

# Khewra Salt Mines Project

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**Submission date:** 17-Jan-2020 04:17PM (UTC+0500)

**Submission ID:** 1243026099

**File name:** Haroon.pdf (6.73M)

**Word count:** 3424

**Character count:** 19675

## “KHEWRA SALT MINES PROJECT”

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**1**  
SEMESTER: FALL 2019, MSPM -III

PROGRAM: MS (PROJECT  
MANAGEMENT)



BAHRIA UNIVERSITY LAHORE CAMPUS

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# CHAPTER 1

## 1. Introduction to Salt Range

Salt mines of Khewra which are world 2<sup>nd</sup> biggest rock salt mines are situated in Pind Dadan Khan Tehsil, which is a part of Jehlum District. It is located at a distance of 180 KM from Islamabad and approximately 245 KM from city of Lahore. The salt range of Khewra is vast, it starts from a place near Jehlum river called as Baganwala and it stretches through district of Khushab and also have a touch points with Kalabagh, Mari Indus and a place called Katcha Bangi Khel in district of Mianwali.

Khewra gorge is renowned as “Museum of Geology”, it is a stretch where we can easily see exposed rocks from Pre Cambrian time to recent age time, it is a very rare phenomena where we can easily excess a place where these two types of rocks are properly exposed. Variety of different types of rocks with beautiful color spectrum are visible in this area and add an exceptional beauty to the region. Medium heighted hills full of salt run east to west on the southern side end of Potohar Plateau. Inside these hills are hidden mountain of Khewra Salt mine also called as “The Salt Kingdom”.

The road from the M2 (Lahore to Islamabad motorway) runs east to a place called Pind Dadan Khan which is located at the lower part or called as feet of the mountains. Lilla interchange exit is used from M2 to take the east bound road to Khewra. If you are approaching Khewra from Kalar Kahar side or Kalar Kahar interchange at M2, a road to Choa Saidan Shah lead to the top site of the valley. The tree line along the road presents a spectacular view. The place is full of salt deposits and bunch of archeological sites, thus gives a unique felling when visited. On the same road Katas Raj a vey historic site of Hindu pilgrimage is also located, the historic temples, water pond rests there since hundreds of years. If we are driving down the road we can see on the left side of the road an old building which is the office of PMDC (Pakistan Mineral Development Corporation) ,the organization which is the owner and operator of salt mines in Khewra.

The salt deposits that are present in the salt range are enormous and can last upto 800 years keeping in mind the use and production capacity of our country, this amount of deposits are very rare naturally and thus add a big role in the country's economic as well as in natural resources pool.

The salt range is about 300 kilometers in length with a width range of 8 to 30 kilometers, the height of mountains in average is around 2200 feet. The salt deposits are almost 640 feet thick in this range range that are very feasible for a salt mines just like Kewra salt mines.

The map of the Khewra salt mines is attached in Appendix A

## 2. Nature of Rock Salt Deposit

The salt range of Khewra are sometimes claimed to be the biggest salt range of the world and they must be, a question of how they were formed is always present. In 1914 series of tests were conducted to develop a theory of origin for these rock salt deposits. It was proved by Dr. A. A. Christie that the rock salt deposit in the Khewra salt range are of Tethys Sea a sea that is expected to have covered the all of Punjab region. This dead sea has deposited this enormous amount of salt and is a gift of nature, Common salt along with Gypsum are found in these deposits, the seam of salt contains about 7 different types of salt

Below is the list of some common rock salt that are found in these deposits

Some Different Types of Salt from Khewra	
Sr. No	Type of Salt
1	North
2	Buggy
3	Sujjowal
4	North Parwala Middle
5	South Parwala

The seam thickness of these different types of salt ranges from 25 to 150 feet in the total thickness. It is established that the layout of these salty hills is academic in nature and a lot of world known geologists are attracted by this area. Once it was also known as the "Geological Museum of India".

### 3. Uses of Salt

There are about 1400 different uses of salt, 5% or less is used for edible purposes, like seasoning of food and cooking. In manufacturing industry different use of salt are present even in air plane parts and glass production. Washing, soap making and a lot of other uses are also liked with salt.

Salt is a good antiseptic and is also used in pesticides and weed killing medicines, dying colors fixing, now keeping in view its use the mineral is not given that much importance.

Below are different uses of salt

Sr. No.	Used of Salt
1	Food and Cooking
2	Paper industry
3	Water treatment
4	Petroleum Industry
5	Pharmaceuticals/Medicines
6	Pesticides
7	Icing Industry
8	Textile and Dying Industry

## 4. History of Khewra Salt Deposit

4.1 Time / Remarks	History
<p><b>4.2 Alexander the Great</b> 327 BC</p>	<p>In 327 BC armies of Alexander (the great) during his campaign he conquered as far as the banks of Jehlum River. Salcus <sup>1</sup> who was the general of the Alexander (the great) also mentioned the salt mountains which are situated near the bank of a river, this is mentioned in his biography. It is said that Alexandar (the great) traveled a great deal and he was anxious to have the taste of this delicious salt.</p> <p>Raja Porus was in possession of the salt range at that time, The armies of Alexander reached the bank of Jehlum which is only 32 Km from the current salt mines. The attacks were made from the far side to the ruler of this area Raja Porus but he sustained all of them. But in the end the armies invaded and Raja surrendered. It is said that the Alexander returned the ruler his kingdom and the war turned to a friendship afterwards, from this originates the friendship meaning of the salt. At that time the people of the area collected salt from the surface and used it, the extent of mining was only that far.</p>
<p><b>4.3 Mughals and Sikhs Era</b> (16 to 18 Century)</p>	<p>Then comes the time of 16<sup>th</sup> Century AD the time of Akbar, Mughals, the hard work of mining was initially started at that time. Then comes the 18<sup>th</sup> Century AD the salt mining activites have gained pace, that time the rules were the Sikhs and were in control of all the</p>



	mining activities. The tax was collected in the name of Maharaja Rangit Singh's name.
<b>4.4 British Rule</b>	In 1849 the control of the mining works was taken over by the British rule, the management authority of the mines also called as Mayo mines was moved to Delhi.
<b>4.5 Dr H Warth</b>	In <sup>1</sup> 1872 Dr H Warth was appointed as Chief Mining Engineer, he was the first to be appointed. He put together plans and a team of geologists including Dr Christy and Dr Gee. That was the first time when the development of proper scientific and modern mining was introduced in the region.

## 5. Khewra Salt Mines

The current Khewra salt mines are now operated and are under control of Pakistan Mineral Development Corporation. All the mining work is being executed by the PMDC supervision and is under the Ministry of Energy directly under the Government of Pakistan.

The Khewra salt mines is associated with local industry and is a part of our industrial heritage, It has been a hub of a economic center for our country, In this part of many salt industry is present like a modern plant of salt production by ICI Pakistan

Mining of salt is being done in Khewra salt mines, different levels also called as floors are generated inside the mine, A total of 17 floors have been established inside the mine, the tourist resort is at floor 5, so a total of 5 floors are above it and a total of 11 floors are under the tourist resort, the access to these upper and lower

floors is limited to mining work only and not to public due to ongoing mining activities inside them, The mine is designed in a spiral shape with specified floors on its main shaft. Chambers are then made for salt mining.



1  
CRYSTAL PALACE (Khewra Salt Mines)



Khewra Salt Mines

## 6. Pakistan Mineral Development Corporation

PMDC is an independent organization working under the control of Ministry of Energy, directly under Government of Pakistan, It is the prime regulator, operator and authority to deal with all the matters of the salt, Khewra salt mines, and selling and marking of salt in Pakistan.

PMDC is dealing with 4 coal as well as 4 salt mines with names below:

Sr. no	Salt mines Names
1	Kalabagh Salt Mines
2	Warcha Salt Mines
3	Jatta Salt Mines
4	Khewra Salt Mines

PMDC has an annual budget of 1 Billion rupees only for the uplift and development of the resorts and tourist attraction development. PMDC have many offices below is the list

Sr. No	Office Location	Type of Office
1	Islamabad	Head Office
2	Quetta	Branch Office
3	Lahore	Branch Office
4	Multan	Branch Office

Branch office like Lahore and others are dealing with the marketing and selling of product which is salt to different vendors across the Pakistan.

### 6.1 Export of Salt

The salt is exported to other countries like India and all around the world from Pakistan. The PMDC sells its salt to different qualified vendors on a govt. regulated rate or on quotation-based system. The salt is then exported to foreign countries by

these vendors/buyers. PMDC also sells its salt directly to international buyers but the export is on the buyer's end.

Government of Pakistan provides duty free export to vendors who tends to export salt to other countries as they add value to the economy.

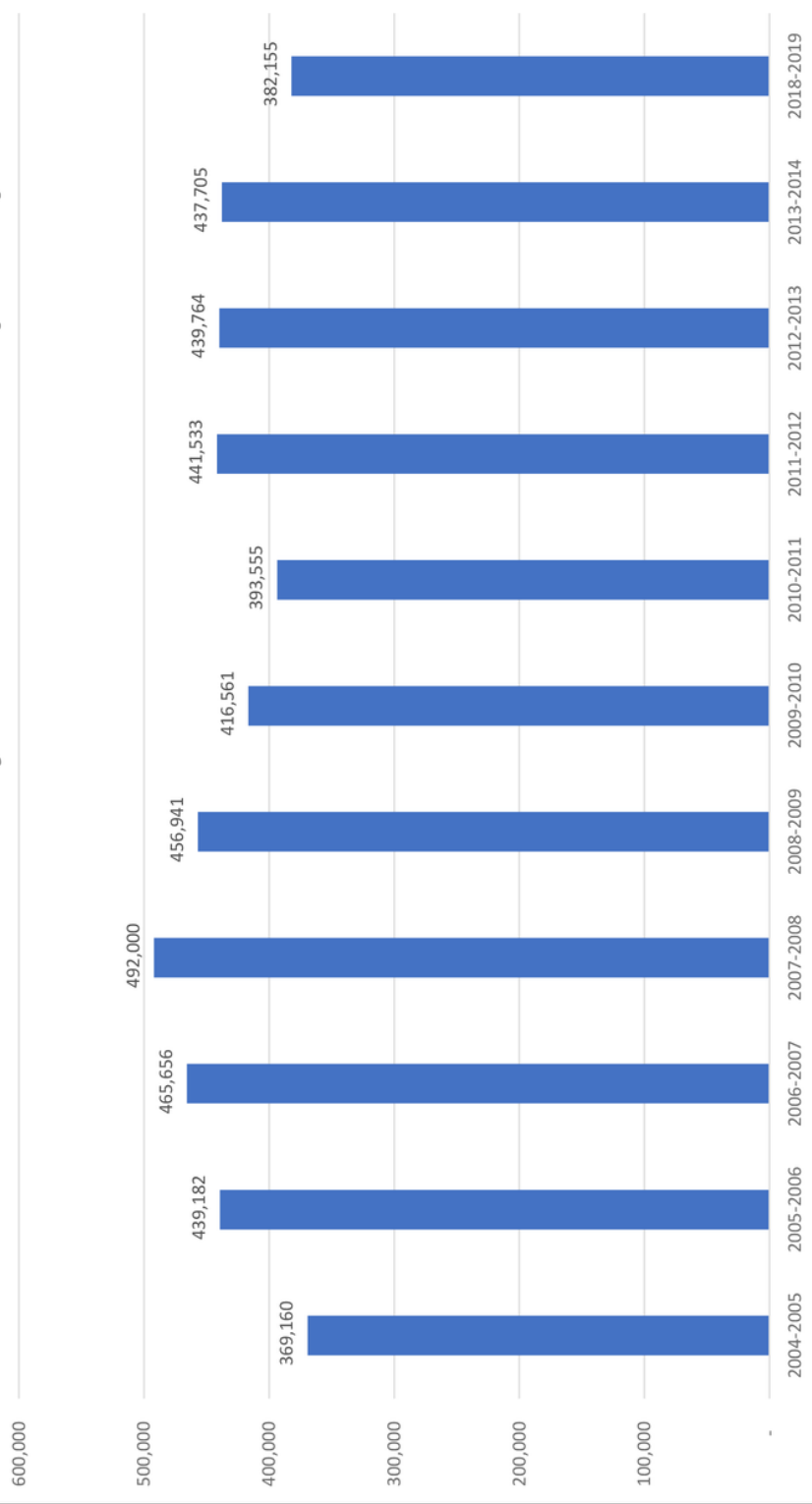
## 7. Production of Salt

Details of Production of Salt by Khewra Salt mine is as follow:

