CNT RECORDS

Community :	SEDRA	**Project/Phase :**	00103-Phase 3
From :	Branch of China Harbour Engineering Co Ltd.	**To :**	East Consulting Engineering Center
Type :	PLN-Plan	**Sub Type :**	HSE-Health and Safety
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Infrastructure works for Riyadh SEDRA Project Phase 3, 4 and 5.

Dust Management Procedure for PHASE-3

00103-CHE-PLN-HSE-0000010

REV. 00

08-July-2024

فرع شركة شاينا هاربور إنجينيرنج كمبني ليمتد
BRANCH OF CHINA HARBOUR ENGINEERING CO., LTD.
中国港湾工程有限责任公司沙特分公司

Document No.	Dust Management procedure for PHASE-3	Revision	00
	00103-CHE-PLN-HSE-0000010		

Infrastructure works for Riyadh SEDRA Project Phase 3, 4 and 5.

Dust Management Procedure for PHASE-3

00103-CHE-PLN-HSE-0000010

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		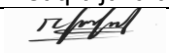		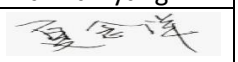	
REV	Date	Prepared By	Reviewed By	Approved By	Remarks

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‘SEDRA PROJECT D U S T M A N A G E M E N T’

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1. General

Construction activities can generate a large amount of dust that can cause significant impacts on air quality of surrounding areas. Dust emission originate from onsite activities such as bulk material transportation, loading and unloading, and the movement of vehicles and equipment. Construction dust is a nuisance to site workers, creates poor visibility (which increases the risk of accidents) and is harmful to health of workers, residents and fauna living within SEDRA (known as receptors). Dust pollution is one of the most serious problems during the construction phase and has the potential to impact environmental protection and human health. Environmental impact assessment should be carried before commissioning of any project.

2. Purpose

To outline contractual requirements for mitigating and controlling, to the greatest extent practicable, fugitive, or airborne dust emissions at all SEDRA Projects sites.

3. Scope

This document gives technical advice on how to:

- Minimize dust emissions from Projects
- Identify potential dust migration pathways
- Monitor dust emissions produced by site activities
- Implement corrective actions as required

4. Definitions and Abbreviations

Table 1 Abbreviations

Abbreviations	Explanation
FIFO	First In First Out
IFC	International Finance Corporation
KMZ	Keyhole Markup Language
KSA	Kingdom of Saudi Arabia
MOC	Management of Change
PM	Particulate Matter
STP	Sewage Treatment Plant
TSE	Treated Sewage Effluent
TMP	Traffic Management Plan

Table 2 Definitions

Term	Definition
Access road	An aggregate armored and stabilized roadway which acts as a defined point of ingress and egress from a site with disturbed soils.
Airborne dust	Airborne dust is particle, or Particulate Matter (PM), pollution, and is one of the most significant air pollutants.
Asphalt	A mixture of dark bituminous pitch with sand or gravel, used for surfacing roads, flooring, roofing, etc.
Audit	The examination or inspection of various documentation of an organizations management system by an auditor followed by physical checking of inventory to make sure that all departments are following documented system of recording transactions. It is done to ascertain the accuracy of statements provided by the organization.
Concrete	A building material made from a mixture of broken stone or gravel, sand, cement, and water, which can be spread or poured into molds and forms a mass resembling stone on hardening.
Construction materials	A list of construction materials includes cement, steel, sand, concrete, ready-mix concrete, binding wires, aggregates, bricks, blocks, etc.
Crusher	A machine designed to reduce large rocks into smaller rocks, gravel, sand, or rock dust.
Drop height	The targeted height of front loader bucket into the trailer of a haulage truck to reduce dust emissions.
Dry compaction	The process in which stress is applied to soil from a height causing densification as air is displaced from the pores between the soil grains.
Dust emissions	Particulate matter that is generated or emitted from open air operations.
Dust polymer	Biocompatible liquid polymers mixed as additives in water to prolong moist conditions of dust sources due to their liquid state. After water is evaporated, the liquid polymers maintain moisture on dust sources, resulting in significantly reduced emissions and extended effectiveness compared to conventional water suppression.
Dust suppression	The application of liquid (water, polymers, etc.) to restrict airborne dissemination of fine particles.
Excavation	The process of moving earth, rock or other materials with tools, equipment, or explosives. It includes earthworks, trenching, wall shafts, foundations, and tunneling.
Excavator	A large machine for digging and moving earth.
Friable material	A term used to describe materials that easily crumbles.
Fine sands	Sand composed of grains ranging from 0.10 to 0.25 mm in diameter.
Front loader	A vehicle with a large scoop in front that is used for digging and loading loose material.
Gravel	Loose rounded fragments of rock.
Handheld monitoring device	A portable handheld Dust Monitor used to monitor particulate matter (PM) concentrations in the air.
Haulage truck	A large truck used to transport bulk construction materials.

