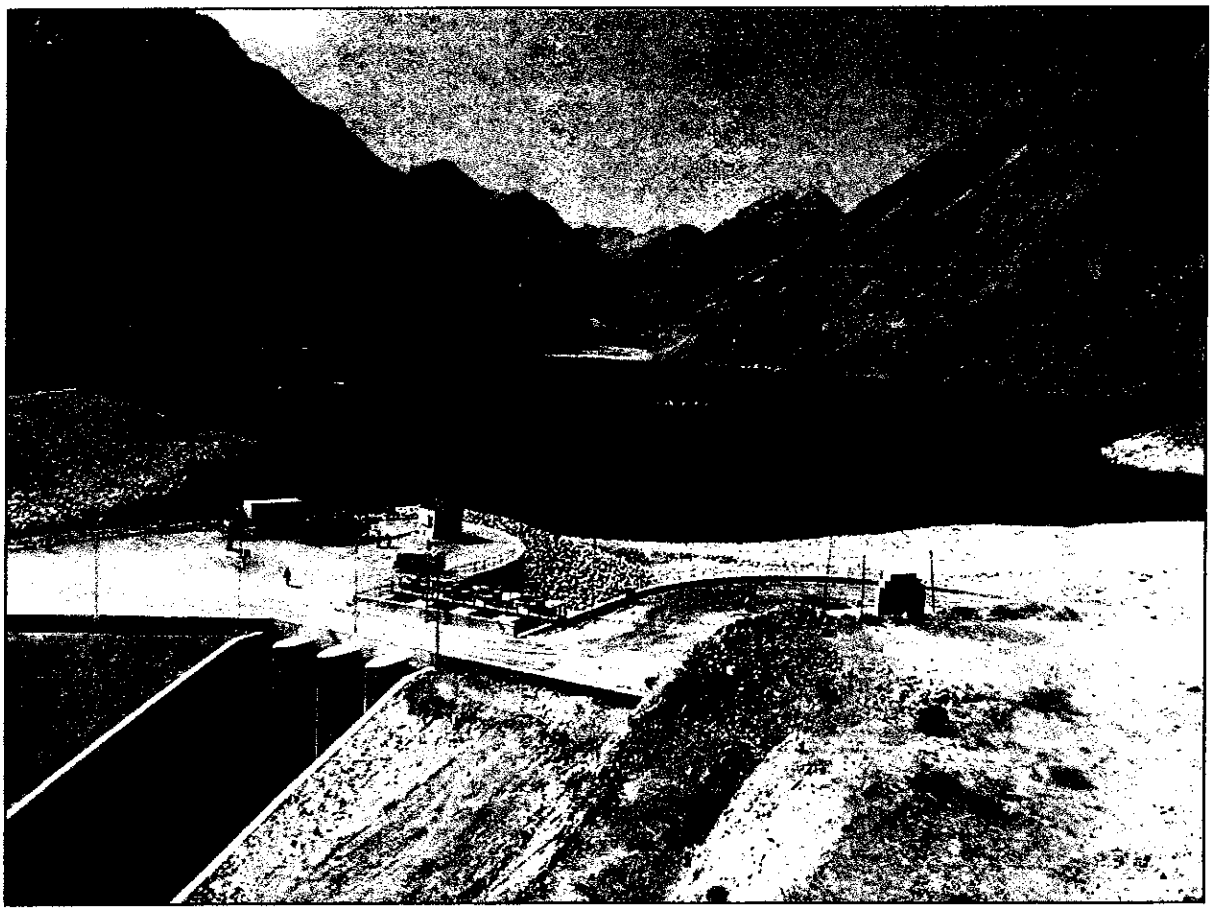
PAKISTAN WATER & POWER DEVELOPMENT AUTHORITY

# MONTHLY PROGRESS REPORT
for the Month of August 2011



SDC SATPARA DAM CONSULTANTS

# Consultancy Services for Implementation of Satpara Dam Project

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# IMPLEMENTATION OF EMMP

# FOR

# POWER HOUSES 3 & 4

# AND REMAINING WORKS

# SATPARA DAM PROJECT

**August 2011**

# SATPARA DAM PROJECT

## IMPLEMENTATION OF EMMP

### 1. IMPLEMENTATION STRATEGY

### 1.1 Remaining Works

EMMP Work Plan has been prepared to ensure its implementation during project activities in the field. EMMP provides the mechanism to implement the mitigation measures identified during the environmental and social analysis. The EMMP includes a mitigation plan, which defines the mitigation actions against each of the potential impacts and Project activity, and also assigns responsibilities for these actions. It also identifies the environmental parameters to be monitored during various project phases.

The Consultants (PES), the Contractor (DESCON) and the Client (WAPDA) are responsible for their respective areas of responsibilities including implementation of EMMP. The Construction Contractor has designated Mr. Malik Baqi Khan as EHS Officer and the Consultants has designated Mr. Zafar Abbas (B.Sc Civil Engineer) as EHS Engineer. The EHS officers of the contractors will be responsible for implementing the mitigation measures and other aspects of EMMP. The EHS Engineer will maintain day-to-day coordination with the EHS Officer and ensure that the EMMP is adequately implemented. The EHS Engineer will also liaise with the Pak-EPA and GB EPA for matters related to environmental management in the project area.

### 1.2 O & M Phase

The EHS Engineer will implement various aspects of EMMP. The EHS Engineer will maintain liaison will outside agencies including the national and provincial EPA's for matters relating to the environmental management and compliance of environmental rules and regulations during the project operation. WAPDA Environmental Cell (WEC) will maintain supervision of the EMMP at the site.

### 2. IMPLEMENTATION SCHEDULE

The schedule for the implementation of EMMP on monthly basis has been drawn up for Remaining Works at the Dam and Powerhouses 3 & 4. The field work is underway since 01 May 2011. The relevant proformas completed for the month of August 2011 complying with NEQS and World Bank Guidelines EHS are enclosed.

The key issues which are essential part of environmental monitoring include air quality, noise, liquid/ solid waste management and environmental health and safety. In particular, wastewater from construction camps is treated by the use of septic tanks/ oxidation ponds to comply with NEQS before

final disposal. For the drinking water, GA PWD has the proper treatment plant based on Satpara lake water whose quality is monitored by them on regular basis. The water from the treatment plant is also used by the Contractor's construction camp.

Field data used for preparation of EMMP Works Plan from August 01 to August 31, 2011 appears as Annexure which are attached and list below:

**Annexure**

| | | |
|---|---|---|
| **1** | **:** | **Office Order / Appointment Letter for EHS Engineer and EHS Officer** |
| **2** | **:** | **WHO Ambient Air Quality Standards** |
| **3** | **:** | **NEQS for Motor Vehicle Exhaust and Noise** |
| **4** | **:** | **NEQS for Water Effluent** |
| **5** | **:** | **Common Diseases in Skardu** |
| **6** | **:** | **Updated Status of Land Acquisition** |
| **7** | **:** | **Inflow Outflow Data of Satpara Dam** |
| **8** | **:** | **Drinking Water Quality Analysis Results** |
| **9** | **:** | **National Drinking Water Quality Standard** |
| **10** | **:** | **Meteorological Data** |

# CHECKLIST FOR IMPLEMENTATION EMMP WORK PLAN

**Date: August 01, 2011 to August 31, 2011** **Project Site: SDP-Power House 3 & 4 and Remaining Works**

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **A. CONTRACTOR'S MOBILIZATION/DEMOBILIZATION** | | | | |
| **1. Soil Erosion/ Contamination** | | | | |
| o Vehicles and equipment not repaired in the field. If unavoidable, impervious sheathing will be used avoid soil and water contamination | Y | | | o Vehicles repair and maintenance done after laying plastic sheets on the ground to prevent soil and water contamination |
| o Stockpiles adequately protected from erosion | Y | | | o To prevent stockpiles erosions |
| **2. Air Quality** | | | | |
| o Construction machinery and vehicles kept in good working condition and properly tuned in order to minimize the exhaust emissions | Y | | | o Appropriate maintenance of generators and vehicles ensured to minimize exhaust emissions as per WHO Ambient Air Quality Standard attached as Annexure – 2. |
| o Fugitive dust emissions minimized by appropriate methods, such as spraying water on soil where required, appropriately | Y | | | - |
| **3. Noise** | | | | |
| o Vehicles have exhaust mufflers to minimize noise generation | Y | | | o Maintained at 85 Db(A) as per requirements of NEQS for motor vehicles exhaust and noise. The standards are given in Annexure -3. |
| o Night traffic avoided near human settlements. Local population will be taken into confidence if such work is unavoidable | Y | | | o Construction activity largely conducted daytime to avoid inconvenience to local population at night |
| o Vehicular traffic through the communities avoided as far as possible. Vehicle speed kept low, and horns used while passing through or near the human settlements | Y | | | - |
| o The vehicles noise comply with the NEQS | Y | | | o Maintained at 85 Db(A) as per requirements of NEQS for motor vehicles exhaust and noise. The standards are given in Annexure -3. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **4. Safety Hazards/Risks** | | | | |
| o Employees provided with safety equipment | Y | | | o During monitoring, EHS Officer at site ensures compliance with all precautionary measures for workers and local population |
| o Hazardous goods stored in bounded area or in secure sheds | Y | | | |
| o Explosives stored in guarded bunkers | Y | | | |
| o Hazardous goods used according to manufacturer's specifications | | | | |
| o The access routes to the Powerhouses 3 and 4 will not pass through the communities | Y | | | |
| o Road signage fixed at appropriate locations to reduce safety hazard associated with project related vehicular traffic | Y | | | |
| o Project drivers trained on defensive driving | Y | | | |
| o Vehicles speeds near/within the communities kept low to avoid safety hazards and dust emissions | Y | | | |
| **5. Damage to Infrastructure** | | | | |
| o All damaged infrastructures restored to original or better condition | Y | | | o Till date no damage to existing infrastructure observed. |
| **B. CONSTRUCTION CAMP ACTIVITIES** | | | | |
| **1. Soil Erosion/ Water Contamination** | | | | |
| o Contractor waste disposal plan and submission to SC/EHS Engineer for approval | Y | | | o The construction contractor's EHS plan includes waste disposal plan which is being implemented under supervision of SC/ EHS Engineer. |
| o For the domestic sewage, appropriate treatment and disposal system constructed having adequate capacity, in accordance with NEQS | Y | | | o Sewage from construction camps is treated in the on-site septic tanks/ oxidation ponds to ensure compliance with NEQS (See Annexure - 4). This is the only way of domestic sewage treatment and disposal as the quantity is small and the hilly terrain does not allow construction of more elaborate wastewater treatment system. Sewage effluents laboratory results are given in Annex-8. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| o Waste oils collected in drums and sold to the recycling contractors in Skardu | Y | | | o The waste oils collected in drums are sold to the recycling contractor or workshops in Skardu. |
| o The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) sold to recycling contractors in Skardu. The hazardous waste kept separate and handled according to the nature of the waste | Y | | | o The construction contractor has made appropriate arrangements for collection and disposal of waste including hazardous material. |
| o Domestic solid waste from the construction camp disposed of in a manner that does not cause soil contamination | Y | | | o Solid waste from construction camp is being disposed of as per municipal committee instructions at designated locations. |
| o The camp sites completely restored after the completion of the construction works | Y | | | o The camp will be handed over to the employer (WAPDA) after completion of works. |
| o All temporary structures demolished, land leveled and re-contoured to the original condition or better | Y | | | - |
| o All debris and any other material removed from the site. The photographs if taken prior to the camp establishment used to restore the area | Y | | | o EHS Engineer takes steps to ensure that all debris removed from the site. |
| **2. Air Quality Deterioration** | | | | |
| o Generators and vehicles kept in good working condition and properly tuned in order to minimize the exhaust emissions | Y | | | o Appropriate maintenance of generators and vehicles ensured to minimize exhaust emissions (See Annexure – 3) |
| o Fugitive dust emissions minimized by appropriate methods such as spraying water on soil where required and appropriate | Y | | | - |
| **3. Loss of Vegetation** | | | | |
| o The construction crew provided with LPG as cooking (and heating, if required) fuel | Y | | | - |
| o Use of fuel wood not allowed | Y | | | - |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **4. Noise** | | | | |
| o Generators and vehicles have exhaust mufflers (silencers) to minimize noise generation | Y | | | o As per NEQS, 85 Db(A) (See Annexure – 3) |
| o Compliance with NEQS ensured | Y | | | o NEQS limits, 85 Db(A) (See Annexure – 4) |
| **5. Safety Hazards** | | | | |
| o Protective fencing to be installed around the Camp to avoid any accidents. | Y | | | - |
| o Firefighting equipment made available at the camps | Y | | | - |
| o The camp staff provided fire fighting training | Y | | | - |
| o All safety precautions taken to transport handle and store hazardous substances, such as fuel | Y | | | - |
| o EHS Plan to be followed | | | | o EHS Plan is inuse by the construction contractor. |
| **6. Public Health** | | | | |
| o The construction camps and site offices will have first-aid kits | Y | | | o First aid kits are available in construction camps and site offices |
| o The construction crew will be provided awareness for the transmissible diseases (such as HIV/AIDS), hepatitis B and C) | Y | | | o A representative of director health services, GB Skardu met the construction crew member and discussed the precautionary measures related to common diseases in Skardu. A letter from him is attached in Annexure – 5. |
| **7. Social and Gender Issues** | | | | |
| o Employment to locals will be maximized | Y | | | o Hiring of locals with appropriate experience has been ensured |
| o No child labor will be employed | Y | | | o No child labour employed in the project activity. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **C. TRANSPORTATION OF EQUIPMENT AND CONSTRUCTION MATERIAL** | | | | |
| **1. Soil Erosion and Contamination** | | | | |
| o Vehicular traffic on unpaved roads will be avoided as far as possible | Y | | | - |
| o Vehicles and equipment not repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination | Y | | | o Vehicles repair and maintenance done after laying plastic sheets on the ground to prevent soil and water contamination. |
| **2. Air Quality Deterioration** | | | | |
| o Vehicles kept in good working condition and properly tuned, in order to minimize the exhaust emissions | Y | | | o Appropriate maintenance of generators and vehicles ensured to minimize exhaust emissions as per emission standards given in Annexure -2 |
| o Fugitive dust emissions minimized by appropriate methods such as spraying water on soil where required and appropriate | Y | | | - |
| **3. Noise** | | | | |
| o Vehicles have exhaust mufflers (silencers) to minimize noise generation | Y | | | o As per NEQS, 85 Db(A). See Annexure -3. |
| o Nighttime traffic avoided near the communities. Local population taken in confidence if such work is unavoidable | Y | | | o Construction activity largely conducted daytime to avoid inconvenience to local population at night |
| **4. Safety Hazards** | | | | |
| o Road signage fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic | Y | | | o Construction contractor has installed road signage at appropriate location. |
| o Project drivers trained on defensive driving | Y | | | o HTV license holder with experience in heavy vehicle driving employed in the field. |
| o Vehicle speeds near/ within the communities kept low, to avoid safety hazard and dust emissions | Y | | | o The speed limits are strictly followed by the drivers. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| o EHS Plan to be strictly followed | | | | o EHS Plan is inuse by the construction contractor. |
| **5. Damage to Infrastructure** | | | | |
| o All damaged infrastructure restored to original or better condition | Y | | | o Till date, no damage to infrastructure observed. |
| **D. CONSTRUCTION WORKS** | | | | |
| **1. Blocked Access** | | | | |
| o A bypass route constructed at the project site avoiding the public traffic passing through the site | Y | | | - |
| **2. Noise and Vibration** | | | | |
| o Construction machinery appropriate noise muffling arrangement NEQS followed | Y | | | o As per NEQS, 85 Db(A).See Annexure – 3. |
| **3. Safety Hazards** | | | | |
| o The construction sites have protective fencing to avoid any unauthorized entry | Y | | | o Security guards stationed at appropriate location on the protective fencing at construction sites. |
| o EHS Plan to be strictly followed | Y | | | o EHS Plan is inuse by the construction contractor. |
| **4. Damage to Infrastructure** | | | | |
| o All damaged infrastructure restored to original or better condition | Y | | | - |
| **5. Social Issues** | | | | |
| o Employment to locals maximized. | Y | | | o Local labour hired as appropriate for on-going construction activities |
| o No child labor employed | Y | | | - |
| **6. Sites of Historical Cultural, Archaeological or Religious Significance** | | | | |
| o In case of chance find of any sites or artifacts of historical, cultural, archeological or religious significance, the work stopped at that site and the provincial and federal archeological departments notified immediately and their advice sought before resumption of the construction activities at such sites | Y | | | o Till date no chance find of any sites or artifacts of historical, cultural, archeological or religious significance is observed |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **7. Soil/ Mountain Slope Erosion** | | | | |
| o The top 30 cm soil removed and stockpiled for redressing the land after removal of borrow material. The excavation in such areas limited to 50 cm depth. The fill material not obtained from any cultivation fields or orchards without the permission of the land owner/cultivator | Y | | | o The borrow areas are about 20 Km from the construction sites. The excavation is done as per Technical Specifications are US-AID Technical Document Volume-II. |
| o The borrow areas protected against land slide/soil erosion, through using appropriate techniques (such as terracing, gabions, vegetation, bioengineering, and others) | Y | | | o The borrow areas belong to private owners whose sell the borrow material as per mutual agreement. Regarding these aspects it is the responsibility of owners himself to take care of. |
| o After the completion of the construction works, campsites and other construction sites completely restored | Y | | | - |
| o No debris, surplus construction material or any garbage left behind | Y | | | o EHS Engineer takes steps to ensure that no debris, surplus construction material or any garbage left behind. |
| o Photographic record if maintained for pre-project conditions used to restore the area | | | N/A | - |
| **8. Soil Contamination** | | | | |
| o Vehicles and equipment not repaired in the field (If unavoidable, impervious sheathing used to avoid soil and water contamination) | Y | | | o Vehicles repair and maintenance done after laying plastic sheets on the ground to prevent soil and water contamination |
| o Waste oils collected in drums and sold to the recycling contractors | Y | | | o The waste oils collected in drums are sold to the recycling contractor or workshops in Skardu. |
| o The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) sold to recycling contractors. The hazardous waste kept separate and handled according to the nature of the waste | Y | | | o The construction contractor has made appropriate arrangements for collection and disposal of waste including hazardous material. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| o Leaked oil collection arrangement incorporated in the design of the transformer foundations at the powerhouse and switchyard | Y | | | o The design of transformer foundations at the powerhouse ar switchyard has incorporated leake oil collection. |
| **9. Air Quality Deterioration** | | | | |
| o Construction generators and vehicles kept in good working condition and properly tuned, in order to minimize the exhaust emission machines | Y | | | o Appropriate maintenance of generators and vehicles ensured t minimize exhaust emissions as pe emission standards given in Annexure at the end. |
| o Relevant NEQS complied | Y | | - | |
| o Fugitive dust emissions minimized by appropriate methods, such as spraying water on soil, where required and appropriate | Y | | - | |
| **10. Loss of Natural Vegetation Aesthetic Value** | | | | |
| o Tree plantation carried out at the site | Y | | | o Tree plantation to be undertaken t the client (WAPDA) in association with GB Forest Department. |

**Additional Comments:**

DESCON Engineering Limited is currently working at Satpara Dam Project (Lot - 1A). It is ISO 14( & ISO 9001 certified organization. DESCON has completed many prestigious & mega projects Pakistan as well as overseas and won excellence awards for maintaining Health, Safety & Environments standards.