<b>Years</b>	<b>Production (Tons)</b>
2004-2005	369,160
2005-2006	439,182
2006-2007	465,656
2007-2008	492,000
2008-2009	456,941
2009-2010	416,561
2010-2011	393,555
2011-2012	441,533
2012-2013	439,764
2013-2014	437,705
2018-2019	382,155

The below histogram shows the above data comparison.

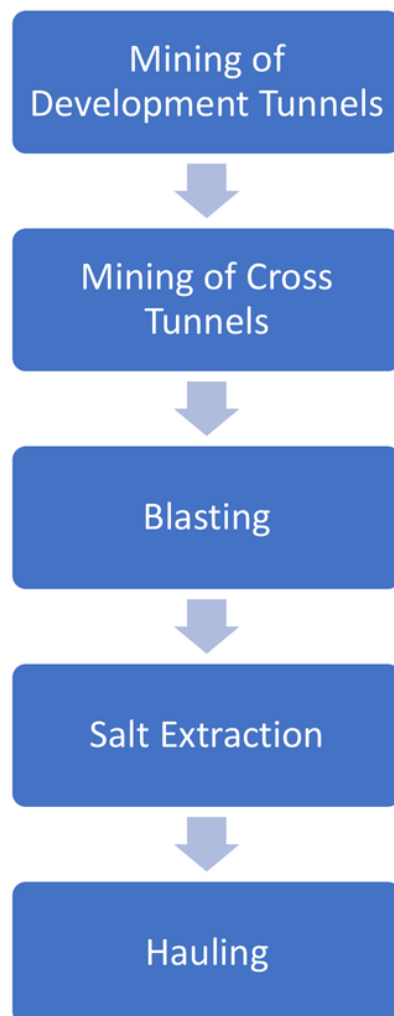
## Salt Production by Khewra Salt Mine (TONS)



## 8. Mining Activities in Khewra Salt Mine (Systematic Mining)

Pillar and Room technology is being used in Khewra salt mines, this include the method is make rooms one above and another by supporting by pillars, in this method only 50% of the salt is usually extracted rest is left as pillars to support the mine roof.

Below show the mining activities that are performed inside to make a new chamber



Some details of mining at Khewra salt mines are as follow:

<b>Details</b>	<b>Remarks</b>
Area Leased (government)	3398.93 acres
History	Pre Cambrian
Salt Purity Percentage	98% Average
Salt Colors	Red, Black, Pink
Mining Technology	Room and Pillar Technology for Mining

### **8.1 Dimensions of Chamber**

A chamber has following dimensions

Width Across Seam	35 to 50 Ft
Breath Across Strike	More than 100 Ft

The extracted salt is then hauled to the ground level via main shaft via tractors and previously via rail locomotives. The salt is then dispatched to the inventory controlled by PMDC.

From that inventory salt is then sold to respective buyers. The main chunk is sold to commercial industry

Waste salt is sold to Soda ash factory.

## 9. Auxiliary Facilities at Khewra Salt Mine

Sr. No.	Facility Name
1	Health Care Center
2	Power System/ Small grid (1800 KV)
3	Two 500 HP Generators
4	Arc Wall Chain Cutter
5	Long Wall Chain Cutter
6	Locomotive Train

## 10. Establishment of Khewra Tourist Resort

In 2001 – 2002 initiative of managing director of PMDC the ground floor area of the Khewra salt mine was turned into a tourist resort area. The tourist resort is a spectacular spot and is mostly crowded in summer season when the temperature of the mine drops inside.

The details regarding resort are below

Annual Tourists	More than 150,000
Highest Chamber	200 ft high
Attractive Spots	Salt Mosque, Sheesh Mahal, Cystal Valley.



### 10.1 Tourists Facility List

Sr. No.	Facility
1	Reception Hall
2	Refreshment Area
3	Walkway
4	Electric Train
5	Souvenir Shop
6	Pony Track

### 11. Asthma Resort

In 2007 Asthma center was also opened by PMDC for the treatment of outside patients suffering from allergic asthma.

## CHAPTER 2

### 12. BULC Industrial Visit to Khewra Salt Mines

Master's program of BULC visited Khewra salt mines on 07<sup>th</sup> of December, 2019. One day visit was executed to visit the salt mines along with Katas Raj Temple and Kalar Kahar Resort.

The industrial tour was executed under the supervision of respectable Mr. Shehzad Ahmad, Senior Assistant Professor and Cluster Head of master's weekend program.

The details of BULC industrial visit are as under

<b>Date</b>	07 <sup>th</sup> December 2019
<b>Total Number of Students</b>	Around 190 Students and Faculty members
<b>Total number of buses</b>	10 Buses
<b>Total Expense per head</b>	Rs 3000
<b>Facilities included</b>	Travel
	Khewra Salt mines Tickets
	Refreshments
	Boating
	Bonfire
	Food

## 12.1 Stops and Places Visited

Following is the detail of the industrial tour by BULC on 7<sup>th</sup> of December, 2019.

Sr. No.	Travel Details
1	Departure from BULC Lahore
2	Stop at Behra Rest Area (M2)
3	Breakfast at Behra
4	Departure from Behra to Khewra Salt Mines
5	Visit to Mine Resort
6	Departure to Katas Raj
7	Visit to Katas Raj
8	Departure to Kalar Kahar Resort
9	Stay at Kalar Kahar Resort
10	Food and Bonfire
11	Departure to Lahore
12	Arrival at BULC

Khewra salt mine industrial tour was a tremendous opportunity for the students of MSPM (Primavera Lab) to study the salt mine project and implement it on EPPM P6, the project is then made on P6 to apply the use of tool in a complete and professional manner.

## CHAPTER 3

### 13. Primavera Project: “Khewra Salt Mines Project”

Primavera P6 is a tool for Enterprise Project Portfolio Management also called as EPPM. EPPM deals in planning, prioritizing, managing, executing and controlling projects under subject globally.

This report summarized the project “Khewra Salt Mines Project” by using Primavera P6 tool, Mining activity going on inside the salt mines is translated into a project and all parameters regarding a project are taken into account. The data related to the costing is assumed and is close to logical values. The activities are generated by doing a research on mining activities going on inside the Khewra salt mines. 52 activities are generated and the project is designed on them.

All the activities are assigned with logical resources and budgeted units of resources are also assigned to all activities this leads to the calculation of total budget cost of the project. This value shows the planned cost of the project. S Curve (Time vs Cost) is also shown for Budget costs spread over time.

Below given are some general details of the project under subject:

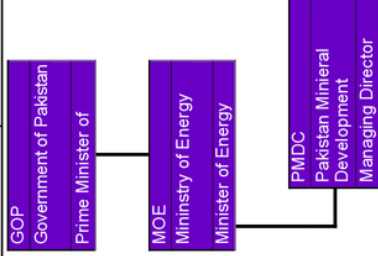
Name of the Project	“Khewra Salt Mines Project”
Planned Start Date	02 September 2019 (8:00 AM)
Planned Finish Date	23 January 2020 (1:48 PM)
Total Activities	52
Total Budgeted Cost	5,224,160 PKR
Total Duration	100 Days 5 Hours

## 13.1 Enterprise Project Structure

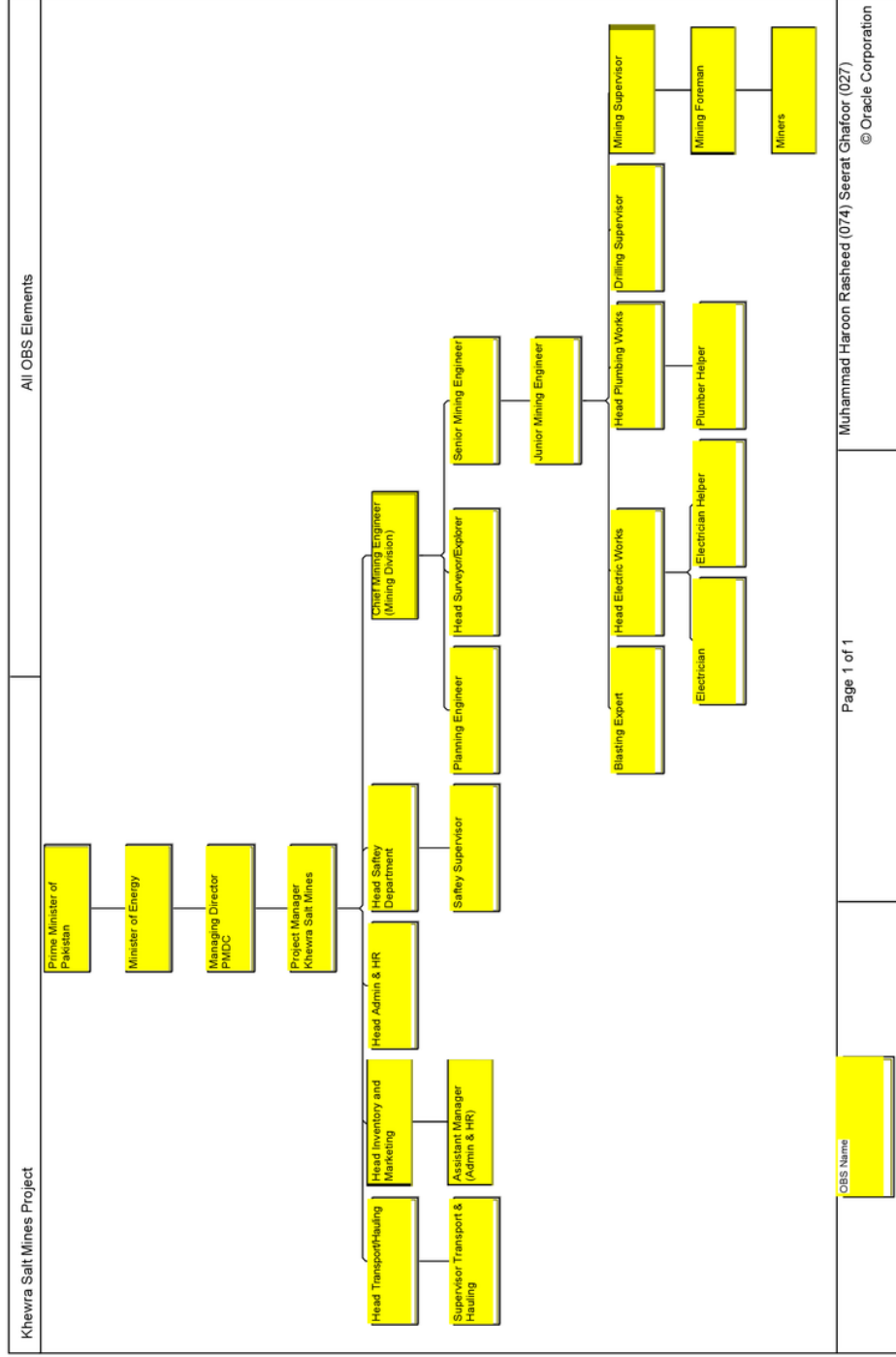
Government of Pakistan EPS and Project Summary		
Project ID	Project Name	TotalActivities
▲ <b>GOP</b>	<b>Government of Pakistan</b>	52
▲ <b>MOE</b>	<b>Ministry of Energy</b>	52
▲ <b>PMDC</b>	<b>Pakistan Mineral Development Cooperation of P</b>	52
■ <b>KSM</b>	<b>Khewra Salt Mines Project</b>	52

