



Environmental Monitoring Report

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PRC: SHANXI ROAD DEVELOPMENT II PROJECT Report No. 1 on Environmental Monitoring in Operational Period

Prepared by Shanxi Environment Monitoring & Testing Center of Communications
Shanxi, People's Republic of China

For Shanxi Hou-yu Expressway Construction Co. Ltd.

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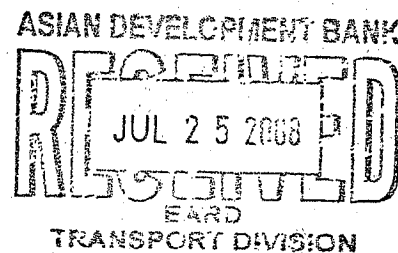
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REPORT No.1
ON ENVIRONMENTAL MONITORING
IN OPERATIONAL PERIOD

Entrusted by: Shanxi Hou-yu Expressway Construction Co. Ltd

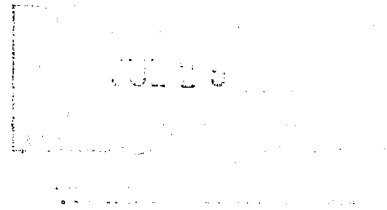
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Foreword

Shanxi Houma-Yumenkou Expressway is a part of national trunk road from Erlianhot to Hekou. It's also an integral section of provincial latitude road network in Shanxi. After completion of this project, it will greatly improve the local traffic situation, which is very conducive to the economic development in Shanxi.

This project began in May 2004, and went into operation by the end of December, 2006. Entrusted by Shanxi Hou-yu Expressway Construction Co. Ltd, Shanxi Environmental Monitoring & Testing Center (SEMTC) carried out systematic environment monitoring test along the Project alignment from July in 2007 to June in 2008. In our working process, we strictly followed the regulations issued by the State Environmental Protection Bureau, Shanxi Provincial Environmental Protection Bureau and Shanxi Provincial Communications Department. Based on the monitoring results, we compiled this report.

Finally, we would like to acknowledge strong support and close cooperation that Shanxi Hou-yu Expressway Construction Co. Ltd has given us in the monitoring work.

ENVIRONMENT MONITORING IN OPERATIONAL PERIOD

REPORT No. 1

1 General Introduction

1.1 Basis for Work

This investigation was based on "Contract of Shanxi Houma-Yumenkou Expressway Environmental Monitoring In Operational Period" and relevant requirements in the "Environment Impact Assessment (EIA)".

1.2 Guides & Purpose

This investigation was focused on air, noise and surface water quality along the line. We adopted objective working principle and strictly followed relevant environmental monitoring regulations of various levels. Through the assessment on environmental situation along the line, we can provide scientific information for environmental protection of this expressway during operational period, which is beneficial to the coordinated development between road construction and environment protection.

1.3 Monitoring Period

We took the samples 4 times from August 14, 2007 to May 6, 2008, and road was normally open to traffic during the investigation.

1.4 Evaluation Standards of Environment Quality

1.4.1 Environmental Air

Contents of CO and NO₂ in the air should conform to level II stipulated in "Quality Standards of the Environmental Air" (GB3095-1996). The standard value is listed in table 1-1.

Table1-1 Environmental air quality standard (extracted)

Name of pollutants		Limited value (mg/m ³)
CO	Day average	4.00
NO ₂	Day average	0.08

1.4.2 Environmental Noise

Environmental Noise quality is required to conform to the Scale IV stipulated in "Environment Noise Standards in Urban Area(GB3096-93)." The concerned limit values read as follow:

Table1-2 Limited Values of Noise in Urban Area (extracted)

Leq: dB (A)

Scale	Daytime	Night
4	70	55

1.4.3 Surface Water

Execute the Scale IV in "Surface Water Environmental Quality Standards (GHZB1-1999)". SS is required to conform to Dry-Farming Scale II stipulated in "Agricultural Irrigation Water Standards (GB5084-92)". The concerned values are listed in table 1-3.