**Reported By:**

Chief Resident Engineer
SDC Skardu

DESCON ENGINEERING LIMITED



PROJECT DIRECTOR
SATPARA DAM PROJECT

# CHECKLIST FOR IMPLEMENTATION EMMP WORK PLAN

**Period: August 01 to August 31, 2011** **Project Site: SDP – Reservoir**

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **A. IMPACTS ASSOCIATED WITH PROJECT DESIGN AND SITE** | | | | |
| **Positive Impacts** | | | | |
| 1. **Reduction of floods** | Y | | | |
| 2. **Regulated supply of irrigation water from the reservoir, and hence increased cultivation in the command area.** | Y | | | |
| o Capacity building and awareness raising of farmers on efficient irrigation techniques | Y | | | |
| o Appropriate use of fertilizers and pesticides | Y | | | |
| o Promotion of organic farming and integrated pest management (IPM) practices | Y | | | |
| o Protection against water logging and soil salinity | | | N/A | |
| 3. **Electricity generation from the project** | | | | |
| o Availability of electricity to the local population. Spending a portion of the proceeds from the electricity generation on the area development | Y | | | o For the month of July 2011 powerhouses 4 & 5 generated 1.99 GWh of electricity for use in Skardu Town. |
| **Negative Impacts** | | | | |
| 1. **Resettlement Issues** | | | | |
| o Prepare and implement Resettlement and Community Development Plan focusing on the community development, in addition to addressing any remaining resettlement issues | | | N/A | o The IEE of the project does not required RAP as the quantum of affectees/ loss of economic assets is small. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| o Early payment for the remaining portion of the compensation | Y | | | o In process. For detail compensation payment see Annexure – 6. |
| o Maintain liaison and coordination with the communities to address and resolve any pending issues or grievances associated with the land acquisition and compensation assessed/paid | Y | | | o No issues pending. |
| o Ensure complete transparency of the entire compensation assessment and payment of compensation | Y | | | o Revenue department and project proponent are ensuring transparent assessment and payment process. |
| o Establish grievance redressal mechanism to address grievances of the stakeholders, particularly the communities | | | N/A | o No issues raised for redressal of grievances. |
| o Maximize employment opportunities to the local population | Y | | | o Hiring of locals with appropriate experience has been ensured. |
| o Give priority to the directly affected communities | | | N/A | o No child labour employed in the project activity. |
| **2. Land sliding, soil erosion and siltation in reservoir, thus reducing the reservoir capacity** | | | | o No land sliding observed. |
| o Develop and implement slope stabilization | Y | | | o A wraparound (designed and built integrally as a project component) safeguards stability issues for the steepest right abutment slopes of the reservoir. |
| o Watershed management and afforestation plan | | N | | - |
| o Appropriate terracing and where necessary gabions may be needed to protect the Deosai Plains road on the right bank of the Lake | Y | | | o The Deosai Road traverses at higher elevations along the right bank of the lake. Retaining walls are however built in immediate vicinity of the dam, within the narrow valley. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **3. Erosion of nullah bed downstream of dam (caused by release of silt-free water from reservoir)** | | | | |
| o Survey of nullah bed downstream of dam to identify potentially at-risk structures | Y | | | o The nullah bed just downstream of the spillway is treated with a reverse slope in riprap safeguarding the toe-drain outlet and the valve chamber from erosive actions in high discharges.<br>o A line of transmission towers further downstream has been relocated from the edge of the nullah, to the right side of the road in view of possible risk in flooding. |
| o Reinforcement of bridges, culverts, and other structures where needed | | | N/A | |
| **4. Dam collapse** | | | | |
| o Prepare and implement Project Operational Manual (OM). ERP to be part of OM Capacity building of O&M staff | Y | | | o Project Operation Manual is currently under preparation by SDC. |
| **5. Modified water flow regime** | | | | |
| o Pre-project flow will be maintained in the Satpara nullah downstream of the diversion for the canals. | Y | | | o The dam does not divert, rather it regulates the flows all around the year. |
| o Install meteorological station at the dam site to record the key meteorological data including temperature, precipitation, humidity, and wind speed/direction. | | N | | o No meteorological station is required at the project site because the meteorological station namely Sakrdu already exist within the project area. The Skardu station is located about 9 km North-East of the project area having Latitude 35o18'00", Longitude 75o41' 00" and at an elevation of 7199 ft amsl. The Sakrdu meteorological station is operated by the Pakistan Meteorological Department. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| o Install river rim stations upstream and downstream of the dam, and monitor water inflow in the reservoir, water releases from the reservoir, irrigation water diverted in the canals, water released in the nullah downstream of canal diversion, and water reaching the Indus river | | | | o An upstream gauge at the Satpara nullah exists for possible monitoring inflows. The inflows however are pre-dominantly snow-melt and subsurface recharges not readily measurable.<br>All outflows from the dam are regulated through gated structures, adequately gauged and rated for different discharges at different gate openings.<br>The data on inflow and outflow from the reservoir is given in Annexure – 7. |
| **6. Drinking water quality**<br>o A water quality monitoring system needs to be established, through which water samples should be collected from various location (upstream and downstream of settling tanks, near the major communities, and randomly at the consumer/household level. Depending upon the quality of water, appropriate treatment will need to be determined, and the treatment plant/arrangements established. | Y | | | o Results of water quality testing from KSC Lab w.r.t. consumer end, outlet of Satpara Dam and Contractor Camp attached – Annexure - 8.<br>National drinking water quality standards (Draft) appear as Annexure – 9. |
| **7. Decreased soil fertility because of decreased silt in irrigation water**<br>Rational use of fertilizer by the growers. Encourage using organic farming and IPM techniques. Capacity building and awareness raising needed. | Y | | | |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **8. Groundwater table rise** | | | | |
| o Capacity building of farmers for appropriate cultivation and irrigation techniques; adopting to shallow groundwater; installation of tube-wells to extract groundwater in areas having shallow groundwater. | | | N/A | o Adaptation of use of shallow groundwater by installation of tubewells is not feasible because of hilly terrain. |
| **9. Loss of natural vegetation and biodiversity in the project area** | | | | |
| o Compensation to be paid to the owners for cutting of trees on privately owned land | Y | | | o Paid. |
| o Re-plantation with local, non-invasive species; prepare re-plantation plan | Y | | | - |
| o Prepare and implement Wildlife Sanctuary Management Plan | Y | | | o Wildlife Sanctuary Management Plan already under implementation by GB Wildlife Department. |
| **10. Project located in wildlife sanctuary** | | | | |
| o Prepare and implement Satpara Wildlife Sanctuary Management Plan | Y | | | o Wildlife Sanctuary Management Plan already under implementation by GB Wildlife Department. |
| o Conduct composite monitoring of biological resources in the area on a regular basis | Y | | | - |
| **11. Increased fish population in reservoir** | | | | |
| o Planned and controlled introduction of appropriate non-invasive species. | Y | | | o The Client (WAPDA) in association with GB Fisheries Department to introduce non-invasive species of fish in the Reservoir after the operation stage. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **12. Increased risk of diseases caused by vectors such as mosquitoes** | | | | |
| o Integrated approach involving preventive as well as curative measures | Y | | | o A representative of director health services, GB Skardu met the construction crew member and discussed the precautionary measures related to common diseases in Skardu. |
| o Use of approved and non-toxic insecticides | Y | | | - |
| o Use of mosquito nets in buildings | Y | | | - |
| o Vaccination (where applicable), and awareness raising | Y | | | - |
| o Strengthen the health care facilities in the command area | Y | | | - |
| **13. Reservoir induced seismicity** | | | | |
| o Conduct further earthquake studies and risk analysis | | N | | - |
| o Appropriate instruments to be installed to monitor the seismicity at the site | Y | | | o An accelerograph has been installed on the dam axis for monitoring seismicity at site. |
| **14. Eutrophication of Reservoir** | | | | |
| o Trees and vegetation to be removed from the area to be inundated. Consider cutting the trees from the already submerged area during low flow | | | | o Trees and vegetation stand removed from the reservoir area under submergence. |
| o Conduct further studies to determine the extent of problem, and to identify remedies | | | | o The conservation level of the reservoir is fixed at 8740 ft amsl. The level of water in the reservoir since start of inflow is only 8717 ft amsl. The problems, if any, will be identified for remedial measures at that stage. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **15. PCB in Transformer Oil** | | | | |
| o Ensure that new transformers are PCB free (Obtain certificates from manufacturers) | Y | | | |
| o Ensure that transformer oil brought to site is PCB free | Y | | | |
| **16. Climate change** | | | | |
| o Conduct studies to address concerns related to climate change (such as increased frequency and intensity of extreme events), and to frame any mitigation or adaptation measures for the Project. | Y | | | o Recent meteorological data does not reflect any extreme event. |

**Additional Comments:**

DESCON Engineering Limited is currently working at Satpara Dam Project (Lot – 1A). It is ISO 14001 & ISO 9001 certified organization. DESCON has completed many prestigious & mega projects in Pakistan as well as overseas and won excellence awards for maintaining Health, Safety and Environments standards.

**Reported By:**

Chief Resident Engineer
SDC Skardu

DESCON ENGINEERING LIMITED

PROJECT DIRECTOR
SATPARA DAM PROJECT
WAPDA SKARDU

# CHECKLIST FOR IMPLEMENTATION EMMP WORK PLAN

**Period: August 01 to August 31, 2011** **Project Site: SDP – O & M Activities**

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **A. OPERATION AND MAINTENANCE OF PROJECT FACILITIES** | | | | |
| **1. Soil and Water Contamination** | | | | |
| o For the domestic sewage, appropriate treatment and disposal system will be constructed having adequate capacity, in accordance with NEQS. | | | | o Sewage from construction camps is treated in the on-site septic tanks/ oxidation ponds to ensure compliance with NEQS (See Annexure). This is the only way of domestic sewage treatment and disposal as the quantity is small and the hilly terrain does not allow construction of more elaborate wastewater treatment system. Sewage effluents laboratory results are given in Annexure – 8. |
| o Waste oils will be collected in drums and sold to the recycling contractors in Skardu. | | | | o The waste oils collected in drums are sold to the recycling contractor or workshops in Skardu. |
| o The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) will be sold to recycling contractors in Skardu. The hazardous waste will be kept separate and handled according to the nature of the waste. | | | | o The construction contractor has made appropriate arrangements for collection and disposal of waste including hazardous material. |
| o Domestic solid waste from the site facilities will be disposed in a manner that does not cause soil contamination. | | | | o Solid waste from construction camp is being disposed of as per municipal committee instructions at designated locations. |
| o The standard EHS Guidelines (eg, IFC'S EHS Guidelines) to be followed. | Y | | | o All the activities related to sewage is being followed by construction contractor as per waste disposal plan given in EHS Plan. |

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| **2. Safety Hazards** | | | | |
| o The dam safety risk assessment will be carried out (if not already done) by an independent panel of experts. | Y | | | o A comprehensive dam safety risk assessment was conducted by SDC in the detailed design stage which was later on independently vetted by a PoE from WAPDA and third party visiting experts from US-AID at different stages. |
| o The standard operating procedures (SOPs) for dam and powerhouse O&M will be prepared and strictly implemented. | Y | | | o The standard operating procedures (SOPs) are under preparation by SDC. |
| o The standard EHS Guidelines will be made part of the SOPs mentioned above, and will be strictly followed. | Y | | | o Under preparation by SDC. |
| o The Emergency Response Plan (ERP) will be made available at the Project sites. Its salient points will be displayed at prominent places. The O&M staff will be given training on the ERP. | Y | | | o The Emergency Response Plan (ERP) is available with the construction contractor at project site. |
| o The O&M staff will be provided essential protective gears and equipment. | Y | | | - |
| o The O&M staff will be provided safety training. Refresher courses will be arranged on regular basis. | Y | | | |
| o The Project sites will have protective fencing to avoid any unauthorized entry. | Y | | | o Security guards stationed at appropriate location on the protective fencing at construction sites. |
| o The project drivers will be trained for defensive driving skills. Vehicular speeds near/within communities will be kept low to minimize safety hazards. | Y | | | o HTV license holder with experience in heavy vehicle driving employed in the field. The speed limits are strictly followed by the drivers. |

Period: August 01 to August 31, 2011

Project Site: SDP – O & M Activities

| Items | Yes | No | N/A | Comments |
|---|---|---|---|---|
| o Firefighting equipment will be made available at the site, fire extinguishers will be provided in the project vehicles. The powerhouse staff will be provided safety training, including the fighting. | Y | | - | |
| o All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel. | Y | | - | |
| o Liaison with the community will be maintained for the canals maintenance works, where necessary. | Y | | - | |
| **3. Loss of Agriculture** | | | | |
| o The crop damage will be minimized during the O&M activities of the irrigation canals. | Y | | | o No such damage is observed. |
| o Community liaison will be maintained during such operations. | Y | | - | |
| o Compensation will be paid to the grower for damage to crops or any other assets. | Y | | - | |

**Additional Comments:**

DESCON Engineering Limited is currently working at Satpara Dam Project (Lot – 1A). It is ISO 14001 & ISO 9001 certified organization. DESCON has completed many prestigious & mega projects in Pakistan as well as overseas and won excellence awards for maintaining Health, Safety and Environments standards.

**Reported By:**

Chief Resident Engineer
SDC Skardu

DESCON ENGINEERING LIMITED



PROJECT DIRECTOR
SATPARA DAM PROJECT
WAPDA SKARDU

# ANNEXURES

ANNEXURE - 1

# OFFICE ORDER/ APPOINTMENT LETTERS

# FOR EHS ENGINEER AND EHS OFFICER

Annexure - 1

# SATPARA DAM CONSULTANTS

A Joint Venture of: Pakistan Engineering Services (Pvt.) Ltd. Zaheeruddin Consultants (Pvt.) Ltd. M M Pakistan (Pvt.) Ltd. IN Consult (Pvt.) Ltd. Project Advisor: Coyne et. Bellier Mirza Associates Engineering Services (Pvt.) Ltd. Technica International

Ref: CRE/SDC/GEN/04/011/239

Date: April 30, 2011

## OFFICE ORDER

Mr. Zafar Abbas a Graduate Civil Engineer is hereby nominated to work as Environmental Health and Safety (EHS) Engineer for implementation of Environmental Mitigation Management Plan (EMMP) as per requirement of USAID Activity Agreement for the Satpara Dam Multipurpose Project with immediate effect.

He is directed to ensure implementation of EMMP Work Plan during project activities in the field and maintain compliance reports thereof on fortnightly basis.

30/04/11

[Ch. Farooq Ahmad]
Chief Resident Engineer
Field Office, Skardu

Distribution:

1. Mr. Jamil Anwer, Chairman (BOM), SDC, Project Office, Lahore.
2. Project Director, WAPDA, SDP, Field Office, Skardu.
3. Mr. Hussain Shigri, ARE-I & Mr. Abid Hussain, ARE-II, SDC, Field Office, Skardu.
4. Project Manager, DESCON, SDP, Field Office, Skardu.
5. Project Manager, CCPG, Field Office, Skardu.
6. Office Copy.

Field office- Ali Abad Road, Satellite Town Skardu -GPO Box No. 652, Skardu. Telephone No- (05815 - 454462, 454461) Fax No # 05815-450412

Annexure - 1

# DESCON – J&P JOINT VENTURE

18 KM Ferozepur Road
Lahore – 53000
Pakistan

Phone: +92 (042) 5805134
Fax: +92 (042) 5811005
+92 (042) 5805137

SATPARA DAM CONSULTANTS
Satpara Dam Project,
Ali Abad Road, Satellite Town,
Skardu.

Our Ref: 5011-PO-SDC-LP- 2997A
Date: May 9, 2011

**Attention:** Chaudhary Farooq Ahmad – Chief Resident Engineer

**Subject:** Satpara Dam Project – Contract LOT 1A – Dam & Power Houses
**Environment, Health and Safety (EHS)**

Dear Sir,

With reference to our earlier discussions, it is to inform your good office that we have already an organized Environment, Health and Safety department to look after the affairs related to EHS. This team of EHS is working under Mr. Baqi Khan, who has vast experience in this field.

This is for your information please.

Assuring you of our best professional services at all times, we remain.

Regards

For DESCON – J&P (JV)

SATPARA DAM CONSULTANTS (NA) FIELD OFFICE SKARDU
RECEIPT OF LETTER
NO.
DATED 11/5/11

Yousaf Mahmood
Project Manager

CC: (1) The Engineer, Satpara Dam Consultants, 188-Y, Commercial Area. DHA Lahore
(2) Project Director, SDP, (WAPDA), Skardu
(3) Head DCS, DESCON, World Headquarter, Lahore
(4) Principal Engineer Contracts, Satpara Dam Consultants, 188-Y, Commercial Area, DHA Lahore

# WHO AMBIENT AIR

# QUALITY STANDARDS

## WHO Ambient Air Quality Standards

| Pollutant | Maximum Allowable Limit | Units | Averaging Time |
|---|---|---|---|
| CO | 35 | ppm | 1 hour |
| $NO_X$ | 106 | ppb | 1 hour |
| $SO_2$ | 134 | ppb | 1 hour |
| $PM_{10}$ | 70 | $\mu g/m^3$ | 24 hours |

Source: World Health Organization.

ANNEXURE - 3

# NEQS FOR MOTOR VEHICLES EXHAUST AND NOISE

# NEQS for Motor Vehicles Exhaust and Noise

(i) For In-use Vehicles

| | Parameter | Standard (Maximum Permissible Limit) | Measuring Method | Applicability |
|---|---|---|---|---|
| 1 | Smoke | 40% or 2 on the Ringlemann Scale during engine ecceleration mode. | To be compared with Ringlemann Chart at a distance 6 or more. r | Immediate effect |
| 2 | Carbon Monoxide | 6% | Under idling conditions: Non-dispersive infrared detection through gas analyzer. | |
| 3 | Noise | 85 db (A). | Sound meter at 7.5 meters from the source. | |

(ii) For new Vehicles

Emission Standards For Diesel Vehicles

(a) For Passenger Cars and Light Commercial Vehicles (g/Km)

| Type of Vehicle | Category/Class | Tiers | CO | HC+ NOx | PM | Measuring Method | Applicability |
|---|---|---|---|---|---|---|---|
| Passenger Cars | M 1: with reference mass (RW) up to 2500 kg. Cers with RW over 2500 kg to meet NI category standerds. | Pak-II IDI | 1.00 | 0.70 | 0.08 | NEOC (ECE 15+ EUDCL) | i. All imported and local manufactured diesel vehicles with effect from 01-07-2012 |
| | | Pak-II DI | 1.00 | 0.90 | 0.10 | | |
| Light Commercial Vehicles | NI-I (RW< 1250 kg) | Pak-II IDI | 1.00 | 0.70 | 0.08 | | |
| | | Pak-II DI | 1.00 | 0.90 | 0.10 | | |
| | NI-II (1250 kg< RW <1700 kg0 | Pek-II IDI | 1.25 | 1.00 | 0.12 | | |
| | | Pak-II DI | 1.25 | 1.30 | 0.14 | | |
| | NI-III (RW> 1700 kg) | Pak-II IDI | 1.50 | 1.20 | 0.17 | | |
| | | Pak-II DI | 1.50 | 1.60 | 0.20 | | |

| Parameter | Standard (maximum parmissible limit) | Measuring Method |
|---|---|---|
| Noise | 85 db (A) | Sound meter at 7.5 meters from the source. |

**(b) For Heavy Duty Diesel Engines and Large Goods Vehicles (g/Kwh)**

| Type of Vehicle | Category / Class | Tiers | CO | HC | NOx | PM | Measuring Method | Applicability |
|---|---|---|---|---|---|---|---|---|
| Heavy Duty Diesel Engines | Trucks and Buses | Pak-II | 4.0 | 1.1 | 7.0 | 0.15 | ECE-R-49 | All imported and local manufactured diesel vehicles with the effect 1-7-2012 |
| Large goods Vehicles | N2 (2000 and up | Pak-II | 4.0 | 7.0 | 1.10 | 0.15 | EDC | |

| Parameter | Standard (maximum permissible limit) | Measuring Method |
|---|---|---|
| Noise | 85 db (A) | Sound meter at 7.5 meters from the source. |

**Emission Standards for Petrol Vehicles (g/km)**

| Type of Vehicle | Category / Class | Tiers | CO | HC+ NOx | Measuring Method | Applicability |
|---|---|---|---|---|---|---|
| Passenger | M 1: With reference mass (RW) up to 2500 kg. Cars with RW over 2500 kg. to meet N1 category standards | Pak-II | 2.20 | 0.50 | NEDC (ECE 15 + EUDCL) | All imported and new models* locally manufactured petrol vehicles with effect from 1st July, 2009** |
| Light Commercial Vehicles | N1-I (RW<1250 kg) | Pak-II | 2.20 | 0.50 | | |
| | N1-II (1250 kg>RW <1700 kg) | Pak-II | 4.00 | 0.65 | | |
| | N1-III (RW>1700 kg) | Pak-II | 5.00 | 0.80 | | |
| Motor Rickshaws & motor Cycles | 2.4 strokes <150 cc | Pak-II | 5.50 | 1.50 | ECER 40 | |
| | 2.4 strokes> 150 cc | Pak-II | 5.50 | 1.30 | | |

| Parameters | Standard (maximum permissible limit) | Measuring Method |
|---|---|---|
| Noise | 85 db (A) | Sound meter at 7.5 meters from the source |

| Explanations: | |
|---|---|
| DI: | Direct Injection |
| IDI: | Indirect Injection |
| EUDCL: | Extra Urban Driving Cyde |
| NEDC: | New Urban Driving Cycle |
| M: | Vehicles designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat |
| N: | Motor vehicles with at least four wheels designed and constructed for the carriage of goods. |
| * | New model means both model and engine type change |
| ** | The existing models of petrol driven vehicles locally manufactured will immediately switch over to Pak-II emission standards but not later than 30th June, 2012 |

# NEQS FOR WASTE EFFLUENTS

## Selected NEQS for Waste Effluents

| Parameter | Unit | Standards (Maximum Allowable Limit) |
|---|---|---|
| Temperature increase | °C | < 3 |
| pH value (acidity/basicity) | pH | 6-9 |
| 5-day biochemical oxygen demand (BOD) at 20 °C | mg/l | 80 |
| Chemical oxygen demand (COD) | mg/l | 150 |
| Total suspended solids | mg/l | 200 |
| Total dissolved solids | mg/l | 3,500 |
| Grease and oil | mg/l | 10 |
| Phenolic compounds (as phenol) | mg/l | 0.1 |
| Chloride (as Cl) | mg/l | 1,000 |
| Fluoride (as F) | mg/l | 10 |
| Sulfate ($SO_4$) | mg/l | 600 |
| Sulfide (S) | mg/l | 1.0 |
| Ammonia ($NH_3$) | mg/l | 40 |
| Cadmium | mg/l | 0.1 |
| Chromium (trivalent and hexavalent) | mg/l | 1.0 |
| Copper | mg/l | 1.0 |
| Lead | mg/l | 0.5 |
| Mercury | mg/l | 0.01 |
| Selenium | mg/l | 0.5 |
| Nickel | mg/l | 1.0 |
| Silver | mg/l | 1.0 |
| Total toxic metals | mg/l | 2.0 |
| Zinc | mg/l | 5 |
| Arsenic | mg/l | 1.0 |
| Barium | mg/l | 1.5 |
| Iron | mg/l | 8.0 |
| Manganese | mg/l | 1.5 |
| Boron | mg/l | 6.0 |
| Chlorine | mg/l | 1.0 |

Source: Government of Pakistan (2000).

Notes:

1. The standard assumes that dilution of 1:10 on discharge is available. That is, for each cubic meter of treated effluent, the recipient water body should have 10 $m^3$ of water for dilution of this effluent.
2. Toxic metals include cadmium, chromium, copper, lead, mercury, selenium, nickel and silver. The effluent should meet the individual standards for these metals as well as the standard for total toxic metal concentration.

ANNEXURE - 5

# COMMON DISEASES IN SKARDU

ANNEX – 5

No. DHS-BR-5 (22) /Stats/ 2008
**GOVERNMENT OF GILGIT – BALTISTAN**
Office of the Director Health Services,
Baltistan Skardu
******

Date: 29 August, 2(

To

The Chief Residence Engineer,
Sadpara Dam Consultants: Skardu.

Subject: **COMMON DISEASE IN SKARDU.**

Following disease are common in Skardu District.

1. Water born diseases:
   a. Infective Hepatitis
   b. Enteric Fever.
   c. Dysentery.
   d. Helmenthiasis.
   e. Diarrhoea.
2. ARI
3. Scabies
4. Hypertension
5. Goiter
6. Brpnchitis /Asthrra
7. Phangities / Tonsillitis
8. Measles

Report is submitted as desired please.

**(Dr. Muhammad Bismillah Khan)**
Director Health Services
Baltistan Skardu

ANNEXURE - 6

# UPDATED STATUS OF LAND ACQUISITION

Annexure - 6

# SATPARA DAM PROJECT

## UPDATED STATUS OF LAND ACQUISITION.

dated: 31-Aug-11

| Sr. # | Project Component | Land Acquired (Acres) | Amount Paid (Rs.M) | land acquisition under process/ to be acquired (Acres) | Cost of Land (Rs. M) |
|---|---|---|---|---|---|
| 1 | Lot - 1A | | | | |
| | a). Dam Site | 33.306 | 59.106 | 4.856 | 7.496 |
| | b). Contractor's Colony | 6.09 | 9.418 | - | - |
| | c). Spill Channel & Penstock. | 1.66 | 4.844 | - | - |
| | d). Access Road to Forebay. | 0.0875 | 0.237 | - | - |
| | Sub Total (1) | 41.143 | 73.605 | 4.856 | 7.496 |
| 2 | Lot - 1B | | | | |
| | a). 66 KV Gnd Station & Powerhouse # 1 & 2 | 1.20 | 2.525 | - | - |
| | b). Switchyard | 0.20 | 2.104 | - | - |
| | c). E&M Additional Works (Tower No. 11ZM6). | 0.07 | 0.178 | - | - |
| | Sub total (2) | 1.468 | 4.807 | 0 | 0 |
| 3 | Lot -2 | | | | |
| | a). Left Bank Canal (LBC). | 14.525 | 57.638 | 31.306 | 46.847 |
| | b). Right Bank Canal (RBC). | 5.356 | 17.826 | - | 0.954 |
| | Sub Total (3) | 19.88 | 75.464 | 31.306 | 47.801 |
| 4 | Power House # 3 | | | 1.25 | 5.500 |
| 5 | Power House # 4 | | | 0.87 | |
| | Sub Total (4+5) | | | 2.12 | 5.500 |
| | Grand Total (1+2+3+4+5) | 63.353 | 156.255 | 37.419 | 58.418 |

- Sr. # 1. Lot-1A(a) Dam Site:- Awards under process and not yet paid owing to civil suit between the owners.
- Sr. # 4 & 5, P.H # 3 & 4, The estimated amount will be payable after verification/clarification of the concerned department.
- The under process land 37.449 Acres & Amounts are tentative as few awards are yet to be finalized by Revenue Department.

