC K-1240p Work Plan and budget in VIII quarter were discussed.

- **Personnel Commitments**

Name	Category	Work days
<b>AIPET</b>		
Ilyushchenko Mikhail Alexeevich	1	8
Mikhailenko Nataliya Alexandrovna	2	25
Yakovleva Lyudmila Vassilievna	2	10
Ibraeva Alma Abylkasymovna	3	15

## 2. Summary of Personnel Commitments

	Man/day	Total days	Total grants (US\$)
Category I	11	265	7520
Category II	12	369	10932
Category III	2	42	705
Category IV			
<b>Total:</b>	<b>25</b>	<b>676</b>	<b>19157</b>

### Change in the project personnel

Name	Previous			Newly appointed			Comments
	Category	Daily rate	Work days	Category	Daily rate	Work days	
no							

## 3. Preparation of reports and publications

1. Report for the Quarter VI has been prepared
2. Website <http://Hg-Pavlodar.narod.ru> has been renewed: a section related to ISTC K-1240p project has been inserted; the text of the section “Mercury pollution management and monitoring in Pavlodar City, the Republic of Kazakhstan” has been extended; English version of the website has been created; illustrations have been added.

## 4. Significant Travel and Meetings

### 4.1. Travel and meetings inside CIS

1. Almaty-Stepnogorsk-Almaty  
4 days, February, 2007  
Uskov Grigoriy Alexandrovich  
The town of Stepnogorsk  
In the town of Stepnogorsk capabilities of BML JSC “Biomedpreparat – Engineering Center”, Laboratory of Monitoring to conduct works on determination of oil products in groundwater of the Northern industrial area of Pavlodar was discussed.
2. Almaty-Pavlodar Almaty  
23 days, March, 2007  
Muhkamejanov Khamit Waliachmetovich  
Stepanov Vladimir Alexandrovich

In Pavlodar field works were conducted on sampling of bottom sediments of the wastewater storage pond Balkyldak

#### 4.2. Travel and meetings outside CIS

1. Almaty-Southampton (United Kingdom)-Almaty (not from the budget of ISTC K-1240p project)  
6 days, February, 2007  
Ilyushchenko Mikhail Alexeevich  
Yakovleva Lyudmila Vassilievna  
Participation in Scientific Workshop “Biomercury”, held by Southampton University. Results of post-demercurization monitoring of the mercury contamination conducted at the area of the former PO ‘Khimprom’, Pavlodar, Kazakhstan were presented and discussed.

#### 5. Co-operation with foreign collaborators

On the 24 of February, 2007 in Southampton University the meeting with Paul Randall, Project Coordinator and Trevor Tanton, Project Collaborator was conducted where the results of the first year of ISTC K-1240p project, the situation with insufficient participation of partners that is PCP/Kaustik and BML in the works on the project and also possible changes in the plan of works on monitoring were discussed.

#### 6. Procurement

Number in accordance with Work Plan	Name	Status
no		

#### 7. Questions, suggestions

(Including plans for the next quarter(s), if initial Work Plan has been changed significantly).

In the Quarter V during discussing the Quarter and Annual reports with Michael Valentine, Curator of the project and at the meeting in February, 2007 in Southampton University with Paul Randall, Project Coordinator and Trevor Tanton, Project Collaborator possibilities of correction in Quarter VI of the Work Plan and K-1240 project internal budget were discussed. In order to justify the necessity to substitute additional works on mercury monitoring for works on oil products monitoring it was recommended to the Project Manager to discuss this problem with administration of Kaustik, POR and Pavlodar regional authority from environmental protection departments.



## ANNEX

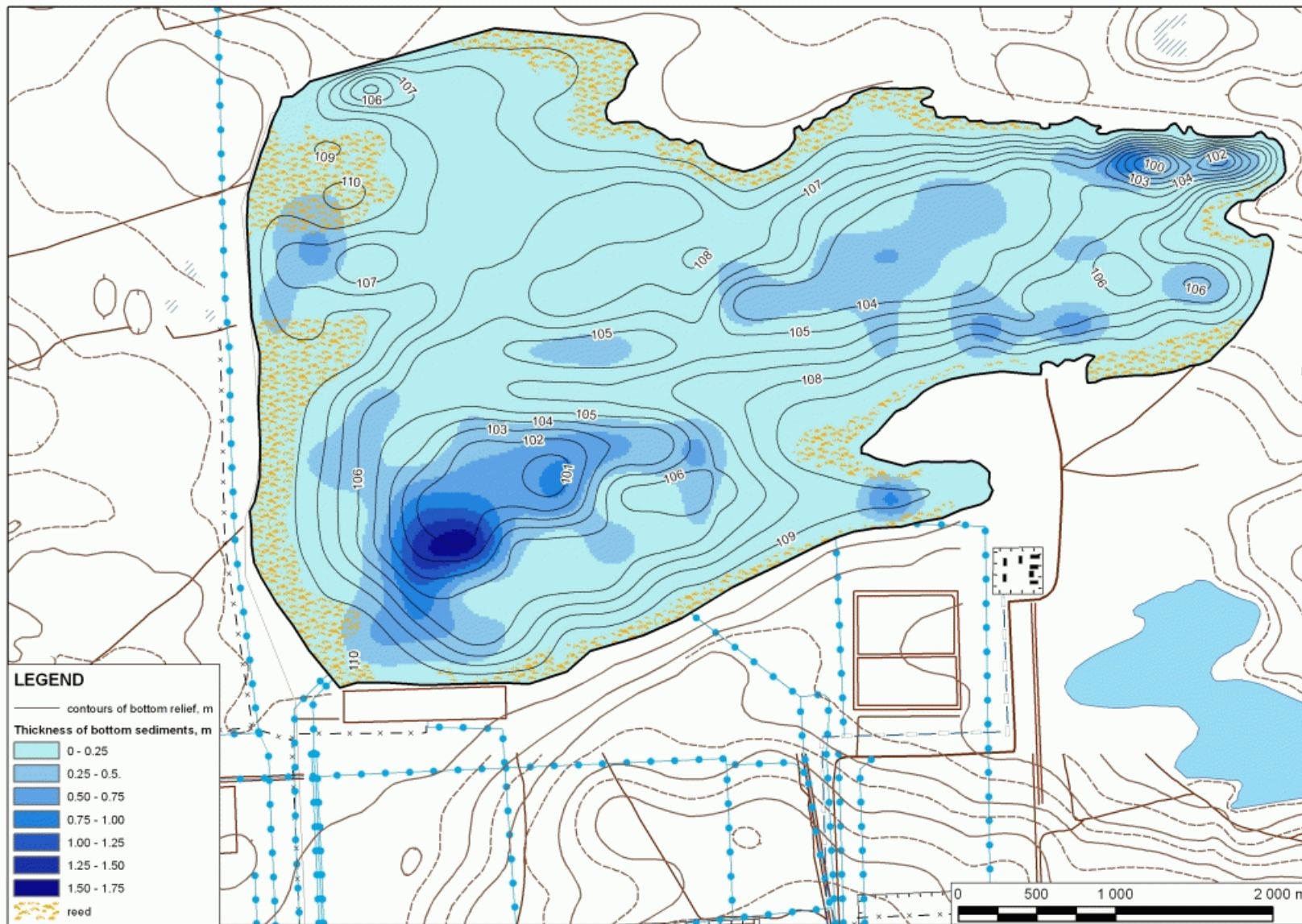


Fig.1. Map of the wastewater storage pond Balkyldak depths and thickness of its bottom sediments