Term	Definition
Haul road	A road designed for heavy or bulk transfer of materials by haul trucks.
Mechanical interaction	Occurs when two non-elastics (i.e., rigid, or stiff) objects push or pull oneach other.
Method statement	A document which sequentially describes how work activities are to be executed in accordance with site health, safety, and environmental requirements, and includes control measures.
Mitigation measure	A system to reduce, avoid or offset the potential adverse environmental consequences of development activities.
Parameter	A limit or boundary which defines the scope of a particular process or activity.
Permissible limits	An exposure limit that is set for exposure to a hazardous substance or harmful agent.
Recycled material	The collection and reprocessing of discarded materials for reuse.
Road grading	The process in which grading equipment is used to restore the driving surface and drainage attributes to unsealed roads.
Sediment track-out	Sediment being tracked out from the construction site as dirt, mud or other sediment attached to the wheels of trucks and deposited on asphalt roads. Once track-out dries, it creates dust emissions by vehicles passing over it.
Sensitive receptor	Pollutants (dust emissions) which has the potential to have an impact on public health and safety and the surrounding natural environment (usually in close proximity to pollutant source).
Soil screening	Screening equipment used during the mechanical screening processes, designed to separate one material from another.
Stockpile	Stockpiling involves removing topsoil which is usually removed with heavy equipment and piled onsite for the duration of the project.
Tarpaulin	A large sheet of strong, flexible, water-resistant, or waterproof material, often cloth such as canvas or polyester coated with polyurethane used to cover the trailer of haulage trucks in order to prevent friable material from emitting dust emissions during transport.
Water canon	Is an independent dust control unit equipped with a fog cannon, a plastic water tank, and a power generating set
Water treatment plant	Sewage treatment is a type of wastewater treatment which aims to remove contaminants from sewage to produce an effluent that is suitable for discharge to the surrounding environment or an intended reuse application (dust suppression), thereby preventing water pollution from raw sewage discharges.
Wetting station	A water station erected at the exit point of construction sites where the wheels of construction vehicles and trucks are washed to remove sediment, preventing sediment track-out on asphalt roads.
Water suppression	A system which uses water specifically intended to suppress dust emissions on construction sites.

5. Strategic Planning

Prior to Construction (pre-mobilization)

- Dust management strategy to be included in CESMP. Strategy to include sources of dust, monitoring and mitigation measures.
- Conduct an equipment needs analysis and submit a procurement action plan.

During Construction (mobilization and execution)

- Tactical dust mitigation plan to be submitted monthly to SEDRA Projects
- Inventory of water trucks, operable misting cannons etc. to be checked daily.
- Weather conditions to be checked daily.
- Submit weekly 7 day look ahead factoring in work activities and weather conditions (refer to weather forecast)

6. Dust Sources

The following activities are the major sources of dust emission during construction and shall be monitored and recorded:

- Vehicular movement over unsealed site access roads
- Mechanical interaction with site surfaces during grading and excavation
- Loading / unloading / haulage of granulated construction materials such as soil, sand, rock, and fill
- Handling of fine sands and the use of powdered construction materials such as cement
- Stockpiling activities
- Crushing and screening of construction materials
- Track-out
- Dry compaction
- Working with materials that contain silica, including concrete, sandstone, rock, brick and mortar which produce silica dust