ANNEXURE - 7

# INFLOW OUTFLOW DATA

# OF SATPARA DAM

# Comparison of Inflow and Outflow of Satpara Dam

| Date | Stilling basin Gauge Reading (ft) | Discharge from Stilling basin (Cusecs) | Lake Level (ft.) | Dischrge Through PH#1 (Cusecs) | Estimated Seepge (Cusecs) | Total Outflow (Cusecs) | Storage Capacity (Acre Feet) | Increased/ Decreased In Water Storage (Acre Feet) | Calcul. Inflow (Cusecs) | Water Released Per Day (Acre Feet) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-Jun-10 | 0 | 0 | 8644.70 | 86.35 | 15 | 101.35 | 43319.50 | | | 201 |
| 2-Jun-10 | 0 | 0 | 8645.55 | 84.56 | 15 | 99.56 | 43650.50 | 331.00 | 266 | 197 |
| 3-Jun-10 | 0 | 0 | 8646.70 | 83.17 | 15 | 98.17 | 43989.00 | 338.50 | 269 | 195 |
| 4-Jun-10 | 0 | 0 | 8648.00 | 69.69 | 15 | 84.69 | 44508.00 | 519.00 | 346 | 168 |
| 5-Jun-10 | 0 | 0 | 8649.55 | 25.04 | 15 | 40.04 | 45038.00 | 530.00 | 307 | 79 |
| 6-Jun-10 | 0 | 0 | 8650.80 | 98.34 | 15 | 113.34 | 45577.00 | 539.00 | 385 | 225 |
| 7-Jun-10 | 0 | 0 | 8651.90 | 99.34 | 15 | 114.34 | 45942.00 | 366.00 | 298 | 227 |
| 8-Jun-10 | 0 | 0 | 8653.10 | 113.09 | 15 | 128.09 | 46314.00 | 372.00 | 316 | 254 |
| 9-Jun-10 | 0 | 0 | 8654.60 | 114.06 | 15 | 129.06 | 46879.50 | 565.50 | 414 | 256 |
| 10-Jun-10 | 0 | 0 | 8656.00 | 106.76 | 20 | 126.76 | 47454.00 | 574.50 | 416 | 251 |
| 11-Jun-10 | 0 | 0 | 8657.40 | 75.04 | 20 | 95.04 | 48040.50 | 586.50 | 391 | 189 |
| 12-Jun-10 | 0 | 0 | 8659.50 | 73.92 | 20 | 93.92 | 48835.00 | 794.50 | 494 | 186 |
| 13-Jun-10 | 0 | 0 | 8662.00 | 72.92 | 20 | 92.92 | 49850.00 | 1015.00 | 605 | 184 |
| 14-Jun-10 | 0 | 0 | 8664.75 | 72.92 | 20 | 92.92 | 50894.00 | 1044.00 | 619 | 184 |
| 15-Jun-10 | 0.5 | 65 | 8667.40 | 68.78 | 26 | 159.78 | 52177.00 | 1283.00 | 807 | 317 |
| 16-Jun-10 | 1 | 178 | 8669.60 | 67.66 | 32 | 277.66 | 53050.50 | 873.50 | 718 | 551 |
| 17-Jun-10 | 1.4 | 300 | 8671.10 | 58.66 | 32 | 390.66 | 53720.00 | 669.50 | 728 | 775 |
| 18-Jun-10 | 2.2 | 550 | 8672.80 | 57.68 | 44 | 651.68 | 54627.00 | 907.00 | 1109 | 1293 |
| 19-Jun-10 | 2.5 | 675 | 8675.00 | 53.45 | 44 | 772.45 | 55555.00 | 928.00 | 1240 | 1532 |
| 20-Jun-10 | 3 | 850 | 8677.15 | 74.43 | 44 | 968.43 | 56501.00 | 946.00 | 1445 | 1921 |
| 21-Jun-10 | 3.25 | 990 | 8679.10 | 61.05 | 44 | 1115.05 | 57461.00 | 960.00 | 1599 | 2212 |
| 22-Jun-10 | 3.33 | 1000 | 8681.05 | 74.35 | 53 | 1127.35 | 58436.00 | 975.00 | 1619 | 2236 |
| 23-Jun-10 | 3.75 | 1225 | 8683.15 | 79.96 | 53 | 1357.96 | 59425.00 | 989.00 | 1857 | 2693 |
| 24-Jun-10 | 4.00 | 1336 | 8684.95 | 86.60 | 53 | 1475.60 | 60423.00 | 998.00 | 1979 | 2927 |
| 25-Jun-10 | 4.17 | 1450 | 8686.10 | 55.63 | 53 | 1556.63 | 60928.00 | 505.00 | 1813 | 3091 |
| 26-Jun-10 | 4.17 | 1450 | 8686.40 | 78.08 | 53 | 1581.08 | 61182.50 | 254.50 | 1709 | 3136 |
| 27-Jun-10 | 4.17 | 1450 | 8686.95 | 87.46 | 53 | 1590.46 | 61437.00 | 254.50 | 1719 | 3155 |
| 28-Jun-10 | 4.17 | 1450 | 8687.70 | 72.29 | 53 | 1575.29 | 61692.50 | 255.50 | 1704 | 3125 |
| 29-Jun-10 | 4 | 1400 | 8688.50 | 89.14 | 53 | 1542.14 | 62204.50 | 512.00 | 1800 | 3059 |
| 30-Jun-10 | 4 | 1400 | 8689.00 | 85.33 | 53 | 1538.33 | 62461.00 | 256.50 | 1668 | 3051 |
| 1-Jul-10 | 4 | 1400 | 8688.35 | 76.4 | 53 | 1529.40 | 61948.00 | -513.00 | 1271 | 3034 |
| 2-Jul-10 | 3.5 | 1150 | 8687.00 | 80.64 | 53 | 1283.64 | 61437.00 | -511.00 | 1026 | 2546 |
| 3-Jul-10 | 2.5 | 750 | 8686.50 | 82 | 53 | 885.00 | 61182.50 | -254.50 | 757 | 1755 |
| 4-Jul-10 | 2 | 550 | 8687.60 | 86.21 | 53 | 689.21 | 61692.50 | 510.00 | 946 | 1367 |
| 5-Jul-10 | 2 | 550 | 8688.40 | 76.02 | 53 | 679.02 | 62204.50 | 512.00 | 937 | 1347 |
| 6-Jul-10 | 2 | 550 | 8689.10 | 79.58 | 53 | 682.56 | 62461.00 | 256.50 | 812 | 1354 |
| 7-Jul-10 | 1.5 | 370 | 8689.40 | 80.65 | 53 | 503.65 | 62719.00 | 258.00 | 634 | 999 |
| 8-Jul-10 | 2.5 | 765 | 8690.70 | 88.28 | 53 | 906.28 | 63337.25 | 618.25 | 1218 | 1798 |
| 9-Jul-10 | 3.75 | 1295 | 8691.75 | 64.94 | 53 | 1412.94 | 63895.50 | 556.25 | 1694 | 2803 |
| 10-Jul-10 | 3.75 | 1295 | 8691.65 | 93.87 | 53 | 1441.87 | 33340.16 | -30555.34 | -13963 | 2860 |
| 11-Jul-10 | 3.25 | 1081 | 8691.80 | 84.03 | 53 | 1218.03 | 33340.16 | 0.00 | 1218 | 2416 |
| 12-Jul-10 | 2.5 | 765 | 8692.30 | 72.35 | 53 | 890.35 | 34765.24 | 1425.08 | 1609 | 1766 |
| 13-Jul-10 | 1 | 218 | 8693.15 | 81.3 | 53 | 352.30 | 36369.52 | 1604.28 | 1161 | 699 |
| 14-Jul-10 | 1.75 | 485 | 8694.40 | 78.26 | 53 | 616.26 | 37371.40 | 1001.88 | 1121 | 1222 |
| 15-Jul-10 | 2 | 585 | 8694.90 | 76.61 | 53 | 714.61 | 65566.60 | 28195.20 | 14930 | 1417 |
| 16-Jul-10 | 2.5 | 793 | 8695.10 | 72.28 | 53 | 918.28 | 65674.00 | 107.40 | 972 | 1821 |
| 17-Jul-10 | 2 | 585 | 8695.50 | 72.13 | 53 | 710.13 | 65894.00 | 220.00 | 821 | 1409 |
| 18-Jul-10 | 2 | 585 | 8696.30 | 75.18 | 53 | 713.18 | 66326.20 | 432.20 | 931 | 1415 |
| 19-Jul-10 | 2.5 | 793 | 8697.10 | 75.96 | 53 | 921.96 | 66763.70 | 437.50 | 1143 | 1829 |
| 20-Jul-10 | 1.75 | 485 | 8697.20 | 79.49 | 53 | 617.49 | 66827.40 | 63.70 | 650 | 1225 |
| 21-Jul-10 | 1 | 218 | 8697.40 | 80.06 | 53 | 351.06 | 66948.80 | 121.40 | 412 | 696 |
| 22-Jul-10 | 1 | 218 | 8698.30 | 85.16 | 53 | 356.16 | 67436.60 | 487.80 | 602 | 706 |
| 23-Jul-10 | 1 | 218 | 8699.20 | 90.66 | 53 | 361.66 | 67932.20 | 495.60 | 612 | 717 |
| 24-Jul-10 | 0.75 | 144 | 8699.70 | 92.48 | 52.5 | 288.98 | 68224.20 | 292.00 | 436 | 573 |
| 25-Jul-10 | 0.75 | 144 | 8700.40 | 94.58 | 54 | 292.58 | 68615.60 | 391.40 | 490 | 580 |
| 26-Jul-10 | 0.75 | 144 | 8701.20 | 105.86 | 54 | 303.86 | 69069.20 | 453.60 | 533 | 603 |
| 27-Jul-10 | 1.41 | 404 | 8702.30 | 102.12 | 54 | 560.12 | 69680.80 | 611.60 | 868 | 1111 |
| 28-Jul-10 | 2 | 604 | 8702.80 | 110 | 50 | 764.00 | 69978.80 | 298.00 | 914 | 1515 |
| 29-Jul-10 | 2.8 | 950 | 8704.15 | 75.6 | 50 | 1075.60 | 70732.80 | 754.00 | 1456 | 2133 |
| 30-Jul-10 | 2.5 | 928 | 8703.95 | 78.67 | 50 | 1056.67 | 70586.50 | -146.30 | 983 | 2096 |
| 31-Jul-10 | 1.63 | 567 | 8704.20 | 72 | 51 | 690.00 | 70729.40 | 142.90 | 762 | 1369 |
| 1-Aug-10 | 0.75 | 172.2 | 8705.20 | 72.54 | 54 | 298.74 | 71302.00 | 572.60 | 587 | 593 |
| 2-Aug-10 | 0.75 | 172.2 | 8706.00 | 72.62 | 54 | 298.82 | 71762.00 | 460.00 | 531 | 593 |
| 3-Aug-10 | 0.375 | 45 | 8706.60 | 74.67 | 54 | 173.67 | 72109.40 | 347.40 | 349 | 344 |
| 4-Aug-10 | 0.00 | 0 | 8707.90 | 65.6 | 54 | 119.60 | 72863.90 | 754.50 | 500 | 237 |
| 5-Aug-10 | 0.00 | 0 | 8709.25 | 80.62 | 54 | 134.62 | 73654.25 | 790.35 | 533 | 267 |
| 6-Aug-10 | 1.13 | 295 | 8711.15 | 86.12 | 54 | 435.12 | 74779.40 | 1125.15 | 1002 | 863 |
| 7-Aug-10 | 0.75 | 203 | 8711.65 | 91.6 | 53 | 347.60 | 75077.40 | 298.00 | 498 | 689 |
| 8-Aug-10 | 1.33 | 440 | 8713.10 | 95.3 | 54 | 589.30 | 75945.20 | 867.80 | 1027 | 1169 |
| 9-Aug-10 | 1.50 | 460 | 8713.30 | 78.39 | 51 | 589.39 | 76065.60 | 120.40 | 650 | 1169 |
| 10-Aug-10 | 1.50 | 460 | 8713.30 | 98.83 | 50 | 608.83 | 76065.60 | 0.00 | 609 | 1208 |
| 11-Aug-10 | 1.50 | 450 | 8713.20 | 95.2 | 50 | 595.20 | 76005.40 | -60.20 | 565 | 1181 |
| 12-Aug-10 | 1.13 | 290 | 8713.00 | 87.51 | 50 | 427.51 | 75885.00 | -120.40 | 367 | 848 |
| 13-Aug-10 | 0.50 | 87 | 8712.95 | 104.44 | 52 | 243.44 | 75855.05 | -29.95 | 228 | 483 |

| Date | Stilling basin Gauge Reading (ft.) | Discharge from Stilling basin (Cusecs) | Lake Level (ft.) | Dischrge Through PH#1 (Cusecs) | Estimated Seepge (Cusecs) | Total Outflow (Cusecs) | Storage capacity (Acre Feet) | Increased/ Decreased in Water Storage (Acre Feet) | Calcull. Inflow (Cusecs) | Water Released Per Day (Acre Feet) |
|---|---|---|---|---|---|---|---|---|---|---|
| 14-Aug-10 | 0.00 | 0.00 | 8713.75 | 106.87 | 52 | 158.87 | 76336.50 | 481.45 | 402 | 315 |
| 15-Aug-10 | 0.75 | 161 | 8714.60 | 89 | 54 | 304.00 | 76850.60 | 514.10 | 563 | 603 |
| 16-Aug-10 | 1.25 | 339 | 8714.00 | 113.71 | 50 | 502.71 | 76487.00 | -363.60 | 319 | 997 |
| 17-Aug-10 | 0.38 | 35 | 8713.75 | 107.07 | 52 | 194.07 | 76336.50 | -150.50 | 118 | 385 |
| 18-Aug-10 | 0.00 | 0 | 8714.10 | 103.04 | 52 | 155.04 | 76547.60 | 211.10 | 261 | 308 |
| 19-Aug-10 | 0.00 | 0 | 8714.70 | 104.59 | 54 | 158.59 | 76915.20 | 367.60 | 344 | 315 |
| 20-Aug-10 | 0.00 | 0 | 8715.20 | 102.21 | 54 | 156.21 | 77215.00 | 299.80 | 307 | 310 |
| 21-Aug-10 | 0.00 | 0 | 8715.60 | 99.33 | 54 | 153.33 | 77459.00 | 244.00 | 276 | 304 |
| 22-Aug-10 | 0.00 | 0 | 8716.00 | 102.58 | 53 | 155.58 | 77703.00 | 244.00 | 279 | 309 |
| 23-Aug-10 | 0.00 | 0 | 8716.25 | 90.32 | 53 | 143.32 | 77856.50 | 153.50 | 221 | 284 |
| 24-Aug-10 | 0.00 | 0 | 8716.40 | 90.66 | 53 | 143.66 | 77948.60 | 92.10 | 190 | 285 |
| 25-Aug-10 | 0.00 | 0 | 8716.80 | 65.13 | 53 | 118.13 | 78194.20 | 245.60 | 242 | 234 |
| 26-Aug-10 | 0.00 | 0 | 8716.55 | 32.99 | 53 | 85.99 | 78040.70 | -153.50 | 9 | 171 |
| 27-Aug-10 | 0.00 | 0 | 8716.15 | 30.42 | 53 | 83.42 | 77795.10 | -245.60 | -40 | 165 |
| 28-Aug-10 | 0.00 | 0 | 8716.25 | 50.91 | 53 | 103.91 | 77856.50 | 61.40 | 135 | 206 |
| 29-Aug-10 | 0.00 | 0 | 8716.40 | 60.49 | 53 | 113.49 | 77948.60 | 92.10 | 160 | 225 |
| 30-Aug-10 | 0.00 | 0 | 8716.10 | 52.08 | 53 | 105.08 | 77764.40 | -184.20 | 12 | 208 |
| 31-Aug-10 | 0.00 | 0 | 8715.70 | 43.41 | 52 | 95.41 | 77520.00 | -244.40 | -28 | 189 |
| 1-Sep-10 | 0.00 | 0 | 8715.30 | 30.84 | 52 | 82.84 | 77276.00 | -244.00 | -40 | 164 |
| 2-Sep-10 | 0.00 | 0 | 8714.85 | 61.85 | 52 | 113.85 | 77005.50 | -270.50 | -23 | 226 |
| 3-Sep-10 | 0.00 | 0 | 8715.00 | 56.59 | 51.2 | 107.79 | 77093.00 | 87.50 | 152 | 214 |
| 4-Sep-10 | 0.00 | 0 | 8715.00 | 59.62 | 50.3 | 109.92 | 77093.00 | 0.00 | 110 | 218 |
| 5-Sep-10 | 0.00 | 0 | 8715.05 | 59.5 | 48 | 107.50 | 77127.50 | 34.50 | 125 | 213 |
| 6-Sep-10 | 0.00 | 0 | 8715.05 | 57.02 | 47 | 104.02 | 77127.50 | 0.00 | 104 | 206 |
| 7-Sep-10 | 0.00 | 0 | 8715.10 | 55.98 | 47 | 102.98 | 77158.00 | 30.50 | 118 | 204 |
| 8-Sep-10 | 0.00 | 0 | 8715.10 | 53.94 | 46.5 | 100.44 | 77158.00 | 0.00 | 100 | 199 |
| 9-Sep-10 | 0.00 | 0 | 8715.05 | 59.00 | 44 | 103.00 | 77127.50 | -30.50 | 88 | 204 |
| 10-Sep-10 | 0.00 | 0 | 8715.05 | 64.41 | 42 | 106.41 | 77127.50 | 0.00 | 106 | 211 |
| 11-Sep-10 | 0.00 | 0 | 8715.00 | 56.65 | 41.7 | 98.35 | 77093.00 | -34.50 | 81 | 195 |
| 12-Sep-10 | 0.00 | 0 | 8715.00 | 56.77 | 41 | 97.77 | 77093.00 | 0.00 | 98 | 194 |
| 13-Sep-10 | 0.00 | 0 | 8714.90 | 61.6 | 53 | 114.60 | 77036.00 | -57.00 | 86 | 227 |
| 14-Sep-10 | 0.00 | 0 | 8714.80 | 51.49 | 54 | 105.49 | 76971.80 | -64.20 | 73 | 209 |
| 15-Sep-10 | 0.00 | 0 | 8714.80 | 55.53 | 44 | 99.53 | 76971.80 | 0.00 | 100 | 197 |
| 16-Sep-10 | 0.00 | 0 | 8714.75 | 49.92 | 44 | 93.92 | 76941.50 | -30.30 | 79 | 186 |
| 17-Sep-10 | 0.00 | 0 | 8714.60 | 49.66 | 44 | 93.66 | 76850.60 | -90.90 | 48 | 186 |
| 18-Sep-10 | 0.00 | 0 | 8714.55 | 49.84 | 44 | 93.84 | 76820.30 | -30.30 | 79 | 186 |
| 19-Sep-10 | 0.00 | 0 | 8714.45 | 54.98 | 44 | 98.98 | 76820.30 | 0.00 | 99 | 196 |
| 20-Sep-10 | 0.00 | 0 | 8714.30 | 52.08 | 44 | 96.08 | 76668.80 | -151.50 | 20 | 191 |
| 21-Sep-10 | 0.00 | 0 | 8714.20 | 39.63 | 42 | 81.63 | 76608.20 | -60.60 | 51 | 162 |
| 22-Sep-10 | 0.00 | 0 | 8714.10 | 38.32 | 44 | 82.32 | 76547.60 | -60.60 | 52 | 163 |
| 23-Sep-10 | 0.00 | 0 | 8714.00 | 41.76 | 44 | 85.76 | 76487.00 | -60.60 | 55 | 170 |
| 24-Sep-10 | 0.00 | 0 | 8713.85 | 41.68 | 44 | 85.68 | 76396.70 | -90.30 | 40 | 170 |
| 25-Sep-10 | 0.00 | 0 | 8713.75 | 41.42 | 44 | 85.42 | 76336.50 | -60.20 | 55 | 169 |
| 26-Sep-10 | 0.00 | 0 | 8713.55 | 43.21 | 44 | 87.21 | 76216.10 | -120.40 | 27 | 173 |
| 27-Sep-10 | 0.00 | 0 | 8713.45 | 37.62 | 44 | 81.62 | 76155.90 | -60.20 | 51 | 162 |
| 28-Sep-10 | 0.00 | 0 | 8713.35 | 41.36 | 44 | 85.36 | 76095.70 | -60.20 | 55 | 169 |
| 29-Sep-10 | 0.00 | 0 | 8713.20 | 39.56 | 44 | 83.56 | 76005.40 | -90.30 | 38 | 166 |
| 30-Sep-10 | 0.00 | 0 | 8713.10 | 43.22 | 53 | 96.22 | 75945.20 | -60.20 | 66 | 191 |
| 1-Oct-10 | 0.00 | 0 | 8712.90 | 51.86 | 53 | 104.86 | 75825.10 | -120.10 | 44 | 208 |
| 2-Oct-10 | 0.00 | 0 | 8712.75 | 47 | 53 | 100.00 | 75735.25 | -89.85 | 55 | 198 |
| 3-Oct-10 | 0.00 | 0 | 8712.55 | 46.58 | 53 | 99.56 | 75615.45 | -119.80 | 39 | 197 |
| 4-Oct-10 | 0.00 | 0 | 8712.35 | 46.26 | 53 | 99.26 | 75495.65 | -119.80 | 39 | 197 |
| 5-Oct-10 | 0.00 | 0 | 8712.15 | 45.79 | 53 | 98.79 | 75375.85 | -119.80 | 38 | 196 |
| 6-Oct-10 | 0.00 | 0 | 8712.00 | 28.51 | 53 | 81.51 | 75286.00 | -89.85 | 36 | 162 |
| 7-Oct-10 | 0.00 | 0 | 8711.80 | 41.86 | 53 | 94.86 | 75166.80 | -119.20 | 35 | 188 |
| 8-Oct-10 | 0.00 | 0 | 8711.60 | 46.33 | 53 | 99.33 | 75047.60 | -119.20 | 39 | 197 |
| 9-Oct-10 | 0.00 | 0 | 8711.40 | 44.77 | 53 | 97.77 | 74928.40 | -119.20 | 38 | 194 |
| 10-Oct-10 | 0.00 | 0 | 8711.15 | 43.14 | 40 | 83.14 | 74779.40 | -149.00 | 8 | 165 |
| 11-Oct-10 | 0.00 | 0 | 8711.00 | 46.58 | 39 | 85.58 | 74690.00 | -89.40 | 41 | 170 |
| 12-Oct-10 | 0.00 | 0 | 8710.75 | 47.45 | 39 | 86.45 | 74541.50 | -148.50 | 12 | 171 |
| 13-Oct-10 | 0.00 | 0 | 8710.55 | 44.41 | 39 | 83.41 | 74422.70 | -118.80 | 24 | 165 |
| 14-Oct-10 | 0.00 | 0 | 8710.35 | 25.69 | 39 | 64.69 | 74303.90 | -118.80 | 5 | 128 |
| 15-Oct-10 | 0.00 | 0 | 8710.15 | 37.17 | 39 | 76.17 | 74185.10 | -118.80 | 16 | 151 |

