Environmental Monitoring Report

Project Number: 34097
December 2006

PRC: SHANXI ROAD DEVELOPMENT II PROJECT
Quarterly Report No. 10
on Environment Monitoring
in Construction Period

Prepared by Shanxi Environment Monitoring & Testing Center of Communications

Shanxi, People's Republic of China

For Shanxi Hou-yu Expressway Construction Co. Ltd.

Asian Development Bank

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SHANXI HOUMA - YUMENKOU EXPRESSWAY

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QUARTERLY REPORT NO. 10
ON ENVIRONMENT MONITORING
IN CONSTRUCTION PERIOD

Shanxi Environment Monitoring &Testing Center of Communications

December, 2006

Project Name: **Environment Monitoring in Construction Period**

For Shanxi Houma - Yumenkou Expressway

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d) Any comments on the report are always appreciated, but the question on the data in the report should be called within 10 days from your receiving.

CONTENTS

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 this project is completed, 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 the expected construction period is three years. 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 October to December in 2006. 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 test results, we compiled this quarterly report in construction period.

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

1. General Introduction

1.1 Geographic Position & Direction of the Expressway

The proposed Shanxi Houma-Yumenkou Expressway is located at 35°23′ to 36°55′ N and 110°15′ to 112°23′E in southwest of Shanxi province, and its entire length is 66.84km. It is a section of national trunk road from Erlianhot to Hekou. This road is started from Houma traffic hub, passing through Xinjiang county, Jishan county and Hejin city and crossing over Yellow River, and finally ended at a place near Xiyuanqian in Shaanxi province.

1.2 Basis for Work

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

1.3 Guides & Purpose

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

1.4 Monitoring Period and General Situation of Road Construction

We took the samples three times from October 16 to December 9. The construction companies had almost finished road pavement work and were installing traffic-engineering facilities at that time.

1.5 Evaluation Standards of Environment Quality

Construction companies should follow the regulations of environmental protection approved by relevant administrations in the period of project design, construction, acceptance test and its operation. This rule was stated in No.3 document, with its name of Management on Environmental Protection Standards issued by China environmental protection agency in 1999. So we implemented these environmental protection standards in the monitoring work of road construction period. For what was not mentioned in previous regulations，we follow

current environmental protection standards according to the practical conditions.

a) Environmental Air

Total suspended particle（TSP）should meet standard of Class Ⅱ demanded 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 pollutant		Limited value（mg/m^3）
TSP	Day average	0.30

b) Environmental Noise

We conducted test according to the information provided by book "Limited Values of Noise on Construction Sites"（GB12523-90）, part of which is listed in table1-2.

Table1-2 Limited values of noise on construction sites (extracted)

Leq dB（A）

Construction period	Main source of noise	Limited values of noise	
		Daytime	Night
Earth & stone work	Bulldozer, excavator、charger etc	75	55
Pile driving	Different kinds of pile driving machine	85	No construction
Structure	Concrete mixer, tamping bar, electric saw etc	70	55
Installation	Crane, Elevator etc	65	55

1.6 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 out it to ensure the correctness of the data. Including:

a. All monitoring personnel are qualified and certified.

b. 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.

c. Strictly follow the test methods stipulated in the related standards of the state.

2 Monitoring Results of Environment Quality

2.1 Monitoring Results on Air Quality & Analysis

2.1.1 Monitoring Analysis Methods

See Table 2-1 for monitoring analysis methods

Table 2-1 Monitoring analysis method for environmental air

Tested item	Testing method	Method number
TSP	Gravimetric method	GB/T15432-95

2.1.2 Monitored Points，Items and Times

See Table 2-2 for monitoring points，items and times

Table 2-2 Monitored points，items and times

Order	Monitored points	chainage	Monitored item	Monitoring frequency
1	BeiPingYuan	K0+500	TSP	Testing for 3 consecutive days with at least 12 hours for sampling every day
2	DongHang	K14+300		
3	FuBo	K44+500		
4	CangTou school	K58+250		

2.1.3 Monitoring Results and its Analysis

See Table 2-3 for monitoring results

Table 2-3 Monitoring results of environmental air unit ： mg/m^3

Item	Monitor-ed points	Measured values								
		October			November			December		
		16th	17th	18 th	13 th	14th	15 th	7th	8 th	9 th
TSP	BeiPingYuan	0.33	0.40	0.37	0.37	0.34	0.41	0.42	0.39	0.38
	DongHan	0.35	0.33	0.38	0.36	0.40	0.39	0.36	0.37	0.40
	FuBo	0.32	0.36	0.36	0.36	0.39	0.42	0.40	0.38	0.42
	CangTou school	0.34	0.36	0.38	0.36	0.39	0.41	0.42	0.39	0.36