7. Dust Control and Mitigation Measures

The following techniques shall be implemented as **mandatory** controls to mitigate dust emissions:

- Construction activities which may contribute to airborne dust (excavating, handling friable materials) shall be minimized on windy days. No crane / plant lifting activities are allowed above the wind speed of 32km/hour.
- Consider wind direction and the presence of sensitive receptors when planning activities that generate airborne dust.
- All construction temporary access and haul roads shall be clearly demarcated, graded and stabilized, and capped with suitable materials (crushed asphalt, gravel, etc.) immediately after grading.
- Vehicle speeds on all construction temporary access and haul roads shall be regulated to a maximum of 30km/h (or less when material is prone to being disturbed or windblown).
- Speed humps to be constructed on haul roads according to the site-specific Traffic Management Plan (TMP).
- All vehicular movements shall be restricted to defined access routes to minimize dust emissions.
- All construction temporary access and haul roads shall be regularly damped down with water using a water suppression trucks, Alternatively, or in addition, biodegradable liquid polymers can be applied to unsurfaced roads for dust control.

- Provide an adequate number of water suppression trucks on site required for the regular damping down of the site road network.
- Water suppression trucks shall have suitably manufactured sprinkler bars installed, which are designed to evenly distribute water on road surfaces.
- Portable pumps and hoses must be installed on all water suppression trucks in the event where truck access is not possible.
- Trucks transporting bulk friable materials shall NOT be overfilled. Truck loads shall NOT be filled within 300mm of the top of the trailer / dump box.
- All trucks transporting bulk friable materials to, from and within the Project site shall be covered with a suitable tarpaulin sheet or similar when in motion.
- At locations where friable materials are loaded, unloaded, stockpiled, or excavated, water cannons and/or misting systems shall be provided to control airborne dust.
- Friable materials shall be kept moist prior to handling/loading to minimize dust and control dust emissions.
- The drop height of excavated materials (onto the ground or into vehicles) shall be minimized to limit dust emissions.
- Wheel washout stations to be installed at critical locations.
- Consider undertaking loading (excavator, front end loader etc.) into trucks on an elevated platformto reduce drop heights.
- Temporary roads should be constructed from recycled material (recycled concrete and asphalt) to eliminate dust.
- Road sweeping of sediment track-out on asphalt roads.
- Reduce time of material storage/stockpiling and use First in First out (FIFO) technique to reduce water evaporation/loss from material while its exposed to sunlight and open air.
- Dig depressions within stockpiles and fill them with water to keep material moisturized and reduce water evaporation and run off/loss.
- Blend wet material with dry material at stockpile locations.
- Ensuring all buildings and vehicles near construction sites are air-conditioned and sealed closed from dust by using air/dust filters.
- Ensuring regular maintenance for all air-conditioners filters (for vehicles and buildings).

- Ensuring periodic watering of unpaved roads, inactive surfaces, and zones with high dust (processes and storage areas).
- Providing dust barriers on the sides of roads in order to redirect the flow of wind carrying dust.
- Wind fencing as part of the dust control mitigations, especially once the construction activities are adjacent to accommodation facilities.

8. Equipment, Polymers and Monitoring Devices

The following is a list of equipment, polymers and monitoring devices that shall be utilized by the Contractor (where applicable) to minimize dust emissions during the lifecycle of the project:

- Water trucks
- Water canons
- Sweeper trucks
- Firefighting canons
- Water sprinklers for crushers
- Hose pipes
- Polymers for soil stabilization of stockpiles, roads, and large areas of graded and finished areas

- Handheld monitoring devices (see Appendix B – Recommended Air Quality Standards for KSA)
- Tarpaulins to cover trailers on haulage trucks

9. Reporting & Tracking

The Contractor shall conduct daily dust monitoring and submit a Dust Monitoring Report on a weekly basis for the duration of the Contract (see Appendix C – report template).