| Date | Stilling basin Gauge Reading (ft.) | Discharge from Stilling basin (Cusecs) | Lake Level (ft.) | Dischrge Through PH#1 (Cusecs) | Estimated Seepge (Cusecs) | Total Outflow (Cusecs) | Storage capacity (Acre Feet) | Increased/ Decreased in Water Storage (Acre Feet) | Calcul. Inflow (Cusecs) | Water Released Per Day (Acre Feet) |
|---|---|---|---|---|---|---|---|---|---|---|
| 16-Oct-10 | 0.00 | 0 | 8709.90 | 46 | 40 | 86.00 | 74037.10 | -148.00 | 11 | 171 |
| 17-Oct-10 | 0.00 | 0 | 8709.70 | 46.8 | 40 | 86.80 | 73919.30 | -117.80 | 27 | 172 |
| 18-Oct-10 | 0.00 | 0 | 8709.45 | 39.21 | 40 | 79.21 | 73772.05 | -147.25 | 5 | 157 |
| 19-Oct-10 | 0.00 | 0 | 8709.20 | 42.26 | 41 | 83.26 | 73624.80 | -147.25 | 9 | 165 |
| 20-Oct-10 | 0.00 | 0 | 8708.90 | 53 | 41 | 94.00 | 73448.50 | -176.30 | 5 | 186 |
| 21-Oct-10 | 0.00 | 0 | 8708.70 | 45.2 | 41 | 86.20 | 73331.50 | -117.00 | 27 | 171 |
| 22-Oct-10 | 0.00 | 0 | 8708.45 | 57.25 | 41 | 98.25 | 73185.25 | -146.25 | 25 | 195 |
| 23-Oct-10 | 0.00 | 0 | 8708.15 | 51.05 | 41 | 92.05 | 73009.75 | -175.50 | 4 | 183 |
| 24-Oct-10 | 0.00 | 0 | 8707.95 | 41.64 | 41 | 82.64 | 72892.95 | -116.80 | 24 | 164 |
| 25-Oct-10 | 0.00 | 0 | 8707.60 | 60.55 | 41 | 101.55 | 72689.60 | -203.35 | -1 | 201 |
| 26-Oct-10 | 0.00 | 0 | 8707.30 | 58.26 | 41 | 99.26 | 72515.30 | -174.30 | 11 | 197 |
| 27-Oct-10 | 0.00 | 0 | 8707.05 | 62.47 | 40 | 102.47 | 72370.05 | -145.25 | 29 | 203 |
| 28-Oct-10 | 0.00 | 0 | 8706.70 | 61.19 | 40 | 101.19 | 72167.30 | -202.75 | -1 | 201 |
| 29-Oct-10 | 0.00 | 0 | 8706.40 | 52.91 | 40 | 92.91 | 71993.60 | -173.70 | 5 | 184 |
| 30-Oct-10 | 0.00 | 0 | 8706.10 | 64.98 | 40 | 104.98 | 71819.90 | -173.70 | 17 | 208 |
| 31-Oct-10 | 0.00 | 0 | 8705.80 | 55.79 | 40 | 95.79 | 71647.00 | -172.90 | 9 | 190 |
| 1-Nov-10 | 0.00 | 0 | 8705.50 | 56.82 | 41 | 97.82 | 71474.50 | -172.50 | 11 | 194 |
| 2-Nov-10 | 0.00 | 0 | 8705.20 | 62.94 | 41 | 103.94 | 71302.00 | -172.50 | 17 | 206 |
| 3-Nov-10 | 0.00 | 0 | 8704.90 | 58.35 | 41 | 99.35 | 71129.80 | -172.20 | 13 | 197 |
| 4-Nov-10 | 0.00 | 0 | 8704.60 | 69.52 | 41 | 110.52 | 70958.20 | -171.60 | 24 | 219 |
| 5-Nov-10 | 0.00 | 0 | 8704.25 | 75.22 | 41 | 116.22 | 70758.00 | -200.20 | 15 | 231 |
| 6-Nov-10 | 0.00 | 0 | 8703.95 | 64.09 | 41 | 105.09 | 70586.50 | -171.50 | 19 | 208 |
| 7-Nov-10 | 0.00 | 0 | 8703.60 | 50.12 | 41 | 91.12 | 70387.00 | -199.50 | -9 | 181 |
| 8-Nov-10 | 0.00 | 0 | 8703.30 | 42.97 | 41 | 83.97 | 70216.00 | -171.00 | -2 | 167 |
| 9-Nov-10 | 0.00 | 0 | 8703.00 | 43.64 | 41 | 84.64 | 70045.00 | -171.00 | -2 | 168 |
| 10-Nov-10 | 0.00 | 0 | 8702.70 | 46.41 | 41 | 87.41 | 69875.20 | -169.80 | 2 | 173 |
| 11-Nov-10 | 0.00 | 0 | 8702.40 | 45.22 | 41 | 86.22 | 69705.40 | -169.80 | 1 | 171 |
| 12-Nov-10 | 0.00 | 0 | 8702.20 | 47.96 | 41 | 88.96 | 69592.20 | -113.20 | 32 | 176 |
| 13-Nov-10 | 0.00 | 0 | 8701.95 | 47.11 | 41 | 88.11 | 69450.95 | -141.25 | 17 | 175 |
| 14-Nov-10 | 0.00 | 0 | 8701.70 | 46.01 | 41 | 87.01 | 69310.70 | -140.25 | 16 | 173 |
| 15-Nov-10 | 0.00 | 0 | 8701.40 | 46.11 | 41 | 87.11 | 69142.40 | -168.30 | 2 | 173 |
| 16-Nov-10 | 0.00 | 0 | 8701.15 | 40.565 | 41 | 81.57 | 69002.15 | -140.25 | 11 | 162 |
| 17-Nov-10 | 0.00 | 0 | 8701.25 | 83.92 | | 83.92 | 69058.25 | 56.10 | 112 | 166 |
| 18-Nov-10 | 0.00 | 0 | 8700.40 | 73.49 | 39.7 | 113.19 | 68582.60 | -475.65 | -127 | 225 |
| 19-Nov-10 | 0.00 | 0 | 8700.10 | 65.6 | 39.7 | 105.30 | 68414.90 | -167.70 | 21 | 209 |
| 20-Nov-10 | 0.00 | 0 | 8699.70 | 35.76 | 39.7 | 75.46 | 68192.20 | -222.70 | -37 | 150 |
| 21-Nov-10 | 0.00 | 0 | 8699.40 | 40.75 | 39.7 | 80.45 | 68025.40 | -166.80 | -4 | 160 |
| 22-Nov-10 | 0.00 | 0 | 8699.10 | 34.69 | 39.7 | 74.39 | 67858.60 | -166.80 | -10 | 148 |
| 23-Nov-10 | 0.00 | 0 | 8698.90 | 41.38 | 39.7 | 81.08 | 67747.80 | -110.80 | 25 | 161 |
| 24-Nov-10 | 0.00 | 0 | 8698.60 | 53.125 | 39.7 | 92.83 | 67582.20 | -165.60 | 9 | 184 |
| 25-Nov-10 | 0.00 | 0 | 8698.30 | 64.2 | 39.7 | 103.90 | 67416.60 | -165.60 | 20 | 206 |
| 26-Nov-10 | 0.00 | 0 | 8697.90 | 47.08 | 39.7 | 86.78 | 67196.30 | -220.30 | -24 | 172 |
| 27-Nov-10 | 0.00 | 0 | 8697.60 | 47.32 | 39.7 | 87.02 | 67032.20 | -164.10 | 4 | 173 |
| 28-Nov-10 | 0.00 | 0 | 8697.35 | 37.87 | 39.7 | 77.57 | 66895.45 | -136.75 | 9 | 154 |
| 29-Nov-10 | 0.00 | 0 | 8697.05 | 47.7 | 39.7 | 87.40 | 66731.35 | -164.10 | 5 | 173 |
| 30-Nov-10 | 0.00 | 0 | 8696.80 | 45.88 | 39.7 | 85.58 | 66595.20 | -136.15 | 17 | 170 |
| 1-Dec-10 | 0.00 | 0 | 8696.50 | 41.15 | 39.7 | 80.85 | 66432.00 | -163.20 | -1 | 160 |
| 2-Dec-10 | 0.00 | 0 | 8696.20 | 36.17 | 39.7 | 75.87 | 66268.80 | -163.20 | -6 | 150 |
| 3-Dec-10 | 0.00 | 0 | 8695.95 | 47.53 | 39.7 | 87.23 | 66133.00 | -135.80 | 19 | 173 |
| 4-Dec-10 | 0.00 | 0 | 8695.60 | 56.24 | 39.7 | 95.94 | 65944.00 | -189.00 | 1 | 190 |
| 5-Dec-10 | 0.00 | 0 | 8695.30 | 46.01 | 39.7 | 85.71 | 65782.00 | -162.00 | 4 | 170 |
| 6-Dec-10 | 0.00 | 0 | 8695.00 | 51.08 | 39.7 | 90.78 | 65620.00 | -162.00 | 9 | 180 |
| 7-Dec-10 | 0.00 | 0 | 8694.70 | 49.52 | 39.7 | 89.22 | 65459.80 | -160.20 | 8 | 177 |
| 8-Dec-10 | 0.00 | 0 | 8694.40 | 58.82 | 39.7 | 98.52 | 65299.60 | -160.20 | 18 | 195 |
| 9-Dec-10 | 0.00 | 0 | 8694.05 | 60.5 | 39.7 | 100.20 | 65112.70 | -186.90 | 6 | 199 |
| 10-Dec-10 | 0.00 | 0 | 8693.70 | 62.7 | 39.7 | 102.40 | 64926.70 | -186.00 | 9 | 203 |
| 11-Dec-10 | 0.00 | 0 | 8693.40 | 66.07 | 39.7 | 105.77 | 64767.40 | -159.30 | 25 | 210 |
| 12-Dec-10 | 0.00 | 0 | 8693.00 | 95 | 38.2 | 133.20 | 64555.00 | -212.40 | 26 | 264 |
| 13-Dec-10 | 0.00 | 0 | 8692.70 | 62.06 | 38.2 | 100.26 | 64396.60 | -158.40 | 20 | 199 |
| 14-Dec-10 | 0.00 | 0 | 8692.30 | 61.41 | 38.2 | 99.61 | 64185.40 | -211.20 | -7 | 198 |
| 15-Dec-10 | 0.00 | 0 | 8692.00 | 76.88 | 38.2 | 115.08 | 64027.00 | -158.40 | 35 | 228 |
| 16-Dec-10 | 0.00 | 0 | 8691.60 | 78.97 | 38.2 | 117.17 | 63816.60 | -210.40 | 11 | 232 |
| 17-Dec-10 | 0.00 | 0 | 8691.20 | 64.32 | 36.9 | 101.22 | 63606.20 | -210.40 | -5 | 201 |

| Date | Stilling basin Gauge Reading (ft.) | Discharge from Stilling basin (Cusecs) | Lake Level (ft.) | Dischrge Through PH#1 (Cusecs) | Estimated Seepge (Cusecs) | Total Inflow (Cusecs) | Storage capacity (Acre Feet) | Increased/ Decreased in Water Storage (Acre Feet) | Calcult. Inflow (Cusecs) | Water Released Per Day (Acre Feet) |
|---|---|---|---|---|---|---|---|---|---|---|
| 18-Dec-10 | 0.00 | 0 | 8690.80 | 44.99 | 36.9 | 81.89 | 63396.20 | -210.00 | -24 | 162 |
| 19-Dec-10 | 0.00 | 0 | 8690.50 | 48.32 | 36.9 | 85.22 | 63239.00 | -157.20 | 6 | 169 |
| 20-Dec-10 | 0.00 | 0 | 8690.20 | 48.32 | 36.9 | 85.22 | 63081.80 | -157.20 | 6 | 169 |
| 21-Dec-10 | 0.00 | 0 | 8689.90 | 49.89 | 35.6 | 85.49 | 62925.40 | -156.40 | 7 | 170 |
| 22-Dec-10 | 0.00 | 0 | 8689.60 | 47.78 | 35.6 | 83.38 | 62770.60 | -154.80 | 5 | 165 |
| 23-Dec-10 | 0.00 | 0 | 8689.30 | 43.69 | 35.6 | 79.29 | 62615.80 | -154.80 | 1 | 157 |
| 24-Dec-10 | 0.00 | 0 | 8689.0D | 45.19 | 36.9 | 82.09 | 62461.00 | -154.80 | 4 | 163 |
| 25-Dec-10 | 0.00 | 0 | 8688.70 | 50.36 | 34.1 | 84.46 | 62307.10 | -153.90 | 7 | 168 |
| 26-Dec-10 | 0.00 | 0 | 8688.40 | 49.98 | 39.7 | 89.68 | 62153.20 | -153.90 | 12 | 178 |
| 27-Dec-10 | 0.00 | 0 | 8688.10 | 49.98 | 39.7 | 89.68 | 61999.30 | -153.90 | 12 | 178 |
| 28-Dec-10 | 0.00 | 0 | 8687.80 | 45.15 | 39.7 | 84.85 | 61845.80 | -153.50 | 7 | 168 |
| 29-Dec-10 | 0.00 | 0 | 8687.45 | 48.12 | 39.7 | 87.82 | 61666.95 | -178.85 | -2 | 174 |
| 30-Dec-10 | 0.00 | 0 | 8687.15 | 45.15 | 39.7 | 84.85 | 61513.65 | -153.30 | 8 | 168 |
| 31-Dec-10 | 0.00 | 0 | 8686.90 | 51.55 | 39.7 | 91.25 | 61386.10 | -127.55 | 27 | 181 |
| 1-Jan-11 | 0.00 | 0 | 8686.60 | 53.22 | 39.7 | 92.92 | 61233.40 | -152.70 | 16 | 184 |
| 2-Jan-11 | 0.00 | 0 | 8686.20 | 48.72 | 39.7 | 88.42 | 61029.80 | -203.60 | -14 | 175 |
| 3-Jan-11 | 0.00 | 0 | 8685.9D | 46.39 | 39.7 | 86.09 | 60877.50 | -152.30 | 9 | 171 |
| 4-Jan-11 | 0.00 | 0 | 8685.55 | 48.322 | 41.0 | 89.33 | 60700.75 | -176.75 | 0 | 177 |
| 5-Jan-11 | 0.00 | 0 | 8685.25 | 48.322 | 41.0 | 89.33 | 60549.25 | -151.50 | 13 | 177 |
| 6-Jan-11 | 0.00 | 0 | 8685.00 | 40.78 | 41.0 | 81.79 | 60423.00 | -126.25 | 18 | 162 |
| 7-Jan-11 | 0.00 | 0 | 8684.65 | 43.283 | 39.7 | 82.98 | 60247.65 | -175.35 | -5 | 165 |
| 8-Jan-11 | 0.00 | 0 | 8684.35 | 44.44 | 39.7 | 84.14 | 60097.35 | -150.30 | 8 | 167 |
| 9-Jan-11 | 0.00 | 0 | 8684.10 | 46.8 | 39.7 | 86.50 | 59972.10 | -125.25 | 23 | 172 |
| 10-Jan-11 | 0.00 | 0 | 8683.75 | 48.15 | 39.7 | 85.85 | 59797.75 | -174.35 | -2 | 170 |
| 11-Jan-11 | 0.00 | 0 | 8683.40 | 44.56 | 39.7 | 84.26 | 59623.80 | -173.95 | -3 | 167 |
| 12-Jan-11 | 0.00 | 0 | 8683.15 | 46.9 | 38.2 | 85.12 | 59499.55 | -124.25 | 22 | 169 |
| 13-Jan-11 | 0.00 | 0 | 8682.90 | 45.35 | 38.2 | 83.57 | 59375.40 | -124.15 | 21 | 166 |
| 14-Jan-11 | 0.00 | 0 | 8682.55 | 46.46 | 38.2 | 84.68 | 59201.80 | -173.60 | -3 | 168 |
| 15-Jan-11 | 0.00 | 0 | 8682.25 | 48.85 | 38.2 | 87.07 | 59053.00 | -148.80 | 12 | 173 |
| 16-Jan-11 | 0.00 | 0 | 8681.90 | 46.35 | 38.2 | 84.57 | 58879.70 | -173.30 | -3 | 168 |
| 17-Jan-11 | 0.00 | 0 | 8681.65 | 43.43 | 36.9 | 80.34 | 58756.45 | -123.25 | 18 | 159 |
| 18-Jan-11 | 0.00 | 0 | 8681.40 | 46.56 | 36.9 | 83.47 | 58633.20 | -123.25 | 21 | 166 |
| 19-Jan-11 | 0.00 | 0 | 8681.00 | 54.27 | 36.9 | 91.18 | 58436.00 | -197.20 | -8 | 181 |
| 20-Jan-11 | 0.00 | 0 | 8680.70 | 54.53 | 36.9 | 91.44 | 58289.30 | -146.70 | 17 | 181 |
| 21-Jan-11 | 0.00 | 0 | 8680.40 | 53.33 | 35.6 | 88.93 | 58142.60 | -146.70 | 15 | 176 |
| 22-Jan-11 | 0.00 | 0 | 8680.00 | 53.68 | 35.6 | 89.28 | 57947.00 | -195.60 | -9 | 177 |
| 23-Jan-11 | 0.00 | 0 | 8679.70 | 53.28 | 36.91 | 90.19 | 57801.20 | -145.80 | 17 | 179 |
| 24-Jan-11 | 0.00 | 0 | 8679.40 | 59.01 | 34.12 | 93.13 | 57655.40 | -145.80 | 20 | 185 |
| 25-Jan-11 | 0.00 | 0 | 8679.00 | 89.81 | 34.12 | 123.93 | 57481.00 | -194.40 | 26 | 246 |
| 26-Jan-11 | 0.00 | 0 | 8678.60 | 63.62 | 32.81 | 96.63 | 57268.20 | -192.80 | -1 | 192 |
| 27-Jan-11 | 0.00 | 0 | 8678.20 | 84.32 | 32.81 | 97.13 | 57075.40 | -192.80 | 0 | 193 |
| 28-Jan-11 | 0.00 | 0 | 8677.80 | 62.53 | 30.02 | 92.55 | 56883.40 | -192.00 | -4 | 184 |
| 29-Jan-11 | 0.00 | 0 | 8677.45 | 61.4 | 30.02 | 91.42 | 56716.10 | -167.30 | 7 | 181 |
| 30-Jan-11 | 0.00 | 0 | 8677.10 | 64.3 | 28.71 | 93.01 | 56548.80 | -167.30 | 9 | 184 |
| 31-Jan-11 | 0.00 | 0 | 8676.70 | 59.22 | 28.71 | 87.93 | 56358.50 | -190.30 | -8 | 174 |
| 1-Feb-11 | 0.00 | 0 | 8676.30 | 57.62 | 24.61 | 82.23 | 56168.50 | -190.00 | -14 | 163 |
| 2-Feb-11 | 0.00 | 0 | 8676.00 | 58.96 | 21.82 | 80.78 | 56026.00 | -142.50 | 9 | 160 |
| 3-Feb-11 | 0.00 | 0 | 8675.60 | 68.06 | 16.40 | 84.46 | 55837.60 | -188.40 | -11 | 168 |
| 4-Feb-11 | 0.00 | 0 | 8675.20 | 60.02 | 12.30 | 72.32 | 55649.20 | -188.40 | -23 | 143 |
| 5-Feb-11 | 0.00 | 0 | 8674.40 | 60.74 | 10.99 | 71.73 | 55275.40 | -373.80 | -117 | 142 |
| 6-Feb-11 | 0.00 | 0 | 8674.50 | 59.69 | 8.20 | 67.89 | 55322.00 | 46.60 | 91 | 135 |
| 7-Feb-11 | 0.00 | 0 | 8674.20 | 59.33 | 8.20 | 67.53 | 55182.20 | -139.80 | -3 | 134 |
| 8-Feb-11 | 0.00 | 0 | 8673.90 | 58.08 | 6.89 | 64.97 | 55055.80 | -126.40 | 1 | 129 |
| 9-Feb-11 | 0.00 | 0 | 8673.55 | 68.02 | 5.41 | 73.43 | 54907.10 | -148.70 | -2 | 146 |
| 10-Feb-11 | 0.00 | 0 | 8673.20 | 68.17 | 28.71 | 96.88 | 54761.40 | -145.70 | 23 | 192 |
| 11-Feb-11 | 0.00 | 0 | 8672.82 | 68.19 | 28.71 | 98.90 | 54544.92 | -216.48 | -12 | 192 |
| 12-Feb-11 | 0.00 | 0 | 8672.40 | 66.43 | 28.71 | 95.14 | 54353.40 | -191.52 | -1 | 189 |
| 13-Feb-11 | 0.00 | 0 | 8672.00 | 68.59 | 28.71 | 97.30 | 54171.00 | -182.40 | 5 | 193 |
| 14-Feb-11 | 0.00 | 0 | 8671.60 | 77.64 | 28.71 | 106.35 | 53990.60 | -180.40 | 15 | 211 |
| 15-Feb-11 | 0.00 | 0 | 8671.20 | 69.8 | 28.71 | 98.51 | 53810.20 | -180.40 | 8 | 195 |
| 16-Feb-11 | 0.00 | 0 | 8670.85 | 67.93 | 28.71 | 96.64 | 53652.80 | -157.40 | 17 | 192 |
| 17-Feb-11 | 0.00 | 0 | 8670.45 | 59.49 | 28.71 | 88.20 | 53924.60 | 271.80 | 225 | 175 |
| 18-Feb-11 | 0.00 | 0 | 8670.10 | 65.19 | 24.61 | 89.80 | 53316.80 | -607.80 | -217 | 178 |