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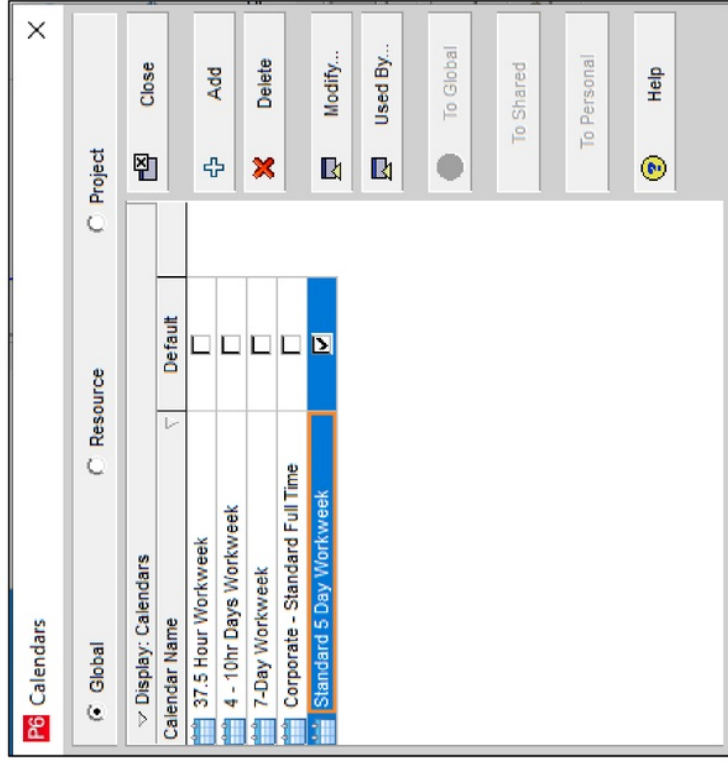
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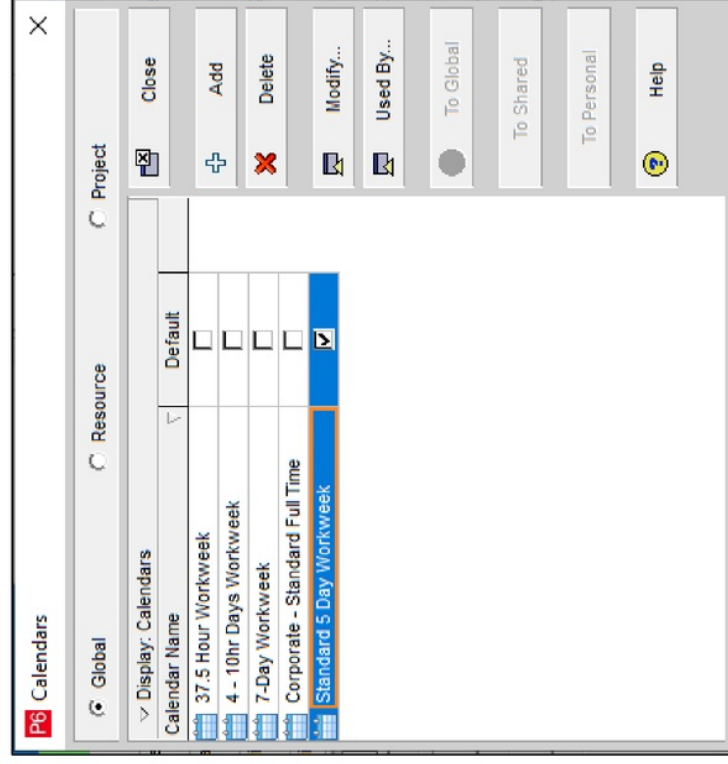
## 13.2 Organizational Breakdown Structure



### 13.3 Calendars



GLOBAL CALENDERS



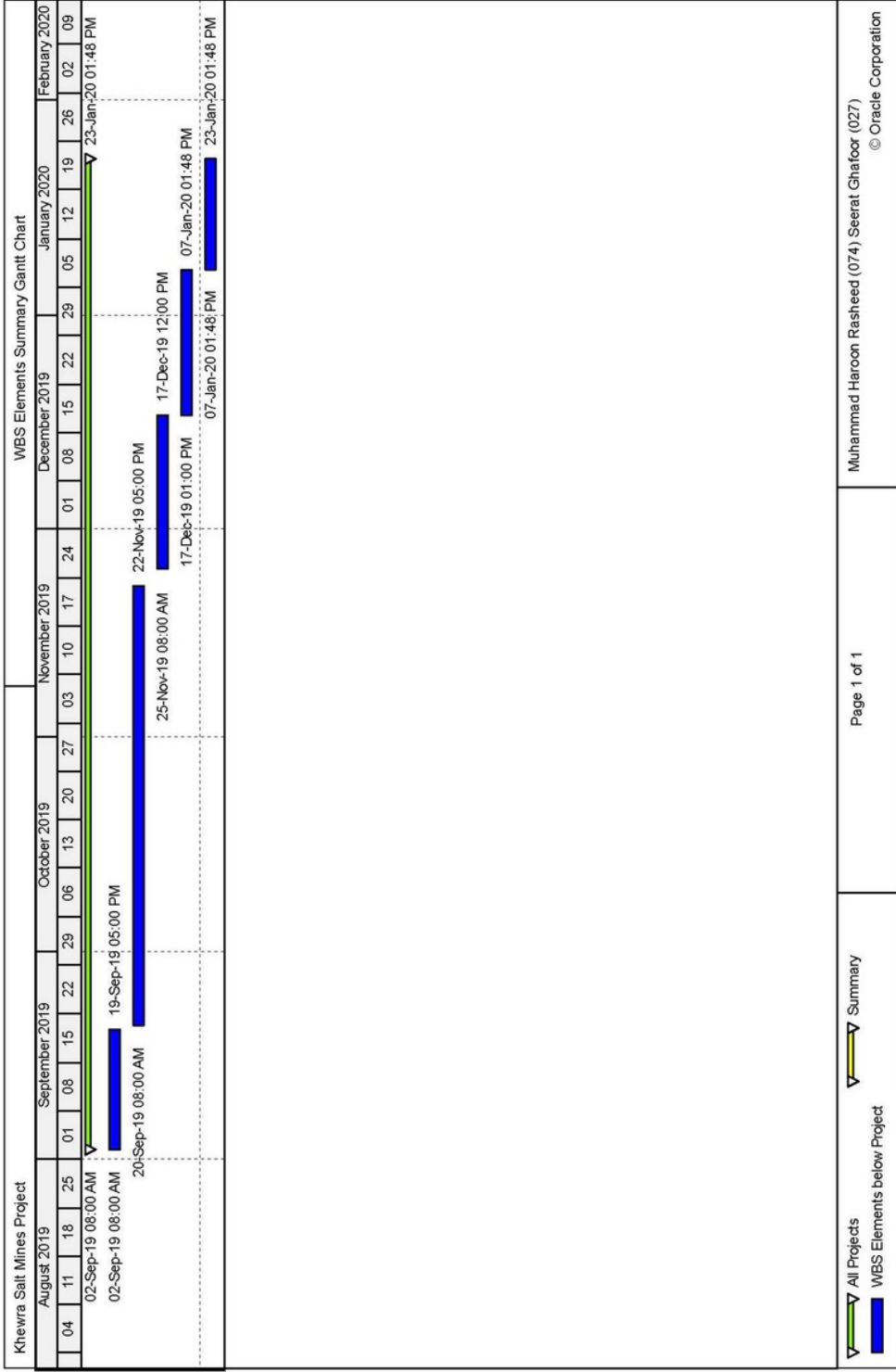
PROJECT CALENDERS



## 13.4 Work Break Down Structure (WBS)

Khewra Salt Mines Project		WBS Elements	
WBS Code	WBS Name	Total Activities	
KSM	Khewra Salt Mines Project	52	
KSM.Exploration	Salt Exploration	8	
KSM.Tunnels	Mining of "Development and Cross Tunne	20	
KSM.Extraction	Salt Mining/Extraction	9	
KSM.Transport and Store	Transportation and Inventory	8	
KSM.Selling of Salt	Marketing and Selling of Salt	7	

Page 1 of 1	Muhammad Haroon Rasheed (074) Seerat Ghafoor (027) © Oracle Corporation
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### 13.5 Activity Tables and Scheduling

Khewra Salt Mines Project		ACTIVITY TABLE With Start and Finish Date and Time		
Activity ID	Activity Name	Original Duration	Start	Finish
<b>Khewra Salt Mines Project</b>				
<b>Salt Exploration</b>				
A100	Start	100d 5h	02-Sep-19 08:00 AM	23-Jan-20 01:48 PM
A101	Reconnaissance Survey inside Main Shaft	0d	02-Sep-19 08:00 AM	19-Sep-19 05:00 PM
A102	Mine Survey	1d	02-Sep-19 08:00 AM	02-Sep-19 05:00 PM
A103	Salt Ore Sampling 1 via drilling	1d	03-Sep-19 08:00 AM	03-Sep-19 05:00 PM
A104	Salt Ore Sampling 2 via drilling	1d	04-Sep-19 08:00 AM	04-Sep-19 05:00 PM
A105	Testing of salt samples in laboratory	3d	05-Sep-19 08:00 AM	11-Sep-19 05:00 PM
A106	Ore sample Reporting and veting	2d	12-Sep-19 08:00 AM	13-Sep-19 05:00 PM
A107	Planning Report Generation (chamber addition)	4d	16-Sep-19 08:00 AM	19-Sep-19 05:00 PM
<b>Mining of "Development and Cross Tunnels"</b>				
A108	Mining Work for Development Tunnel 1 (100 ft)	25d	20-Sep-19 08:00 AM	24-Oct-19 05:00 PM
A109	Roofing Work of Development Tunnel 1	20d	27-Sep-19 08:00 AM	24-Oct-19 05:00 PM
A110	Installation of Electric Pipes and Lights Dev Tunnel 1	5d	18-Oct-19 08:00 AM	24-Oct-19 05:00 PM
A111	Installation of Water Pipeline in Dev Tunnel 1	5d	18-Oct-19 08:00 AM	24-Oct-19 05:00 PM
A112	Inspection of Dev Tunnel 1	1d	25-Oct-19 08:00 AM	25-Oct-19 05:00 PM
A113	Mining Work for Development Tunnel 2 (100 ft)	25d	20-Sep-19 08:00 AM	24-Oct-19 05:00 PM
A114	Roofing Work of Development Tunnel 2	20d	27-Sep-19 08:00 AM	24-Oct-19 05:00 PM
A115	Installation of Electric Pipes and Lights in Dev Tunnel	5d	18-Oct-19 08:00 AM	24-Oct-19 05:00 PM
A116	Installation of Water Pipeline in Dev Tunnel 2	5d	18-Oct-19 08:00 AM	24-Oct-19 05:00 PM
A117	Inspection of Dev Tunnel 2	1d	25-Oct-19 08:00 AM	25-Oct-19 05:00 PM