The weekly Dust Monitoring report for each week shall be submitted to the Employer in native excel format by the Saturday of each following week.

The weekly Dust Monitoring report shall be submitted for each week from Contract Commencement to Contract Completion or end of the Defects Liability Period whichever is the later.

10. Records

All records/documentation/reports relating to dust management shall be maintained at the Contractor's office and will be made available for auditing purpose.

11. Violation & Work Stoppage

Excessive dust emissions can trigger Health & Safety and Environmental concerns. The following is a list of criteria eligible for temporary work stoppage:

- When permissible levels of PM10 and PM2.5 are exceeded
- Visible dust emissions affecting the visibility on public roads
- Excessive wind speeds above 32km/hour
- As a preventive measure (prior to dust emission). For example:
  - The Contractor starts working on stockpiles without wetting;
  - The Contractor starts hauling activities without wetting the access roads; etc.

The Contractor shall ensure that dust emissions are always within permissible limits. Sites will be shut down temporarily should excessive dust levels become a concern by the Employer or the Employer Representative. Once suitable mitigation measures are in place and agreed upon by the Employer or the Employer Representative, site works may resume.

Appendix B – Recommended Air Quality Standards for KSA

Pollutant	Averaging Period	KSA ($\mu g.m^{-3}$)	IFC Guidelines ($\mu g.m^{-3}$)
SO_2	10 minutes	-	**500**
	Hourly	**730**(1)-	-
	Daily	**365**(2)	20 125 (Interim target-1) 50 (Interim target-1)
	Annual	**80**	-
NO_2	Hourly	**660**(3)	200
	Annual	**100**	40
CO	Hourly	**40,000**	-
	8-hourly	**10,000**	-
PM_{10}	Daily	**340**(4)	50 150 (Interim target-1) 100 (Interim target-1) 75 ((Interim target-1)
	Annual	**80**	20 70 (Interim target-1) 50 (Interim target-1) 30 (Interim target-1)
$PM_{2.5}$	Daily	**35**(5)	25 75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3)
	Annual	**15**	10 35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3)
O_3	Hourly	**235**(3)	-
	8 Hour	**157**(6)	100 160 (Interim target-1)
H_2S	Daily	**150**(7)	150
	Annual	**40**	-
Benzene	Annual	**5**	-
Lead	Annual	**0.5**	-

Notes:

(1) Not to be exceeded more than twice per year.
(2) Not to be exceeded more than once per year.
(3) Not to be exceeded more than twice in 30 days.
(4) Not to be exceeded more than 24 times per year. The average 90th percentile 24 hour concentration must not exceed 340µg/Nm^3.
(5) Not to be exceeded more than 24 times per year. The average 90th percentile 24 hour concentration must not exceed 35µg/Nm^3
(6) Not to be exceeded more than 2 times in 7 days.
(7) Not to be exceeded more than 10 times per year.

KSA National standards from Environmental Standards Ambient Air Quality. Presidency of Meteorology and Environment. 1409-01, 24/03/2012.

IFC/ WHO standards from:

1. International Finance Corporation (2007) General EHS Guidelines: Environmental – Air Emissions and Ambient Air Quality, April 30th 2007
2. World Health Organization, 2000. Air quality guidelines for Europe. 2nd edition.
3. World Health Organization, 2005. Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide, Global Update.

Where the WHO guideline value cannot be met, interim targets are proposed as a means of promoting steady progress toward implementation of the guideline value.