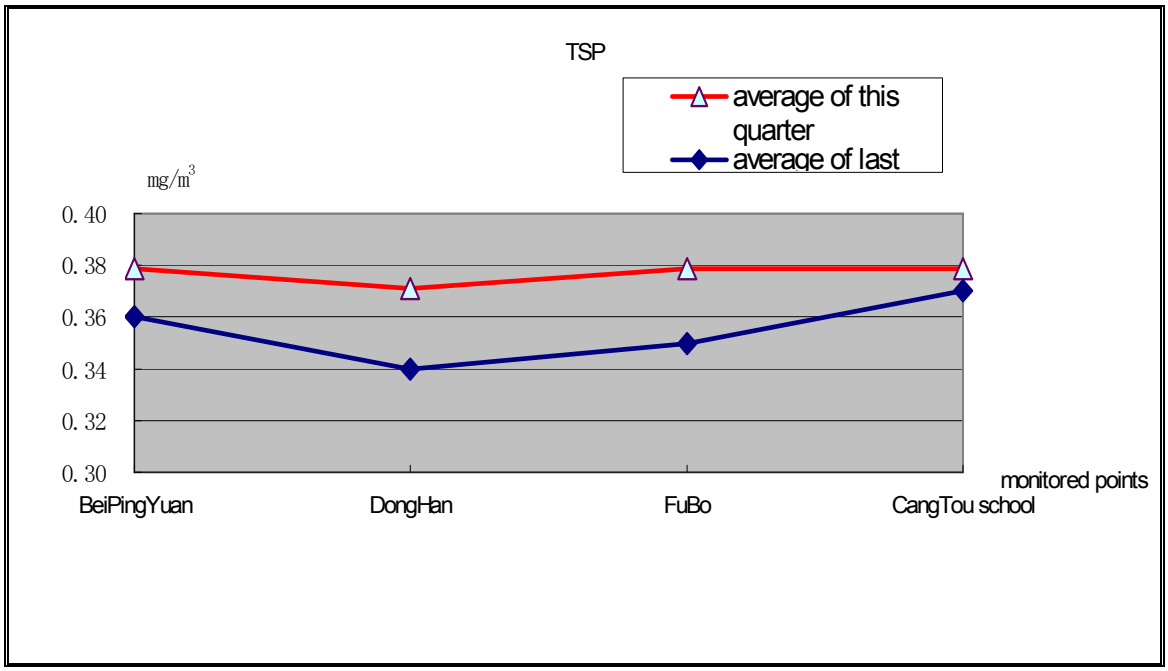
Table 2-4 Statistical table of monitoring results on environmental air

order	Tested points	Range of measured data (mg/m^3)	average (mg/m^3)	Overproof multiple	Maximum overproof multiple
1	BeiPingYuan	0.33-0.42	0.38	0.27	0.40
2	DongHan	0.33-0.40	0.37	0.23	0.33
3	FuBo	0.32-0.42	0.38	0.27	0.40
4	CangTou school	0.34-0.42	0.38	0.27	0.40
Standard value		0.30			

2.1.4 Analysis of Air Monitoring Results

Analysis of monitoring results: The range of TSP values in 3 months is from 0.32 mg/m^3 to 0.42mg/m^3. The average of every tested point in 3 months all exceed standard value. The overproof multiples are between 0.23 and 0.27. The maximum overproof multiple this time is 0.40.

2.1.5 Analysis of Air Quality Variation



Graph 1: Quarterly variation of air quality

From the graph above, we can learn that the averages of TSP values in 4 sensitive points go up to some extent compared with that of last quarter.

2.2 Monitoring Results on Noise & Analysis

2.2.1 Monitoring Method

Measurement was conducted according to *GB/T12524-90* “measurement method for noise in construction site”. Monitoring instrument: Model HS6288D sound level meter.