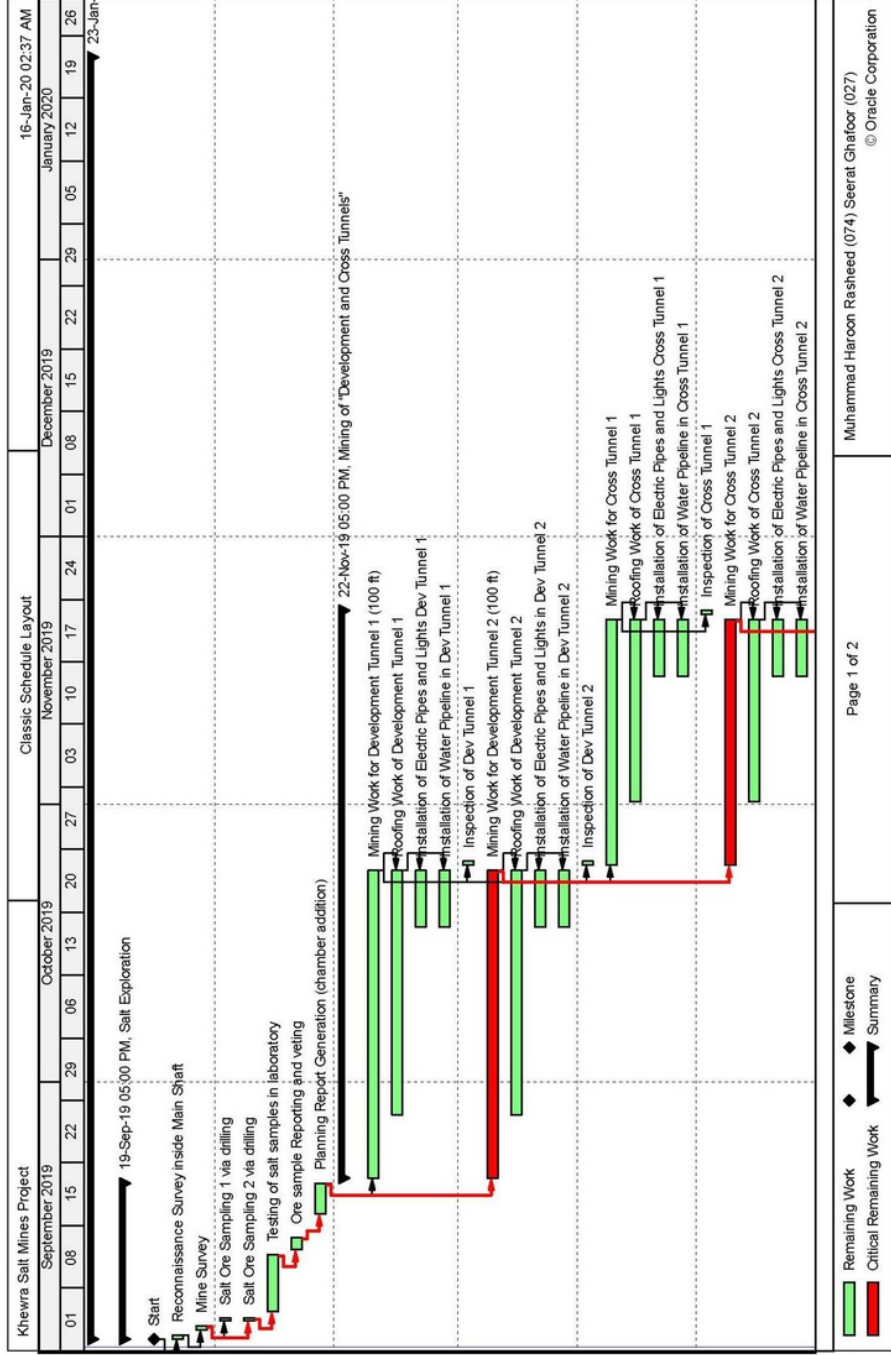
## Activity Tables

Khewra Salt Mines Project		ACTIVITY TABLE With Start and Finish Date and Time		
Activity ID	Activity Name	Original Duration	Start	Finish
A118	Mining Work for Cross Tunnel 1	20d	25-Oct-19 08:00 AM	21-Nov-19 05:00 PM
A119	Roofing Work of Cross Tunnel 1	15d	01-Nov-19 08:00 AM	21-Nov-19 05:00 PM
A120	Installation of Electric Pipes and Lights Cross Tunnel	5d	15-Nov-19 08:00 AM	21-Nov-19 05:00 PM
A121	Installation of Water Pipeline in Cross Tunnel 1	5d	15-Nov-19 08:00 AM	21-Nov-19 05:00 PM
A122	Inspection of Cross Tunnel 1	1d	22-Nov-19 08:00 AM	22-Nov-19 05:00 PM
A123	Mining Work for Cross Tunnel 2	20d	25-Oct-19 08:00 AM	21-Nov-19 05:00 PM
A124	Roofing Work of Cross Tunnel 2	15d	01-Nov-19 08:00 AM	21-Nov-19 05:00 PM
A125	Installation of Electric Pipes and Lights Cross Tunnel	5d	15-Nov-19 08:00 AM	21-Nov-19 05:00 PM
A126	Installation of Water Pipeline in Cross Tunnel 2	5d	15-Nov-19 08:00 AM	21-Nov-19 05:00 PM
A127	Inspection of Cross Tunnel 2	1d	22-Nov-19 08:00 AM	22-Nov-19 05:00 PM
<b>Salt Mining/Extraction</b>				
A128	Inspection of Site for Blasting	16d 4h	25-Nov-19 08:00 AM	17-Dec-19 12:00 PM
A129	Cavity Drilling	1d	25-Nov-19 08:00 AM	25-Nov-19 05:00 PM
A130	Installation of Blasting Powder Units	2d	26-Nov-19 08:00 AM	27-Nov-19 05:00 PM
A131	Installation of Electric System for Blasting	1d	28-Nov-19 08:00 AM	28-Nov-19 05:00 PM
A132	Pre Blasting Inspection	1d	28-Nov-19 08:00 AM	28-Nov-19 05:00 PM
A133	Blasting	2d	29-Nov-19 08:00 AM	02-Dec-19 05:00 PM
A134	Cesmic Inspection/Test	0d 4h	03-Dec-19 08:00 AM	03-Dec-19 12:00 PM
A135	Reporting and Clearance	2d	03-Dec-19 01:00 PM	05-Dec-19 12:00 PM
A136	Breaking of Salt (transportable size 75 - 150 KG)	3d	05-Dec-19 01:00 PM	10-Dec-19 12:00 PM
<b>Transportation and Inventory</b>				
		5d	10-Dec-19 01:00 PM	17-Dec-19 12:00 PM
		14d 1h	17-Dec-19 01:00 PM	07-Jan-20 01:48 PM