Table 1-3 Water Quality Evaluation Standards (extracted)

Unit:mg/L (without pH)

Evaluation Standards		pH	CODcr	SS	Pb	Oil
GHZB1-1999 (Surface Water Scale IV)	Limited values	6.5-8.5	30	-	0.05	0.5
GB5084-92 (Dry-Farming Scale II)	Limited value	-	-	200	-	-

1.5 Assurance for Monitoring Quality

Following the related requirements in the document of SEPA(91) HJZ No.043 "About Management Regulations of Environmental Monitoring Quality Guarantee (interim)", we have worked out a "Quality Control Plan" and strictly carry it out to ensure accuracy of the data. Including:

- All monitoring personnel are qualified and certified.
- All monitoring instruments employed by our center must be checked by authoritative measuring bureau before use in order to guarantee the reliability of test data.
- Strictly follow the test methods stipulated in the related standards of the state.

2 Air Quality Monitoring Results & its Analysis

2.1 Monitoring Points, Items and Times

Look at Table 2-1 for monitoring points, items and times.

Table 2-1 Monitoring points, items and times

Order	Monitoring points	Monitored item	Monitoring frequency
1	LiuJianZhuang	NO ₂ CO	Monitor once a quarter, with 2 days every time.
2	CangTouCun		

2.2 Monitoring Methods

See Table 2-2 for monitoring methods:

Table 2-2 Monitoring Methods of Environmental Air

Monitored Item	Monitoring Methods	From
NO ₂	saltzman	GB/T15435-95
CO	Nondispersive ultra red ray	GB9801-88

2.3 Monitoring Results

See Table 2-3 for monitoring results:

Table 2-3 Monitoring Results of Environmental Air

unit mg/m ³							
Monitoring Points	Monitoring Period	Monitoring Results		Monitoring Points	Monitoring Period	Monitoring Results	
		NO ₂	CO			NO ₂	CO
Liu Jian zhuang	August 14, 2007	0.024	3.20	Cang Tou Cun	August 14, 2007	0.016	2.88
	August 15, 2007	0.031	3.64		August 15, 2007	0.030	3.40
	November 7, 2007	0.039	4.20		November 7, 2007	0.033	3.80
	November 8, 2007	0.032	3.76		November 8, 2007	0.029	3.62
	February 26, 2008	0.034	4.00		February 26, 2008	0.038	4.10
	February 27, 2008	0.036	4.30		February 27, 2008	0.030	3.18
	May 5, 2008	0.020	3.66		May 5, 2008	0.024	3.06
	May 6, 2008	0.028	2.80		May 6, 2008	0.020	3.20
Average		0.031	3.67	Average		0.028	3.41

2.4 Analysis of Air Quality Monitoring Results

Averages of NO₂ content on two monitoring points are 0.031 mg/m³ and 0.028 mg/m³ respectively, which all conform to current executive standard and show resilient environmental capacity.

Averages of CO content on two monitoring points are 3.67 mg/m³ and 3.41 mg/m³ respectively, which all meet current executive standard, but leave a little margin to the limit.

3 Noise Monitoring Results & its Analysis

3.1 Monitoring Method

The monitoring method we adopted was GB/T14623-93 from "Environmental Noise Monitoring Method in Urban Area". Monitoring instrument is Model HS6288D sound meter.

3.2 Monitoring Points, Items and Times

See table 3-1 for monitoring points and times

Table 3-1 Monitoring Points and Times for Noise

Order	Monitored points	monitored item	Frequency
1	BeiPingYuan	Noise : equivalent acoustic level A	Monitor once in daytime and at night respectively every quarter
2	LiuJianZhuang		
3	DongHan		
4	FuBo		
5	XinFeng		
6	LingLi		
7	CangTou		
8	CangTou school		

3.3 Monitoring Results

See table 3-2 for noise monitoring results:

Table 3-2 Noise Monitoring Results

Order	Monitoring points	Leq dB(A)							
		August, 2007		November, 2007		February, 2008		May, 2008	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
1	BeiPing Yuan	65.1	52.0	62.6	52.7	63.7	50.8	64.8	51.9
2	LiuJian Zhuang	64.8	50.0	66.1	53.0	60.0	51.5	67.2	52.9
3	DongHan	61.6	51.6	62.0	51.0	59.6	51.7	61.0	49.0
4	FuBo	61.8	50.5	60.3	50.6	58.1	48.6	61.0	53.1
5	XinFeng	59.6	52.8	63.3	52.2	63.6	53.5	60.1	48.8
6	LingLi	63.2	52.0	61.0	50.0	61.4	51.0	62.3	52.1
7	CangTou	59.8	51.6	59.6	52.2	60.8	51.6	62.0	51.8
8	CangTou school	56.6	50.8	61.0	51.4	56.3	49.6	62.2	52.3

3.4 Analysis on Environmental Air Quality

The recorded results on 8 monitoring points at day time are between 56.3dB and 67.2dB which are all less than the required limited value, 70dB.