Appendix C – Daily / Weekly Dust Monitoring Report Template

WEEKLY DUST MONITORING CHECKLIST

Project and Spacific Location	SEDRA PROJECT,PHASE 3G		DATE :
Contractor	CHINA HARBOUR		
ITEMS TO BE CHECKED			REMARKS
S/N	PLANNING/SITE MANAGEMENT	YES/NO	
1	A Dust Control Plan/Schedule has been preprared and its upto date.		
2	Selected activities are suspended if wind speed High.		
3	Depending on weather conditions,spacial instructions communicated to workers.		
4	Site Loactions are visited to check dust/visibilty.		
5	Emergency contact numbers are displayed on the site.		
S/N	SITE ACCESS ROADS	YES/NO	
1	Trailer/Trucks moving on the roads are properly covered.		
2	Roads/Right of ways are compected.		
3	Exits to main highways are free of sadiments.		
4	speed control measures (Signs, Bumps, etc) are in place.		
5	Dust Supression (Water, polymer etc.) is applied regularly.		
S/N	EARTHWORKS,LOADING UNLOADING AREAS	YES/NO	
1	Drop Heights From conveyors, loading shovals or other handling equipments are minimized.		
2	The Area of Exposed soil is minimised as much as possible.		
3	Dust Supression (Water, polymer etc.) is applied regularly.		
S/N	CRUSHER AREA	YES/NO	
1	Rubber flabs, Baffles/ Dust Seal are installed on input apurture and exit points,		
2	Conveyors are maintained		
3	Conveyors skirts are avalible and maintained.		
4	Conveyors speed are reduced and shoots low to discharge point.		
5	dust Supression system (such as dry fog, fine mist, spray nozzels) is availible and efficiently working		
6	Cabins are covered and maintained.		
7	Is the crushing material wetted before crushing		
S/N	STOCKPILLING	YES/NO	
1	Is stockpile height limited.		
2	Slopes are no steeper then the normal angle of repose of material.		
3	Stablization measurements are applied to stockpiles or protect it from the rain or wind.		
4	Dust supression(Water,misting system, etc.)is applied regularly		

Prepared By:Muhammad Saqib Javaid
Position:Enviromental Manager

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Appendix D –Dust Schedule Template

CHEC 中国港湾 CHINA HARBOUR

DATE:01-06-2024

WATER SPRINKLING SCHEDULE

S#	DESCRIPTION	DRIVER NAME	DRIVER MOBILE #	TANKER NUMBER PLATE	COMPNAY	AREA COVERING	TRIP 01	TRIP 02	TRIP 03	TRIP 04
1	N/A	NABEEL ANJUM	0539373215	5596	VERTICAL	PHASE 03(3A)	07.00 AM	09.30 AM	N/A	N/A
2	# 03	FAHEEM	0591529388	8611	CHEC	PHASE 03(3G,3H,3A)	07.00 AM	09.30 AM	14.00 PM	16.00 PM
3	# 04	MUSHTAQ KHAN	0531530607	8613	CHEC	WAREHOUSE AREA,PHASE 03 ROAD SIDE	07.00 AM	10.00 AM	14.00 PM	16.00 PM
4	N/A	FAZAL SHAH	0593740687	6827	CHEC5	PHASE 04 (4E NORTH SIDE)	N/A	10.00 AM	14.00 PM	N/A
5	N/A	SHAH ALAM	0593740687	2454	CHEC5	PHASE 04 (4E NORTH SIDE)	08.00 AM	N/A	13.00 PM	15.00 PM
6	N/A	AAMIR ALI	0531315077	8020	CHEC6	PHASE 03(3G,3H,4D)	08.30 AM	10.30 AM	15.00 PM	N/A
7	WTN 01	KHIDIR ABDULLAH	0504059214	4040	CHEC7	PHASE 04 (4E EAST)	07.00 AM	N/A	14.30 PM	18.00 PM
8	WTN 02	ABU TURKEY	0508558828	51694	CHEC7	PHASE 04 (4E EAST,3G)	09.00 AM	09.30 AM	14.00 PM	16.00 PM

Figure 1. Road wetting by water truck.


E
S
N
W

Figure 2,3. Stockpile wetting during loading activities.

Figure 4. Crusher with water sprinkler system.

Figure 5. Water cannon misting stockpiles during loading activities (TSE not permitted for misting).

Figure 6. Fire hose fittings attached to water truck.

Figure 7. Dry compacting.

Figure 8. Loading materials at elevated platforms to minimize dust emissions by gently placing material rather than dropping from a height (Copyright – Google photo).

Figure 9. Wetting stations for wetting materials prior to tarping.