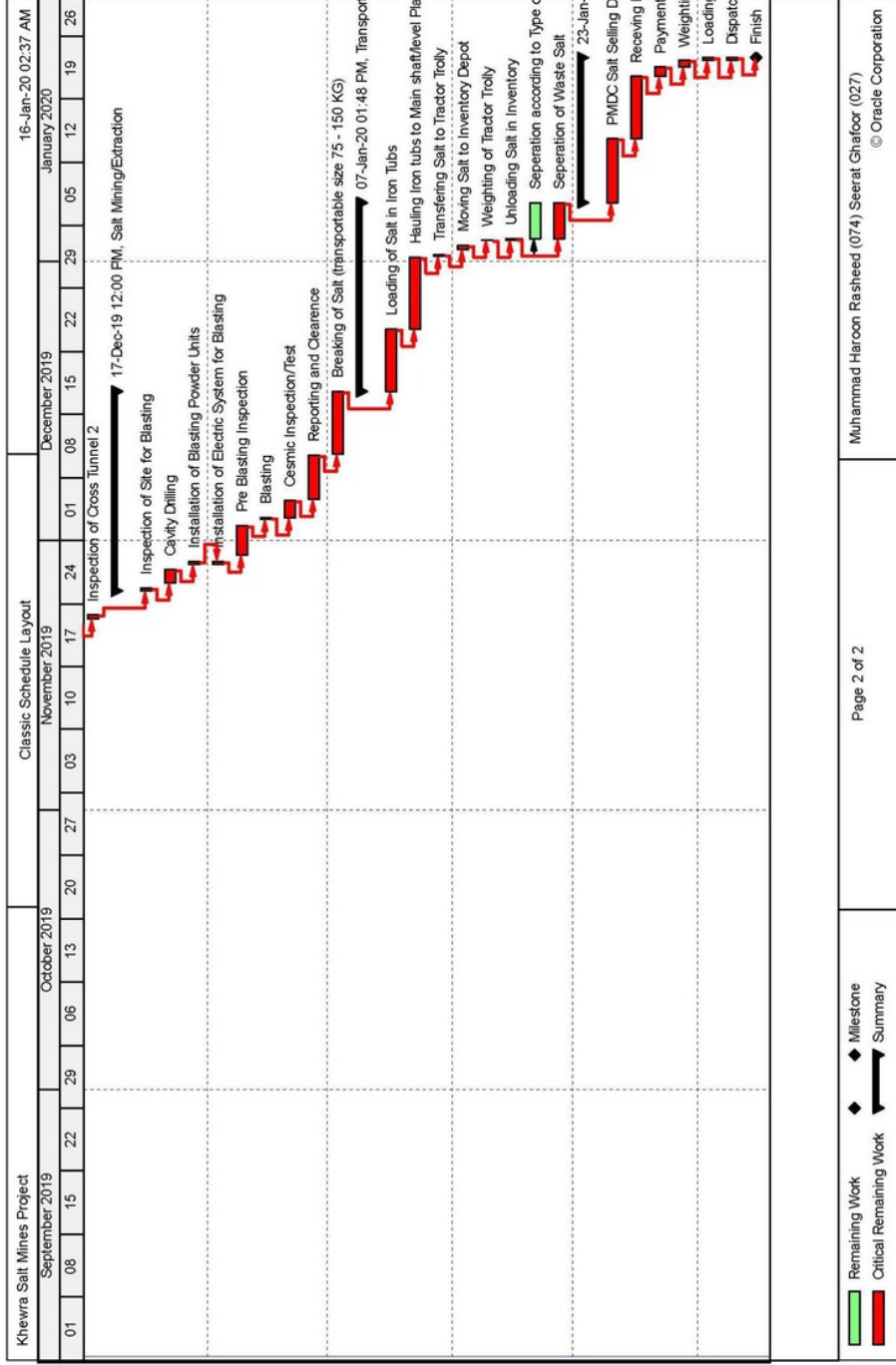
## Activity Tables

Khehra Salt Mines Project		ACTIVITY TABLE With Start and Finish Date and Time		
Activity ID	Activity Name	Original Duration	Start	Finish
A137	Loading of Salt in Iron Tubs	5d	17-Dec-19 01:00 PM	24-Dec-19 12:00 PM
A138	Hauling Iron tubs to Main shaft/level Platform	5d	24-Dec-19 01:00 PM	01-Jan-20 12:00 PM
A139	Transferring Salt to Tractor Trolley	0d 4h	01-Jan-20 01:00 PM	01-Jan-20 05:00 PM
A140	Moving Salt to Inventory Depot	1d	02-Jan-20 08:00 AM	02-Jan-20 05:00 PM
A141	Weighting of Tractor Trolley	0d 1h	03-Jan-20 08:00 AM	03-Jan-20 08:48 AM
A142	Unloading Salt in Inventory	0d 4h	03-Jan-20 08:48 AM	03-Jan-20 01:48 PM
A143	Separation according to Type of Edible Salt	2d	03-Jan-20 01:48 PM	07-Jan-20 01:48 PM
A144	Separation of Waste Salt	2d	03-Jan-20 01:48 PM	07-Jan-20 01:48 PM
	<b>Marketing and Selling of Salt</b>	12d	07-Jan-20 01:48 PM	23-Jan-20 01:48 PM
A145	PMDC Salt Selling Documentation (waste + edible)	5d	07-Jan-20 01:48 PM	14-Jan-20 01:48 PM
A146	Receiving PO from Vendors/Salt Refiners/Chemical In	5d	14-Jan-20 01:48 PM	21-Jan-20 01:48 PM
A147	Payment from Buyer	1d	21-Jan-20 01:48 PM	22-Jan-20 01:48 PM
A148	Weighting Waste Salt	0d 4h	22-Jan-20 01:48 PM	23-Jan-20 08:48 AM
A149	Loading and Dispatching Waste Salt to Chemical Ind	0d 4h	23-Jan-20 08:48 AM	23-Jan-20 01:48 PM
A150	Dispatching of Edible Salt to respective Buyer	0d 4h	23-Jan-20 08:48 AM	23-Jan-20 01:48 PM
A151	Finish	0d		23-Jan-20 01:48 PM






































# 13.6 Gantt Chart for Activity Relationship and Schedule



## Gantt Chart for Activity Relationship and Schedule (PLANNED)



## 13.7 Resources List

Khewra Salt Mines Project		All Resources		
Resource ID	Resource Name	Resource Type	Unit of Measure	Price / Unit
 L1	Project Manager KSM	Labor		Rs.1,700.00/h
 L2	Head Inventory & Marketing	Labor		Rs.400.00/h
 L30	Supervisor Marketing & Selling	Labor		Rs.100.00/h
 L3	Head Admin & HR	Labor		Rs.400.00/h
 L4	AM Admin & HR	Labor		Rs.200.00/h
 L5	Head Saftey Dept	Labor		Rs.400.00/h
 L6	Supervisor Saftey	Labor		Rs.230.00/h
 L7	Head Transport/Hauling	Labor		Rs.400.00/h
 L8	Supervisor Transport/Hauling	Labor		Rs.200.00/h
 L9	Chief Mining Engineer	Labor		Rs.1,135.00/h
 L28	Mine Inspector	Labor		Rs.285.00/h
 L29	Junior Mine Inspector	Labor		Rs.200.00/h
 L27	Geologist	Labor		Rs.340.00/h
 L10	Planning Engineer	Labor		Rs.340.00/h
 L11	Head Surveyor/Explorer	Labor		Rs.340.00/h
 L12	Senior Mining Engineer	Labor		Rs.340.00/h
 L13	Junior Mining Engieer	Labor		Rs.285.00/h
 L14	Blasting Expert	Labor		Rs.200.00/h
 L15	Head Electrician	Labor		Rs.145.00/h
 L16	Electrician	Labor		Rs.115.00/h
 L18	Electrician Helper	Labor		Rs.100.00/h
 L19	Head Plumber	Labor		Rs.145.00/h
 L20	Plumber Helper	Labor		Rs.110.00/h
 L21	Mining Supervisor	Labor		Rs.230.00/h
 L22	Foreman	Labor		Rs.200.00/h
 L23	Miner	Labor		Rs.1,000.00/d
 L24	Labourer	Labor		Rs.800.00/d
 L25	Drilling Supervisor	Labor		Rs.200.00/h
 L26	Driller Helper	Labor		Rs.145.00/h
 NL1	Driller Machine (Portable)	Nonlabor		Rs.100.00/h
 NL2	Core Sampling Machine	Nonlabor		Rs.200.00/h
 NL3	Jack Hammer	Nonlabor		Rs.150.00/h
 NL4	Small Excavaltor	Nonlabor		Rs.1,000.00/h
 NL5	Tractor Trolly	Nonlabor		Rs.400.00/h
 NL6	Heavy Loader	Nonlabor		Rs.500.00/h
 NL7	Seismometer	Nonlabor		Rs.10,000.00/d
 NL8	Water Bowser	Nonlabor		Rs.2,000.00/d





## 13.8 Resource Assignment to Activities

Khewra Salt Mines Project		Resource Assignments
Activity ID	Activity Name	Resources
<b>Khewra Salt Mines Project</b>		
<b>Salt Exploration</b>		
A100	Start	
A101	Reconnaissance Survey inside Main Shaft	Chief Mining Engineer, Head Surveyor/Explorer, Senior Mining Engineer, Junior Mining Engineer, Planning Engineer, Project Manager KSM
A102	Mine Survey	Planning Engineer, Chief Mining Engineer, Head Surveyor/Explorer, Senior Mining Engineer, Junior Mining Engineer, Project Manager KSM
A103	Salt Ore Sampling 1 via drilling	Drilling Supervisor, Driller Helper, Driller Machine (Portable), Chief Mining Engineer, Senior Mining Engineer, Junior Mining Engineer, Core Sampling Machine
A104	Salt Ore Sampling 2 via drilling	Chief Mining Engineer, Senior Mining Engineer, Junior Mining Engineer, Drilling Supervisor, Driller Helper, Driller Machine (Portable), Core Sampling Machine
A105	Testing of salt samples in laboratory	Geologist
A106	Ore sample Reporting and vetting	Geologist, Project Manager KSM, Chief Mining Engineer, Senior Mining Engineer
A107	Planning Report Generation (chamber addition)	Project Manager KSM, Supervisor Safety, Chief Mining Engineer, Head Transport/Hauling, Planning Engineer, Senior Mining Engineer, Junior Mining Engineer, Head Surveyor/Explorer
<b>Mining of "Development and Cross Tunnels"</b>		
A108	Mining Work for Development Tunnel 1 (100 ft)	Chief Mining Engineer, Senior Mining Engineer, Junior Mining Engineer, Mining Supervisor, Foreman, Miner, Labourer, Jack Hammer, Small Excavator, Heavy Loader, Tractor Trolley, Water Bowser, Supervisor Safety
A109	Roofing Work of Development Tunnel 1	Chief Mining Engineer, Senior Mining Engineer, Junior Mining Engineer, Labourer, Foreman, Timber Planks, Pre Casted Concrete Slab
A110	Installation of Electric Pipes and Lights Dev Tunnel 1	Head Electrician, Electrician, Electric Wire, Electric Lights 250W
A111	Installation of Water Pipeline in Dev Tunnel 1	Plumber Helper, Head Plumber, PVC Pipe Length
A112	Inspection of Dev Tunnel 1	Mine Inspector, Junior Mine Inspector, Supervisor Safety, Head Safety Dept
A113	Mining Work for Development Tunnel 2 (100 ft)	Chief Mining Engineer, Supervisor Safety, Senior Mining Engineer, Junior Mining Engineer, Mining Supervisor, Foreman, Miner, Jack Hammer, Small Excavator, Tractor Trolley, Heavy Loader, Water Bowser
A114	Roofing Work of Development Tunnel 2	Chief Mining Engineer, Senior Mining Engineer, Junior Mining Engineer, Foreman, Labourer, Timber Planks, Pre Casted Concrete Slab
Page 1 of 4		Muhammad Haroon Rasheed (074) , Seerat Ghafoor (027) © Oracle Corporation

## Resource Assignment to Activities

Khewra Salt Mines Project		Resource Assignments	
Activity ID	Activity Name	Resources	
A115	Installation of Electric Pipes and Lights in Dev Tunnel 2	Electric Wire, Electric Lights 250W, Electrician, Head Electrician, Electrician Helper	
A116	Installation of Water Pipeline in Dev Tunnel 2	Head Plumber, Plumber Helper, PVC Pipe Length	
A117	Inspection of Dev Tunnel 2	Mine Inspector, Junior Mine Inspector, Supervisor Safety, Head Safety Dept	
A118	Mining Work for Cross Tunnel 1	Chief Mining Engineer, Senior Mining Engineer, Junior Mining Engineer, Mining Supervisor, Foreman, Miner, Jack Hammer, Driller Machine (Portable), Small Excavator, Tractor Trolley, Heavy Loader, Water Bower	
A119	Roofing Work of Cross Tunnel 1	Senior Mining Engineer, Junior Mining Engineer, Chief Mining Engineer, Foreman, Labourer, Timber Planks, Pre Casted Concrete Slab, Crane	
A120	Installation of Electric Pipes and Lights Cross Tunnel 1	Electric Wire, Electric Lights 250W, Electrician, Electrician Helper, Head Electrician	
A121	Installation of Water Pipeline in Cross Tunnel 1	Head Plumber, Plumber Helper, PVC Pipe Length	
A122	Inspection of Cross Tunnel 1	Mine Inspector, Junior Mine Inspector, Head Safety Dept, Supervisor Safety	
A123	Mining Work for Cross Tunnel 2	Chief Mining Engineer, Senior Mining Engineer, Junior Mining Engineer, Mining Supervisor, Foreman, Miner, Jack Hammer, Driller Machine (Portable), Small Excavator, Tractor Trolley, Heavy Loader, Water Bower	
A124	Roofing Work of Cross Tunnel 2	Crane, Timber Planks, Pre Casted Concrete Slab, Foreman, Labourer, Senior Mining Engineer, Junior Mining Engineer, Chief Mining Engineer	
A125	Installation of Electric Pipes and Lights Cross Tunnel 2	Electrician, Head Electrician, Electrician Helper, Electric Wire, Electric Lights 250W	
A126	Installation of Water Pipeline in Cross Tunnel 2	PVC Pipe Length, Head Plumber, Plumber Helper	
A127	Inspection of Cross Tunnel 2	Supervisor Safety, Mine Inspector, Junior Mine Inspector, Head Safety Dept	
<b>Salt Mining/Extraction</b>			
A128	Inspection of Site for Blasting	Chief Mining Engineer, Mine Inspector, Junior Mine Inspector, Senior Mining Engineer, Junior Mining Engineer, Blasting Expert, Supervisor Safety	
A129	Cavity Drilling	Blasting Expert, Senior Mining Engineer, Junior Mining Engineer, Chief Mining Engineer, Labourer, Driller Machine (Portable), Core Sampling Machine	
A130	Installation of Blasting Powder Units	Blast Unit, Pre Casted Concrete Slab, Blasting Expert, Labourer, Supervisor Safety	
A131	Installation of Electric System for Blasting	Electrician, Electrician Helper, Electric Wire, Head Electrician, Blasting Expert, Supervisor Safety	