The results between 48.6 dB and 53.5 dB are recorded on 8 monitoring points at night. All meet the requirement of limited value, 55 dB.

4 Surface water Monitoring Results & its Analysis

4.1 Tested Points, Tested Items, Frequency and Analysing Method

See table 4-1, 4-2 for the relevant information.

Table 4-1 Tested Point, Items, and Frequency

Monitored Points	Items	Frequency	Remarks
100m away in the upper reaches from Grand Yellow River Bridge	Ph, CODcr SS, Pb, Oil	Twice every year	5 tested points along the cross-section
200m away in the lower reaches from Grand Yellow River Bridge	Ph, CODcr SS, Pb, Oil	Twice every year	5 tested points along the cross-section

Table 4-2 Testing Methods

Order	Items	Testing methods	Relevant national standards
1	pH	glass electrode method	GB6920-86
2	CODcr	potassium dichromate method	GB11914-89
3	SS	gravimetric method	GB11901-89
4	Pb	atomic absorption method	Testing Methods of Surface Water and Waste Water (4 th edition)
5	Oil	infrared spectrophotometry	GB/T16488-1996

4.2 Testing Results

See table 4-3, 4-4, 4-5 for monitoring results about water:

Table 4-3 Testing Results of Water Quality in the Upper Reaches of Grand

Yellow River Bridge

Items Point Numbers		pH	CODcr (mg/L)	SS (mg/L)	Pb (mg/L)	Oil (mg/L)
1	August 14, 2007	8.08	14.6	580	Not detected	0.18
	May 6, 2008	7.98	11.0	512	Not detected	0.22
2	August 14, 2007	7.82	12.4	408	Not detected	0.20
	May 6, 2008	7.96	15.0	475	Not detected	0.18
3	August 14, 2007	7.90	14.3	490	Not detected	0.17
	May 6, 2008	8.06	14.5	580	Not detected	0.15
4	August 14, 2007	8.00	14.4	455	Not detected	0.13
	May 6, 2008	7.95	13.8	518	Not detected	0.14
5	August 14, 2007	8.03	13.6	633	Not detected	0.16
	May 6, 2008	8.10	14.5	410	Not detected	0.10
Averages		7.99	13.8	506	Not detected	0.16

Table 4-4 Testing Results of Water Quality in the Lower Reaches of Grand Yellow River Bridge

Items Point Numbers		pH	CODcr (mg/L)	SS (mg/L)	Pb (mg/L)	Oil (mg/L)
1	August 14, 2007	7.99	12.6	622	Not detected	0.16
	May 6, 2008	7.90	13.6	486	Not detected	0.25
2	August 14, 2007	7.96	14.7	320	Not detected	0.16
	May 6, 2008	8.11	12.2	576	Not detected	0.16
3	August 14, 2007	8.04	11.2	465	Not detected	0.18
	May 6, 2008	7.90	13.6	565	Not detected	0.15
4	August 14, 2007	8.09	15.2	600	Not detected	0.20
	May 6, 2008	7.88	13.6	558	Not detected	0.25
5	August 14, 2007	7.95	13.0	596	Not detected	0.15
	May 6, 2008	8.11	14.6	549	Not detected	0.21
Averages		7.99	13.4	534	Not detected	0.19

Table 4-5 Comparison of Water Quality in the Upper Reaches with That of Lower Reaches of the Grand Yellow River Bridge

Items	pH	CODcr (mg/L)	SS (mg/L)	Pb (mg/L)	Oil (mg/L)
Averages in the upper reaches	7.99	13.8	506	Not detected	0.16
Over proof multiple	Not over limit	Not over limit	1.53	Not detected	Not over limit
Averages in the lower reaches	7.99	13.4	534	Not detected	0.19
Over proof multiple	Not over limit	Not over limit	1.67	Not over limit	Not over limit

4.3 Analysis on Surface Water Quality

It shows from 3 tables above that monitored results of pH、CODcr、Pb and oil all meet standards, SS exceeds limit, and Over proof multiples are 1.53 and 1.67

respectively at one cross-section 100m away in the upper reaches and another cross-section 200m away in the lower reaches from the Grand Yellow River Bridge. Monitored values about water quality at these two sections of Yellow River are very close, which demonstrates that the bridge's openness to traffic made no big difference on the water quality in the river.