| Date | Stilling basin Gauge Reading (ft) | Discharge from Stilling basin (Cusecs) | Lake Level (ft.) | Dischrge Through PH#1 (Cusecs) | Estimated Seepge (Cusecs) | Total Outflow (Cusecs) | Storage capacity (Acre Feet) | Increased/ Decreased in Water Storage (Acre Feet) | Calcul. Inflow (Cusecs) | Water Released Per Day (Acre Feet) |
|---|---|---|---|---|---|---|---|---|---|---|
| 19-Feb-11 | 0.00 | 0 | 8669.70 | 68.05 | 24.61 | 92.66 | 53139.10 | -177.70 | 3 | 184 |
| 20-Feb-11 | 0.00 | 0 | 8669.30 | 66.77 | 24.61 | 91.38 | 52961.90 | -177.20 | 2 | 181 |
| 21-Feb-11 | 0.00 | 0 | 8669.00 | 75.05 | 24.61 | 99.66 | 52829.00 | -132.90 | 33 | 198 |
| 22-Feb-11 | 0.00 | 0 | 8668.55 | 87.22 | 24.61 | 111.83 | 52632.80 | -196.20 | 13 | 222 |
| 23-Feb-11 | 0.00 | 0 | 8668.10 | 101.13 | 24.61 | 125.74 | 52436.60 | -196.20 | 27 | 249 |
| 24-Feb-11 | 0.00 | 0 | 8667.60 | 88.07 | 24.61 | 112.68 | 52220.20 | -216.40 | 4 | 223 |
| 25-Feb-11 | 0.00 | 0 | 8667.20 | 90.06 | 21.82 | 111.88 | 52047.40 | -172.80 | 25 | 222 |
| 26-Feb-11 | 0.00 | 0 | 8666.75 | 79.33 | 21.82 | 101.15 | 51853.75 | -193.65 | 4 | 201 |
| 27-Feb-11 | 0.00 | 0 | 8666.30 | 90.26 | 21.82 | 112.08 | 51660.70 | -193.05 | 15 | 222 |
| 28-Feb-11 | 0.00 | 0 | 8665.80 | 91.45 | 21.82 | 113.27 | 51446.60 | -214.10 | 5 | 225 |
| 1-Mar-11 | 0.00 | 0 | 8665.40 | 95.33 | 21.82 | 117.15 | 51275.80 | -170.80 | 31 | 232 |
| 2-Mar-11 | 0.00 | 0 | 8664.80 | 110.49 | 21.82 | 132.31 | 51020.60 | -255.20 | 4 | 262 |
| 3-Mar-11 | 0.00 | 0 | 8664.30 | 135.95 | 21.82 | 157.77 | 50809.60 | -211.00 | 51 | 313 |
| 4-Mar-11 | 0.00 | 0 | 8663.70 | 122.1 | 16.4 | 138.50 | 50557.60 | -252.00 | 11 | 275 |
| 5-Mar-11 | 0.00 | 0 | 8663.10 | 120.02 | 16.4 | 136.42 | 50306.80 | -250.80 | 10 | 271 |
| 6-Mar-11 | 0.00 | 0 | 8662.60 | 132.72 | 16.4 | 149.12 | 50099.00 | -207.80 | 44 | 296 |
| 7-Mar-11 | 0.00 | 0 | 8661.80 | 107.68 | 16.4 | 124.08 | 49767.80 | -331.20 | -43 | 246 |
| 8-Mar-11 | 0.00 | 0 | 8661.30 | 114.44 | 16.4 | 130.84 | 49562.30 | -205.50 | 27 | 260 |
| 9-Mar-11 | 0.00 | 0 | 8660.70 | 92.7 | 16.4 | 109.10 | 49317.80 | -244.50 | -14 | 216 |
| 10-Mar-11 | 0.00 | 0 | 8660.25 | 91.38 | 16.4 | 107.78 | 49136.00 | -181.80 | 16 | 214 |
| 11-Mar-11 | 0.00 | 0 | 8659.90 | 91.38 | 12.3 | 103.68 | 48995.00 | -141.00 | 33 | 206 |
| 12-Mar-11 | 0.00 | 0 | 8659.50 | 61.49 | 12.3 | 73.79 | 48835.00 | -160.00 | -7 | 146 |
| 13-Mar-11 | 0.00 | 0 | 8659.20 | 61.64 | 12.3 | 73.94 | 48715.00 | -120.00 | 13 | 147 |
| 14-Mar-11 | 0.00 | 0 | 8658.90 | 64.43 | 12.3 | 76.73 | 48595.20 | -119.80 | 16 | 152 |
| 15-Mar-11 | 0.00 | 0 | 8658.60 | 62.74 | 12.3 | 75.04 | 48475.80 | -119.40 | 15 | 149 |
| 16-Mar-11 | 0.00 | 0 | 8658.30 | 62.87 | 12.3 | 75.17 | 48356.40 | -119.40 | 15 | 149 |
| 17-Mar-11 | 0.00 | 0 | 8657.95 | 63.37 | 12.3 | 75.67 | 48217.35 | -139.05 | 6 | 150 |
| 18-Mar-11 | 0.00 | 0 | 8657.60 | 65.94 | 10.99 | 76.93 | 48079.80 | -137.55 | 8 | 153 |
| 19-Mar-11 | 0.00 | 0 | 8657.30 | 71.46 | 10.99 | 82.45 | 47961.90 | -117.90 | 23 | 164 |
| 20-Mar-11 | 0.00 | 0 | 8656.90 | 71.46 | 10.99 | 82.45 | 47805.00 | -156.90 | 3 | 164 |
| 21-Mar-11 | 0.00 | 0 | 8656.40 | 101.03 | 10.99 | 112.02 | 47610.00 | -195.00 | 14 | 222 |
| 22-Mar-11 | 0.00 | 0 | 8655.80 | 102.7 | 10.99 | 113.69 | 47377.20 | -232.80 | -4 | 226 |
| 23-Mar-11 | 0.00 | 0 | 8655.40 | 103.7 | 10.99 | 114.69 | 47223.60 | -153.60 | 37 | 227 |
| 24-Mar-11 | 0.00 | 0 | 8654.80 | 56.48 | 10.99 | 67.47 | 46993.80 | -229.80 | -48 | 134 |
| 25-Mar-11 | 0.00 | 0 | 8654.50 | 68.19 | 8.2 | 76.39 | 46879.50 | -114.30 | 19 | 152 |
| 26-Mar-11 | 0.00 | 0 | 8654.20 | 68.23 | 8.2 | 76.43 | 46765.20 | -114.30 | 19 | 152 |
| 27-Mar-11 | 0.00 | 0 | 8653.80 | 62.36 | 8.2 | 70.56 | 46614.00 | -151.20 | -6 | 140 |
| 28-Mar-11 | 0.00 | 0 | 8653.50 | 70.01 | 8.2 | 78.21 | 46501.50 | -112.50 | 21 | 155 |
| 29-Mar-11 | 0.00 | 0 | 8653.20 | 72.17 | 8.2 | 80.37 | 46389.00 | -112.50 | 24 | 159 |
| 30-Mar-11 | 0.00 | 0 | 8652.80 | 77.75 | 6.2 | 85.95 | 46239.60 | -149.40 | 11 | 170 |
| 31-Mar-11 | 0.00 | 0 | 8652.35 | 64.94 | 8.2 | 73.14 | 46072.20 | -167.40 | -11 | 145 |
| 1-Apr-11 | 0.00 | 0 | 8652.00 | 64.45 | 8.2 | 72.65 | 45942.00 | -130.20 | 7 | 144 |
| 2-Apr-11 | 0.00 | 0 | 8651.60 | 75.7 | 8.2 | 83.90 | 45796.00 | -146.00 | 10 | 166 |
| 3-Apr-11 | 0.00 | 0 | 8651.20 | 62.385 | 8.2 | 70.59 | 45650.00 | -146.00 | -3 | 140 |
| 4-Apr-11 | 0.00 | 0 | 8650.90 | 66.15 | 8.2 | 74.35 | 45540.90 | -109.10 | 19 | 147 |
| 5-Apr-11 | 0.00 | 0 | 8650.50 | 70.5 | 8.2 | 78.70 | 45396.50 | -144.40 | 6 | 156 |
| 6-Apr-11 | 0.00 | 0 | 8650.15 | 67.067 | 8.2 | 75.29 | 45270.15 | -126.35 | 12 | 149 |
| 7-Apr-11 | 0.00 | 0 | 8649.80 | 66.67 | 8.2 | 74.87 | 45144.80 | -125.35 | 12 | 149 |
| 8-Apr-11 | 0.00 | 0 | 8649.40 | 68.62 | 5.41 | 74.03 | 45002.40 | -142.40 | 2 | 147 |
| 9-Apr-11 | 0.00 | 0 | 8649.00 | 66.66 | 5.41 | 72.07 | 44860.00 | -142.40 | 0 | 143 |
| 10-Apr-11 | 0.00 | 0 | 8648.70 | 69.27 | 5.41 | 74.68 | 44754.40 | -105.60 | 21 | 148 |
| 11-Apr-11 | 0.00 | 0 | 8648.30 | 69.9 | 5.41 | 75.31 | 44613.60 | -140.80 | 4 | 149 |
| 12-Apr-11 | 0.00 | 0 | 8648.00 | 66.3 | 5.41 | 71.71 | 44508.00 | -105.60 | 18 | 142 |
| 13-Apr-11 | 0.00 | 0 | 8647.75 | 76.3 | 5.41 | 81.71 | 44421.00 | -87.00 | 38 | 162 |
| 14-Apr-11 | 0.00 | 0 | 8647.35 | 72.87 | 5.41 | 78.28 | 44281.80 | -139.20 | 8 | 155 |
| 15-Apr-11 | 0.00 | 0 | 8646.95 | 69.82 | 5.41 | 75.23 | 44142.90 | -138.90 | 5 | 149 |
| 16-Apr-11 | 0.00 | 0 | 8646.55 | 74.52 | 5.41 | 79.93 | 44006.10 | -136.80 | 11 | 159 |
| 17-Apr-11 | 0.00 | 0 | 8646.20 | 43.77 | 5.41 | 49.18 | 43886.40 | -119.70 | -11 | 98 |
| 18-Apr-11 | 0.00 | 0 | 8645.90 | 75.83 | 5.41 | 81.24 | 43784.50 | -101.90 | 30 | 161 |
| 19-Apr-11 | 0.00 | 0 | 8645.50 | 68.32 | 5.41 | 73.73 | 43650.50 | -134.00 | 6 | 146 |
| 20-Apr-11 | 0.00 | 0 | 8645.10 | 78.5 | 5.41 | 83.91 | 43516.50 | -134.00 | 16 | 166 |
| 21-Apr-11 | 0.00 | 0 | 8644.60 | 72.11 | 5.41 | 77.52 | 43352.20 | -164.30 | -5 | 154 |
| 22-Apr-11 | 0.00 | 0 | 8644.15 | 75.8 | 4.11 | 79.91 | 43516.50 | 164.30 | 163 | 156 |

| Date | Stilling basin Gauge Reading (ft) | Discharge from Stilling basin (Cusecs) | Lake Level (ft.) | Dischrge Through PH#1 (Cusecs) | Estimated Seepge (Cusecs) | Total Outflow (Cusecs) | Storage capacity (Acre Feet) | Increased/ Decreased in Water Storage (Acre Feet) | Calcul. Inflow (Cusecs) | Water Released Per Day (Acre Feet) |
|---|---|---|---|---|---|---|---|---|---|---|
| 23-Apr-11 | 0.00 | 0 | 8643.70 | 82.41 | 4.11 | 86.52 | 43060.00 | -456.50 | -144 | 172 |
| 24-Apr-11 | 0.00 | 0 | 8643.20 | 87.13 | 4.11 | 91.24 | 42900.00 | -160.00 | 11 | 181 |
| 25-Apr-11 | 0.00 | 0 | 8642.60 | 86.9 | 4.11 | 91.01 | 42710.40 | -189.60 | -5 | 181 |
| 26-Apr-11 | 0.00 | 0 | 8642.05 | 87.17 | 4.11 | 91.28 | 42537.70 | -172.70 | 4 | 181 |
| 27-Apr-11 | 0.00 | 0 | 8641.50 | 89.83 | 4.11 | 93.94 | 42368.50 | -169.20 | 9 | 186 |
| 28-Apr-11 | 0.00 | 0 | 8640.95 | 101.2 | 4.11 | 105.31 | 42199.90 | -168.60 | 20 | 209 |
| 29-Apr-11 | 0.00 | 0 | 8640.40 | 92.79 | 2.1 | 94.89 | 42033.80 | -166.10 | 11 | 188 |
| 30-Apr-11 | 0.00 | 0 | 8639.90 | 90.41 | 8.2 | 98.61 | 41883.40 | -150.40 | 23 | 196 |
| 1-May-11 | 0.00 | 0 | 8639.50 | 82.89 | 8.2 | 91.09 | 41765.00 | -118.40 | 31 | 181 |
| 2-May-11 | 0.00 | 0 | 8639.00 | 82.89 | 8.2 | 91.09 | 41617.00 | -148.00 | 16 | 181 |
| 3-May-11 | 0.00 | 0 | 8638.75 | 93.59 | 8.2 | 101.79 | 41529.40 | -87.60 | 58 | 202 |
| 4-May-11 | 0.00 | 0 | 8638.70 | 101 | 8.2 | 109.20 | 41529.40 | 0.00 | 109 | 217 |
| 5-May-11 | 0.00 | 0 | [illegible] | [illegible] | 8.2 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 6-May-11 | 0.00 | 85 | 8640.16 | 28.6 | 2.79 | 116.39 | 41961.32 | 246.64 | 241 | 231 |
| 7-May-11 | 0.00 | 280 | 8640.40 | 0 | 2.79 | 282.79 | 42033.80 | 72.48 | 319 | 561 |
| 8-May-11 | 0.00 | 750 | 8640.25 | 0 | 2.79 | 752.79 | 41988.50 | -45.30 | 730 | 1493 |
| 9-May-11 | 0.00 | 950 | 8639.70 | 0 | 2.79 | 952.79 | 41824.20 | -164.30 | 870 | 1890 |
| 10-May-11 | 0.00 | 1190 | 8638.30 | 7.4 | 2.79 | 1200.19 | 41412.60 | -411.60 | 993 | 2381 |
| 11-May-11 | 0.00 | 1260 | 8636.58 | 6.87 | 2.79 | 1269.66 | 40915.04 | -497.56 | 1019 | 2518 |
| 12-May-11 | 0.00 | 1320 | 8634.39 | 9.41 | 2.79 | 1332.20 | 40288.76 | -626.28 | 1016 | 2642 |
| 13-May-11 | 0.00 | 1300 | 8633.22 | 3.03 | 2.79 | 1305.82 | 39958.04 | -330.72 | 1139 | 2590 |
| 14-May-11 | 0.00 | 1200 | 8632.83 | 8.09 | 2.79 | 1210.88 | 39848.23 | -109.81 | 1156 | 2402 |
| 15-May-11 | 0.00 | 0 | 8632.66 | 3.18 | 2.79 | 5.97 | 39800.46 | -47.77 | -18 | 12 |
| 16-May-11 | 0.00 | 0 | 8633.66 | 0 | 2.79 | 2.79 | 40082.12 | 281.66 | 145 | 6 |
| 17-May-11 | 0.00 | 120 | 8636.58 | 54.97 | 2.79 | 177.76 | 40915.04 | 832.92 | 598 | 353 |
| 18-May-11 | 0.00 | 0 | 8639.92 | 114.62 | 2.79 | 117.41 | 41889.32 | 974.28 | 609 | 233 |
| 19-May-11 | 0.00 | 200 | 8642.10 | 37.08 | 2.79 | 239.87 | 42553.40 | 664.08 | 575 | 476 |
| 20-May-11 | 0.00 | 100 | 8644.80 | 26.96 | 2.79 | 129.75 | 43417.60 | 864.20 | 565 | 257 |
| 21-May-11 | 0.00 | 120 | 8647.00 | 10.03 | 2.79 | 132.82 | 44160.00 | 742.40 | 507 | 263 |
| 22-May-11 | 0.00 | 90 | 8647.95 | 83.46 | 2.79 | 176.25 | 44490.60 | 330.60 | 343 | 350 |
| 23-May-11 | 0.00 | 0 | 8648.40 | 97.92 | 4.1 | 102.02 | 44648.80 | 158.20 | 182 | 202 |
| 24-May-11 | 0.00 | 0 | 8649.70 | 110.7 | 4.1 | 114.80 | 45109.20 | 460.40 | 347 | 228 |
| 25-May-11 | 0.00 | 0 | 8651.50 | 102.97 | 5.41 | 108.38 | 45759.50 | 650.30 | 436 | 215 |
| 26-May-11 | 0.00 | 0 | 8653.90 | 78.04 | 5.41 | 83.45 | 46651.50 | 892.00 | 533 | 166 |
| 27-May-11 | 0.25 | 18 | 8655.40 | 86.32 | 6.89 | 111.21 | 47223.60 | 572.10 | 400 | 221 |
| 28-May-11 | 0.25 | 18 | 8656.20 | 54.69 | 8.2 | 80.89 | 47532.00 | 308.40 | 236 | 160 |
| 29-May-11 | 0.25 | 18 | 8657.40 | 51.76 | 9.51 | 79.27 | 48001.20 | 469.20 | 316 | 157 |
| 30-May-11 | 0.25 | 19 | 8659.10 | 68.04 | 9.51 | 96.55 | 48675.00 | 673.80 | 436 | 192 |
| 31-May-11 | 0.25 | 21 | 8660.95 | 55.73 | 12.3 | 89.03 | 49418.80 | 743.80 | 464 | 177 |
| 1-Jun-11 | 0.42 | 41 | 8662.90 | 60.44 | 13.62 | 115.06 | 50223.50 | 804.70 | 521 | 228 |
| 2-Jun-11 | 0.42 | 41 | 8663.65 | 88.46 | 13.62 | 123.08 | 50536.70 | 313.20 | 281 | 244 |
| 3-Jun-11 | 0.42 | 45 | 8663.80 | 78.18 | 13.62 | 136.80 | 50599.40 | 62.70 | 168 | 271 |
| 4-Jun-11 | 0.00 | 0 | 8663.90 | 86.1 | 13.62 | 99.72 | 50641.20 | 41.80 | 121 | 198 |
| 5-Jun-11 | 0.00 | 0 | 8664.75 | 66.29 | 13.82 | 79.91 | 50999.50 | 358.30 | 261 | 158 |
| 6-Jun-11 | 0.25 | 20 | 8666.10 | 75.82 | 13.82 | 109.44 | 51574.90 | 575.40 | 400 | 217 |
| 7-Jun-11 | 0.25 | 20 | 8667.00 | 81.85 | 15.09 | 116.94 | 51961.00 | 386.10 | 312 | 232 |
| 8-Jun-11 | 0.25 | 21 | 8668.00 | 58.4 | 15.09 | 94.49 | 52393.00 | 432.00 | 312 | 187 |
| 9-Jun-11 | 0.25 | 22 | 8669.10 | 54.35 | 17.72 | 94.07 | 52873.30 | 480.30 | 336 | 187 |
| 10-Jun-11 | 0.25 | 23 | 8670.10 | 58.93 | 17.72 | 99.65 | 53316.80 | 443.50 | 323 | 198 |
| 11-Jun-11 | 0.25 | 23 | 8671.20 | 51.98 | 17.72 | 92.70 | 53810.20 | 493.40 | 341 | 184 |
| 12-Jun-11 | 0.25 | 23 | 8672.25 | [illegible] | 19.19 | 42.19 | 54285.00 | 474.80 | 282 | 84 |
| 13-Jun-11 | 0.25 | 23 | 8673.10 | 45.64 | 20.51 | 89.15 | 54673.20 | 388.20 | 265 | 177 |
| 14-Jun-11 | 0.25 | 23 | 8673.80 | 48 | 20.51 | 91.51 | 54996.60 | 323.40 | 255 | 182 |
| 15-Jun-11 | 0.25 | 23 | 8674.60 | 58.01 | 21.82 | 102.83 | 55368.80 | 372.00 | 290 | 204 |
| 16-Jun-11 | 0.50 | 68 | 8675.15 | 60.37 | 21.82 | 150.19 | 55625.65 | 257.05 | 280 | 298 |
| 17-Jun-11 | 0.50 | 68 | 8675.80 | 84.44 | 21.82 | 154.26 | 55931.80 | 306.15 | 309 | 306 |
| 18-Jun-11 | 0.50 | 68 | 8676.40 | 64.1 | 23.30 | 155.40 | 56216.00 | 284.20 | 299 | 308 |
| 19-Jun-11 | 0.50 | 68 | 8676.70 | 67.42 | 23.30 | 158.72 | 56358.50 | 142.50 | 231 | 315 |
| 20-Jun-11 | 0.50 | 68 | 8676.90 | 68.82 | 23.30 | 160.12 | 56453.50 | 95.00 | 208 | 318 |
| 21-Jun-11 | 0.50 | 69 | 8677.10 | 68.61 | 25.92 | 163.53 | 56548.80 | 95.30 | 212 | 324 |
| 22-Jun-11 | 0.50 | 69 | 8677.30 | [illegible] | 25.92 | 94.92 | 56644.40 | 95.60 | 143 | 188 |
| 23-Jun-11 | 0.50 | 69 | 8677.60 | 52.57 | 25.92 | 147.49 | 56787.80 | 143.40 | 220 | 293 |
| 24-Jun-11 | 0.50 | 69 | 8678.30 | 0 | 25.92 | 94.92 | 57123.60 | 335.80 | 264 | 188 |