## Resource Assignment to Activities

Khewra Salt Mines Project		Resource Assignments	
Activity ID	Activity Name	Resources	
A132	Pre Blasting Inspection	Blasting Expert, Senior Mining Engineer, Junior Mining Engineer, Mine Inspector, Junior Mine Inspector, Supervisor Safety	
A133	Blasting	Chief Mining Engineer, Blasting Expert, Senior Mining Engineer, Junior Mining Engineer, Supervisor Safety	
A134	Cosmic Inspection/Test	Geologist, Mine Inspector, Junior Mine Inspector, Seismometer	
A135	Reporting and Clearance	Chief Mining Engineer, Supervisor Safety, Senior Mining Engineer, Junior Mining Engineer	
A136	Breaking of Salt (transportable size 75 - 150 KG)	Labourer, Foreman, Supervisor Transport/Hauling, Jack Hammer	
<b>Transportation and Inventory</b>			
A137	Loading of Salt in Iron Tubs	Head Transport/Hauling, Supervisor Transport/Hauling, Labourer, Heavy Loader	
A138	Hauling Iron tubs to Main shaft/level Platform	Labourer, Head Transport/Hauling, Supervisor Transport/Hauling	
A139	Transferring Salt to Tractor Tolly	Labourer, Foreman, Supervisor Transport/Hauling	
A140	Moving Salt to Inventory Depot	Tractor Tolly, Heavy Loader, Labourer, Head Transport/Hauling, Supervisor Transport/Hauling	
A141	Weighting of Tractor Tolly	Head Inventory & Marketing	
A142	Unloading Salt in Inventory	Head Inventory & Marketing	
A143	Separation according to Type of Edible Salt	Labourer, Head Inventory & Marketing	
A144	Separation of Waste Salt	Head Inventory & Marketing, Labourer	
<b>Marketing and Selling of Salt</b>			
A145	PMDC Salt Selling Documentation (waste + edible)	Head Inventory & Marketing, Supervisor Marketing & Selling	
A146	Receiving PO from Vendors/Salt Refiners/Chemical Industry	Head Inventory & Marketing, Supervisor Marketing & Selling	
A147	Payment from Buyer	Head Inventory & Marketing, Supervisor Marketing & Selling	

## Resource Assignment to Activities

Khewra Salt Mines Project		Resource Assignments	
Activity ID	Activity Name	Resources	
A148	Weighting Waste Salt	Head Inventory & Marketing, Supervisor Marketing & Selling, Labourer	
A149	Loading and Dispatching Waste Salt to Chemical Industry	Supervisor Marketing & Selling	
A150	Dispatching of Edible Salt to respective Buyer	Labourer, Supervisor Marketing & Selling, Head Inventory & Marketing	
A151	Finish		

## 13.9 Primary Resources for each Activity

Khewra Salt Mines Project		Primary Resources
Activity ID	Activity Name	Primary Resource
<b>Khewra Salt Mines Project</b>		
<b>Salt Exploration</b>		
A100	Start	
A101	Reconnaissance Survey inside Main Shaft	L9.Chief Mining Engineer
A102	Mine Survey	L10.Planning Engineer
A103	Salt Ore Sampling 1 via drilling	L25.Drilling Supervisor
A104	Salt Ore Sampling 2 via drilling	L25.Drilling Supervisor
A105	Testing of salt samples in laboratory	L27.Geologist
A106	Ore sample Reporting and veting	L9.Chief Mining Engineer
A107	Planning Report Generation (chamber addition)	L1.Project Manager KSM
<b>Mining of "Development and Cross Tunnels"</b>		
A108	Mining Work for Development Tunnel 1 (100 ft)	L9.Chief Mining Engineer
A109	Roofing Work of Development Tunnel 1	L9.Chief Mining Engineer
A110	Installation of Electric Pipes and Lights Dev Tunnel 1	L15.Head Electrician
A111	Installation of Water Pipeline in Dev Tunnel 1	L19.Head Plumber
A112	Inspection of Dev Tunnel 1	L28.Mine Inspector
A113	Mining Work for Development Tunnel 2 (100 ft)	L9.Chief Mining Engineer
A114	Roofing Work of Development Tunnel 2	L12.Senior Mining Engineer
A115	Installation of Electric Pipes and Lights in Dev Tunnel 2	L16.Electrician
A116	Installation of Water Pipeline in Dev Tunnel 2	L19.Head Plumber
A117	Inspection of Dev Tunnel 2	L28.Mine Inspector
A118	Mining Work for Cross Tunnel 1	L9.Chief Mining Engineer
A119	Roofing Work of Cross Tunnel 1	L12.Senior Mining Engineer
A120	Installation of Electric Pipes and Lights Cross Tunnel 1	L16.Electrician
A121	Installation of Water Pipeline in Cross Tunnel 1	L19.Head Plumber
A122	Inspection of Cross Tunnel 1	L28.Mine Inspector
A123	Mining Work for Cross Tunnel 2	L9.Chief Mining Engineer
A124	Roofing Work of Cross Tunnel 2	L22.Foreman
A125	Installation of Electric Pipes and Lights Cross Tunnel 2	L16.Electrician
		Page 1 of 2
		Muhammad Haroon Rasheed (074) , Seerat Ghafoor (027)

## Primary Resources for each Activity

Khewra Salt Mines Project		Primary Resources
Activity ID	Activity Name	Primary Resource
A126	Installation of Water Pipeline in Cross Tunnel 2	L19.Head Plumber
A127	Inspection of Cross Tunnel 2	L28.Mine Inspector
<b>Salt Mining/Extraction</b>		
A128	Inspection of Site for Blasting	L14.Blasting Expert
A129	Cavity Drilling	L14.Blasting Expert
A130	Installation of Blasting Powder Units	L14.Blasting Expert
A131	Installation of Electric System for Blasting	L16.Electrician
A132	Pre Blasting Inspection	L28.Mine Inspector
A133	Blasting	L9.Chief Mining Engineer
A134	Cesmic Inspection/Test	L27.Geologist
A135	Reporting and Clearance	L9.Chief Mining Engineer
A136	Breaking of Salt (transportable size 75 - 150 KG)	L24.Labourer
<b>Transportation and Inventory</b>		
A137	Loading of Salt in Iron Tubs	L7.Head Transport/Hauling
A138	Hauling Iron tubs to Main shaft/level Platform	L24.Labourer
A139	Transferring Salt to Tractor Trolley	L24.Labourer
A140	Moving Salt to Inventory Depot	L24.Labourer
A141	Weighting of Tractor Trolley	L2.Head Inventory & Marketing
A142	Unloading Salt in Inventory	L2.Head Inventory & Marketing
A143	Seperation according to Type of Edible Salt	L24.Labourer
A144	Seperation of Waste Salt	L2.Head Inventory & Marketing
<b>Marketing and Selling of Salt</b>		
A145	PMDC Salt Selling Documentation (waste + edible)	L2.Head Inventory & Marketing
A146	Receiving PO from Vendors/Salt Refiners/Chemical Industry	L2.Head Inventory & Marketing
A147	Payment from Buyer	L2.Head Inventory & Marketing
A148	Weighting Waste Salt	L2.Head Inventory & Marketing
A149	Loading and Dispatching Waste Salt to Chemical Industry	L30.Supervisor Marketing & Selling
A150	Dispatching of Edible Salt to respective Buyer	L24.Labourer
A151	Finish	
		Page 2 of 2
		Muhammad Haroon Rasheed (074) , Seerat Ghafoor (027)

## 13.10 Budgeted Total Cost (including Labor, Material and Non-Labor Cost) for each activity

Khewra Salt Mines Project		Budgeted Total Cost: Labour , Non Labor and Material Budgeted Cost				
Activity ID	Activity Name	Original Duration	Budgeted Total Cost	Budgeted Material Cost	Budgeted Nonlabor Cost	Budgeted Labor Cost
<b>Khewra Salt Mines Project</b>						
<b>Salt Exploration</b>		100d 5h	Rs 5,224,160.00	Rs 623,200.00	Rs 1,502,600.00	Rs 3,098,360.00
A100	Start	12d	Rs 276,360.00	Rs 0.00	Rs 4,800.00	Rs 271,560.00
		0d	Rs 0.00	Rs 0.00	Rs 0.00	Rs 0.00
A101	Reconnaissance Survey inside Main Shaft	1d	Rs 28,580.00	Rs 0.00	Rs 0.00	Rs 28,580.00
A102	Mine Survey	1d	Rs 28,580.00	Rs 0.00	Rs 0.00	Rs 28,580.00
A103	Salt Ore Sampling 1 via drilling	1d	Rs 14,700.00	Rs 0.00	Rs 2,400.00	Rs 12,300.00
A104	Salt Ore Sampling 2 via drilling	1d	Rs 14,700.00	Rs 0.00	Rs 2,400.00	Rs 12,300.00
A105	Testing of salt samples in laboratory	3d	Rs 8,160.00	Rs 0.00	Rs 0.00	Rs 8,160.00
A106	Ore sample Reporting and veting	2d	Rs 47,160.00	Rs 0.00	Rs 0.00	Rs 47,160.00
A107	Planning Report Generation (chamber addition)	4d	Rs 134,480.00	Rs 0.00	Rs 0.00	Rs 134,480.00
<b>Mining of "Development and Cross Tunnels"</b>						
A108	Mining Work for Development Tunnel 1 (100 ft)	46d	Rs 4,556,580.00	Rs 562,000.00	Rs 1,454,500.00	Rs 2,540,080.00
		25d	Rs 692,000.00	Rs 0.00	Rs 298,500.00	Rs 392,500.00
A109	Roofing Work of Development Tunnel 1	20d	Rs 328,800.00	Rs 90,000.00	Rs 0.00	Rs 238,800.00
A110	Installation of Electric Pipes and Lights Dev Tunnel 1	5d	Rs 52,400.00	Rs 42,000.00	Rs 0.00	Rs 10,400.00
A111	Installation of Water Pipeline in Dev Tunnel 1	5d	Rs 24,200.00	Rs 14,000.00	Rs 0.00	Rs 10,200.00
A112	Inspection of Dev Tunnel 1	1d	Rs 8,920.00	Rs 0.00	Rs 0.00	Rs 8,920.00
A113	Mining Work for Development Tunnel 2 (100 ft)	25d	Rs 633,000.00	Rs 0.00	Rs 237,500.00	Rs 395,500.00
A114	Roofing Work of Development Tunnel 2	20d	Rs 419,600.00	Rs 90,000.00	Rs 0.00	Rs 329,600.00