2.2.2 Monitoring Points，Items and Times

See table 2-5 for Monitoring Points，Items and Times

Table 2-5 Monitoring points for noise and times

Order	Monitored points	About monitoring points	monitored item	Frequency
1	BeiPingYuan	Residential area with roughly 400 inhabitants	Noise : equivalent acoustic level A	Measuring once at daytime and night respectively
2	ShuiXizhuang	Residential area with roughly 500 inhabitants		
3	DongHan	Residential area with roughly 500 inhabitants		
4	FuBo	Residential area with roughly 800 inhabitants		
5	XinFeng	Residential area with roughly 700 inhabitants		
6	LingLi	Residential area with roughly 600 inhabitants		
7	CangTou	Residential area with roughly 1700 inhabitants		
8	CangTou school	300 students		

2.2.3 Analysis on Monitoring Results

Monitoring results for noise is listed in table 2-6

Table 2-6 Monitoring results for noise

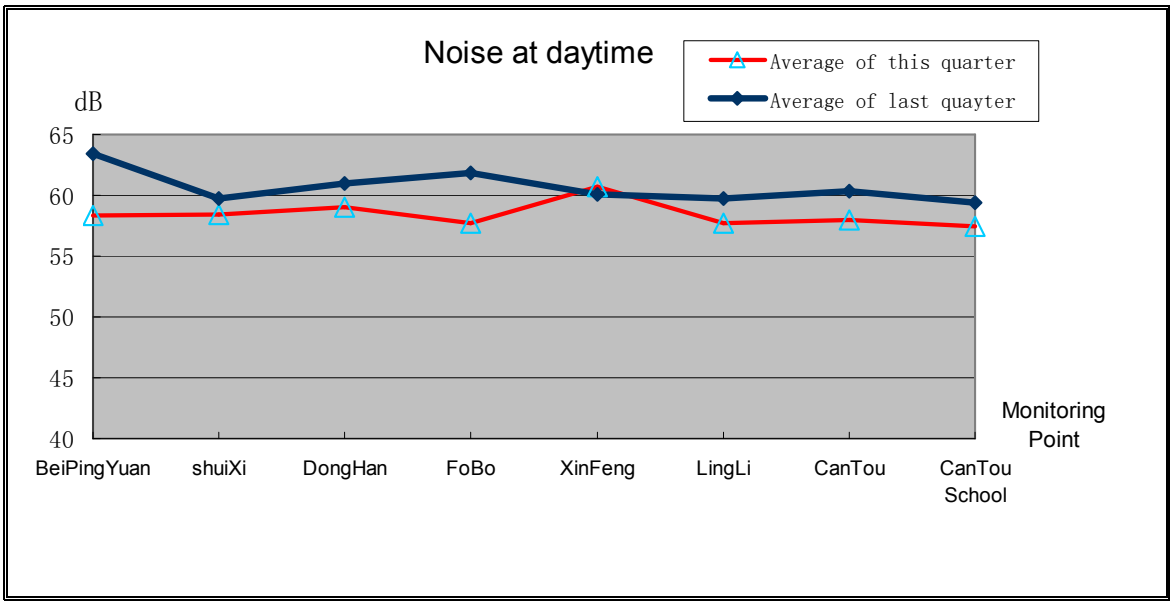
No.	Monitored points (villages)	Leq dB(A)					
		October		November		December	
		day	night	day	night	day	night
1	BeiPingYuan	60.2	47.8	56.1	47.9	58.7	50.2
2	ShuiXiZhuang	57.9	49.2	57.6	50.3	59.7	49.2
3	DongHan	60.1	48.4	57.4	49.6	59.6	47.7
4	FuBo	56.8	47.5	58.3	45.6	58.1	47.2
5	XinFeng	61.5	52.8	60.4	47.8	60.3	48.5
6	LingLi	57.2	49.6	57.5	46.2	58.4	46.4
7	CangTou	57.8	46.1	56.3	47.2	59.8	45.6
8	CangTou school	58.3	46.8	56.8	46.4	57.3	47.7