| Date | Stilling basin Gauge Reading (ft.) | Discharge from stilling basin (Cusecs) | Lake Level (ft.) | Dischrge Through PH#1 (Cusecs) | Estimated Seepge (Cusecs) | Total Outflow (Cusecs) | Storage capacity (Acre Feet) | Increased/ Decreased In Water Storage (Acre Feet) | Calcul. Inflow (Cusecs) | Water Released Per Day (Acre Feet) |
|---|---|---|---|---|---|---|---|---|---|---|
| 25-Jun-11 | 0.25 | 69 | 8679.00 | 54.04 | 25.92 | 148.96 | 57461.00 | 337.40 | 319 | 295 |
| 26-Jun-11 | 0.25 | 69 | 8679.65 | 140.75 | 25.92 | 235.67 | 57776.90 | 315.90 | 395 | 467 |
| 27-Jun-11 | 0.00 | 0 | 8680.25 | 85.83 | 27.40 | 113.23 | 58069.25 | 292.35 | 261 | 225 |
| 28-Jun-11 | 0.00 | 0 | 8681.10 | 79.17 | 27.40 | 106.57 | 58485.30 | 416.05 | 316 | 211 |
| 29-Jun-11 | 0.00 | 0 | 8681.80 | 80.33 | 27.40 | 107.73 | 58830.40 | 345.10 | 282 | 214 |
| 30-Jun-11 | 0.00 | 0 | 8682.40 | 86 | 28.71 | 114.71 | 59127.40 | 297.00 | 264 | 228 |
| 1-Jul-11 | 0.00 | 0 | 8682.80 | 81.17 | 28.71 | 109.88 | 59325.80 | 198.40 | 210 | 218 |
| 2-Jul-11 | 0.00 | 0 | 8683.10 | 69.28 | 28.71 | 97.99 | 59474.70 | 148.90 | 173 | 194 |
| 3-Jul-11 | 0.00 | 0 | 8683.40 | 70.13 | 28.71 | 98.84 | 59623.80 | 149.10 | 174 | 196 |
| 4-Jul-11 | 0.00 | 0 | 8683.60 | 70.13 | 28.71 | 98.84 | 59723.20 | 99.40 | 149 | 196 |
| 5-Jul-11 | 0.00 | 0 | 8683.88 | 68.34 | 30.01 | 98.35 | 59862.36 | 139.16 | 169 | 195 |
| 6-Jul-11 | 0.00 | 0 | 8683.95 | 71.01 | 30.01 | 101.02 | 59897.15 | 34.79 | 119 | 200 |
| 7-Jul-11 | 0.00 | 0 | 8684.00 | 69.34 | 30.01 | 99.35 | 59922.00 | 24.85 | 112 | 197 |
| 8-Jul-11 | 0.00 | 0 | 8684.15 | 69.22 | 30.01 | 99.23 | 59997.15 | 75.15 | 137 | 197 |
| 9-Jul-11 | 0.00 | 0 | 8684.30 | 73.81 | 30.01 | 103.82 | 60072.30 | 75.15 | 142 | 206 |
| 10-Jul-11 | 0.00 | 0 | 8684.40 | 74.9 | 30.01 | 104.91 | 60122.40 | 50.10 | 130 | 208 |
| 11-Jul-11 | 0.00 | 0 | 8684.50 | 71.82 | 30.01 | 101.83 | 60172.50 | 50.10 | 127 | 202 |
| 12-Jul-11 | 0.00 | 0 | 8684.80 | 69.96 | 30.01 | 99.97 | 60222.60 | 50.10 | 125 | 198 |
| 13-Jul-11 | 0.00 | 0 | 8684.60 | 71.69 | 30.01 | 101.70 | 60247.65 | 25.05 | 114 | 202 |
| 14-Jul-11 | 0.00 | 0 | 8684.65 | 69.36 | 31.48 | 100.84 | 60297.75 | 50.10 | 126 | 200 |
| 15-Jul-11 | 0.00 | 0 | 8684.75 | 72.08 | 31.48 | 103.56 | 60297.75 | 0.00 | 104 | 205 |
| 16-Jul-11 | 0.00 | 0 | 8684.80 | 68.62 | 31.48 | 100.10 | 60322.80 | 25.05 | 113 | 199 |
| 17-Jul-11 | 0.00 | 0 | 8684.95 | 79.01 | 31.48 | 110.49 | 60397.95 | 75.15 | 148 | 219 |
| 18-Jul-11 | 0.00 | 0 | 8685.00 | 74.26 | 31.48 | 105.74 | 60423.00 | 25.05 | 118 | 210 |
| 19-Jul-11 | 0.00 | 0 | 8685.00 | 60.93 | 30.01 | 90.94 | 60423.00 | 0.00 | 91 | 180 |
| 20-Jul-11 | 0.00 | 0 | 8685.10 | 55.83 | 30.01 | 85.84 | 60473.50 | 50.50 | 111 | 170 |
| 21-Jul-11 | 0.00 | 0 | 8685.20 | 67.09 | 30.01 | 97.10 | 60524.00 | 50.50 | 123 | 193 |
| 22-Jul-11 | 0.00 | 0 | 8685.30 | 68.38 | 30.01 | 98.39 | 60574.50 | 50.50 | 124 | 195 |
| 23-Jul-11 | 0.00 | 0 | 8685.35 | 70.27 | 30.01 | 100.28 | 60599.75 | 25.25 | 113 | 199 |
| 24-Jul-11 | 0.00 | 0 | [illegible] | [illegible] | 30.01 | 30.01 | | -60599.75 | -30522 | 60 |
| 25-Jul-11 | 0.00 | 0 | 8685.50 | 70.25 | 30.01 | 100.26 | 60675.50 | 60675.50 | 30691 | 199 |
| 26-Jul-11 | 0.00 | 0 | 8685.70 | 65.7 | 30.01 | 95.71 | 80776.50 | 101.00 | 147 | 190 |
| 27-Jul-11 | 0.00 | 0 | 8685.00 | 73.46 | 30.01 | 103.47 | 60423.00 | -353.50 | -75 | 205 |
| 28-Jul-11 | 0.00 | 0 | 8685.85 | 74.61 | 31.48 | 106.09 | 60852.25 | 429.25 | 323 | 210 |
| 29-Jul-11 | 0.00 | 0 | 8686.10 | [illegible] | 31.48 | 31.48 | 60978.90 | 126.65 | 95 | 62 |
| 30-Jul-11 | 0.00 | 0 | [illegible] | [illegible] | 31.48 | 31.48 | | -60978.90 | -30712 | 62 |
| 31-Jul-11 | 0.00 | 0 | 8686.50 | 71.78 | 31.48 | 103.26 | 61182.50 | 61182.50 | 30949 | 205 |
| 1-Aug-11 | 0.00 | 0 | 8686.60 | 66.41 | 31.48 | 97.89 | 61233.40 | 50.90 | 124 | 194 |
| 2-Aug-11 | 0.00 | 0 | 8686.60 | 76.06 | 31.48 | 107.54 | 61233.40 | 0.00 | 108 | 213 |
| 3-Aug-11 | 0.00 | 0 | 8686.60 | 70.69 | 31.48 | 102.17 | 61233.40 | 0.00 | 102 | 203 |
| 4-Aug-11 | 0.00 | 0 | 8686.55 | 70.33 | 31.48 | 101.81 | 61207.95 | -25.45 | 89 | 202 |
| 5-Aug-11 | 0.00 | 0 | 8686.50 | 65.2 | 31.48 | 96.68 | 61182.50 | -25.45 | 84 | 192 |
| 6-Aug-11 | 0.00 | 0 | 8886.45 | 59.14 | 31.48 | 90.62 | 61157.05 | -25.45 | 78 | 180 |
| 7-Aug-11 | 0.00 | 0 | [illegible] | [illegible] | 31.48 | 31.48 | | -61157.05 | -30802 | 62 |
| 8-Aug-11 | 0.00 | 0 | 8686.60 | 60.8 | 31.48 | 92.28 | 61233.40 | 61233.40 | 30964 | 183 |
| 9-Aug-11 | 0.00 | 0 | 8686.95 | 63.81 | 31.48 | 95.29 | 61411.55 | 178.15 | 185 | 189 |
| 10-Aug-11 | 0.00 | 0 | 8687.20 | 45.3 | 31.48 | 76.78 | 61539.20 | 127.65 | 141 | 152 |
| 11-Aug-11 | 0.00 | 0 | 8687.35 | 62.76 | 31.48 | 94.24 | 61615.85 | 76.65 | 133 | 187 |
| 12-Aug-11 | 0.00 | 0 | 8687.40 | 76.81 | 31.48 | 108.29 | 61641.40 | 25.55 | 121 | 215 |
| 13-Aug-11 | 0.00 | 0 | 8687.50 | 69.41 | 31.48 | 100.89 | 61692.50 | 51.10 | 127 | 200 |
| 14-Aug-11 | 0.00 | 0 | [illegible] | [illegible] | 31.48 | 31.48 | | -61692.50 | -31072 | 62 |
| 15-Aug-11 | 0.00 | 0 | 8687.65 | 59.3 | 31.48 | 90.78 | 61769.15 | 61769.15 | 31233 | 180 |

| Date | Stilling basin Gauge Reading (ft.) | Discharge from Stilling basin (Cusecs) | Lake Level (ft.) | Dischrge Through PH#1 (Cusecs) | Estimated Seepge (Cusecs) | Total Outflow (Cusecs) | Storage Capacity (Acre Feet) | Increased/ Decreased in Water Storage (Acre Feet) | Calcul. Inflow (Cusecs) | Water Released Per Day (Acre Feet) |
|---|---|---|---|---|---|---|---|---|---|---|
| 16-Aug-11 | 0.00 | 0 | 8687.70 | 56.23 | 31.48 | 87.71 | 61794.70 | 25.55 | 101 | 174 |
| 17-Aug-11 | 0.00 | 0 | 8687.75 | 56.23 | 31.48 | 87.71 | 61820.25 | 25.55 | 101 | 174 |
| 18-Aug-11 | 0.00 | 0 | 8687.80 | 61.01 | 31.48 | 92.49 | 61845.80 | 25.55 | 105 | 183 |
| 19-Aug-11 | 0.00 | 0 | 8687.80 | 65.52 | 31.48 | 97.00 | 61845.80 | 0.00 | 97 | 192 |
| 20-Aug-11 | 0.00 | 0 | 8687.80 | 65.52 | 31.48 | 97.00 | 61845.80 | 0.00 | 97 | 192 |
| 21-Aug-11 | 0.00 | 0 | | | 31.48 | 31.48 | | -61845.80 | -31149 | 62 |
| 22-Aug-11 | 0.00 | 0 | 8687.75 | 60.8 | 31.48 | 92.28 | 61820.25 | 61820.25 | 31260 | 183 |
| 23-Aug-11 | 0.00 | 0 | 8687.70 | 58.73 | 31.48 | 90.21 | 61794.70 | -25.55 | 77 | 179 |
| 24-Aug-11 | 0.00 | 0 | 8687.65 | 52.29 | 31.48 | 83.77 | 61769.15 | -25.55 | 71 | 166 |
| 25-Aug-11 | 0.00 | 0 | 8687.65 | 54.96 | 31.48 | 86.44 | 61769.15 | 0.00 | 86 | 171 |
| 26-Aug-11 | 0.00 | 0 | 8687.60 | 57.29 | 31.48 | 88.77 | 61743.60 | -25.55 | 76 | 176 |
| 27-Aug-11 | 0.00 | 0 | 8687.60 | 50.12 | 31.48 | 81.60 | 61743.60 | 0.00 | 82 | 162 |
| 28-Aug-11 | 0.00 | 0 | 8687.60 | 44.85 | 31.48 | 76.33 | 61743.60 | 0.00 | 76 | 151 |
| 29-Aug-11 | 0.00 | 0 | | | 31.48 | 31.48 | | -61743.60 | -31098 | 62 |
| 30-Aug-11 | 0.00 | 0 | 8687.70 | 54.59 | 31.48 | 86.07 | 61794.70 | 61794.70 | 31241 | 171 |
| 31-Aug-11 | 0.00 | 0 | 8687.65 | 53.25 | 31.48 | 84.73 | 61769.15 | -25.55 | 72 | 168 |
| | | | | | | | | 16,731.15 | | 183,128.66 |
| | | | Total Inflow Quantity (Acre Feet) = | | | | | 199,860 | | |

# DRINKING WATER QUALITY ANALYSIS RESULTS

KSC

# Karakurum Scientific Consultants®

## Water Quality Testing Laboratory

Client Name: DESCON Skardu — Contact Person: Abdul Baqi, Chief Engineer
Sample Description: Source of Drinking Water at Chomik Skardu
Nature of Sample: Spring
Sample Collected by: Wazir Iftikhar — Sample receiving date: October 25, 2010
Sample Code: DCni-2 (10)/10 — Reporting date: November 18, 2010
Address for delivery of results: DESCON Engineering Company, Sadpara Dam Project Office, Satpara Road, Skardu Baltistan

Analytical Result

| Test Description | Sample Result | WHO Guideline Values (GVs) |
|---|---|---|
| **Microbiological** | | |
| 1. Total Coliform | 0/100 ml | 0/100 ml |
| 2. Escherichia coli (E.coli) | 0/100 ml | 0/100 ml |
| **Aesthetic & Physical** | | |
| 1. Color | Colorless | <15 TCU |
| 2. Odor | Odorless | Odorless |
| 3. Taste | Not tested | Tasteless |
| 4. Appearance | Clear (transparent) | Clear |
| 5. Turbidity | <0.2 NTU | <5 NTU |
| 6. pH | 7.5 | 6.5 - 8.5 |
| 7. E. Cond. | 420µS/cm | <1428 µS/cm |
| 8. Temperature | Not tested | NGVS |
| **Environmental Parameters** | | |
| 1. Biological Oxygen Demand (BODs) | | |
| 2. Chemical Oxygen Demand (COD) | | |
| 3. Total Suspended Solids (TSS) | | |
| **Chemical** | | |
| 1. Nitrate (N) | 3 mg/L | 10 mg/L |
| 2. TDS | 231 mg/L | <1000 mg/L |
| 3. Total Hardness (Calcium Carbonate) | 202 mg/L | 500 mg/L |
| 4. Calcium hardness | 57 mg/L | 75 mg/L |
| 5. Magnesium hardness | 15 mg/L | 150 mg/L |
| 6. Sulfate | 30 mg/L | NGVS |
| 7. Potassium | 30.2 mg/L | 250 mg/L |
| 8. Chlorides | 8 mg/L | 200 mg/L |
| 9. Sodium | 6 mg/L | 200 mg/L |
| 10. Carbonate | <5 mg/L | NGVs |
| 11. Bicarbonate | 167 mg/L | NGVs |
| 12. Total Alkalinity | 167 mg/L | NGVS |

*NGVS = No Guideline Values Set, E.Coli = Escherichia coli (an indicator pathogenic organism)*

Comments:
*The analytical results of sample found complying guidelines values for microbiological quality and standards for chemical quality as per recommended by World Health Organization (WHO).*

M. Abbas
Director

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KSC

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## Water Quality Testing Laboratory

Client Name: DESCON Skardu
Contact Person: Abdul Baqi, Chief Engineer
Sample Description: Source of Drinking Water Supply System/ Outlet Satpara Dam
Nature of Sample: Surface Water (Stream)
Sample Collected by: Wazir Iftikhar
Sample receiving date: October 25, 2010
Sample Code: DCN-1 (10)/10
Reporting date: November 18, 2010
Address for delivery of results: DESCON Engineering Company, Satpara Dam Project Office, Satpara Road, Skardu Baltistan

### Analytical Result

| Test Description | Sample Result | WHO Guideline Values (GVs) |
|---|---|---|
| **Microbiological** | | |
| 1. Total Coliform | 0/100 ml | 0/100 ml |
| 2. Escherichia coli (E.coli) | 0/100 ml | 0/100 ml |
| **Physical** | | |
| 1. Color | Colorless | <15 TCU |
| 2. Odor | Odorless | Odorless |
| 3. Taste | Not tested | Tasteless |
| 4. Appearance | Clear (transparent) | Clear |
| 5. Turbidity | <0.2 NTU | <5 NTU |
| 6. pH | 7.8 | 6.5 - 8.5 |
| 7. E. Cond. | 133µS/cm | <1428 µS/cm |
| 8. Temperature | Not tested | NGVS |
| **Chemical** | | |
| 1. Nitrate (N) | 0.5 mg/L | 10 mg/L |
| 2. TDS | 73 mg/L | <1000 mg/L |
| 3. Total Hardness (Calcium Carbonate) | 67 mg/L | 500 mg/L |
| 4. Calcium hardness | 17 mg/L | 75 mg/L |
| 5. Magnesium hardness | 6 mg/L | 150 mg/L |
| 6. Sulfate | 12mg/L | NGVS |
| 7. Potassium | 1.4 mg/L | 250 mg/L |
| 8. Chlorides | <2.0 mg/L | 250 mg/L |
| 9. Sodium | 2 mg/L | 200 mg/L |
| 10 Carbonate | <5 mg/L | NGVs |
| 11. Bicarbonate | 52 mg/L | NGVs |
| 12. Total Alkalinity | 52 mg/L | NGVS |

*NGVS = No Guideline Values Set, E.Coli = Escherichia coli (an indicator pathogenic organism)*

**Comments:**

*The analytical results of sample respect to microbiological and chemical quality found complying guidelines values recommended by world health organization (WHO) for drinking water. However one time sampling doc not represent the real situation for whole the year especially for surface water source. Therefore suggested to repeat the test during each season for whole the year.*

Nawab Ali Abbas
Director

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KSC

# Karakurum Scientific Consultants®

## Water Quality Testing Laboratory

Client Name: DESCON Skardu
Contact Person: Abdul Baqi, Chief Engineer
Sample Description: Sewage Effluent of DESCON staff colony
Nature of Sample: Waste Water Sample
Sample Collected by: Wazir Iftikhar
Sample Code: DCN-3 (10)/10
Sample receiving date: October 25, 2010
Reporting date: November 18, 2010
Address for delivery of results: DESCON Engineering Company, Sadpara Dam Project Office, Satpara Road, Skardu Baltistan

Analytical Result

| Test Description | Sample Result | WHO Guideline Values (GVs) |
|---|---|---|
| **Environmental Parameters** | | |
| 1. Biological Oxygen Demand (BODs) | 122 mg/L | 80 mg/L |
| 2. Chemical Oxygen Demand (COD) | 210 mg/L | 150 mg/L |
| 3. Total Suspended Solids (TSS) | 27.3 mg/L | <1000 mg/L |
| **Chemical** | | |
| 1. Nitrate (N) | - | 10 mg/L |
| 2. TDS | - | <1000 mg/L |
| 3. Total Hardness (Calcium Carbonate) | - | 500 mg/L |
| 4. Calcium hardness | - | 75 mg/L |
| 5. Magnesium hardness | - | 150 mg/L |
| 6. Sulfate | - | NGVS |
| 7. Potassium | - | 250 mg/L |
| 8. Chlorides | - | 200 mg/L |
| 9. Sodium | - | 200 mg/L |
| 10. Carbonate | - | NGVs |
| 11. Bicarbonate | - | NGVs |
| 12. Total Alkalinity | - | NGVS |
| 13. Nitrate (N) | - | 10 mg/L |

*NGVS = No Guideline Values Set, E.Coli = Escherichia coli (an indicator pathogenic organism)*

Comments:

1. The analytical result of water samples taken from the effluent discharge found out of guideline values recommended by world health organization (WHO) and NEQS.
2. There is need to improve the treatment process to ensure safe effluent discharge to the environment.

M. Abbas
Director

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ANNEXURE - 9

# NATIONAL DRINKING WATER QUALITY STANDARDS (DRAFT)

# National Drinking Water Quality Standards (Draft) [12]

| Properties/Parameters | Standard Values for Pakistan |
|---|---|
| **Bacterial** | |
| All water intended for drinking (e.Coli or Thermotolerant Coliform bacteria) | Must not be detectable in any 100 ml samples |
| Treated water entering the distribution system (E.Coli or thermotolerant coliform and total coliform bacteria) | Must not be detectable in any 100 ml samples |
| Treated water in the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria) | Must not be detectable in any 100 ml samples<br>In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12- month period |
| **Physical** | |
| Color | ≤15 TCU |
| Taste | Non objectionable/Accept able |
| Odor | Non objectionable/Accept able |
| Turbidity | ‹ 5 NTU |
| Total hardness as $CaCO_3$ | < 500 mg/l |
| TDS | ‹ 1000 |
| pH | 6.5 – 8.5 |
| **Chemical** | |
| ***Essential Inorganic*** | ***mg/Liter*** |
| Aluminum (Al) | ≤0.2 |
| Antimony (Sb) | ≤0.005 (P) |
| Arsenic (As) | ≤ 0.05 (P) |
| Barium (Ba) | 0.7 |
| Boron (B) | 0.3 |
| Cadmium (Cd) | 0.01 |
| Chloride (Cl) | <250 |
| Chromium (Cr) | ≤0.05 |
| Copper (Cu) | 2 |
| ***Toxic Inorganic*** | ***mg/liter*** |
| Cyanide (CN) | ≤0.05 |
| Fluoride (F)* | ≤1.5 |
| Lead (Pb) | ≤0.05 |
| Manganese (Mn) | ≤ 0.5 |
| Mercury (Hg) | ≤0.001 |
| Nickel (Ni) | ≤0.02 |

12 Full text of the Standards is available at the Pak-EPA website: (http://www.environment.gov.pk/info.htm).

| Properties/Parameters | Standard Values for Pakistan |
|---|---|
| Nitrate ($NO_3$)* | ≤50 |
| Nitrite ($NO_2$)* | ≤3 (P) |
| Selenium (Se) | 0.01 (P) |
| Residual chlorine | 0.2-0.5 at consumer end; 0.5-1.5 at source |
| Zinc (Zn) | 5.0 |
| Organic | |
| Pesticides mg/l | PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20- 58 may be consulted.** |
| Phenolic compound (as phenols) mg/l | |
| Polynuclear Aromatic hydrocarbon (as PAH) g/L | |
| Radioactive | |
| Alpha Emitters bq/L or pCi | 0.1 |
| Beta Emitters | 1 |

* indicates priority health related inorganic constituents which need regular monitoring.

** PSQCA: Pakistan Standards Quality Control Authority.

ANNEXURE - 10

# METEOROLOGICAL DATA

# Temperature Record January 2011

| Date | Max | Min | General waether Condition |
|---|---|---|---|
| 1-Jan-11 | 06 $^0$C | M 09 $^0$C | foggy |
| 2-Jan-11 | 07 $^0$C | M 10 $^0$C | partially cloudy |
| 3-Jan-11 | 06 $^0$C | M 11 $^0$C | fair and dry |
| 4-Jan-11 | 07 $^0$C | M 09 $^0$C | partially cloudy |
| 5-Jan-11 | 06 $^0$C | M 09 $^0$C | partially cloudy |
| 6-Jan-11 | 05 $^0$C | M 09 $^0$C | cloudy |
| 7-Jan-11 | 06 $^0$C | M 09 $^0$C | cloudy |
| 8-Jan-11 | 06 $^0$C | M 06 $^0$C | cloudy |
| 9-Jan-11 | 07 $^0$C | M 07 $^0$C | partially cloudy |
| 10-Jan-11 | 06 $^0$C | M 11 $^0$C | partially cloudy |
| 11-Jan-11 | 02 $^0$C | M 09 $^0$C | cloudy |
| 12-Jan-11 | 03 $^0$C | M 06 $^0$C | fog and cloudy |
| 13-Jan-11 | 06 $^0$C | M 07 $^0$C | cloudy |
| 14-Jan-11 | 03 $^0$C | M 06 $^0$C | overcast/cloudy |
| 15-Jan-11 | 04 $^0$C | M 03 $^0$C | cloudy and snowfall |
| 16-Jan-11 | 05 $^0$C | M 10 $^0$C | cloudy |
| 17-Jan-11 | 00 $^0$C | M 09 $^0$C | snowfall |
| 18-Jan-11 | 00 $^0$C | M 11 $^0$C | foggy |
| 19-Jan-11 | 04 $^0$C | M 11 $^0$C | cloudy |
| 20-Jan-11 | 02 $^0$C | M 12 $^0$C | cloudy |
| 21-Jan-11 | 03 $^0$C | M 09 $^0$C | cloudy |
| 22-Jan-11 | 07 $^0$C | M 08 $^0$C | partially cloudy |
| 23-Jan-11 | 05 $^0$C | M 08 $^0$C | partially cloudy |
| 24-Jan-11 | 07 $^0$C | M 10 $^0$C | partially cloudy |
| 25-Jan-11 | 06 $^0$C | M 11 $^0$C | partially cloudy |
| 26-Jan-11 | 06 $^0$C | M 11 $^0$C | fair and dry |
| 27-Jan-11 | 06 $^0$C | M 11 $^0$C | fair and dry |
| 28-Jan-11 | 05 $^0$C | M 10 $^0$C | cloudy |
| 29-Jan-11 | 03 $^0$C | M 07 $^0$C | snowfall |
| 30-Jan-11 | 05 $^0$C | M 04 $^0$C | cloudy |
| 31-Jan-11 | 04 $^0$C | M 07 $^0$C | cloudy |

# Temperature Record February 2011

| Date | Max | Min | General waether Condition |
|---|---|---|---|
| 1-Feb-11 | 08 $^0$C | M 04 $^0$C | cloudy |
| 2-Feb-11 | 09 $^0$C | M 04 $^0$C | cloudy |
| 3-Feb-11 | 09 $^0$C | M 04 $^0$C | cloudy |
| 4-Feb-11 | 07 $^0$C | M 02 $^0$C | driffle and rain fall |
| 5-Feb-11 | 11 $^0$C | 01 $^0$C | rainfall |
| 6-Feb-11 | 04 $^0$C | M 01 $^0$C | snowfall |
| 7-Feb-11 | 03 $^0$C | M 01 $^0$C | snowfall and rainfall |
| 8-Feb-11 | 05 $^0$C | M 09 $^0$C | partially cloudy |
| 9-Feb-11 | 03 $^0$C | M 11 $^0$C | cloudy |
| 10-Feb-11 | 04 $^0$C | M 10 $^0$C | partially cloudy |
| 11-Feb-11 | 06 $^0$C | M 09 $^0$C | cloudy |
| 12-Feb-11 | 05 $^0$C | M 04 $^0$C | snowfall |
| 13-Feb-11 | 05 $^0$C | M 01 $^0$C | snowfall |
| 14-Feb-11 | 03 $^0$C | M 01 $^0$C | rainfall |
| 15-Feb-11 | 07 $^0$C | M 03 $^0$C | cloudy |
| 16-Feb-11 | 06 $^0$C | M 03 $^0$C | cloudy |
| 17-Feb-11 | 05 $^0$C | M 06 $^0$C | partially cloudy |
| 18-Feb-11 | 07 $^0$C | M 04 $^0$C | partially cloudy |
| 19-Feb-11 | 04 $^0$C | M 03 $^0$C | cloudy |
| 20-Feb-11 | 06 $^0$C | M 02 $^0$C | cloudy |
| 21-Feb-11 | 08 $^0$C | M 03 $^0$C | cloudy |
| 22-Feb-11 | 07 $^0$C | M 02 $^0$C | cloudy /overcast |
| 23-Feb-11 | 05 $^0$C | M 02 $^0$C | snowfall |
| 24-Feb-11 | 06 $^0$C | M 03 $^0$C | cloudy |
| 25-Feb-11 | 07 $^0$C | M 02 $^0$C | cloudy |
| 26-Feb-11 | 05 $^0$C | M 01 $^0$C | cloudy |
| 27-Feb-11 | 08 $^0$C | M 03 $^0$C | cloudy |
| 28-Feb-11 | 06 $^0$C | M 03 $^0$C | cloudy |