**2 Budgeted Total Cost (including Labor, Material and Non-Labor Cost) for each activity**

Khewra Salt Mines Project		Budgeted Total Cost, Labour, Non Labor and Material Budgeted Cost				
Activity ID	Activity Name	Original Duration	Budgeted Total Cost	Budgeted Material Cost	Budgeted Nonlabor Cost	Budgeted Labor Cost
A115	Installation of Electric Pipes and Lights in Dev Tunnel 2	5d	Rs.56,400.00	Rs.42,000.00	Rs.0.00	Rs.14,400.00
A116	Installation of Water Pipeline in Dev Tunnel 2	5d	Rs.38,200.00	Rs.28,000.00	Rs.0.00	Rs.10,200.00
A117	Inspection of Dev Tunnel 2	1d	Rs.8,920.00	Rs.0.00	Rs.0.00	Rs.8,920.00
A118	Mining Work for Cross Tunnel 1	20d	Rs.497,100.00	Rs.0.00	Rs.217,500.00	Rs.279,600.00
A119	Roofing Work of Cross Tunnel 1	15d	Rs.559,200.00	Rs.72,000.00	Rs.240,000.00	Rs.247,200.00
A120	Installation of Electric Pipes and Lights Cross Tunnel 1	5d	Rs.56,400.00	Rs.42,000.00	Rs.0.00	Rs.14,400.00
A121	Installation of Water Pipeline in Cross Tunnel 1	5d	Rs.24,200.00	Rs.14,000.00	Rs.0.00	Rs.10,200.00
A122	Inspection of Cross Tunnel 1	1d	Rs.8,920.00	Rs.0.00	Rs.0.00	Rs.8,920.00
A123	Mining Work for Cross Tunnel 2	20d	Rs.499,600.00	Rs.0.00	Rs.220,000.00	Rs.279,600.00
A124	Roofing Work of Cross Tunnel 2	15d	Rs.559,200.00	Rs.72,000.00	Rs.240,000.00	Rs.247,200.00
A125	Installation of Electric Pipes and Lights Cross Tunnel 2	5d	Rs.56,400.00	Rs.42,000.00	Rs.0.00	Rs.14,400.00
A126	Installation of Water Pipeline in Cross Tunnel 2	5d	Rs.24,200.00	Rs.14,000.00	Rs.0.00	Rs.10,200.00
A127	Inspection of Cross Tunnel 2	1d	Rs.8,920.00	Rs.0.00	Rs.0.00	Rs.8,920.00
<b>Salt Mining/Extraction</b>		<b>16d 4h</b>	<b>Rs.248,900.00</b>	<b>Rs.61,200.00</b>	<b>Rs.29,300.00</b>	<b>Rs.158,400.00</b>
A128	Inspection of Site for Blasting	1d	Rs.21,400.00	Rs.0.00	Rs.0.00	Rs.21,400.00
A129	Cavity Drilling	2d	Rs.37,760.00	Rs.0.00	Rs.4,800.00	Rs.32,960.00
A130	Installation of Blasting Powder Units	1d	Rs.21,440.00	Rs.17,200.00	Rs.0.00	Rs.4,240.00
A131	Installation of Electric System for Blasting	1d	Rs.50,320.00	Rs.44,000.00	Rs.0.00	Rs.6,320.00

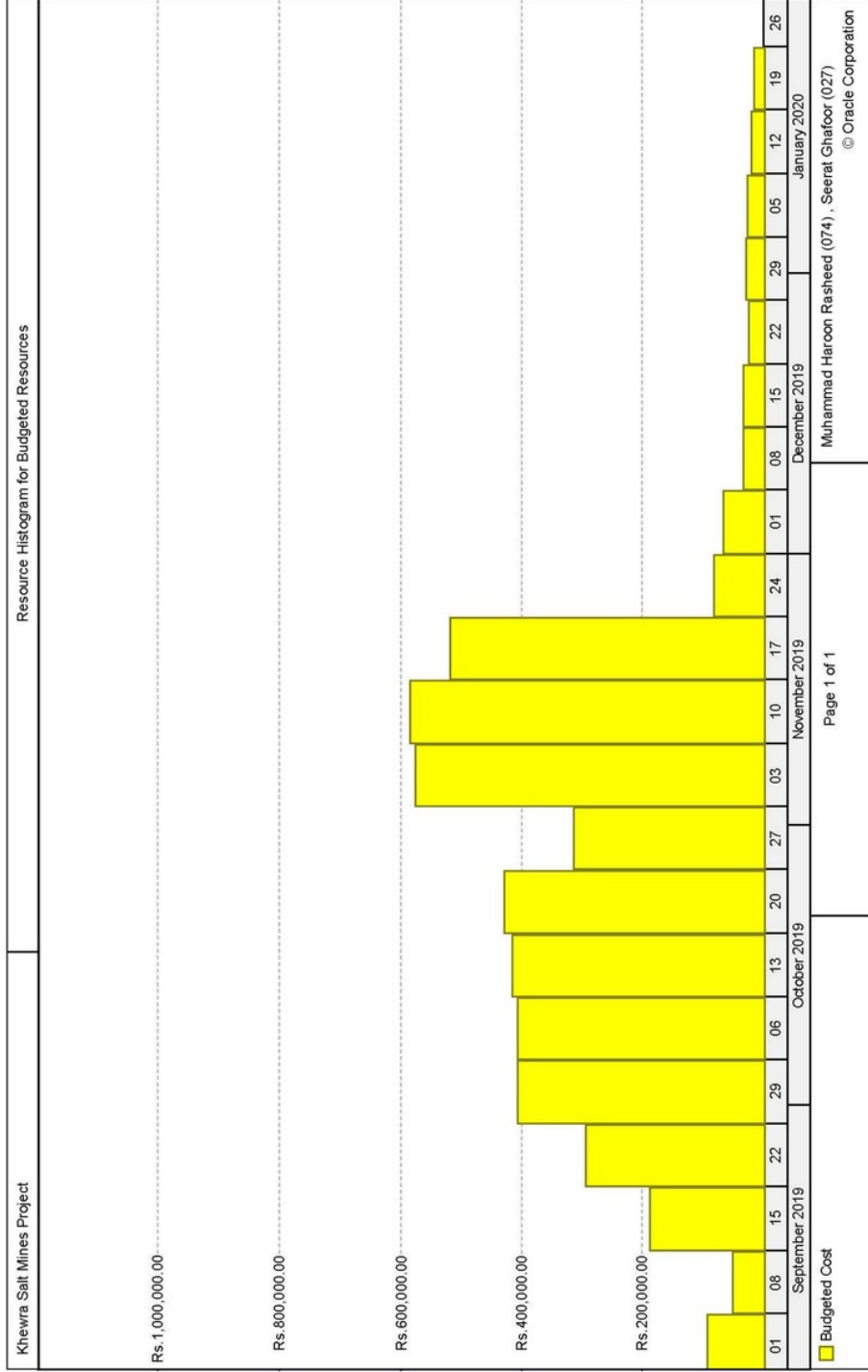
## 2 Budgeted Total Cost (including Labor, Material and Non-Labor Cost) for each activity

Khehra Salt Mines Project		Budgeted Total Cost, Labour, Non Labor and Material Budgeted Cost					
Activity ID	Activity Name	Original Duration	Budgeted Total Cost	Budgeted Material Cost	Budgeted Nonlabor Cost	Budgeted Labor Cost	
A132	Pre Blasting Inspection	2d	Rs.24,640.00	Rs.0.00	Rs.0.00	Rs.24,640.00	
A133	Blasting	0d 4h	Rs.6,490.00	Rs.0.00	Rs.0.00	Rs.6,490.00	
A134	Cesmic Inspection/Test	2d	Rs.30,480.00	Rs.0.00	Rs.20,000.00	Rs.10,480.00	
A135	Reporting and Clearance	3d	Rs.31,870.00	Rs.0.00	Rs.0.00	Rs.31,870.00	
A136	Breaking of Salt (transportable size 75 - 150 KG)	5d	Rs.24,500.00	Rs.0.00	Rs.4,500.00	Rs.20,000.00	
<b>Transportation and Inventory</b>							
A137	Loading of Salt in Iron Tubs	14d 1h 5d	Rs.92,720.00 Rs.38,000.00	Rs.0.00 Rs.0.00	Rs.14,000.00 Rs.10,000.00	Rs.78,720.00 Rs.28,000.00	
A138	Hauling Iron tubs to Main shaft/level Platform	5d	Rs.28,000.00	Rs.0.00	Rs.0.00	Rs.28,000.00	
A139	Transferring Salt to Tractor Trolly	0d 4h	Rs.2,000.00	Rs.0.00	Rs.0.00	Rs.2,000.00	
A140	Moving Salt to Inventory Depot	1d	Rs.6,800.00	Rs.0.00	Rs.4,000.00	Rs.2,800.00	
A141	Weighting of Tractor Trolly	0d 1h	Rs.320.00	Rs.0.00	Rs.0.00	Rs.320.00	
A142	Unloading Salt in Inventory	0d 4h	Rs.1,600.00	Rs.0.00	Rs.0.00	Rs.1,600.00	
A143	Separation according to Type of Edible Salt	2d	Rs.8,000.00	Rs.0.00	Rs.0.00	Rs.8,000.00	
A144	Separation of Waste Salt	2d	Rs.8,000.00	Rs.0.00	Rs.0.00	Rs.8,000.00	
<b>Marketing and Selling of Salt</b>							
A145	PMDC Salt Selling Documentation (waste + edible)	12d 5d	Rs.49,600.00 Rs.20,000.00	Rs.0.00 Rs.0.00	Rs.0.00 Rs.0.00	Rs.49,600.00 Rs.20,000.00	
A146	Receiving PO from Vendors/Salt Refiners/Chemical Industry	5d	Rs.20,000.00	Rs.0.00	Rs.0.00	Rs.20,000.00	
A147	Payment from Buyer	1d	Rs.4,000.00	Rs.0.00	Rs.0.00	Rs.4,000.00	