2.2.4 Noise Monitoring Results & its Analysis

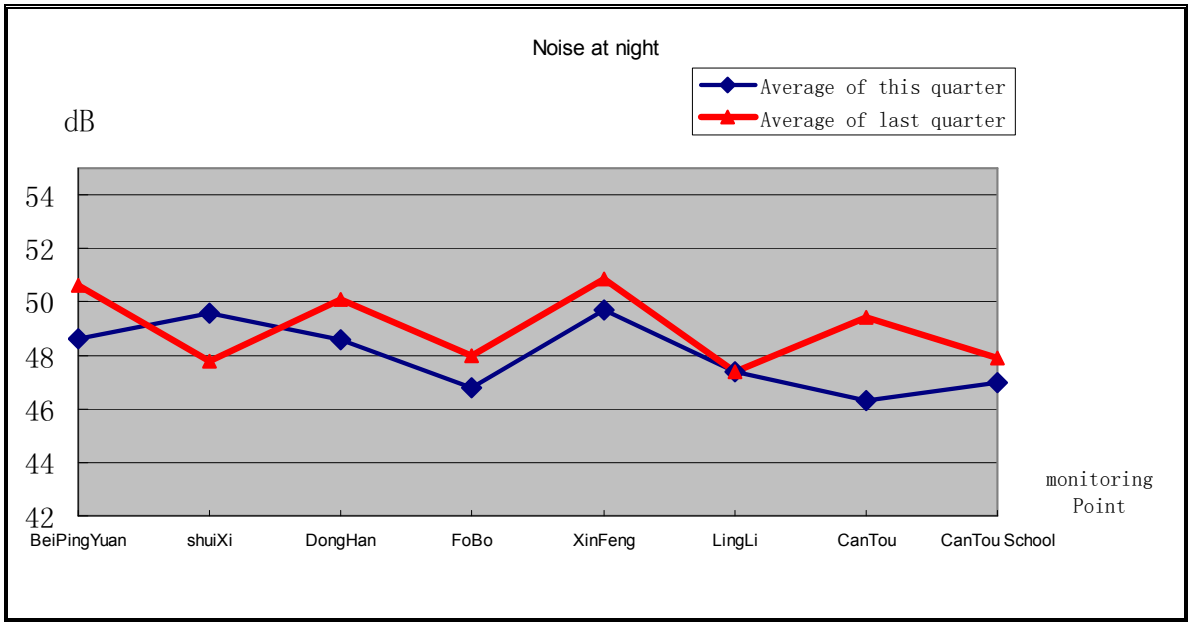
（1）The recorded results are between 56.1dB and 61.5dB on 8 monitored points at day time. All meet the requirement stipulated in “Limited Values of Noise on Construction Sites”.

（2）The results between 45.6 dB and 52.8 dB are recorded on 8 monitored points at night. All meet the requirement of limited value，55 dB.

2.2.5 Analysis on Environmental Noise Quality Variation



Graph2: Quarterly variation of noise at daytime



Graph3: Quarterly variation of noise at night

From the chart above, we can see that environmental noise quality this time at night basically kept stable and declined a little at day time compared with last quarter.

3 Environmental Quality Assessment

From what we have described above, we can see overall environmental condition along the alignment keeps relatively stable while road pavement has already been finished. It is because relevant construction companies adopted effective environmental protection measures according to *HouYu Expressway Environment Protection Strategies*. TSP values in this quarter exceed standard and go up a little compared with that of last quarter because local inhabitants burned coal to warm their houses. All monitoring results of noise meet standard and keep relatively stable.

Appendix:

3 Measured meteorological data along the HouYu expressway

Time / Point		October 16th				October 17th				October 18th			
		Air temper-ature	Air pressure	wind velocity	wind irection	Airtempe rature	Air pressure	wind velocity	wind direc-tion	Air tempe-rature	Air pressure	wind velocity	wind direc-tion
Bei Ping Yuan	7:00	13	96.4	windless	-	12	96.8	windless	-	12	96.9	windless	-
	11:00	24	96.4	windless	-	23	96.5	windless	-	23	96.5	windless	-
	15:00	25	96.4	windless	-	24	96.5	windless	-	24	96.5	windless	-
	19:00	17	96.5	windless	-	16	96.5	windless	-	16	96.5	windless	-
Dong Han	7:00	13	96.6	windless	-	12	96.5	windless	-	12	96.5	windless	-
	11:00	24	96.4	windless	-	23	96.4	windless	-	24	96.4	windless	-
	15:00	24	96.4	windless	-	24	96.4	windless	-	24	96.4	windless	-
	19:00	15	96.4	windless	-	14	96.5	windless	-	15	96.4	windless	-
FuBo	7:00	13	97.0	windless	-	13	97.4	windless	-	13	97.4	windless	-
	11:00	23	97.0	windless	-	23	97.4	windless	-	23	97.3	windless	-
	15:00	24	97.2	windless	-	23	97.4	windless	-	22	97.3	windless	-
	19:00	16	97.2	windless	-	15	97.3	windless	-	16	97.3	windless	-
Cang Tou scho-ol	7:00	13	97.4	windless	-	11	97.5	windless	-	13	97.4	windless	-
	11:00	24	97.3	windless	-	23	97.5	windless	-	23	97.3	windless	-
	15:00	25	97.3	windless	-	25	97.5	windless	-	24	97.3	windless	-
	19:00	15	97.3	windless	-	15	97.5	windless	-	16	97.3	windless	-