# Temperature Record March 2011

| Date | Max | Min | General waether Condition |
|---|---|---|---|
| 1-Mar-11 | 08 $^0$C | M 02 $^0$C | Snow fall |
| 2-Mar-11 | 07 $^0$C | M 01 $^0$C | Snow fall |
| 3-Mar-11 | 09 $^0$C | M 01 $^0$C | Snow fall |
| 4-Mar-11 | 07 $^0$C | M 01 $^0$C | Snow fall |
| 5-Mar-11 | 07 $^0$C | M 03 $^0$C | cloudy wearther |
| 6-Mar-11 | 09 $^0$C | M 03 $^0$C | cloudy wearther |
| 7-Mar-11 | 10 $^0$C | 00 $^0$C | cloudy wearther |
| 8-Mar-11 | 13 $^0$C | 00 $^0$C | cloudy wearther |
| 9-Mar-11 | 13 $^0$C | 00 $^0$C | partially cloudy |
| 10-Mar-11 | 13 $^0$C | M 02 $^0$C | Dry |
| 11-Mar-11 | 12 $^0$C | M 01 $^0$C | dry |
| 12-Mar-11 | 14 $^0$C | M 02 $^0$C | partially cloudy |
| 13-Mar-11 | 14 $^0$C | M 02 $^0$C | partially cloudy |
| 14-Mar-11 | 15 $^0$C | M 01 $^0$C | Dry and fair |
| 15-Mar-11 | 17 $^0$C | M 01 $^0$C | partially cloudy |
| 16-Mar-11 | 17 $^0$C | 01 $^0$C | cloudy |
| 17-Mar-11 | 11 $^0$C | 03 $^0$C | cloudy and overcast |
| 18-Mar-11 | 18 $^0$C | 04 $^0$C | partially cloudy |
| 19-Mar-11 | 06 $^0$C | 04 $^0$C | rainfall |
| 20-Mar-11 | 10 $^0$C | 00 $^0$C | snow and rain fall |
| 21-Mar-11 | 12 $^0$C | 01 $^0$C | cloudy |
| 22-Mar-11 | 14 $^0$C | 01 $^0$C | partially cloudy |
| 23-Mar-11 | 16 $^0$C | 01 $^0$C | partially cloudy |
| 24-Mar-11 | 17 $^0$C | 04 $^0$C | partially cloudy |
| 25-Mar-11 | 18 $^0$C | 03 $^0$C | partially cloudy |
| 26-Mar-11 | 19 $^0$C | 03 $^0$C | fair and partially cloudy |
| 27-Mar-11 | 19 $^0$C | 05 $^0$C | partially cloudy |
| 28-Mar-11 | 11 $^0$C | 09 $^0$C | rainfall / drizzle |
| 29-Mar-11 | 17 $^0$C | 04 $^0$C | rainfall |
| 30-Mar-11 | 15 $^0$C | 07 $^0$C | cloudy |
| 31-Mar-11 | 17 $^0$C | 06 $^0$C | partially cloudy |

# Temperature Record April 2011

| Date | Max | Min | General waether Condition |
|---|---|---|---|
| 1-Apr-11 | 15 $^0$C | 07 $^0$C | Over cast to cloudy |
| 2-Apr-11 | 16 $^0$C | 06 $^0$C | cloudy wearther |
| 3-Apr-11 | 17 $^0$C | 04 $^0$C | Partially cloudy |
| 4-Apr-11 | 12 $^0$C | 03 $^0$C | cloudy to over cast |
| 5-Apr-11 | 13 $^0$C | 04 $^0$C | cloudy wearther |
| 6-Apr-11 | 12 $^0$C | 02 $^0$C | partially cloudy to over cast |
| 7-Apr-11 | 17 $^0$C | 01 $^0$C | fair weather |
| 8-Apr-11 | 17 $^0$C | 02 $^0$C | fair weather |
| 9-Apr-11 | 17 $^0$C | 01 $^0$C | cloudy wearther |
| 10-Apr-11 | 17 $^0$C | 03 $^0$C | cloudy wearther |
| 11-Apr-11 | 19 $^0$C | 07 $^0$C | cloudy and drizzling |
| 12-Apr-11 | 17 $^0$C | 06 $^0$C | Rainfall and over cast weather |
| 13-Apr-11 | 20 $^0$C | 06 $^0$C | cloudy wearther |
| 14-Apr-11 | 21 $^0$C | 05 $^0$C | partially cloudy and fair |
| 15-Apr-11 | 22 $^0$C | 07 $^0$C | fair to cloudy weather |
| 16-Apr-11 | 19 $^0$C | 08 $^0$C | over cast and cloudy weather |
| 17-Apr-11 | 15 $^0$C | 05 $^0$C | Rainfall and over cast weather |
| 18-Apr-11 | 18 $^0$C | 07 $^0$C | cloudy wearther |
| 19-Apr-11 | 19 $^0$C | 05 $^0$C | cloudy wearther |
| 20-Apr-11 | 16 $^0$C | 05 $^0$C | cloudy wearther |
| 21-Apr-11 | 21 $^0$C | 04 $^0$C | fair weather |
| 22-Apr-11 | 24 $^0$C | 04 $^0$C | Dry and Sunny |
| 23-Apr-11 | 25 $^0$C | 06 $^0$C | Dry and Sunny |
| 24-Apr-11 | 26 $^0$C | 06 $^0$C | Dry and Sunny |
| 25-Apr-11 | 27 $^0$C | 07 $^0$C | Dry and Sunny |
| 26-Apr-11 | 28 $^0$C | 09 $^0$C | Dry and Sunny |
| 27-Apr-11 | 28 $^0$C | 07 $^0$C | Dry and Sunny |
| 28-Apr-11 | 28 $^0$C | 08 $^0$C | partially cloudy |
| 29-Apr-11 | 25 $^0$C | 15 $^0$C | cloudy |
| 30-Apr-11 | 24 $^0$C | 13 $^0$C | cloudy wearther |

# Temperature Record May 2011

| Date | Max | Min | Rain Fall | General waether Condition |
|---|---|---|---|---|
| 1-May-11 | 26 $^0$C | 08 $^0$C | Total amounbt of rainfall during the month was = 14.9 mm | cloudy |
| 2-May-11 | 28 $^0$C | 07 $^0$C | | Fair |
| 3-May-11 | 29 $^0$C | 08 $^0$C | | Fair |
| 4-May-11 | 30 $^0$C | 09 $^0$C | | cloudy |
| 5-May-11 | 27 $^0$C | 07 $^0$C | | cloudy |
| 6-May-11 | 22 $^0$C | 13 $^0$C | | cloudy |
| 7-May-11 | 23 $^0$C | 12 $^0$C | | partially cloudy |
| 8-May-11 | 26 $^0$C | 09 $^0$C | | partially cloudy |
| 9-May-11 | 26 $^0$C | 10 $^0$C | | cloudy |
| 10-May-11 | 26 $^0$C | 11 $^0$C | | cloudy |
| 11-May-11 | 24 $^0$C | 09 $^0$C | | cloudy |
| 12-May-11 | 24 $^0$C | 09 $^0$C | | cloudy |
| 13-May-11 | 25 $^0$C | 08 $^0$C | | cloudy |
| 14-May-11 | 27 $^0$C | 07 $^0$C | | partially cloudy |
| 15-May-11 | 31 $^0$C | 09 $^0$C | | Fair |
| 16-May-11 | 33 $^0$C | 06 $^0$C | | Fair |
| 17-May-11 | 31 $^0$C | 08 $^0$C | | Fair |
| 18-May-11 | 31 $^0$C | 13 $^0$C | | Fair |
| 19-May-11 | 31 $^0$C | 14 $^0$C | | Fair |
| 20-May-11 | 25 $^0$C | 11 $^0$C | | cloudy |
| 21-May-11 | 17 $^0$C | 11 $^0$C | | cloudy |
| 22-May-11 | 22 $^0$C | 07 $^0$C | | cloudy |
| 23-May-11 | 28 $^0$C | 09 $^0$C | | partially cloudy |
| 24-May-11 | 28 $^0$C | 10 $^0$C | | partially cloudy |
| 25-May-11 | 29 $^0$C | 10 $^0$C | | Fair |
| 26-May-11 | 26 $^0$C | 13 $^0$C | | cloudy+rainfall |
| 27-May-11 | 22 $^0$C | 11 $^0$C | | cloudy+rainfall |
| 28-May-11 | 28 $^0$C | 11 $^0$C | | partially cloudy |
| 29-May-11 | 29 $^0$C | 10 $^0$C | | partially cloudy |
| 30-May-11 | 29 $^0$C | 11 $^0$C | | partially cloudy |
| 31-May-11 | 30 $^0$C | 11 $^0$C | | partially cloudy |

# Temperature Record June 2011

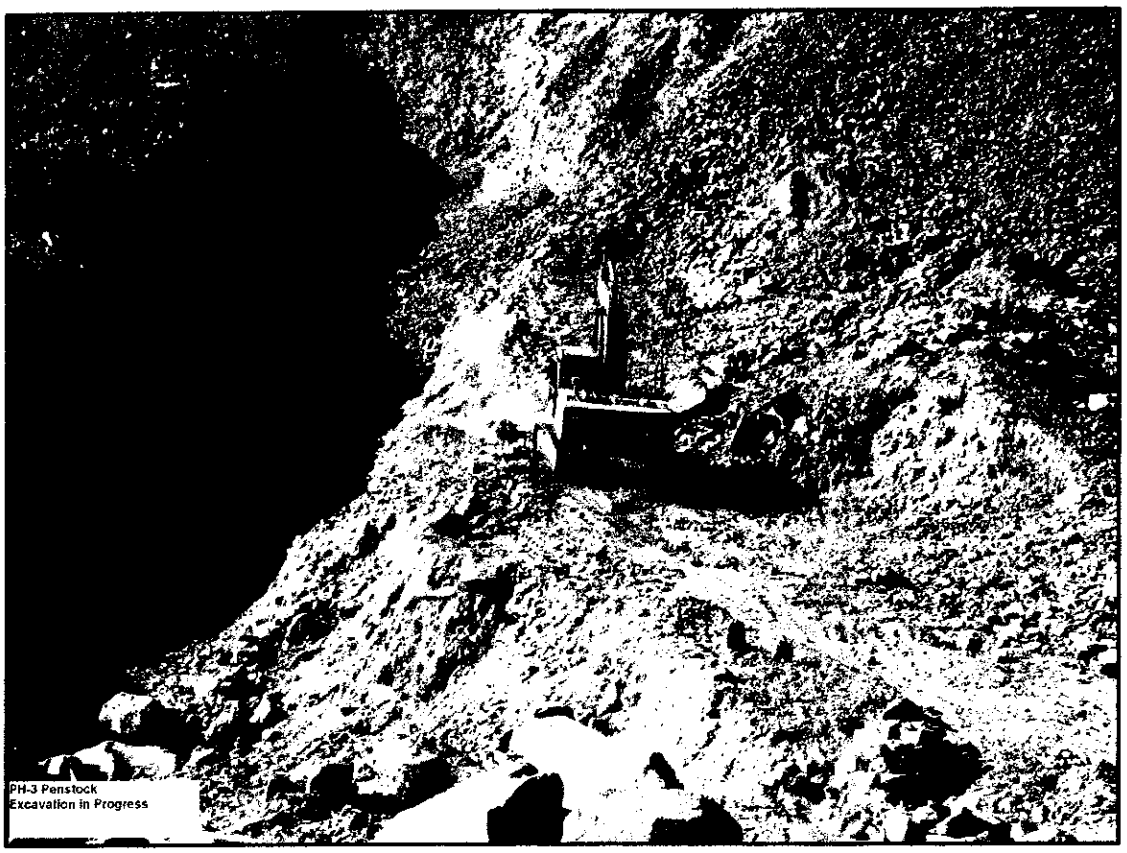
| Date | Max | Min | Rain fall | General waether Condition |
|---|---|---|---|---|
| 1-Jun-11 | 21 $^0$C | 14 $^0$C | Total amount of rainfall during the month = 09.0 mm | cloudy |
| 2-Jun-11 | 21 $^0$C | 10 $^0$C | | cloudy |
| 3-Jun-11 | 25 $^0$C | 09 $^0$C | | partially cloudy |
| 4-Jun-11 | 29 $^0$C | 09 $^0$C | | Fair |
| 5-Jun-11 | 29 $^0$C | 09 $^0$C | | Fair |
| 6-Jun-11 | 29 $^0$C | 11 $^0$C | | Fair |
| 7-Jun-11 | 31 $^0$C | 10 $^0$C | | Fair |
| 8-Jun-11 | 31 $^0$C | 12 $^0$C | | Fair |
| 9-Jun-11 | 31 $^0$C | 11 $^0$C | | Fair |
| 10-Jun-11 | 32 $^0$C | 11 $^0$C | | Fine & hot |
| 11-Jun-11 | 33 $^0$C | 14 $^0$C | | Fine & hot |
| 12-Jun-11 | 30 $^0$C | 17 $^0$C | | Fair |
| 13-Jun-11 | 29 $^0$C | 16 $^0$C | | partially cloudy |
| 14-Jun-11 | 30 $^0$C | 15 $^0$C | | Fair |
| 15-Jun-11 | 33 $^0$C | 12 $^0$C | | Fine & hot |
| 16-Jun-11 | 34 $^0$C | 13 $^0$C | | Fine & hot |
| 17-Jun-11 | 32 $^0$C | 15 $^0$C | | Fair |
| 18-Jun-11 | 28 $^0$C | 16 $^0$C | | partially cloudy |
| 19-Jun-11 | 31 $^0$C | 13 $^0$C | | Fair |
| 20-Jun-11 | 31 $^0$C | 15 $^0$C | | Fair |
| 21-Jun-11 | 35 $^0$C | 12 $^0$C | | Fine & hot |
| 22-Jun-11 | 35 $^0$C | 13 $^0$C | | Fine & hot |
| 23-Jun-11 | 32 $^0$C | 22 $^0$C | | Fair |
| 24-Jun-11 | 35 $^0$C | 20 $^0$C | | Fine & hot |
| 25-Jun-11 | 38 $^0$C | 15 $^0$C | | Fine & hot |
| 26-Jun-11 | 36 $^0$C | 18 $^0$C | | Fine & hot |
| 27-Jun-11 | 32 $^0$C | 22 $^0$C | | Fine & hot |
| 28-Jun-11 | 32 $^0$C | 16 $^0$C | | Fine & hot |
| 29-Jun-11 | 28 $^0$C | 14 $^0$C | | fair to cloudy |
| 30-Jun-11 | 28 $^0$C | 13 $^0$C | | fair to cloudy |

# Temperature Record July 2011

| Date | Max | Min | Rain Fall | General waether Condition |
|---|---|---|---|---|
| 1-Jul-11 | 27 $^0$C | 12 $^0$C | Total amount of rainfall during the month is = 08.3 mm | cloudy |
| 2-Jul-11 | 30 $^0$C | 18 $^0$C | | cloudy |
| 3-Jul-11 | 26 $^0$C | 11 $^0$C | | cloudy+rainfall |
| 4-Jul-11 | 28 $^0$C | 15 $^0$C | | cloudy+rainfall |
| 5-Jul-11 | 31 $^0$C | 12 $^0$C | | Fair |
| 6-Jul-11 | 34 $^0$C | 13 $^0$C | | Fine |
| 7-Jul-11 | 33 $^0$C | 13 $^0$C | | Fine |
| 8-Jul-11 | 23 $^0$C | 16 $^0$C | | cloudy+rainfall |
| 9-Jul-11 | 22 $^0$C | 15 $^0$C | | cloudy+rainfall |
| 10-Jul-11 | 24 $^0$C | 12 $^0$C | | cloudy+rainfall |
| 11-Jul-11 | 27 $^0$C | 14 $^0$C | | cloudy thuad&shower |
| 12-Jul-11 | 33 $^0$C | 11 $^0$C | | Fair |
| 13-Jul-11 | 37 $^0$C | 13 $^0$C | | Fine& hot |
| 14-Jul-11 | 36 $^0$C | 14 $^0$C | | Fine& hot |
| 15-Jul-11 | 27 $^0$C | 22 $^0$C | | cloudy |
| 16-Jul-11 | 23 $^0$C | 15 $^0$C | | cloudy+rainfall |
| 17-Jul-11 | 30 $^0$C | 12 $^0$C | | partially cloudy |
| 18-Jul-11 | 33 $^0$C | 15 $^0$C | | Fair |
| 19-Jul-11 | 30 $^0$C | 18 $^0$C | | partially cloudy |
| 20-Jul-11 | 33 $^0$C | 15 $^0$C | | Fair |
| 21-Jul-11 | 33 $^0$C | 18 $^0$C | | Fair |
| 22-Jul-11 | 34 $^0$C | 18 $^0$C | | Fine& hot |
| 23-Jul-11 | 37 $^0$C | 18 $^0$C | | Fine& hot |
| 24-Jul-11 | 36 $^0$C | 20 $^0$C | | fine to fair |
| 25-Jul-11 | 37 $^0$C | 18 $^0$C | | Fine& hot |
| 26-Jul-11 | 37 $^0$C | 19 $^0$C | | Fine& hot |
| 27-Jul-11 | 28 $^0$C | 17 $^0$C | | cloudy |
| 28-Jul-11 | 30 $^0$C | 16 $^0$C | | partially cloudy |
| 29-Jul-11 | 27 $^0$C | 16 $^0$C | | cloudy |
| 30-Jul-11 | 28 $^0$C | 15 $^0$C | | cloudy |
| 31-Jul-11 | 29 $^0$C | 13 $^0$C | | partially cloudy |