Appendix:**Measured Meteorological Data along the HouYu Expressway**

Points		August 14, 2007				August 15, 2007			
		7:00	11:00	15:00	19:00	7:00	11:00	15:00	19:00
Liu Jian Zhuang	temperature	24	29	32	30	23	30	34	31
	Air pressure	90.6	90.6	90.4	90.4	90.2	90.2	90.2	90.2
	Wind velocity	windless	windless	windless	windless	windless	windless	windless	windless
	Wind direction	-	-	-	-	-	-	-	-
Cang Tou Cun	temperature	25	29	32	30	23	30	34	30
	Air pressure	90.8	90.8	90.7	90.7	90.4	90.4	90.2	90.2
	Wind velocity	windless	windless	windless	windless	windless	windless	windless	windless
	Wind direction	-	-	-	-	-	-	-	-

Note: related units in this table: "°C" for air temperature, "kpa" for air pressure, "m/s" for wind velocity, degree"°" for wind direction.

Measured Meteorological Data along the HouYu Expressway

Points		November 7, 2007				November 8, 2007			
		7:00	11:00	15:00	19:00	7:00	11:00	15:00	19:00
Liu Jian Zhuang	temperature	2	13	17	6	0	7	11	3
	Air pressure	92.2	92.0	92.0	92.0	92.3	92.3	92.3	92.3
	Wind velocity	windless	windless	windless	windless	windless	windless	windless	windless
	Wind direction	-	-	-	-	-	-	-	-
Cang Tou Cun	temperature	1	12	17	6	0	7	11	3
	Air pressure	92.4	92.4	92.4	92.4	92.0	92.0	92.0	92.0
	Wind velocity	windless	windless	windless	windless	windless	windless	windless	windless
	Wind direction	-	-	-	-	-	-	-	-

Note: related units in this table: "°C" for air temperature, "kpa" for air pressure, "m/s" for wind velocity, degree"°" for wind direction.

Measured Meteorological Data along the HouYu Expressway

Points		February 26, 2008				February 27, 2008			
		7:00	11:00	7:00	11:00	7:00	11:00	7:00	11:00
Liu Jian Zhuang	temperture	-5	0	4	-2	-1	2	8	0
	Air press- ure	93.0	93.0	93.0	93.0	93.0	93.0	93.0	93.0
	Wind velocity	windless	windless	windless	windless	windless	windless	windless	windless
	Wind direction	-	-	-	-	-	-	-	-
Cang Tou Cun	temperture	-5	0	4	-2	-1	2	8	0
	Air press- ure	93.0	93.0	93.0	93.0	92.6	92.6	92.6	92.6
	Wind velocity	windless	windless	windless	windless	windless	windless	windless	windless
	Wind direction	-	-	-	-	-	-	-	-

Note: related units in this table: "°C" for air temperature, "kpa" for air pressure, "m/s" for wind velocity, degree"°" for wind direction.

Measured Meteorological Data along the HouYu Expressway

Points		May 5, 2008				May 6, 2008			
		7:00	11:00	7:00	11:00	7:00	11:00	7:00	11:00
Liu Jian Zhuang	temperture	15	23	27	23	19	26	33	25
	Air press- ure	91.0	91.0	90.9	91.0	91.0	91.0	91.0	91.0
	Wind velocity	windless	windless	windless	windless	windless	windless	windless	windless
	Wind direction	-	-	-	-	-	-	-	-
Cang Tou Cun	temperture	15	23	27	23	19	26	33	25
	Air press- ure	91.0	91.0	90.8	91.0	91.0	90.9	91.0	91.0
	Wind velocity	windless	windless	windless	windless	windless	windless	windless	windless
	Wind direction	-	-	-	-	-	-	-	-

Note: related units in this table: "°C" for air temperature, "kpa" for air pressure, "m/s" for wind velocity, degree"°" for wind direction.



Grand LongMen Bridge Across the Yellow River