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

Appendix:

4 Measured meteorological data along the houyu expressway

Time / Point		November 13th				November 14th				November 15th			
		Air tempe-rature	Air press-ure	wind velocity	Wind irec-tion	Air tempe rature	Air pressure	Windvelocity	wind direc-tion	Air tempe-rature	Air press-ure	wind velocity	wind dire-ction
Bei Ping Yuan	7:00	4	96.7	windless	-	5	96.7	windless	-	4	96.7	windless	-
	11:00	10	96.5	windless	-	9	96.5	windless	-	9	96.5	windless	-
	15:00	9	96.5	windless	-	9	96.5	windless	-	9	96.5	windless	-
	19:00	5	96.6	windless	-	7	96.6	windless	-	5	96.5	windless	-
Dong Han	7:00	4	97.3	windless	-	5	97.3	windless	-	4	97.3	windless	-
	11:00	10	97.2	windless	-	8	97.3	windless	-	9	97.3	windless	-
	15:00	9	97.2	windless	-	8	97.3	windless	-	8	97.2	windless	-
	19:00	5	97.2	windless	-	5	97.3	windless	-	5	97.2	windless	-
FuBo	7:00	4	97.8	windless	-	5	97.6	windless	-	4	97.6	windless	-
	11:00	9	97.8	windless	-	9	97.6	windless	-	9	97.6	windless	-
	15:00	8	97.7	windless	-	8	97.6	windless	-	8	97.6	windless	-
	19:00	6	97.7	windless	-	6	97.7	windless	-	5	97.6	windless	-
Cang Tou school	7:00	4	98.2	windless	-	5	98.2	windless	-	4	98.3	windless	-
	11:00	10	98.2	windless	-	10	98.2	windless	-	9	98.3	windless	-
	15:00	9	98.2	windless	-	9	98.2	windless	-	8	98.1	windless	-
	19:00	5	98.3	windless	-	5	98.3	windless	-	5	98.1	windless	-

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

Appendix:

5 Measured meteorological data along the HouYu expressway

Time / Point		December 7th				December 8th				Decemberr 9th			
		Air tempe-rature	Air press-ure	wind velocity	Wind direc-tion	Air tempe-rat ure	Air press-ure	wind velocity	wind direc-tion	Air tempe-rature	Air press-ure	wind velocity	Wind direc-tion
Bei Ping Yuan	7:00	-2	97.3	windless	-	-2	97.2	windless	-	-3	97.2	windless	-
	11:00	3	97.4	windless	-	4	97.2	windless	-	2	97.2	windless	-
	15:00	4	97.4	windless	-	4	97.2	windless	-	0	97.2	windless	-
	19:00	-1	97.4	windless	-	-1	97.3	windless	-	-2	97.3	windless	-
Dong Han	7:00	-2	97.5	windless	-	-2	97.5	windless	-	-2	97.5	windless	-
	11:00	4	97.5	windless	-	4	97.5	windless	-	4	97.5	windless	-
	15:00	4	97.5	windless	-	4	97.4	windless	-	5	97.5	windless	-
	19:00	-2	97.5	windless	-	-1	97.4	windless	-	-1	97.5	windless	-
FuBo	7:00	-2	97.4	windless	-	-2	97.5	windless	-	-3	97.4	windless	-
	11:00	4	97.4	windless	-	5	97.5	windless	-	4	97.4	windless	-
	15:00	5	97.4	windless	-	4	97.5	windless	-	4	97.3	windless	-
	19:00	-1	97.4	windless	-	0	97.5	windless	-	-2	97.3	windless	-
Cang Tou school	7:00	-3	98.2	windless	-	-1	98.3	windless	-	-2	98.0	windless	-
	11:00	4	98.2	windless	-	5	98.3	windless	-	4	98.1	windless	-
	15:00	4	98.3	windless	-	5	98.2	windless	-	5	98.1	windless	-
	19:00	-2	98.3	windless	-	-1	98.2	windless	-	-1	98.1	windless	-

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