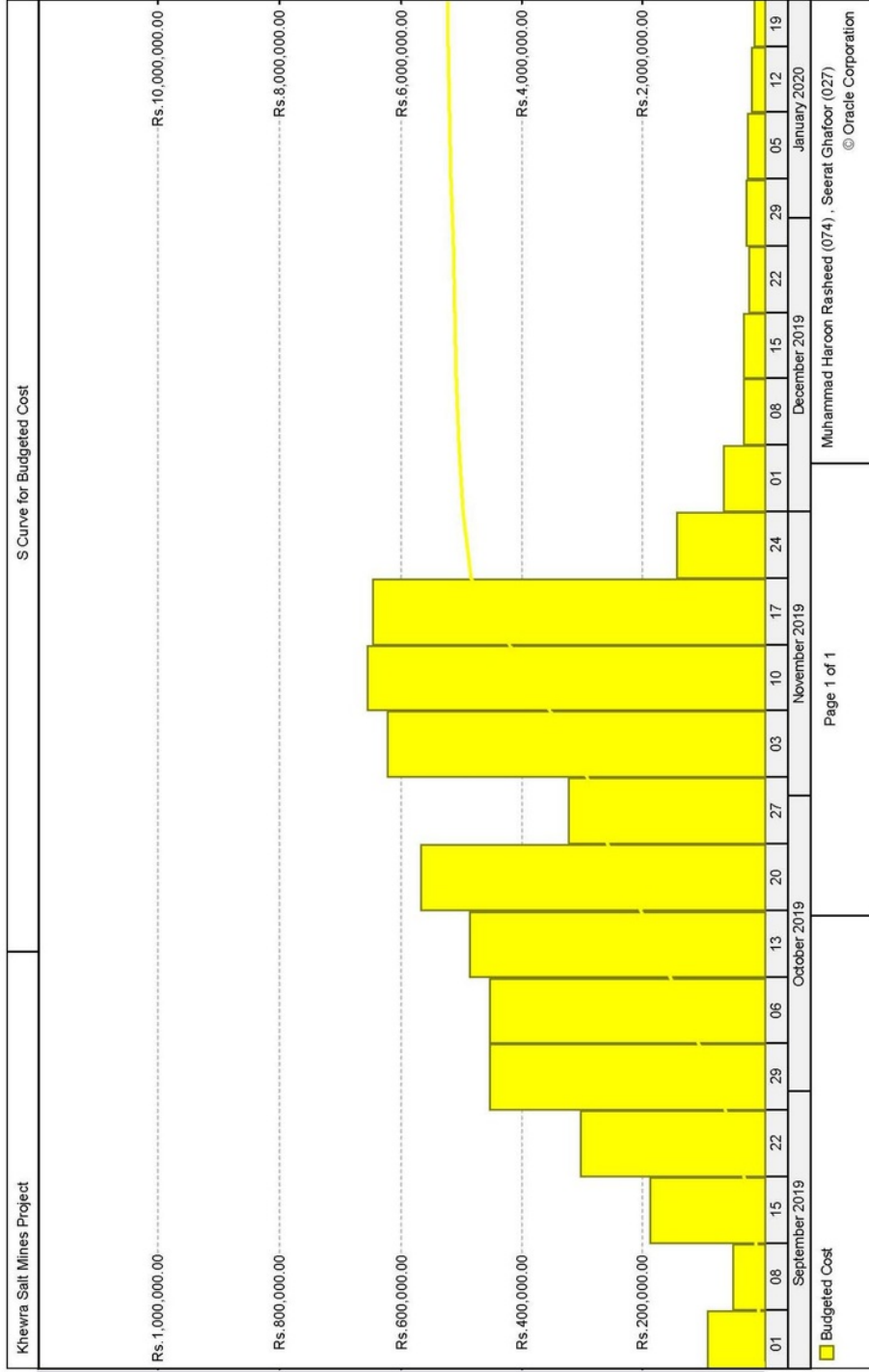
**2 Budgeted Total Cost (including Labor, Material and Non-Labor Cost) for each activity**

Khewra Salt Mines Project		Budgeted Total Cost, Labour, Non Labor and Material Budgeted Cost					
Activity ID	Activity Name	Original Duration	Budgeted Total Cost	Budgeted Material Cost	Budgeted Nonlabor Cost	Budgeted Labor Cost	
A148	Weighting Waste Salt	0d 4h	Rs.2,400.00	Rs.0.00	Rs.0.00	Rs.2,400.00	
A149	Loading and Dispatching Waste Salt to Chemical Industry	0d 4h	Rs.400.00	Rs.0.00	Rs.0.00	Rs.400.00	
A150	Dispatching of Edible Salt to respective Buyer	0d 4h	Rs.2,800.00	Rs.0.00	Rs.0.00	Rs.2,800.00	
A151	Finish	0d	Rs.0.00	Rs.0.00	Rs.0.00	Rs.0.00	

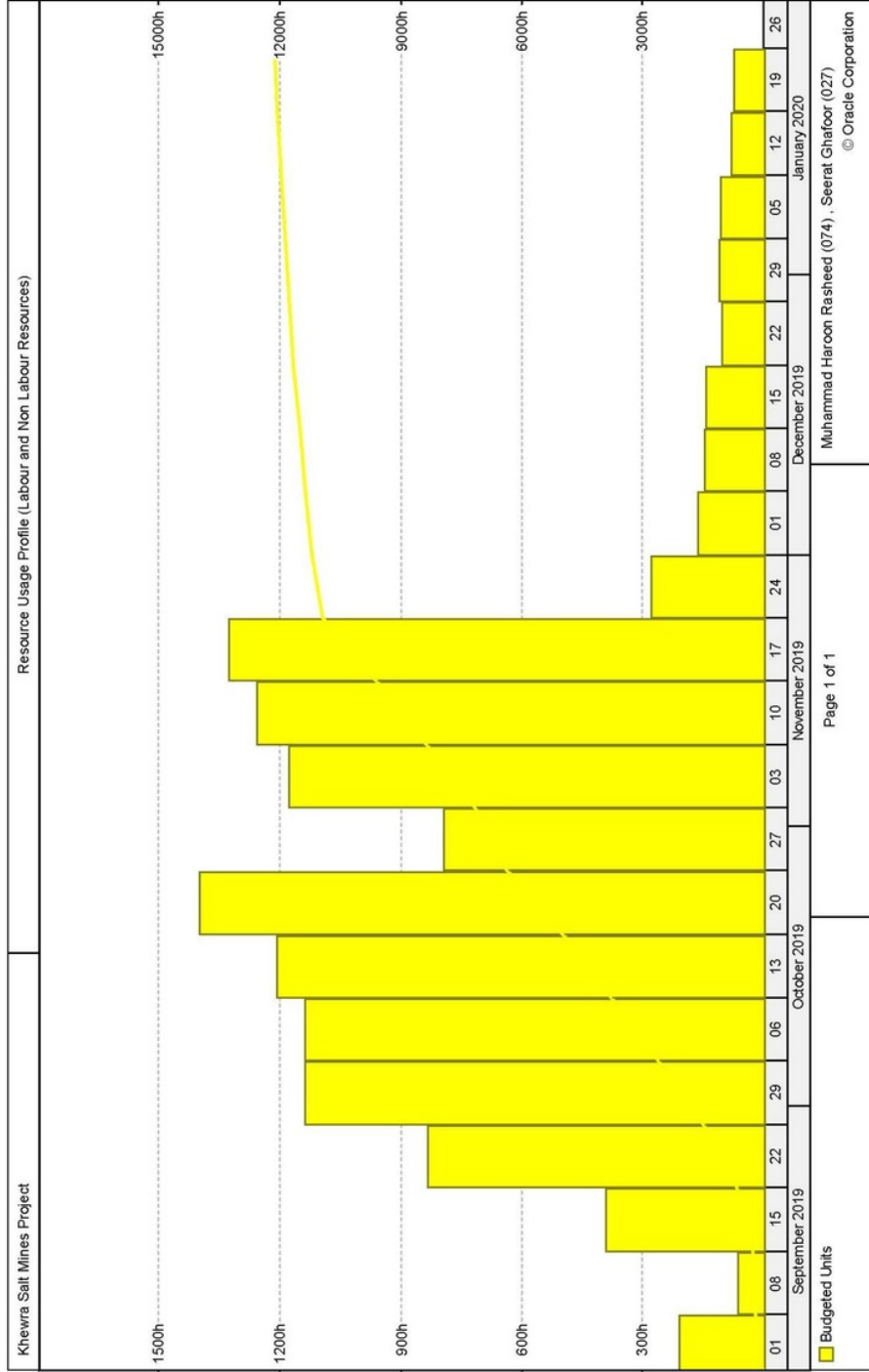
### 13.11 Resource Histogram for Budgeted Resources (Planned)



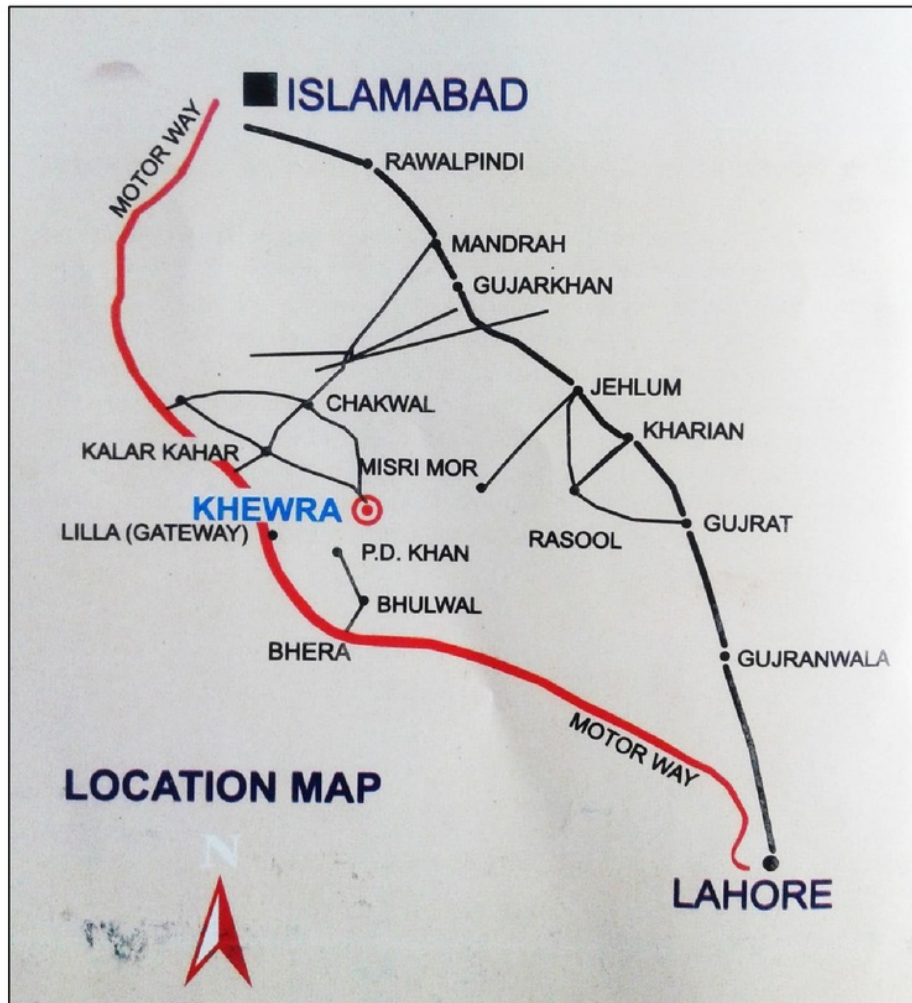
### 13.12S-Curve for Budgeted Cost (Total Resources)



### 13.13 Resource Usage Profile for Budgeted Resources (Labor and Non-Labor)



## 14. Appendix



APPENDIX A: MAP OF KHEWRA

## 15. References

- "The Salt Kingdom Khewra" by Mr. Muhammad Naeem Murtaza, (published by Shalimar Publishers, 2008)



# Khewra Salt Mines Project

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