# Progress Photographs
## Contract Lot-1A: Dam & Powerhouse

# Progress Photographs
## Contract Lot-1A, Dam & Powerhouse



PH-3 Penstock
Excavation in Progress

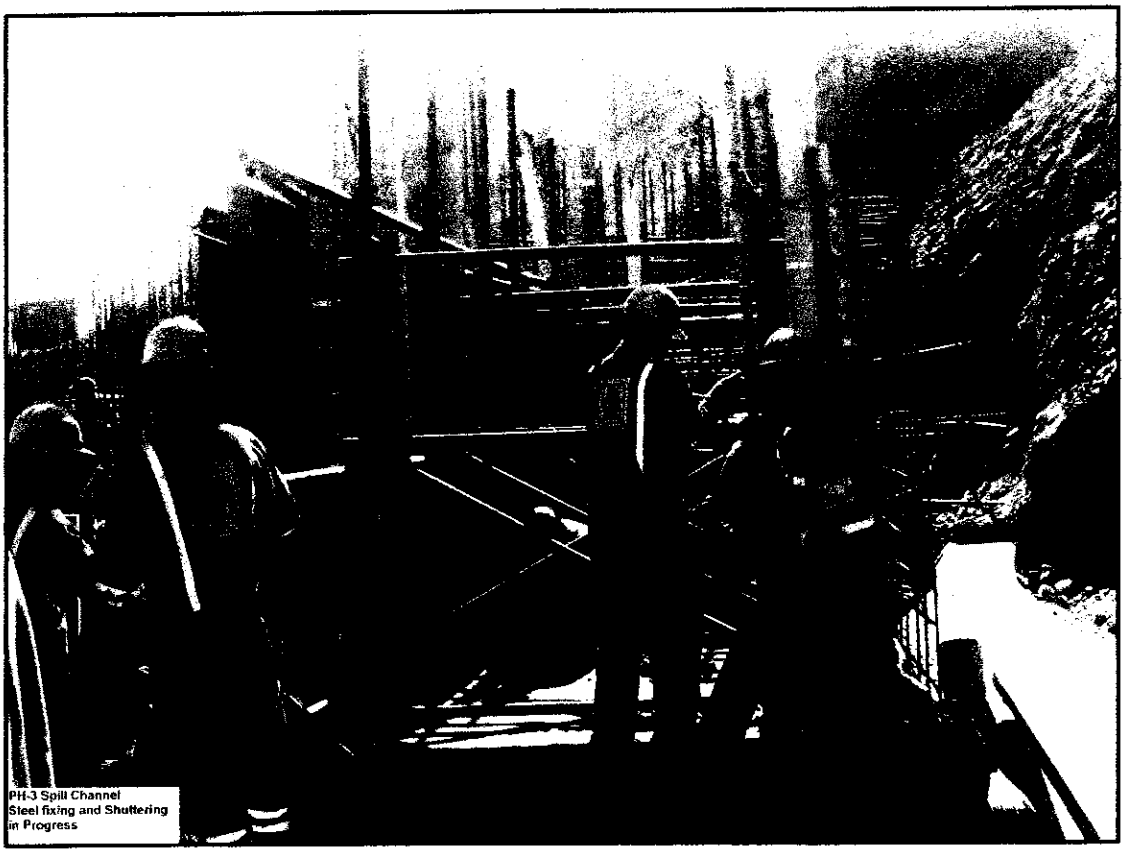
PH-3 Tailrace
Excavation in Progress

# Progress Photographs
## Contract Lot-1A, Dam & Powerhouse

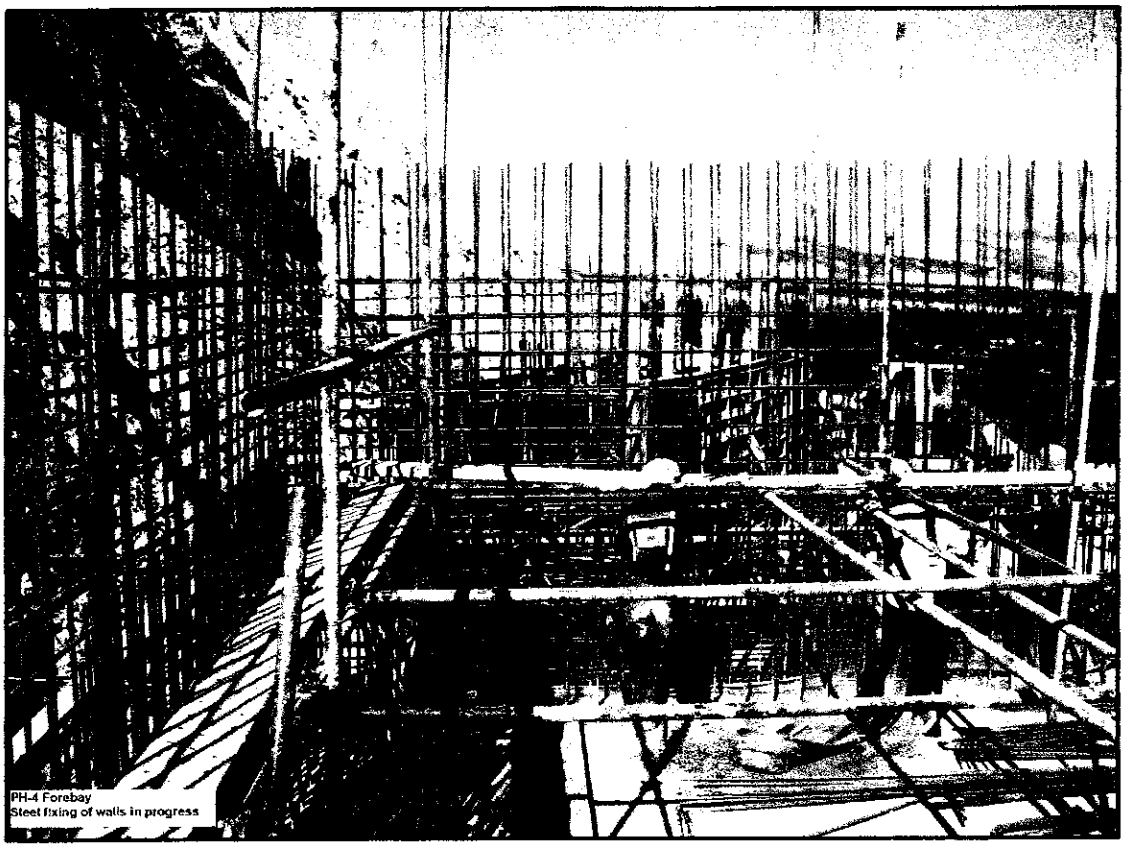
PH-4
Boulder Blasting in Progress

PH-4
Excavation completed
Ready for Earthing

# Progress Photographs
## Contract Lot-1A, Dam & Powerhouse

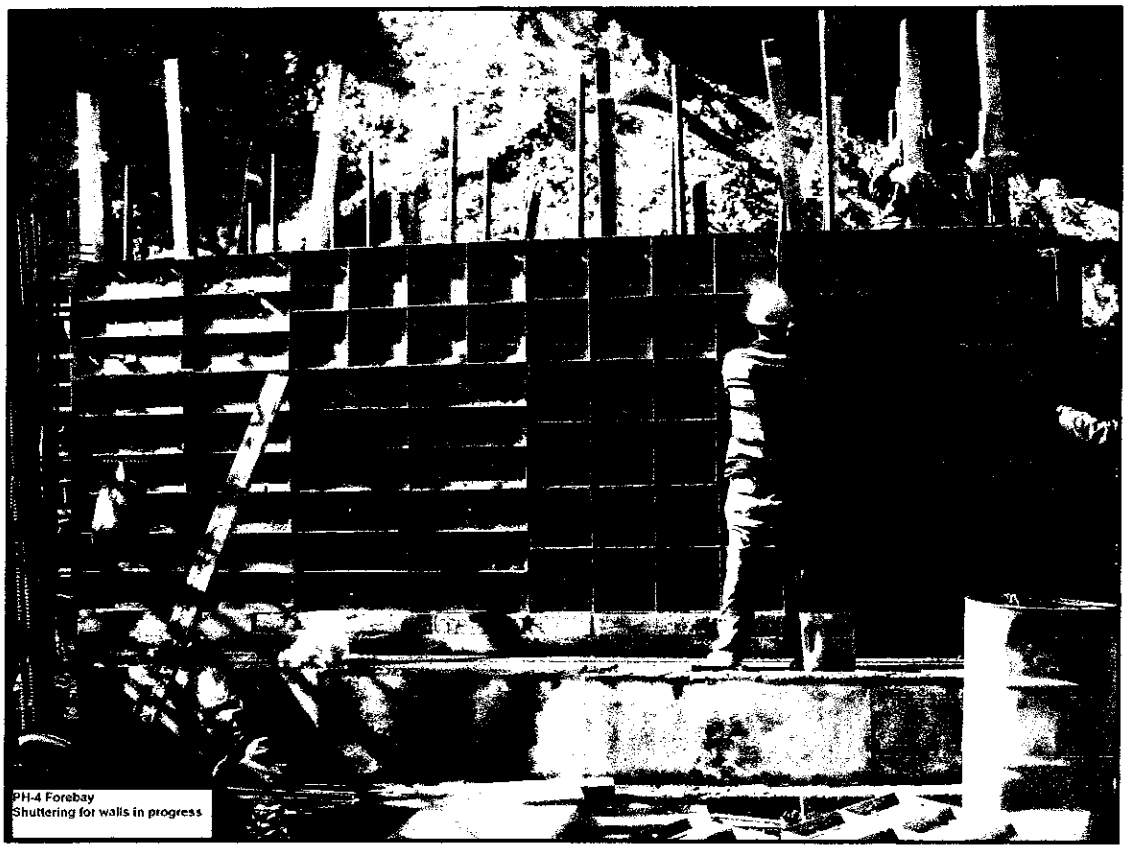


PH-3 Spill Channel
Steel fixing and Shuttering in Progress

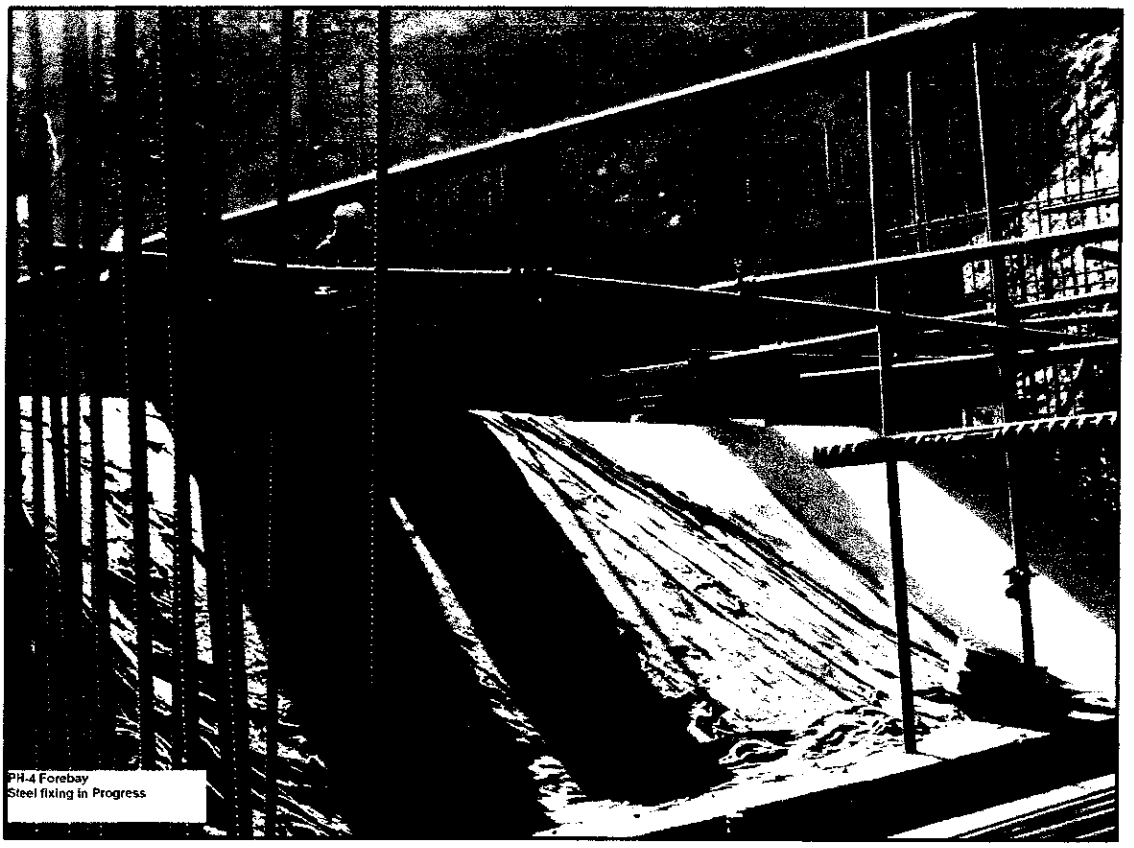


PH-4 Forebay
Steel fixing of walls in progress

# Progress Photographs
## Contract Lot-1A, Dam & Powerhouse



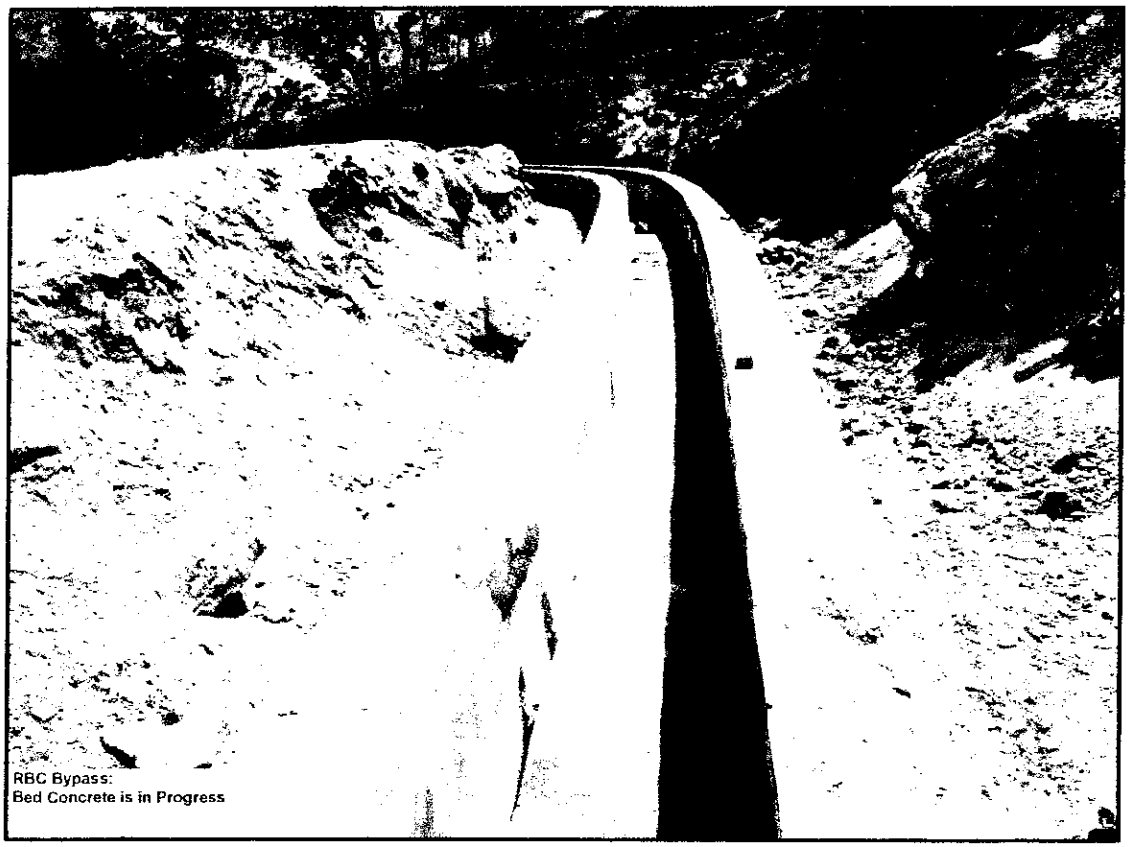
PH-4 Forebay
Shuttering for walls in progress



PH-4 Forebay
Steel fixing in Progress

# Progress Photographs
## Contract Lot-2: Irrigation System

# Progress Photographs
# Contract Lot-2, Irrigation System

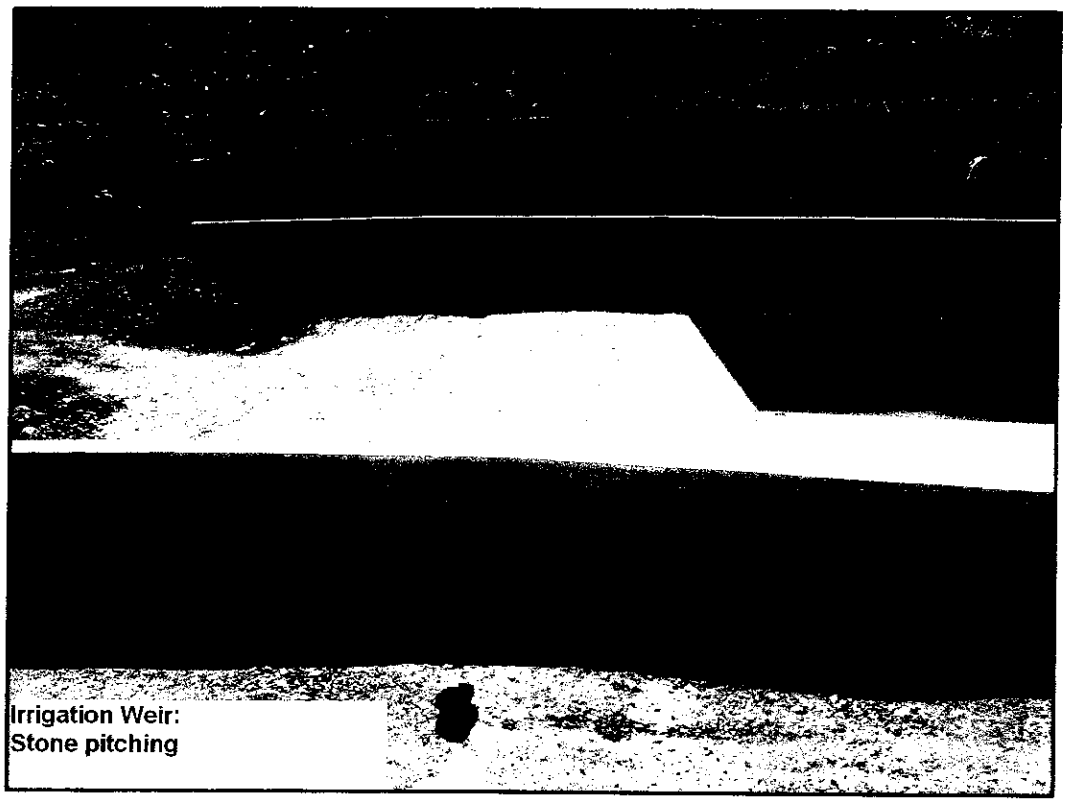


RBC Bypass:
Bed Concrete is in Progress

RBC Bypass:
Plaster Work Completed

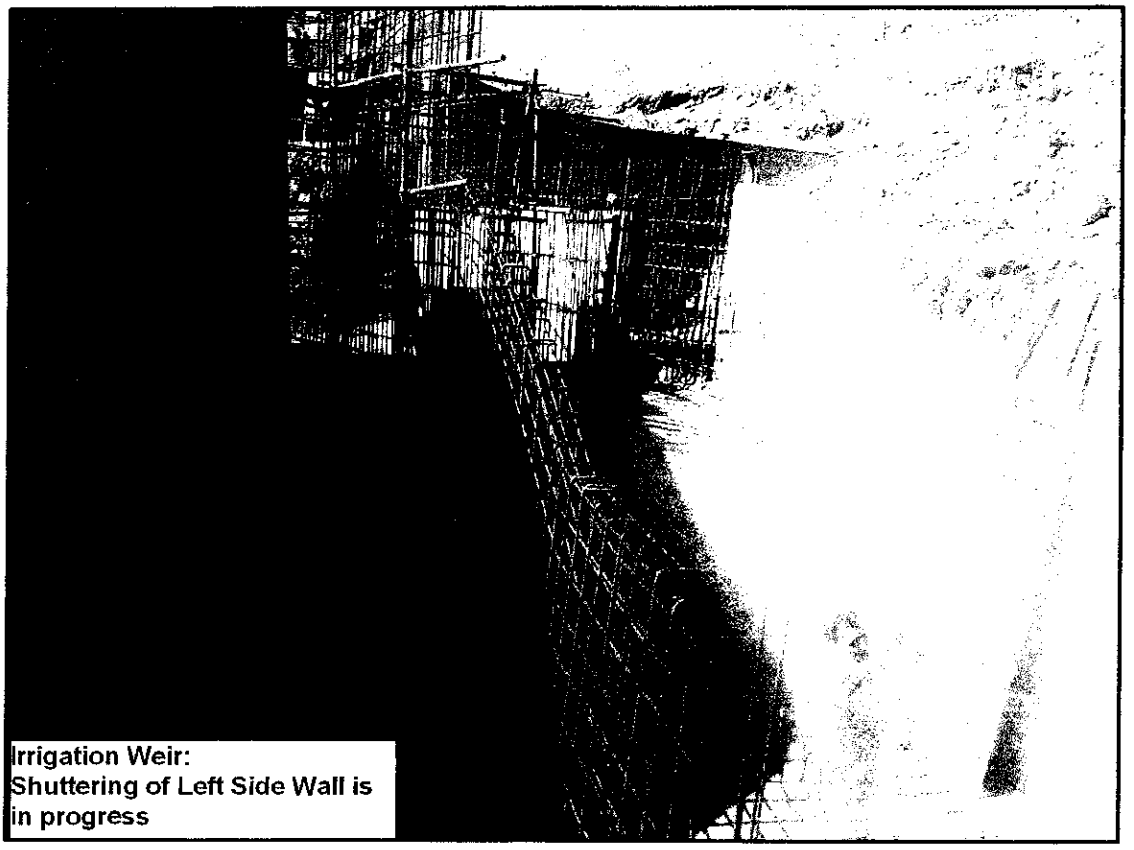
# Progress Photographs
## Contract Lot-2, Irrigation System

RBC
Copping in Progress

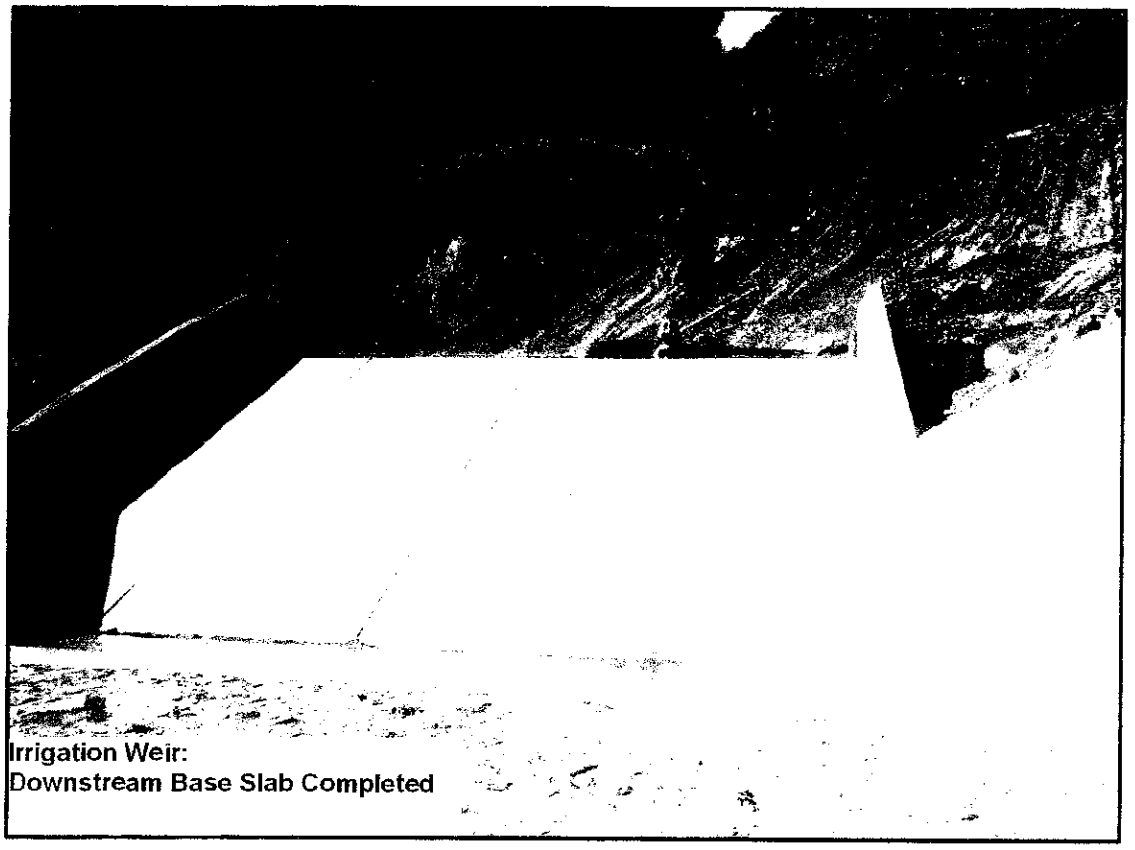


Irrigation Weir:
Stone pitching

# Progress Photographs
## Contract Lot-2, Irrigation System

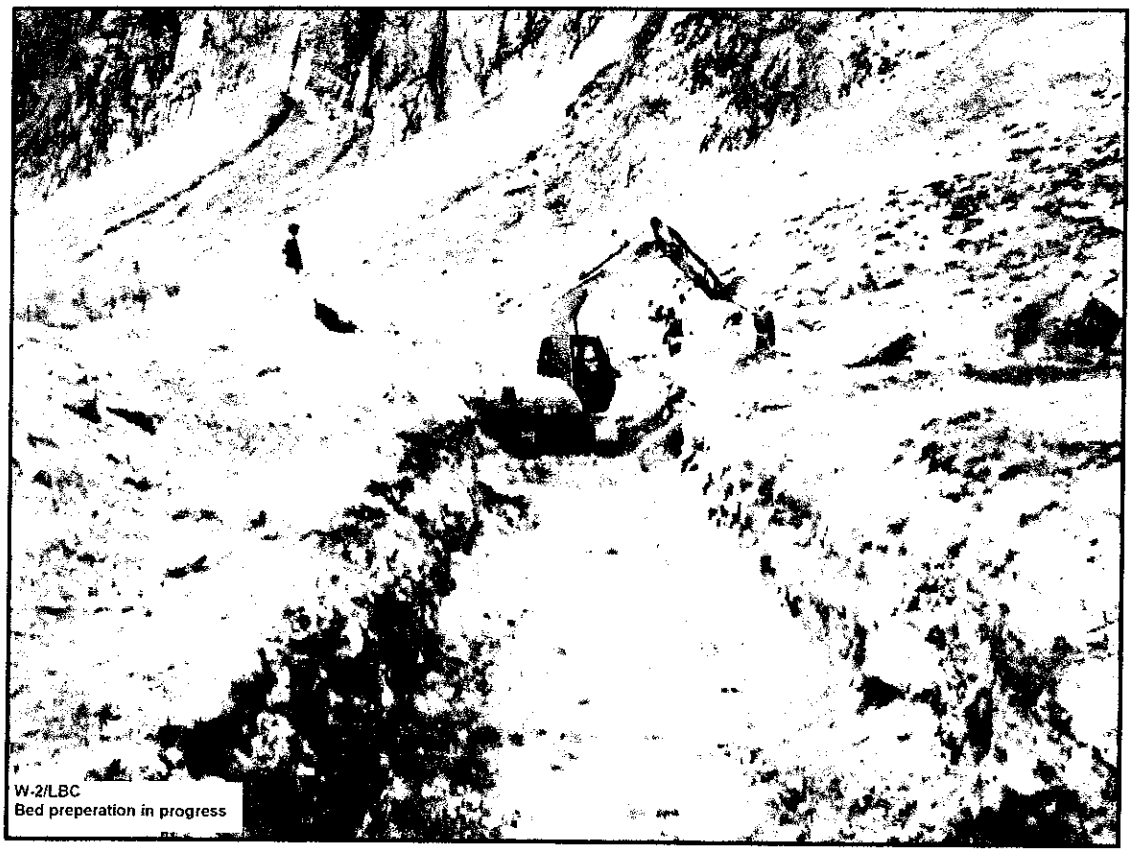


Irrigation Weir:
Shuttering of Left Side Wall is in progress



Irrigation Weir:
Downstream Base Slab Completed

# Progress Photographs
## Contract Lot-2, Irrigation System



W-2/LBC
Bed preperation in progress